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REPORT ON A
CONTAMINATION ASSESSMENT
AT
FORMER AGRICULTURAL PREMISES
EAUGATE ROAD
MOULTON EAUGATE
SPALDING
LINCOLNSHIRE

Report Reference C15587

On behalf of:

Woodgate Farms Limited

109 Eaugate Road,
Moulton Chapel
Spalding
PE12 0XJ

April 2022

C15587 Former Agricultural Premises, Eaugate Road, Moulton Eaugate, Spalding, Lincolnshire

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WOODGATE FARMS LIMITED

OGLESBY & LIMB LIMITED
ARCHITECTS

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INTRODUCTION

Ground Engineering Limited was instructed by the client, Woodgate Farms Limited, through Oglesby and Limb Architects, to carry out an intrusive soil contamination assessment beneath their farm premises on Eaugate Road, Moulton Eaugate, Spalding. The work is in preparation for the construction of a detached dwelling.

The scope of the site investigation comprised desk study research, and five window sample boreholes with laboratory chemical testing on recovered samples to determine the nature of the underlying soil.

This report provides the findings of the investigation and comments on the risk of soil contamination being present.

LOCATION, TOPOGRAPHY AND GEOLOGY OF THE SITE

The fenland site is located 8km to the south-east of Spalding and lies within the hamlet of Moulton Eaugate as shown in Figure 1. The National Grid Reference at the centre of the site is TF 2998 1673.

The site comprises an irregular polygonal shaped plot of land with four sides of lengths 70m, 90m, 55m and 45m. A belt of mature deciduous trees wraps around the southern, western and northern margins of the site and encloses a 40m long by 30m wide gravel/earth surfaced storage yard. Within the north-western corner of the yard was a 20m long by 13m wide agricultural shed with double height pitched roof. The roof and side cladding comprised what appeared to be cement bonded asbestos sheet materials.

Freshwater Drain runs along the eastern edge of the site alongside Eaugate Road. The site was surrounded by fenland fields and the nearest property comprised a dwelling some 0.5km to the north.

The site was flat and level and Eaugate Road, to the east, stands at about 3mOD.

The geological map at 1:50,000 scale, Sheet 145, and the BGS Geology of Britain viewer indicates the site to be directly underlain by sand/silt/clay Tidal Flat Deposits comprising the Terrington Beds and Barroway Drove Beds. The underlying solid geology is indicated to be the Oxford Clay Formation, which is expected to be present at depth.

SITE HISTORY

Research into the site history involved reference to historical Ordnance Survey (OS) maps, aerial photographs, and internet research. Selected extracts are presented in Appendix 1 and described below:

<i>OS Map Extract</i>	<i>Description</i>
1887 OS County Series Scale 1:10,560 Figure A	The site is shown to be occupied by a farmstead called Plover Hall comprising a collection of eight buildings including a water pump. Eaugate Road is located along the eastern side of the site and three small dwellings are located opposite the site. The site is surrounded by Moulton Fen and the next nearest dwelling comprises Snake Hall some 500m to the north.
1888 OS County Series Scale 1:2500 Figure B	A drain runs along the eastern side of the site parallel to Eaugate Road. A sluice and footbridge are shown crossing the drain from the north-east corner of the site. There is a small pond located about 110m to the north-east of the site.
1904 OS County Series Scale 1:2500 Figure C	The western end of the Plover Hall has been reconfigured resulting in the removal of one building and replacement with two new buildings, which extend to the west outside the development plot.
1938 OS County Series Scale 1:10,560 Figure D	The site and immediate surroundings appear as shown in the previous map.
1950 OS County Series Scale 1:10,560 Figure E	The site and immediate surroundings appear as shown in the previous map.
1959 OS Sheet TF21NE/31NW Scale 1:10,560 Figure G	The site and immediate surroundings appear as shown in the previous map.
1976 OS Sheet TF2916 Scale 1:2500 Figure G	Plover Hall has been demolished and replaced by two farm buildings. The pond located about 110m to the north-east of the site is no longer depicted.
1989 OS Sheet TF21NE Scale 1:10,000 Figure H	The site and immediate surroundings appear as shown in the previous map.

<i>OS Map Extract</i>	<i>Description</i>
1995 OS Sheet TF2916 Scale 1:2500 Figure I	The site and immediate surroundings appear as shown in the previous map.
2003 OS Sheet TF2916NE Scale 1:1250 Figure J	The site and immediate surroundings appear as shown in the previous map.
1999 Aerial Photograph On Page 12, Appendix 2	This shows the site to comprise an overgrown yard with two agricultural buildings and a belt of trees around the southern, western and northern site margins.
2007 Aerial Photograph On Page 11, Appendix 2	The smaller southern building is no longer present leaving the larger building in the north-western corner of the yard, which has been cleared of vegetation. The belt of trees remains unchanged.
2010 OS Sheet TF21NE Scale 1:10,000 Figure K	The site and immediate surroundings appear as shown in the previous aerial photograph.
2013 Aerial Photographs On Page 10, Appendix 2	Whilst there are some materials stored within the yard, the site appears as shown previously.
2018 Aerial Photographs On Page 8, Appendix 2	There are three vehicles parked within the yard.
2021 Google Street View September 2021	There are four caravans, two trailers, a vehicle, and a piece of agricultural machinery together with several pallets of bagged materials stored within the yard.
2022 OS Sheet TF21NE Scale 1:10,000 Figure R 2022 OS Mastermap On Page 13, Appendix 2	The site and immediate surroundings appear as shown in the previous map.

Historical Summary

The 1888 first edition of the OS County Series maps shows the site to have been developed with buildings belonging to a farmstead called Plover Hall. By 1904, the western end of the Plover Hall had been reconfigured resulting in the removal of one building and replacement with two new buildings, which extended to the west outside the development plot. The site remained as Plover Hall until the 1960s/1970s when it was demolished and replaced by two agricultural buildings. A belt of mature deciduous trees subsequently became established around the southern, western and northern margins of the site. The smaller of the two buildings was removed between 2003 and 2010 leaving the larger agricultural building to remain through to the present time in 2022.

SUMMARY OF ENVIRONMENTAL DATA

Appendix 2 contains information derived from Environmental Databases for a radius of up to 2000m from the site. The information covers datasets held by the Groundsure with contributors including the local authority, the Environment Agency, British Geological Survey, Ordnance Survey and the Coal Authority and the results, within a radius of 250m, are summarised below:

Historical Industrial Sites	On Site	0-50m	51 - 250m
Historical Industrial Land Uses	0	0	0
Historical Tanks	0	0	0
Historical Energy Features Database	0	0	0
Historical Petrol and Fuel Site Database	0	0	0
Historical Garages	0	0	0
Historical Military Land	0	0	0
Landfill and Other Waste Sites	On Site	0-50m	51 - 250m
Landfill Sites	0	0	0
Waste Sites	0	0	0
Current Industrial Land Uses	On Site	0-50m	51 - 250m
Recent Industrial Land Uses	0	0	0
Current or Recent Petrol Stations	0	0	0
Electricity Cables	0	0	0
Gas Pipelines	0	0	0
Sites Determined as Contaminated Land	0	0	0
Permits/Authorisations	0	0	0
Pollution Discharge	0	0	0
Dangerous Substances	0	0	0
Pollution Incidents	0	0	0
Pollutions Inventories	0	0	0
Hydrogeology	On Site	0-50m	51 - 250m
Superficial Aquifer	Identified (within 500m)		
Bedrock Aquifer	Identified (within 500m)		
Groundwater Vulnerability	Identified (within 50m)		
Groundwater Abstractions	0	0	0
Surface Water Abstractions	0	3	0
Potable Abstractions	0	0	0
Source Protection Zones	0	0	0
Hydrology	On Site	0-50m	51 - 250m
Water Network (OS MasterMap)	2	2	4
Surface Water Features	1	2	3

River and Coastal Flooding	On Site	0-50m	51 - 250m
Risk of Flooding from Rivers and Sea	Low (within 50m)		
Historical Flood Events	0	0	0
Flood Defences	0	0	0
Areas Benefiting from Flood Defences	0	0	0
Flood storage areas	0	0	0
Flood Zone 2	Identified (within 50m)		
Flood Zone 3	None (within 50m)		
Surface Water Flooding			
Surface Water Flooding	1 in 30 year, 0.3m-1.0m (within 50m)		
Groundwater Flooding			
Groundwater Flooding	Negligible (within 50m)		
Designated Environmentally Sensitive Sites	On Site	0-50m	51 - 250m
Environmentally sensitive sites	0	0	0
Natural Hazards			
Hazard			
Shrinking or Swelling Clay	Low (within 50m)		
Running Sand	Moderate (within 50m)		
Compressible Ground	Moderate (within 50m)		
Collapsible Deposits	Negligible (within 50m)		
Landslides	Very Low (within 50m)		
Ground Dissolution of Soluble Rocks	Negligible (within 50m)		
Mining, Ground Workings & Natural Cavities	On Site	0-50m	51 - 250m
Natural Cavities	0	0	0
Surface Ground Workings	0	0	0
Underground Mining	0	0	0
Radon			
The property is not in a Radon Affected Area, as less than 1% of properties are above the action level. The site lies within an area where no radon protection measures are necessary.			

Database Summary

There are no current or historical industrial land uses recorded for the site or within 250m. There are no landfill or waste sites within a 250m radius of the site. There are three historical surface water abstraction points from the Fresh Water Drain within 250m of the site.

The site and immediate surroundings are indicated to be directly underlain by Tidal Flat Deposits over the solid geology of the Oxford Clay Formation, which are both Unproductive in terms of aquifer classification.

The Freshwater Drain is noted along the eastern boundary of the site. There are a further six records relating to drainage ditches within 250m of the site.

The property is not in a Radon Affected Area, as less than 1% of properties are above the action level. The site lies within an area where no radon protection measures are necessary.

PRELIMINARY RISK ASSESSMENT

Potential sources of contamination present on or beneath the site would relate primarily to; the historical use of the site; possible damaged drainage; the presence of contaminated soil; and the potential presence of soil 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

<i>Contaminant Source</i>	<i>Comments</i>
Soil Beneath Site	Contamination may be present within any made ground materials on the site.
Soil Gas	Potential soil gas generated from Tidal Flat Deposits.
Ground Contamination Outside Site Boundary	Ground contamination migrating from adjoining sites.

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

<i>Human Receptor-Mechanism</i>	<i>Typical Exposure Pathway</i>
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

<i>Receptor-Water Environment</i>	<i>Typical Exposure Pathway</i>
The site and immediate surroundings are indicated to be directly underlain by Tidal Flat Deposits over the solid geology of the Oxford Clay Formation, which are both Unproductive in terms of aquifer classification.	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.
The Freshwater Drain is noted along the eastern boundary of the site. There are a further six records relating to drainage ditches within 250m 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 Proposed Development

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources		
		Soil Beneath Site	Soil Gas	Ground Contamination Outside Site Boundary
Human Health – site and ground workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low likelihood	Low likelihood	Low likelihood
Human Health – users of completed development	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low likelihood	Low likelihood	Low likelihood
Water Environment	Migration through ground into surface water or surrounding groundwater	Low likelihood	Low likelihood	Low likelihood
Flora	Vegetation on site growing on contaminated soil	Low likelihood	Unlikely	Unlikely
Building Materials	Contact with contaminated soil	Low likelihood	Unlikely	Unlikely
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.			
NA	Not Applicable			

SITE WORK

The site work was carried out on 10 February 2022. The works comprised five window sample boreholes (WS1 to WS5) at locations shown in Figure 2.

The exploratory hole records have been produced in accordance with British Standard BS5930:2015+A1:2020 ‘Code of Practice for Site Investigations’ and are given in Appendix 3. The records provide the descriptions and depths of the various strata encountered, details of standpipe installations, samples taken, and the groundwater conditions observed during excavation, boring and on completion. The results of hand vane testing have also been presented as applicable on the exploratory hole records.

Service plans were consulted and a cable avoidance tool (CAT) was used to check for the absence of buried services prior to boring.

Window Sample Boreholes (WS1 to WS5)

The window sample boreholes, WS1 to WS5, were started by the excavation, using hand tools, of service inspection pits to a depth of 1.20m in order to ensure the absence of buried services. Representative small disturbed samples of soil were taken from each starter pit.

The window sample boreholes were formed by a small track-mounted window sampling and super heavy dynamic probing rig and taken to a depth of 3.00m. The window sampling equipment consisted of drive-in sample tubes of specially constructed and strengthened steel, lined with a plastic core-liner. The barrels were initially of 87mm internal diameter and were reduced in diameter with successive barrels with increasing depth. Upon extraction, a continuous ‘undisturbed’ profile of the soil was obtained within the plastic liners.

On completion soil gas and groundwater monitoring installations were fitted into three of the boreholes to a depth of 3.00m. The installation comprised a standpipe fitted to 3.00m depth with a silica gravel surround to a depth of 1.00m. A bentonite seal was inserted between

0.50m and 1.00m depth, above which the tube was sealed by a gas valve and a surface protective cover was fixed in concrete.

Return Visits to Site

Three return visits to site were undertaken on 8, 15 and 22 April 2022 to monitor the standpipe installations (WS2, WS4 and WS5) for depth to groundwater and the concentrations of methane, carbon dioxide and oxygen. Measurement was carried out using a Gasdata GFM430, which also recorded the atmospheric pressure and flow rate. The monitoring results are presented on and following the borehole records in Appendix 3.

CHEMICAL LABORATORY TESTING

Selected soil samples were submitted to a UKAS Accredited Laboratory who carried out a suite of tests which encompassed 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'.

Tests were carried out to screen the samples for the following potential contaminants: total arsenic, total cadmium, total chromium, hexavalent chromium, total lead, total mercury, total selenium, water soluble boron, total copper, total nickel, total zinc, total cyanides, free cyanides, soluble sulphate, sulphides and pH-value, phenols and polyaromatic hydrocarbons (PAH), including benzo[a]pyrene, and petroleum hydrocarbons (TPH). Selected samples were also screened for asbestos.

The results of chemical testing are presented in Appendix 4.

GROUND CONDITIONS

The strata encountered in the exploratory holes comprised between about 0.20m and 1.00m thickness of made ground over Tidal Flat Deposits.

Made Ground

The boreholes encountered a surface layer made ground, which was present with a thickness between 0.50m and 1.00m. The made ground comprised dark brown and grey brown layers/mixtures of gravelly, silty sand; sandy, gravelly silt; clayey silt; and silty, sand and gravel. The gravel fraction comprised brick, macadam, ash, clinker, flint and quartzite.

Tidal Flat Deposits

The Tidal Flat Deposits were encountered below the made ground surface layer at depths between 0.30m and 0.50m, and comprised brown, orange brown and grey, very silty fine sand. Within WS3, WS4 and WS5 an upper layer of dark brown and brown fine sandy silt was encountered to depths of between 0.70m and 0.80m.

The boreholes were completed at a depth of 3.00m within the Tidal Flat Deposits.

Groundwater

Water seepages were encountered during boring between 2.20m and 3.00m depth. Standpipe water levels in WS2, WS4 and WS5 were recorded standing between 2.37m and 2.50m depth.

COMMENTS ON SOIL CHEMICAL TESTING

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

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

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

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

- Residential use with home grown produce
- Residential use without home grown produce
- Public Open Spaces Near Residential Housing

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 & 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 usage values are considered appropriately conservative screening values for the proposed housing development.

Table 5: Comparison of 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:			Measured 95 th Percentile (mg/kg)	Soil Screening Values (SSV) (1% SOM)			
				Residential with home grown produce	Residential without home grown produce	Public Open Spaces Near Residential Housing		Assessment Method	Residential with home grown produce (mg/kg)	Residential without home grown produce (mg/kg)	Public Open Spaces Near Residential Housing (mg/kg)
Organic matter	5	2.2%	7.8%	-	-	-		-	-	-	-
Arsenic	5	7.1	14	0	0	0	13.96	S4UL	37	40	79
Cadmium	5	<0.10	0.18	0	0	0	0.17	S4UL	11	85	120
Total Chromium	5	15	28	0	0	0	26.76	S4UL	910	910	1500
Hexavalent Chromium	5	<0.50	<0.50	0	0	0	<0.50	S4UL	6	6	7.7
Lead	5	19	150	0	0	0	133.31	C4SL	200	310	630
Mercury	5	<0.10	0.51	0	0	0	0.47	S4UL	11	15	40
Selenium	5	<0.20	0.31	0	0	0	0.30	S4UL	250	430	1100
Nickel	5	9.7	19	0	0	0	16.69	S4UL	130	180	230
Phenols	5	<0.10	<0.10	0	0	0	<0.10	S4UL	120	440	1300
Copper	5	14	26	0	0	0	27.00	S4UL	2400	7100	12,000
Zinc	5	58	120	0	0	0	107.61	S4UL	3700	40,000	81,000
Free Cyanide	5	7.3	16	0	0	0	14.14	ATRISK	34	34	34
Notes S4UL and C4SL for metals were derived using 6% SOM. These values are not sensitive to SOM and would also be applicable for 1% SOM and 2.5% SOM LQM/CIEH S4ULs 'Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3608. All rights reserved' ATRISKsoil SSVs produced by Atkins Limited and provided under licence to Ground Engineering Limited											

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:			Measured 95 th Percentile (mg/kg)	Soil Screening Values (SSV) (1% SOM)			
				Residential with home grown produce	Residential without home grown produce	Public Open Spaces Near Residential Housing		Assessment Method	Residential with home grown produce (mg/kg)	Residential without home grown produce (mg/kg)	Public Open Spaces Near Residential Housing (mg/kg)
Acenaphthene	5	<0.10	1.5	0	0	0	1.17	S4UL	210	3000	15,000
Acenaphthylene	5	<0.10	0.84	0	0	0	0.64	S4UL	170	2900	15,000
Anthracene	5	0.26	5.0	0	0	0	3.43	S4UL	2400	3100	74,000
Benzo[a]anthracene	5	0.85	15	1	1	0	10.16	S4UL	7.2	11	29
Benzo[a]pyrene	5	1.1	18	2	1	1	12.02	S4UL	2.2	3.2	5.7
Benzo[b]fluoranthene	5	1.3	21	2	1	1	14.04	S4UL	2.6	3.9	7.1
Benzo[g,h,i]perylene	5	<0.10	11	0	0	0	7.51	S4UL	320	360	640
Benzo[k]fluoranthene	5	0.53	8.7	0	0	0	5.82	S4UL	77	110	190
Chrysene	5	0.73	14	0	0	0	9.81	S4UL	15	30	57
Dibenzo[a,h]anthracene	5	<0.10	3.9	4	2	1	2.55	S4UL	0.24	0.31	0.57
Fluoranthene	5	1.6	31	0	0	0	21.12	S4UL	280	1500	3100
Fluorene	5	<0.10	1.0	0	0	0	0.86	S4UL	170	2800	9900
Indeno[1,2,3-cd]pyrene	5	<0.10	13	0	0	0	8.55	S4UL	27	45	82
Naphthalene	5	<0.10	6.1	4	4	0	4.88	S4UL	2.3	2.3	4900
Phenanthrene	5	0.52	14	0	0	0	10.49	S4UL	95	1300	3100
Pyrene	5	1.7	31	0	0	0	21.03	S4UL	620	3700	7400
Notes LQM/CIEH S4ULs 'Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3608. All rights reserved' ATRISKsoil SSVs produced by Atkins Limited and provided under licence to Ground Engineering Limited											

Table 3: Summary of Petroleum Hydrocarbon Test Results in Soil

Depth m	Concentration of Total Petroleum Hydrocarbons (TPH) in soil mg/kg (s) and water µg/l (w)				
	WS1	WS2	WS3	WS4	WS5
0.10		930			51
0.30	<10s			30	
0.60			78		
1.20	<10s	<10s	<10s	<10s	<10s
3.00	<10s	<10s	<10s	<10s	<10s

Discussion of Results

With the exception of polycyclic aromatic hydrocarbons (PAH), none of the determinand concentrations exceeded the respective SSV for residential with home grown produce, residential without home grown produce end use, or for public open spaces near residential housing usage. No asbestos was encountered in the screened samples.

The near surface made ground, which contained gravel of brick, siltstone, ash, clinker, flint and quartzite, was contaminated with elevated concentrations of benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, dibenzo[a,h]anthracene and naphthalene that exceeded the respective SSVs for residential with home grown produce and residential without home grown produce end use. Consequently, this near surface soil is considered unsuitable for reuse at the surface within any new landscaped and garden areas featuring within the proposed residential development.

No visual or olfactory evidence of petroleum fuel pollution was observed in the boreholes. The TPH laboratory results generally reflected this with concentrations of less than 10mg/kg. The TPH concentrations of 930mg/kg (WS2), 30mg/kg (WS4) and 51mg/kg (WS5), which were encountered within the near surface made ground, are attributable to the presence of ash, clinker and macadam rather than petroleum fuel.

SOIL GAS

Soil gas and water monitoring of the standpipes WS2, WS4 and WS5 was conducted on 8, 15 and 22 March 2022.

Concentrations of less than 0.1% by volume methane was encountered with carbon dioxide concentrations between 2.3% and 4.0% by volume. Oxygen levels of between 16.7% and 19.1% were measured.

The results indicate a Gas Screening Value (GSV) of 0.00011/hr for methane and 0.00401/hr for carbon dioxide.

The results fall into Characteristic Situation 1 as defined by BS8485:2015+A1:2019 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'.

UPDATED CONCEPTUAL MODEL

A generalised conceptual model, updated following the intrusive works, monitoring and testing, is presented below in Table 7 and follows the comparison of consequence against probability presented in CIRIA 552.

Table 7: Updated Conceptual Model & Risk Assessment Relative to Construction and Future Development

Source	Pathway	Receptor	Probability of risk being realised	Consequence of risk being realised	Risk Classification
Made Ground Soil Beneath Site	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Human Health Groundworkers	Likely	Minor	Low Risk
		Human Health Site Users if exposed at surface	Likely	Mild	Moderate/ Low Risk
		Human Health Site Users if present beneath permanent hardstanding/roads	Unlikely	Minor	Very Low Risk
	Migration through ground into surface water or groundwater	Water Environment	Unlikely	Minor	Very Low Risk
Natural Soil Beneath Site	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Human Health Groundworkers	Unlikely	Minor	Very Low Risk
		Human Health Site Users if exposed at surface	Unlikely	Minor	Very Low Risk
		Human Health Site Users if present beneath permanent hardstanding/roads	Unlikely	Minor	Very Low Risk
	Migration through ground into surface water or groundwater	Water Environment	Unlikely	Minor	Very Low Risk
Soil Gas	Inhalation of Soil Gas	Human Health Groundworkers	Unlikely	Minor	Very Low Risk
		Human Health Site Users	Unlikely	Minor	Very Low Risk

Source	Pathway	Receptor	Probability of risk being realised	Consequence of risk being realised	Risk Classification
Ground Contamination Outside Site boundary	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Human Health Groundworkers	Unlikely	Minor	Very Low Risk
		Human Health Site Users	Unlikely	Minor	Very Low Risk
	Migration through ground into surface water or groundwater	Water Environment	Unlikely	Minor	Very Low Risk

Key to Table 7 Risk	Definition
Very High risk	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 risk	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 risk	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 risk	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 risk	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.

COMMENTS ON GROUND CONTAMINATION IN RELATION TO PROPOSED RESIDENTIAL REDEVELOPMENT

The ground investigation works have been carried out in advance of proposed residential development scheduled to comprise a single dwelling.

This investigation may not have revealed the full depth or extent of made ground or contamination on the site and appropriate professional advice should be sought if subsequent site works reveal materials that appear to be contaminated.

Anticipated exposure scenarios relating to the site and future use, in the context of the conceptual model, are discussed as follows.

Contamination Risk - Near Surface Soil

The near surface made ground, which contained gravel of brick, siltstone, ash, clinker, flint and quartzite, was contaminated with elevated PAH concentrations that exceeded the respective SSVs for residential with home grown produce and residential without home grown produce end use. Consequently, this made ground soil is considered unsuitable for re-use at the surface within any new landscaped and garden areas featuring within the proposed residential development.

Human Health - Construction Workers

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).

For the protection of these 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 – Residential Usage

It should be noted that this investigation may not have revealed the full depth or extent of made ground or contamination on the site and appropriate professional advice should be sought if subsequent site works reveal materials that appear to be contaminated.

Due to the presence of elevated PAH concentrations within the 0.50m to 1.00m thick surface layer of made ground, this soil is considered unsuitable for re-use at the surface within any new landscaped and garden areas featuring within the proposed residential development.

The underlying natural soils are however considered suitable for use within the proposed residential development.

Unsuitable soil at the surface within gardens or landscaped areas should be replaced with a suitably thick, clean capping layer.

- For residential garden areas it would be recommended that the underlying natural ground be exposed, or in deeper areas the unsuitable made ground should be removed to a minimum depth of 1.00m and replaced with an equivalent thickness of clean inert soil.

All garden and landscaped areas should be inspected prior to final capping to ensure that unsuitable materials have not been inadvertently placed in the garden or landscaped areas during the preceding stages of redevelopment works.

All imported soils will be certified 'clean' fill and should be suitable for use in accordance with UK legislation and Environment Agency policy.

Methane and Carbon Dioxide Soil Gas

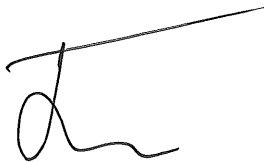
According to database information, there are no landfills within 250m of the site and the composition of the underlying natural soil would suggest a very low hazard potential. The soil gas monitoring results fall into Characteristic Situation 1 (very low risk) as defined by BS8485:2015+A1:2019 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'.

In conclusion, gas protection measures are not considered necessary in relation to methane and carbon dioxide soil gases.

Off-Site Disposal of Soil Arisings

The results of chemical analysis are provided in Appendix 4 and can be used within the suite of information necessary for basic characterisation of the soil destined for 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 and 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.

The clean arisings from the underlying natural soils, excluding peat and topsoil, across this site should fall under the EWC code 17 05 04 inert category.

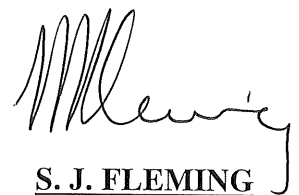


J. H. GIBB

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Senior Geo-Environmental Engineer

GROUND ENGINEERING LIMITED



S. J. FLEMING

M.Sc., M.C.S.M., C.Geol., F.G.S.

Director

Figures

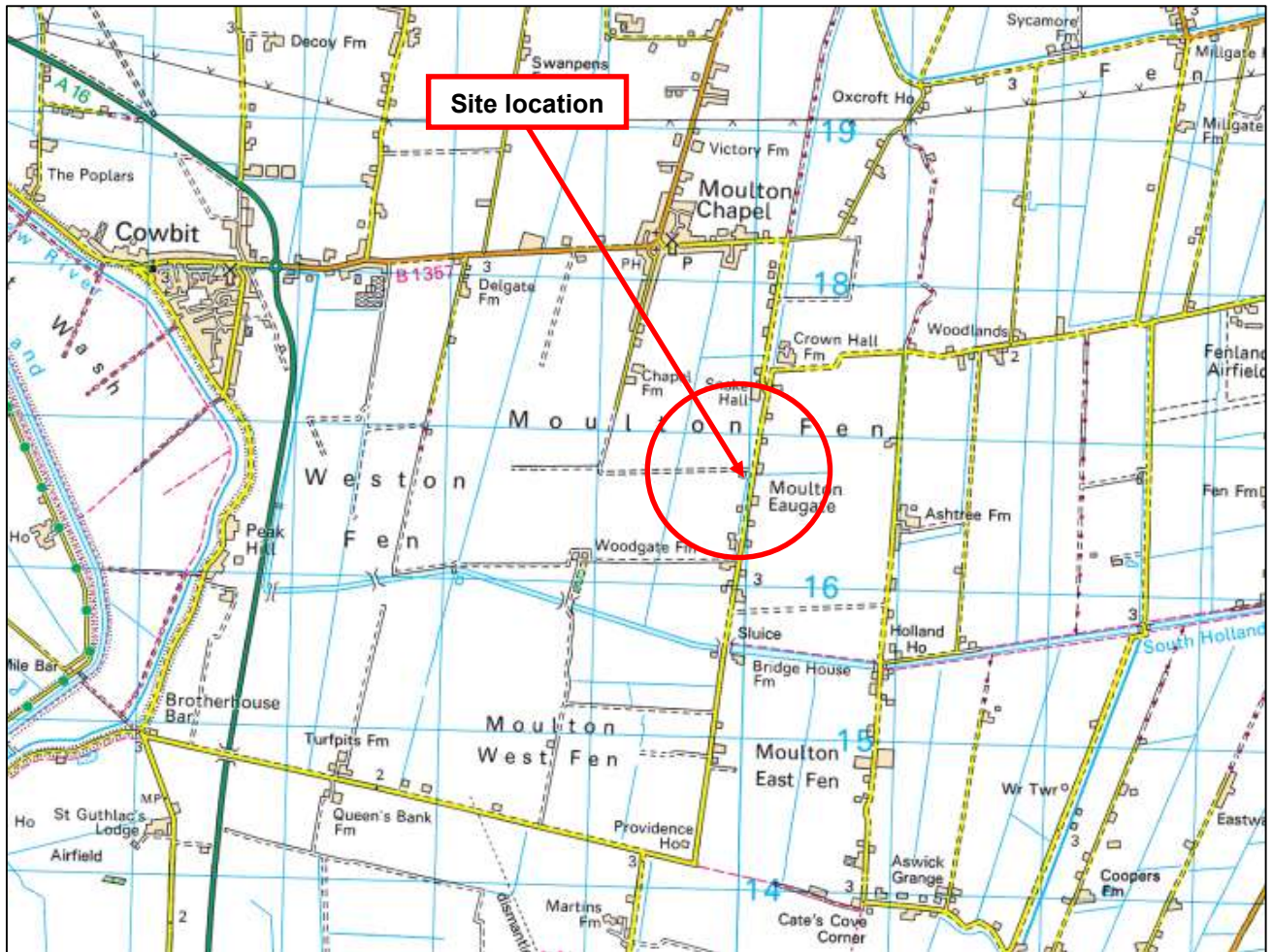
Figure 1: Site Location Plan

Figure 2: Exploratory Hole Location Plan

Site Location Plan

Figure 1

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Client : Woodgate Farms Limited

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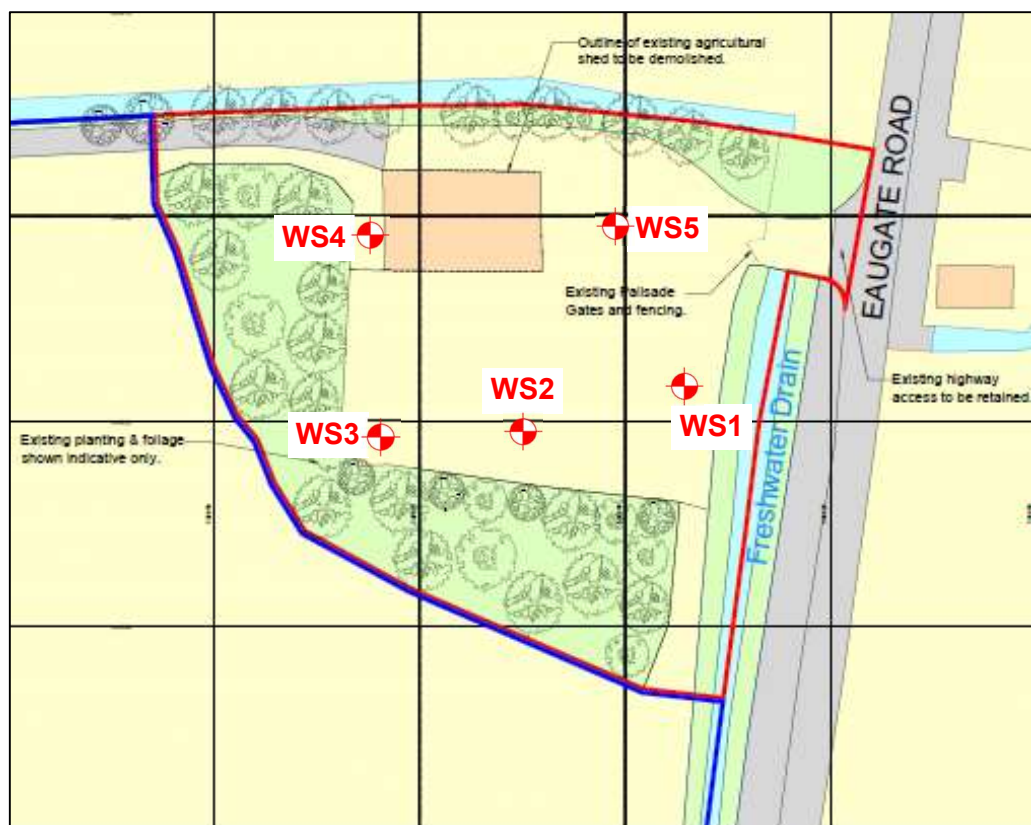
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Exploratory Hole Location Plan

Figure 2



Scale

30m

KEY



Boreholes WS1 to WS5

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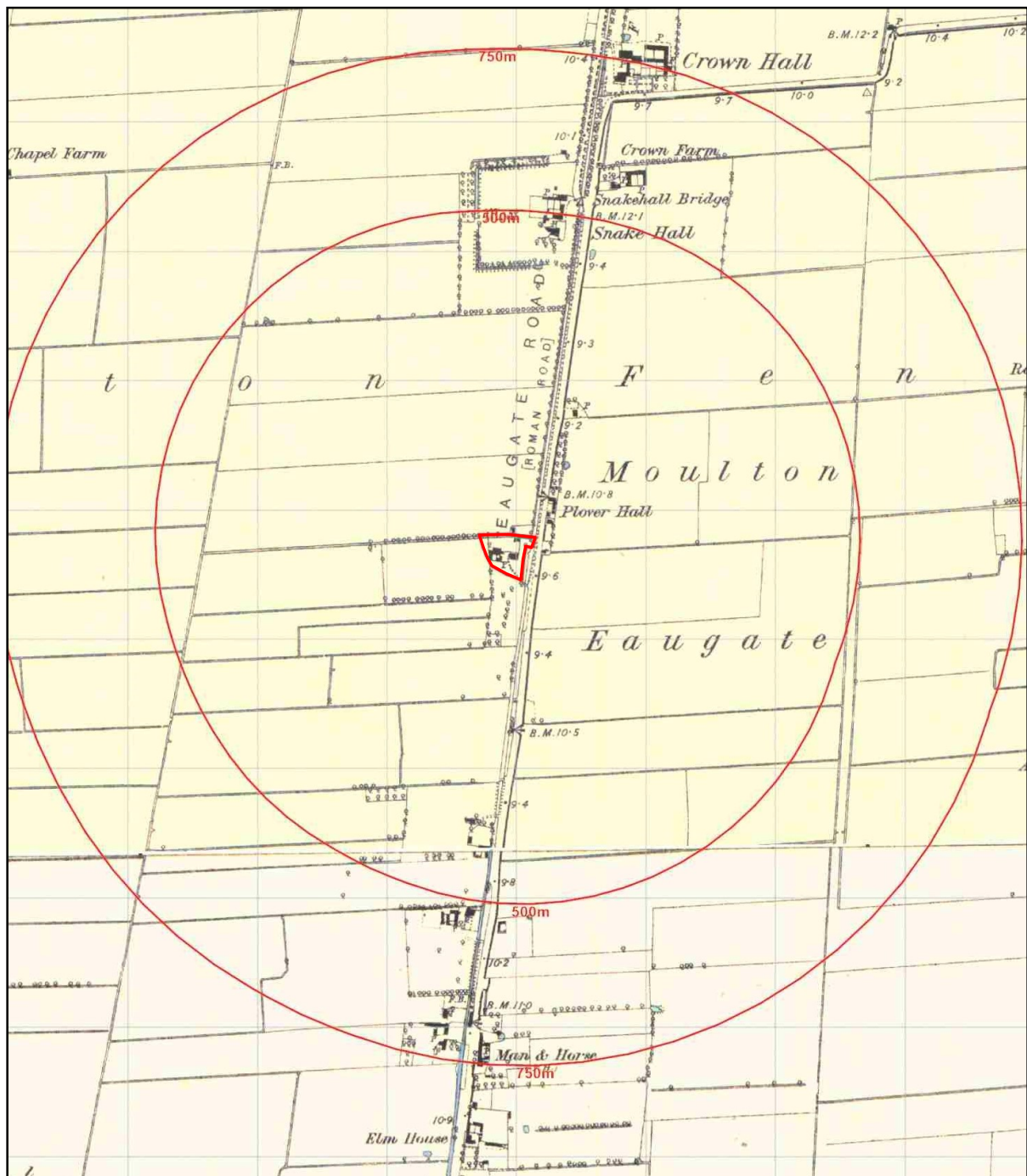
Appendix 1

Historical Maps

Site History

Figure A

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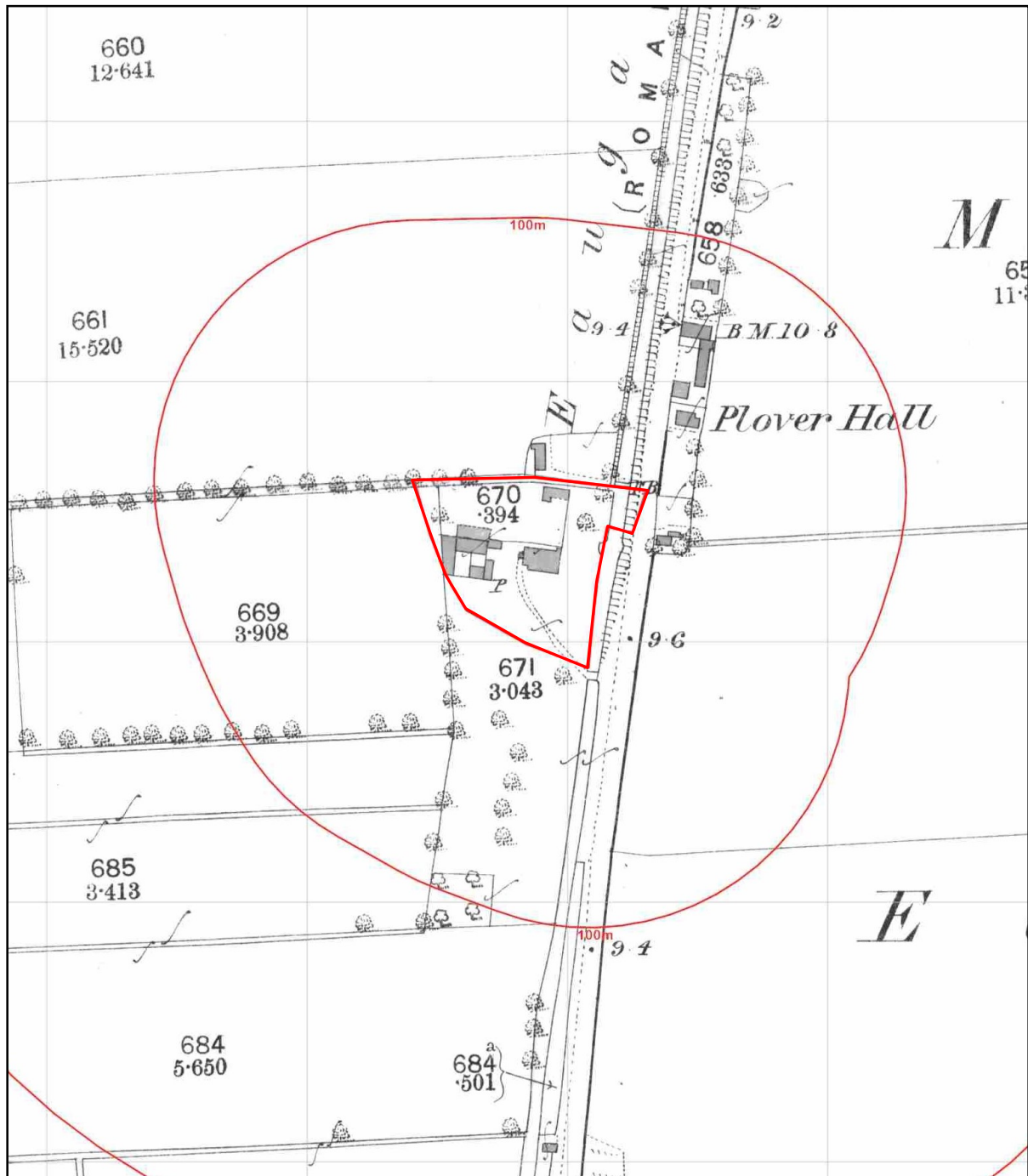
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Site History

Figure B

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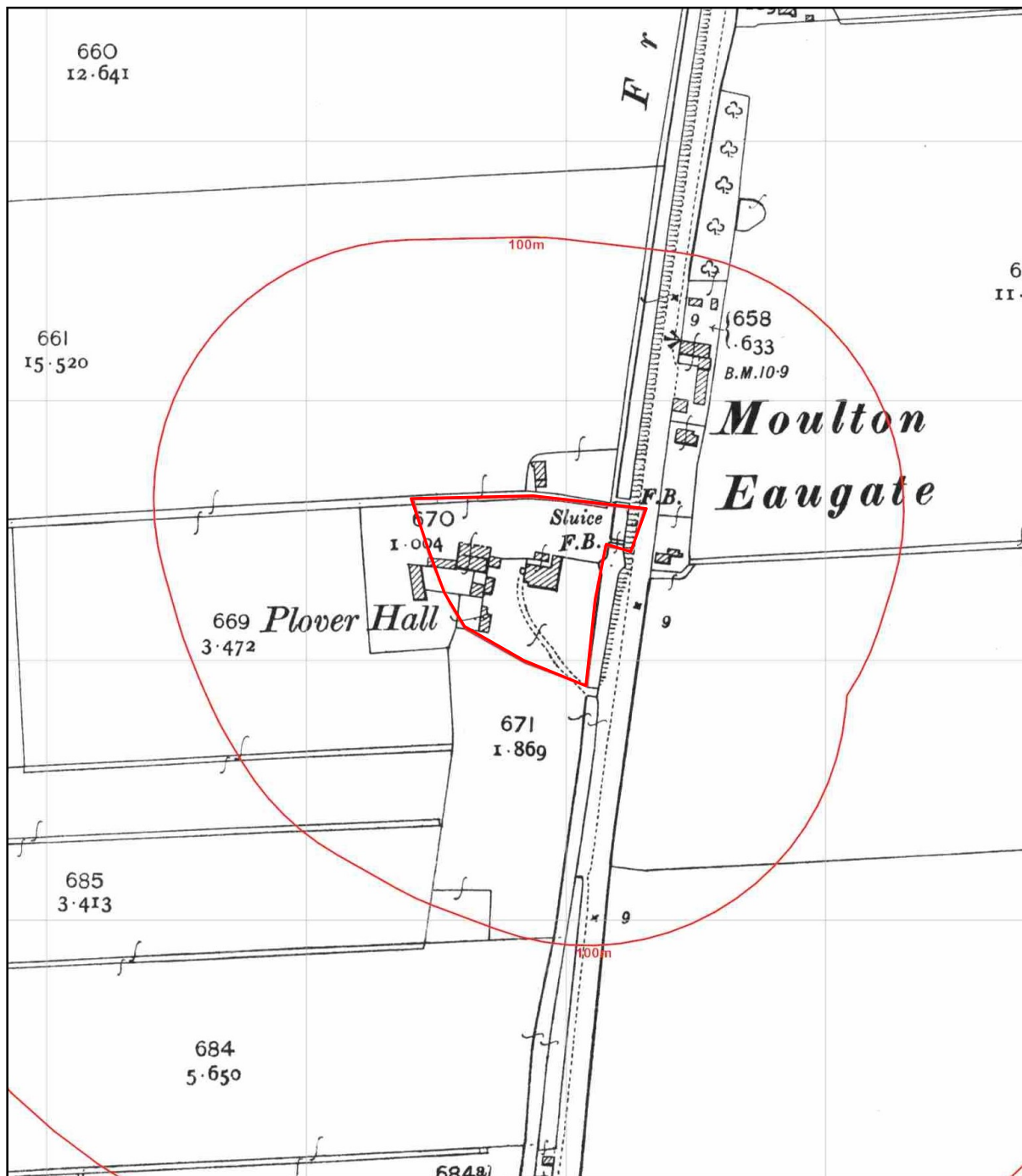
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Figure C

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Figure D

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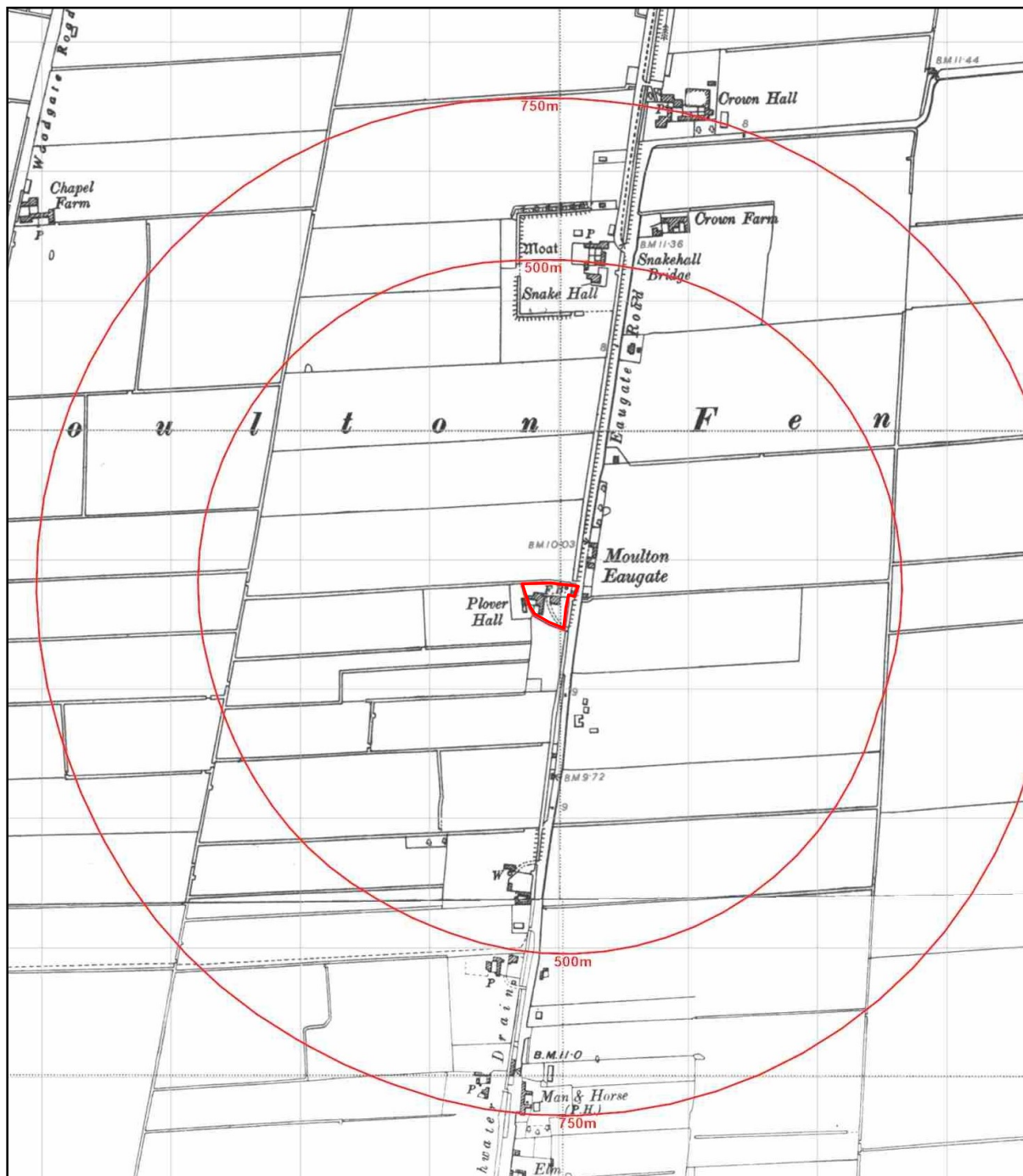
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Figure E

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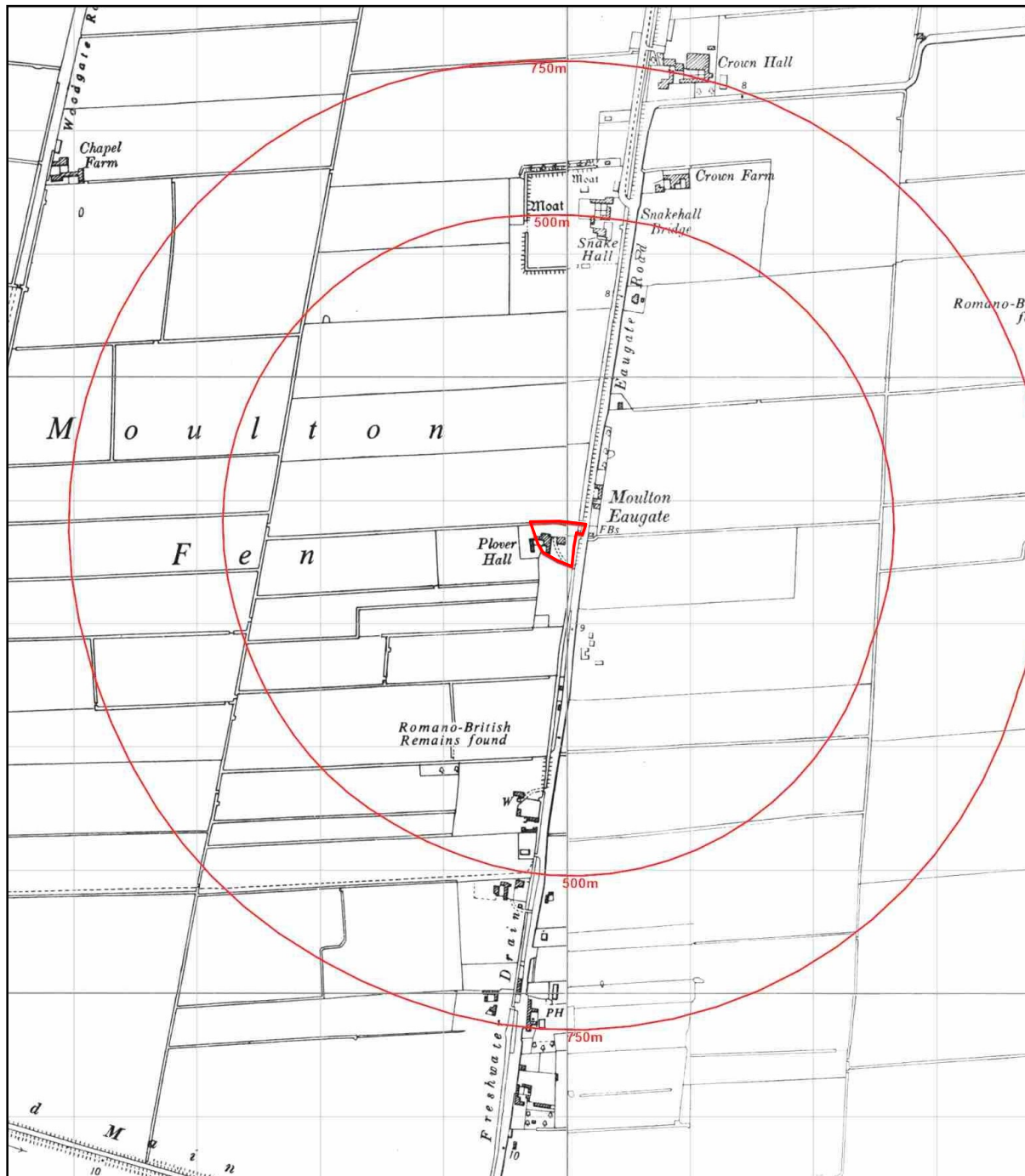
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Site History

Figure F

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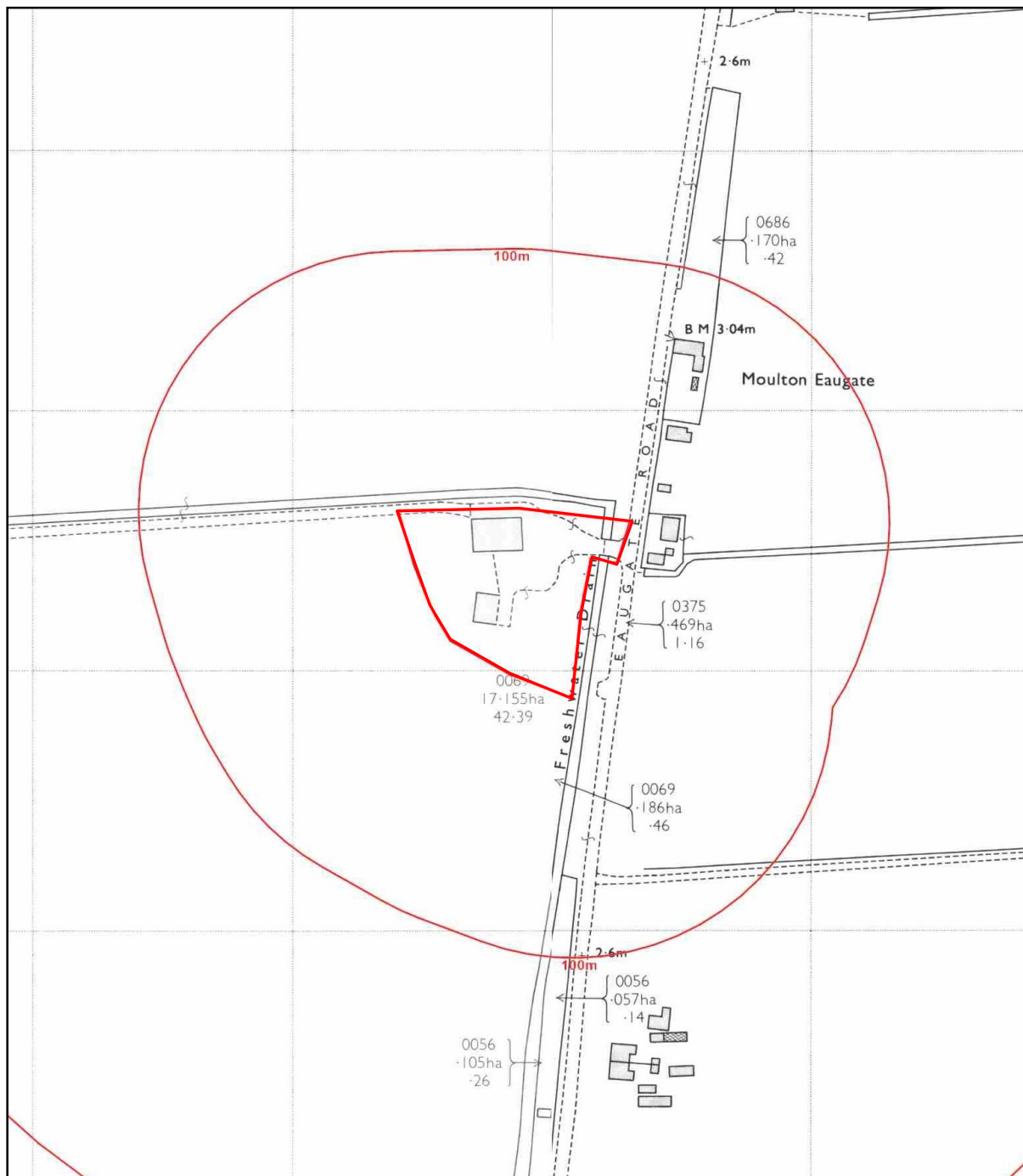
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Site History

Figure G

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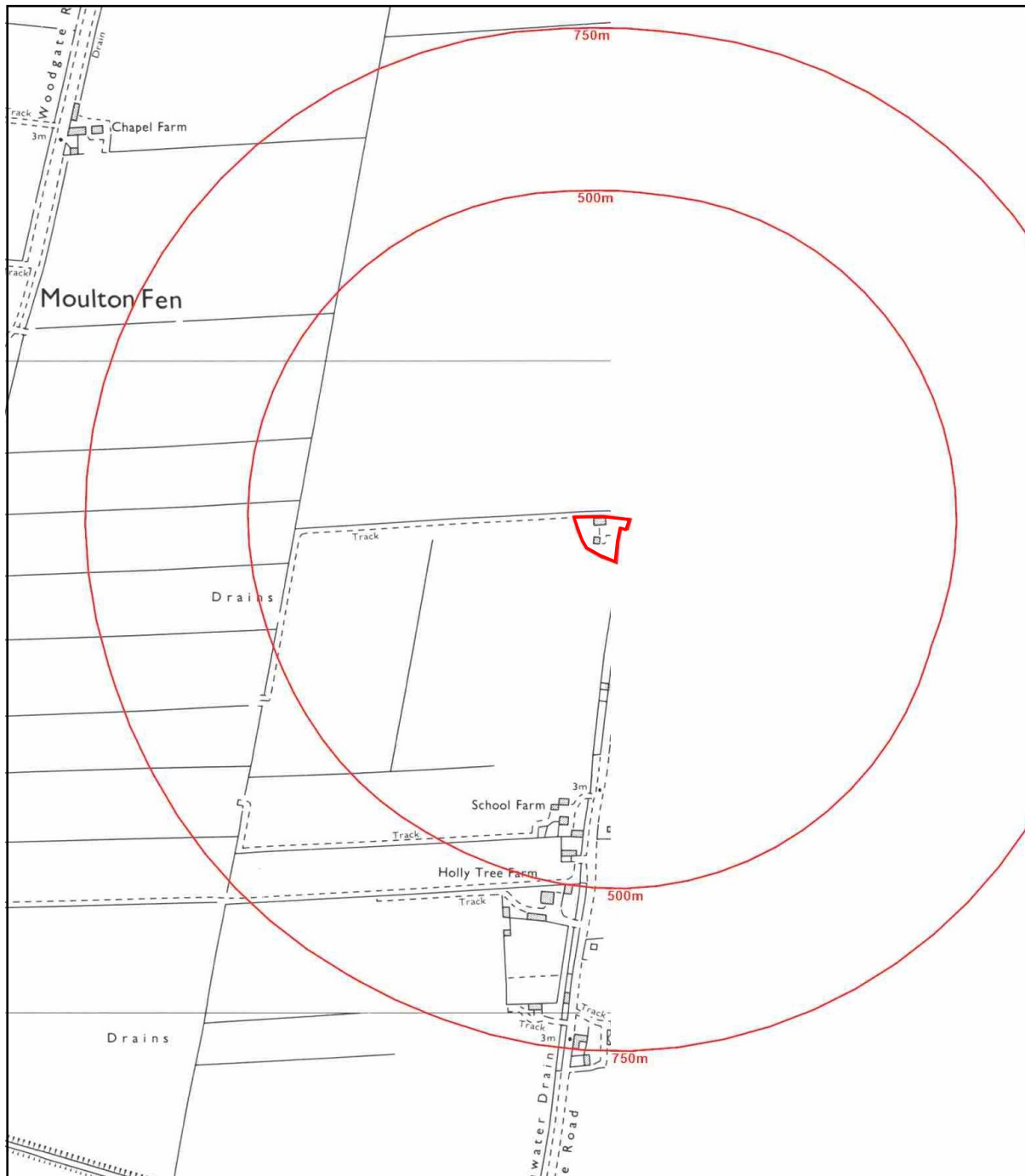
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Site History

Figure H

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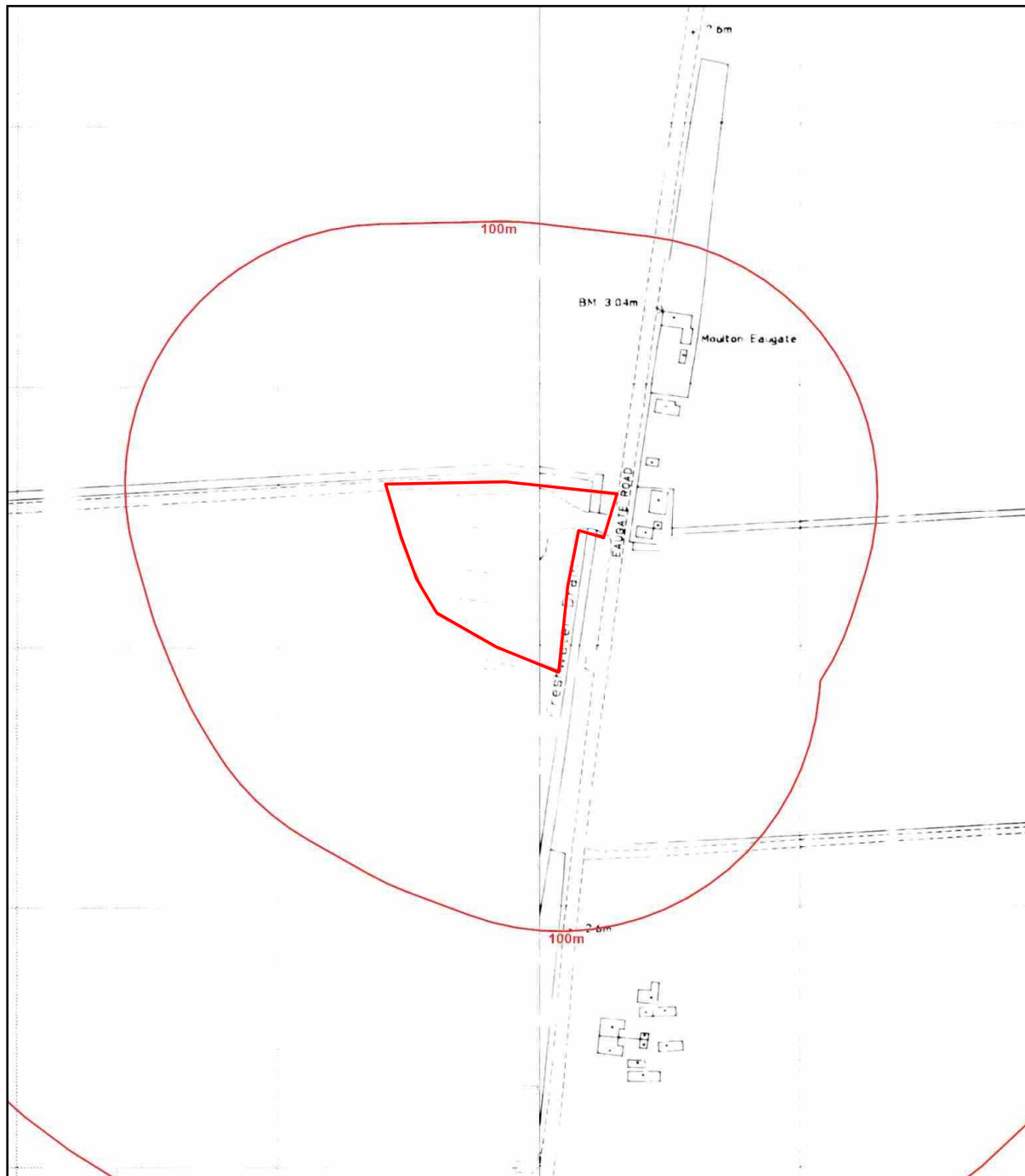
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Figure I

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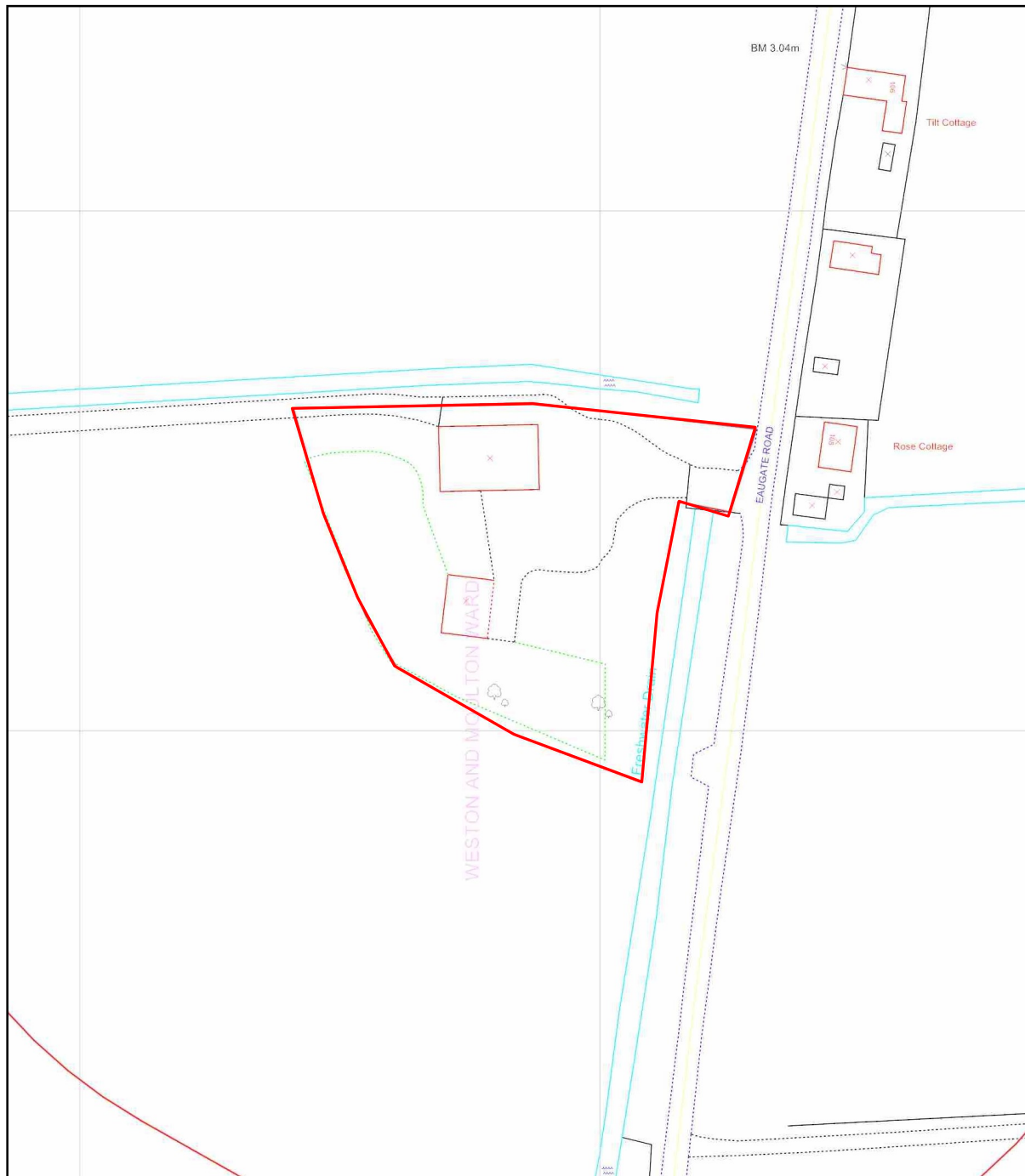
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Figure J

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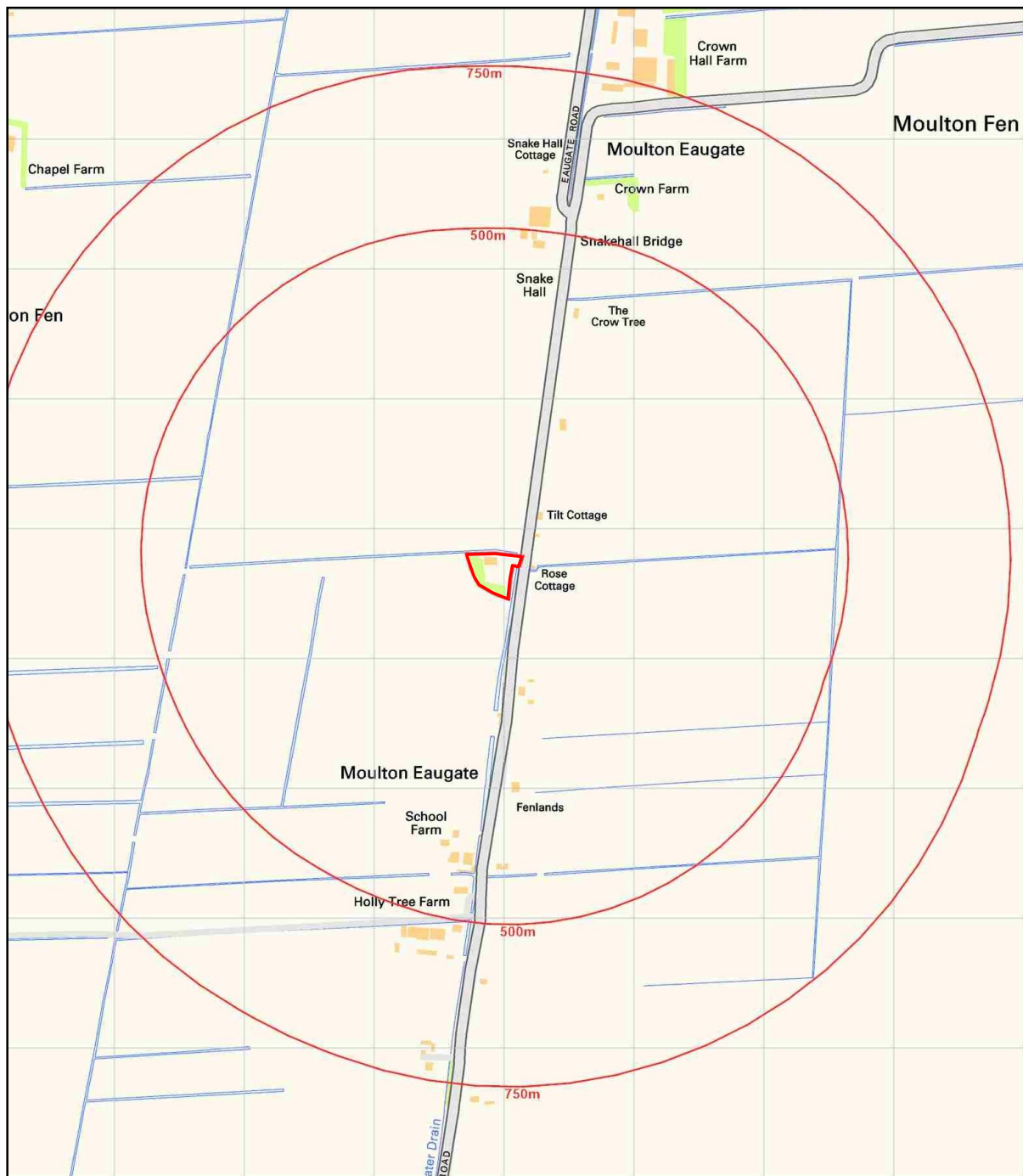
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Site History

Figure K

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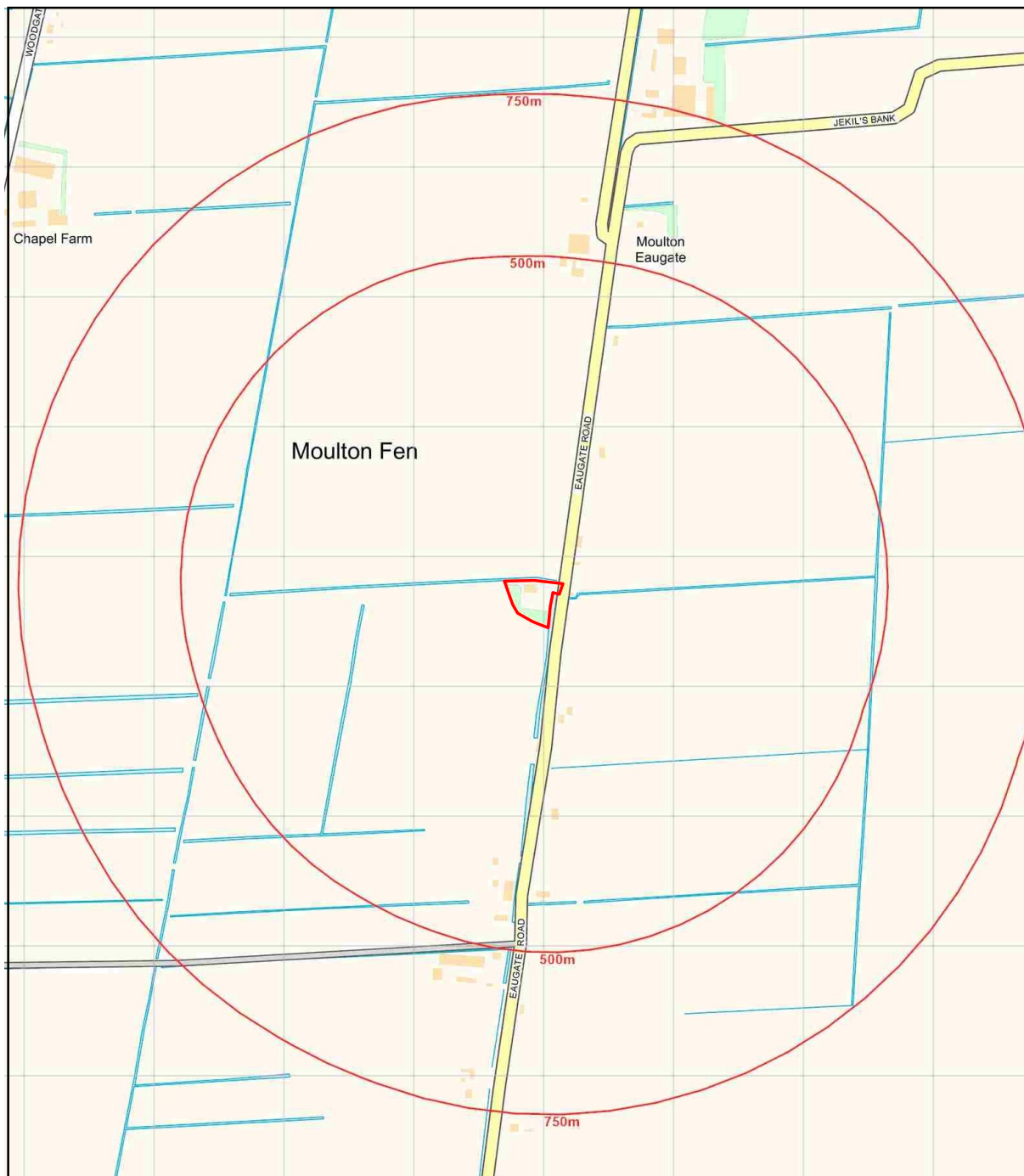
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Site History

Figure L

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Appendix 2

Database Information

FORMER AGRICULTURAL PREMISES, EAUGATE ROAD, MOULTON EAUGATE, SPALDING, PE12 0SZ

Order Details

Date: 09/02/2022
Your ref: C15587
Our Ref: HMD-8508797
Client: Ground Engineering Limited

Site Details

Location: 529987 316735
Area: 0.4 ha
Authority: [South Holland District Council](#)



Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

p.13

groundsure.com/insightuserguide

Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

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



22	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
22	4.7	Regulated explosive sites	0	0	0	0	-
22	4.8	Hazardous substance storage/usage	0	0	0	0	-
22	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
22	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
23	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
23	4.12	Radioactive Substance Authorisations	0	0	0	0	-
23	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
23	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
23	4.15	Pollutant release to public sewer	0	0	0	0	-
24	4.16	List 1 Dangerous Substances	0	0	0	0	-
24	4.17	List 2 Dangerous Substances	0	0	0	0	-
24	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
24	4.19	Pollution inventory substances	0	0	0	0	-
24	4.20	Pollution inventory waste transfers	0	0	0	0	-
25	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
26	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
27	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
28	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
29	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
29	5.5	Groundwater vulnerability- local information	None (within 0m)				
30	5.6	Groundwater abstractions	0	0	0	0	0
31	5.7	<u>Surface water abstractions</u>	0	3	0	1	2
32	5.8	Potable abstractions	0	0	0	0	0
32	5.9	Source Protection Zones	0	0	0	0	-
32	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
33	6.1	<u>Water Network (OS MasterMap)</u>	2	2	4	-	-



34	6.2	<u>Surface water features</u>	1	2	3	-	-
34	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
35	6.4	<u>WFD Surface water bodies</u>	0	0	0	-	-
35	6.5	WFD Groundwater bodies	0	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
36	7.1	<u>Risk of flooding from rivers and the sea</u>	Low (within 50m)				
37	7.2	Historical Flood Events	0	0	0	-	-
37	7.3	Flood Defences	0	0	0	-	-
37	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
37	7.5	Flood Storage Areas	0	0	0	-	-
38	7.6	<u>Flood Zone 2</u>	Identified (within 50m)				
39	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
40	8.1	<u>Surface water flooding</u>	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
42	9.1	<u>Groundwater flooding</u>	Negligible (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
43	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
43	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
43	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
43	10.4	Special Protection Areas (SPA)	0	0	0	0	0
44	10.5	National Nature Reserves (NNR)	0	0	0	0	0
44	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
44	10.7	Designated Ancient Woodland	0	0	0	0	0
44	10.8	Biosphere Reserves	0	0	0	0	0
45	10.9	Forest Parks	0	0	0	0	0
45	10.10	Marine Conservation Zones	0	0	0	0	0
45	10.11	Green Belt	0	0	0	0	0
45	10.12	Proposed Ramsar sites	0	0	0	0	0



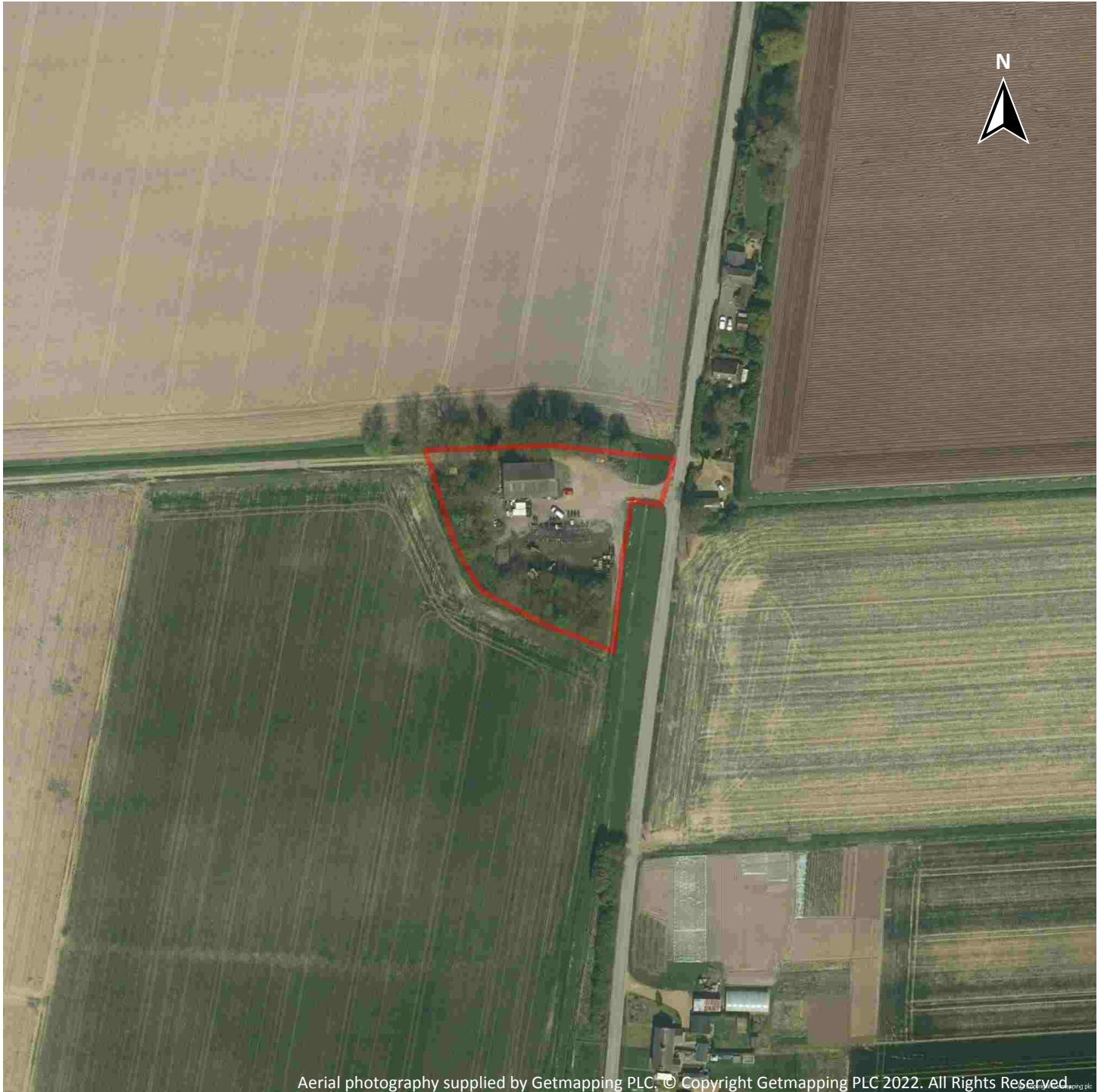
45	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
46	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
46	10.15	Nitrate Sensitive Areas	0	0	0	0	0
46	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
47	10.17	SSSI Impact Risk Zones	0	-	-	-	-
47	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
48	11.1	World Heritage Sites	0	0	0	-	-
48	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
48	11.3	National Parks	0	0	0	-	-
48	11.4	Listed Buildings	0	0	0	-	-
49	11.5	Conservation Areas	0	0	0	-	-
49	11.6	Scheduled Ancient Monuments	0	0	0	-	-
49	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
50	<u>12.1</u>	<u>Agricultural Land Classification</u>	Grade 1 (within 250m)				
51	12.2	Open Access Land	0	0	0	-	-
51	12.3	Tree Felling Licences	0	0	0	-	-
51	12.4	Environmental Stewardship Schemes	0	0	0	-	-
52	<u>12.5</u>	<u>Countryside Stewardship Schemes</u>	0	1	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
53	13.1	Priority Habitat Inventory	0	0	0	-	-
53	13.2	Habitat Networks	0	0	0	-	-
53	13.3	Open Mosaic Habitat	0	0	0	-	-
53	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
54	<u>14.1</u>	<u>10k Availability</u>	Identified (within 500m)				
55	14.2	Artificial and made ground (10k)	0	0	0	0	-
56	<u>14.3</u>	<u>Superficial geology (10k)</u>	1	0	0	0	-

57	14.4	Landslip (10k)	0	0	0	0	-
58	14.5	<u>Bedrock geology (10k)</u>	1	0	0	0	-
59	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
60	15.1	<u>50k Availability</u>	Identified (within 500m)				
61	15.2	Artificial and made ground (50k)	0	0	0	0	-
61	15.3	Artificial ground permeability (50k)	0	0	-	-	-
62	15.4	<u>Superficial geology (50k)</u>	1	0	1	0	-
63	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
63	15.6	Landslip (50k)	0	0	0	0	-
63	15.7	Landslip permeability (50k)	None (within 50m)				
64	15.8	<u>Bedrock geology (50k)</u>	1	0	0	0	-
65	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
65	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
66	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence					
67	17.1	<u>Shrink swell clays</u>	Low (within 50m)				
68	17.2	<u>Running sands</u>	Moderate (within 50m)				
69	17.3	<u>Compressible deposits</u>	Moderate (within 50m)				
70	17.4	<u>Collapsible deposits</u>	Negligible (within 50m)				
71	17.5	<u>Landslides</u>	Very low (within 50m)				
72	17.6	<u>Ground dissolution of soluble rocks</u>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
73	18.1	Natural cavities	0	0	0	0	-
73	18.2	BritPits	0	0	0	0	-
73	18.3	Surface ground workings	0	0	0	-	-
73	18.4	Underground workings	0	0	0	0	0
74	18.5	Historical Mineral Planning Areas	0	0	0	0	-



74	18.6	Non-coal mining	0	0	0	0	0
74	18.7	Mining cavities	0	0	0	0	0
74	18.8	JPB mining areas	None (within 0m)				
74	18.9	Coal mining	None (within 0m)				
75	18.10	Brine areas	None (within 0m)				
75	18.11	Gypsum areas	None (within 0m)				
75	18.12	Tin mining	None (within 0m)				
75	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
76	19.1	Radon	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
77	20.1	BGS Estimated Background Soil Chemistry	3	0	-	-	-
77	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
77	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
78	21.1	Underground railways (London)	0	0	0	-	-
78	21.2	Underground railways (Non-London)	0	0	0	-	-
78	21.3	Railway tunnels	0	0	0	-	-
78	21.4	Historical railway and tunnel features	0	0	0	-	-
78	21.5	Royal Mail tunnels	0	0	0	-	-
79	21.6	Historical railways	0	0	0	-	-
79	21.7	Railways	0	0	0	-	-
79	21.8	Crossrail 1	0	0	0	0	-
79	21.9	Crossrail 2	0	0	0	0	-
79	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 20/04/2018

Site Area: 0.4ha



Recent site history - 2015 aerial photograph



Capture Date: 06/04/2015

Site Area: 0.4ha



Recent site history - 2013 aerial photograph

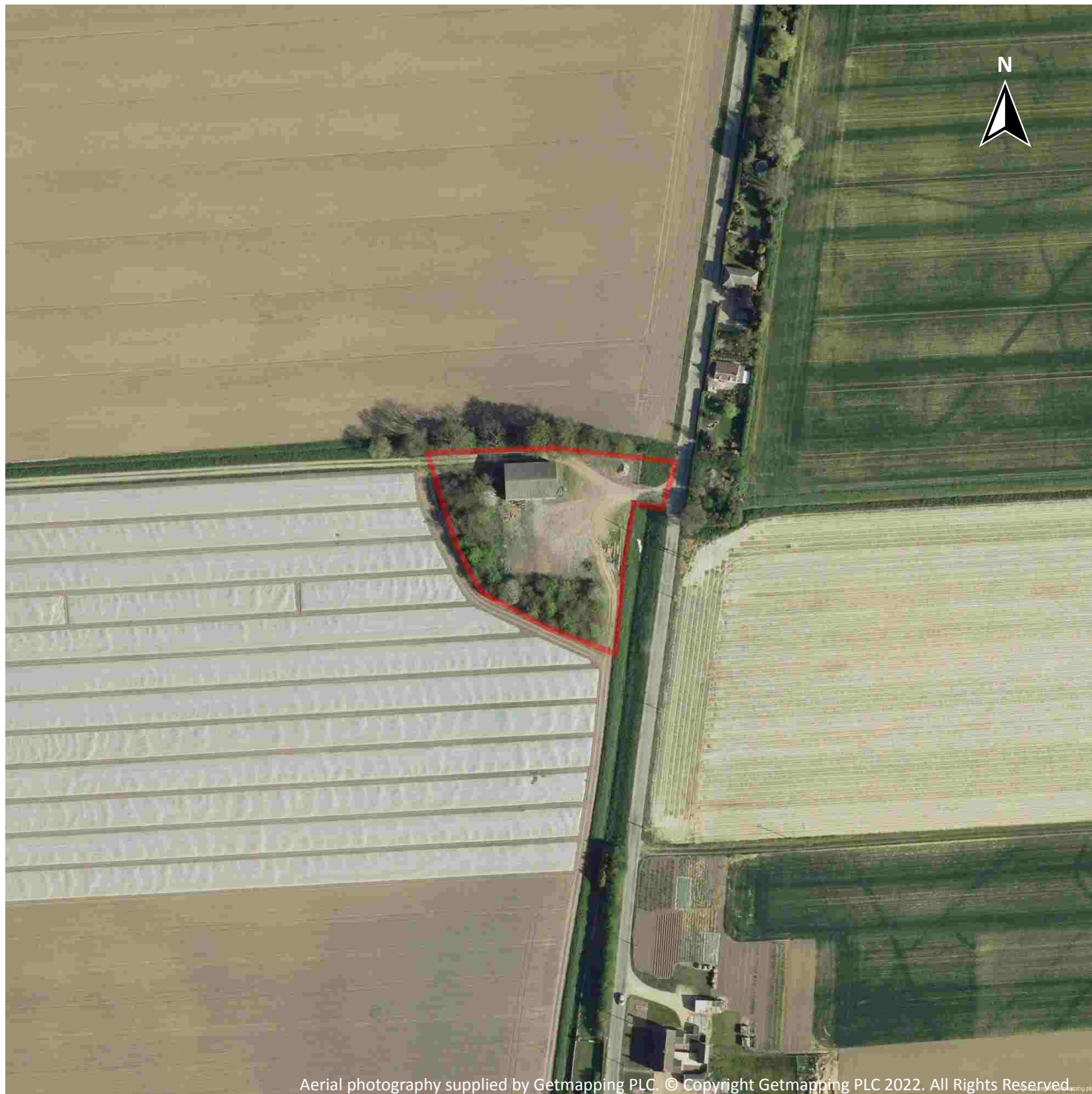


Capture Date: 27/05/2013

Site Area: 0.4ha



Recent site history - 2007 aerial photograph



Capture Date: 19/04/2007

Site Area: 0.4ha



Recent site history - 1999 aerial photograph



Capture Date: 18/06/1999

Site Area: 0.4ha



OS MasterMap site plan



Site Area: 0.4ha



1 Past land use



— Site Outline

Search buffers in metres (m)

Historical industrial land uses

1.1 Historical industrial land uses

Records within 500m

1

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

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

ID	Location	Land use	Dates present	Group ID
1	307m S	Cuttings	1938	2011647



This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

0

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

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m

0

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

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m

0

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

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m

0

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



This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

0

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

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



2 Past land use - un-grouped



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

2.1 Historical industrial land uses

Records within 500m

1

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

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

ID	Location	Land Use	Date	Group ID
1	307m S	Cuttings	1938	2011647

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

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

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

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

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

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

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

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

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

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

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

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

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill

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

0

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.

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



4 Current industrial land use

4.1 Recent industrial land uses

Records within 250m	0
---------------------	---

Current potentially contaminative industrial sites.

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

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

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

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

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

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

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

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

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

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m**0**

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

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m**0**

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

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m**0**

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

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m**0**

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

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

4.10 Licensed industrial activities (Part A(1))

Records within 500m**0**

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

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

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

Records within 500m**0**

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

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m**0**

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

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

4.13 Licensed Discharges to controlled waters

Records within 500m**0**

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

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

4.14 Pollutant release to surface waters (Red List)

Records within 500m**0**

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

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

4.15 Pollutant release to public sewer

Records within 500m**0**

Discharges of Special Category Effluents to the public sewer.

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

4.16 List 1 Dangerous Substances

Records within 500m**0**

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

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

4.17 List 2 Dangerous Substances

Records within 500m**0**

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

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

4.18 Pollution Incidents (EA/NRW)

Records within 500m**0**

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

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

4.19 Pollution inventory substances

Records within 500m**0**

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

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

4.20 Pollution inventory waste transfers

Records within 500m**0**

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

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

4.21 Pollution inventory radioactive waste

Records within 500m

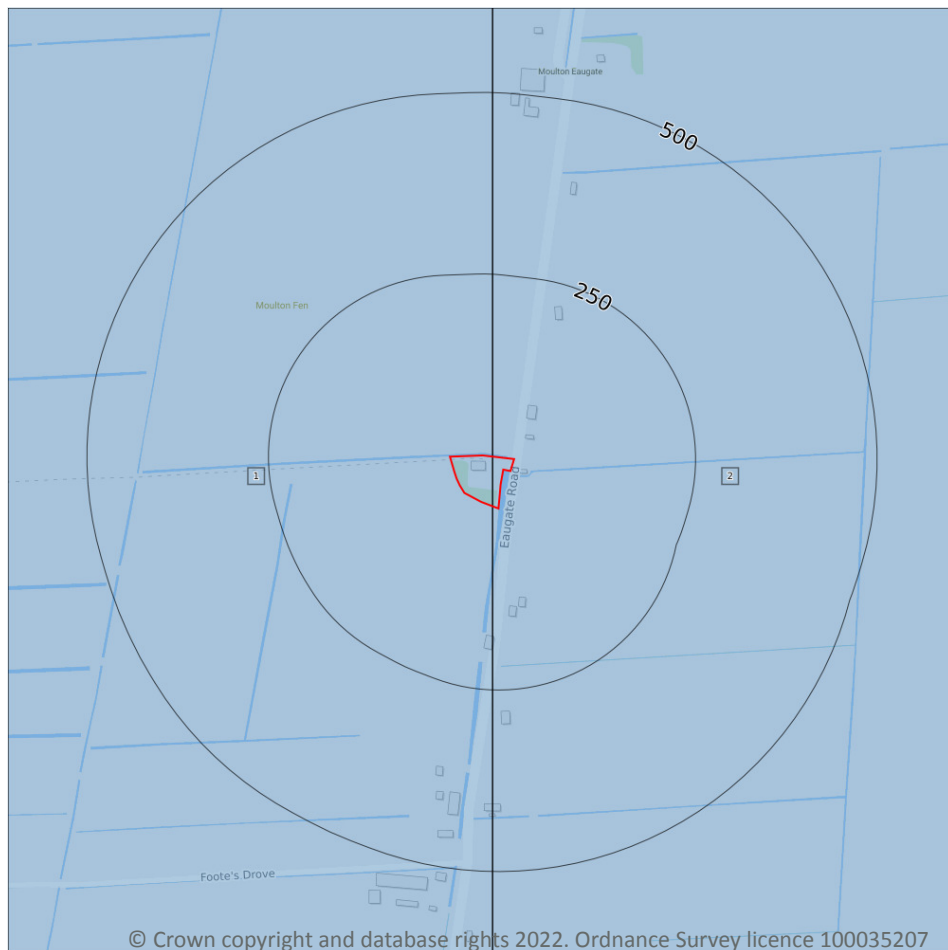
0

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

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



5 Hydrogeology - Superficial aquifer



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

5.1 Superficial aquifer

Records within 500m

2

Aquifer status of groundwater held within superficial geology.

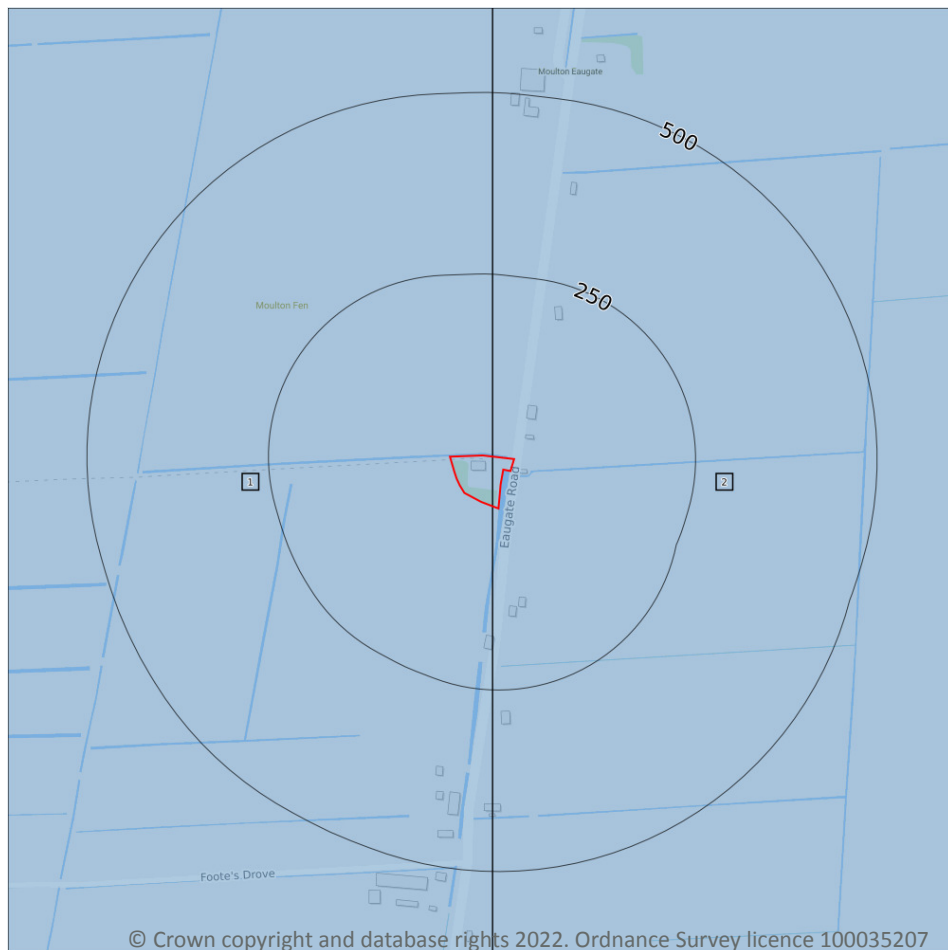
Features are displayed on the Hydrogeology map on **page 26**

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

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



Bedrock aquifer



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

5.2 Bedrock aquifer

Records within 500m

2

Aquifer status of groundwater held within bedrock geology.

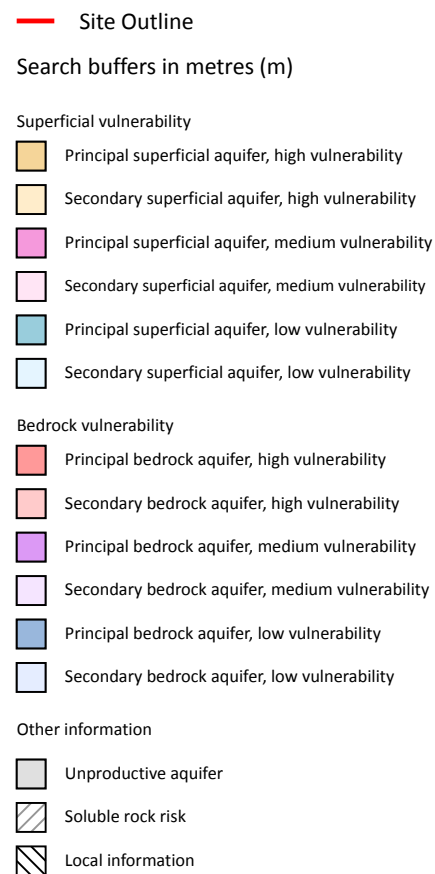
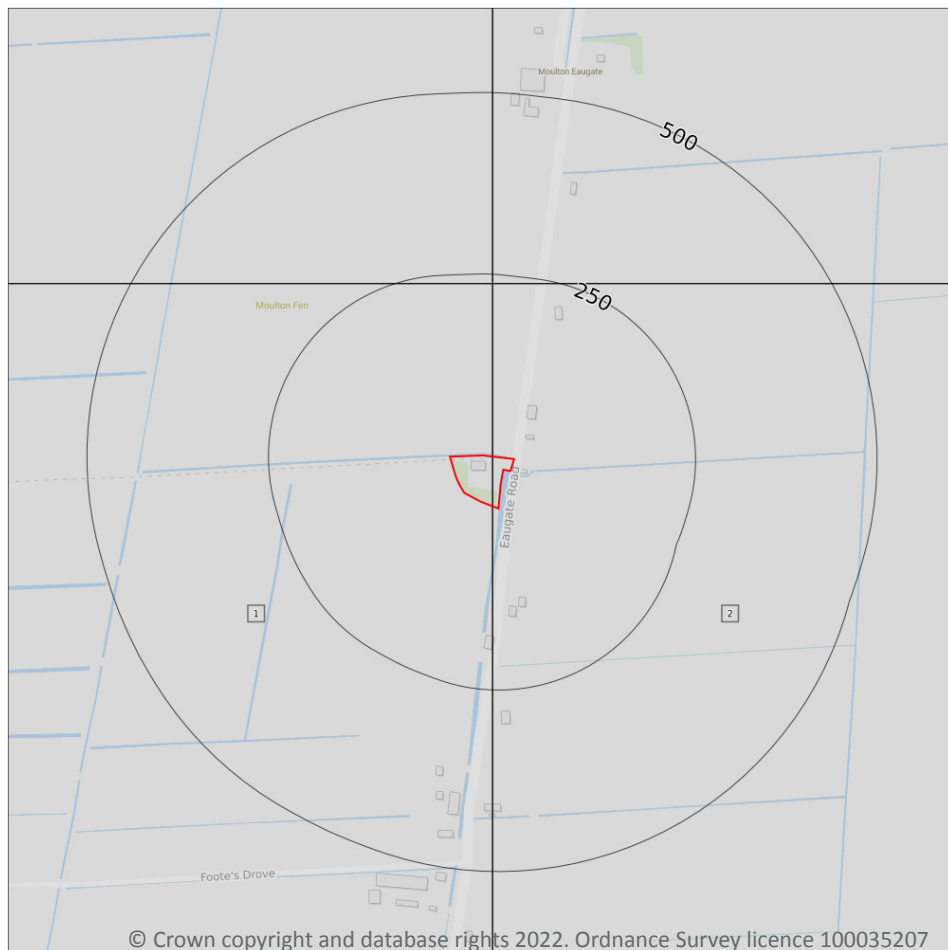
Features are displayed on the Bedrock aquifer map on **page 27**

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

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



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

2

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

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

Features are displayed on the Groundwater vulnerability map on **page 28**

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

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

5.4 Groundwater vulnerability- soluble rock risk

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

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

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

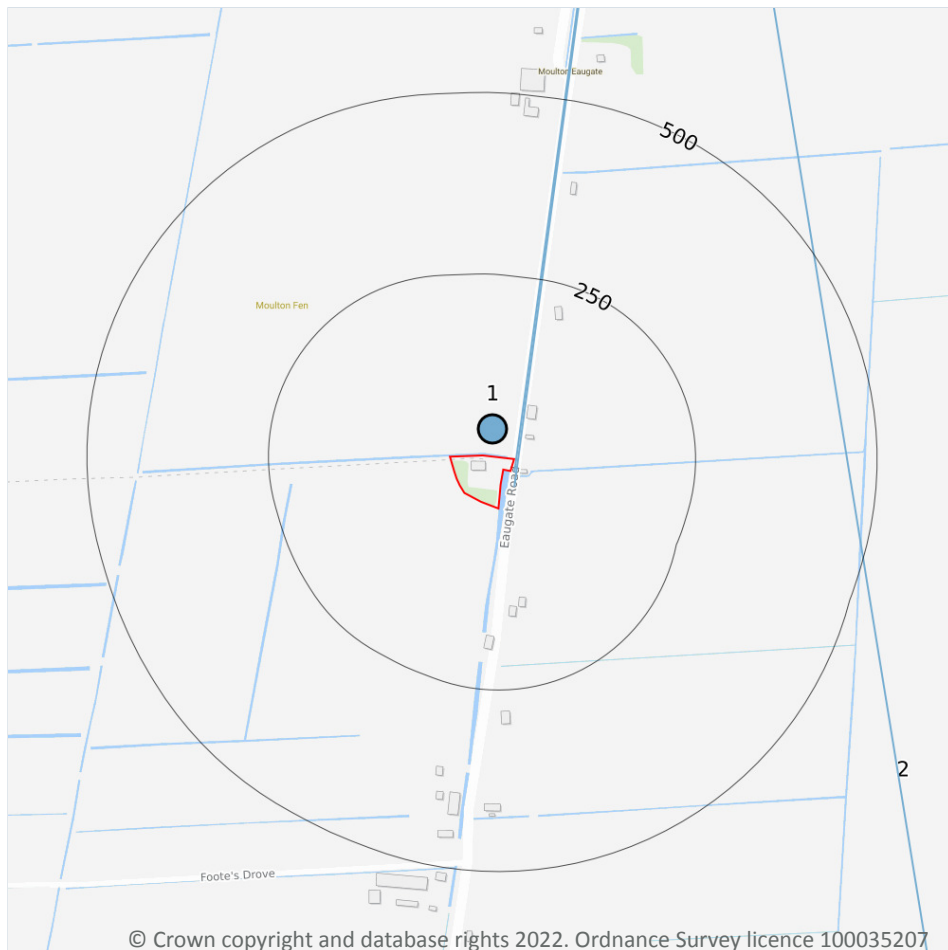
5.5 Groundwater vulnerability- local information

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

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

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

Abstractions and Source Protection Zones



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

5.6 Groundwater abstractions

Records within 2000m

0

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

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

5.7 Surface water abstractions

Records within 2000m

6

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 30**

ID	Location	Details	
A	2m E	Status: Historical Licence No: 5/32/11/*S/0052B Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FRESH WATER DRAIN, CROWN HALL Data Type: Line Name: A H CLARK FARMS LTD Easting: 530030 Northing: 316740	Annual Volume (m ³): 4091 Max Daily Volume (m ³): 818.3 Original Application No: - Original Start Date: 01/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 02/04/1966 Version End Date: -
A	5m E	Status: Historical Licence No: 5/32/11/*S/0052B Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FRESH WATER DRAIN, CROWN HALL Data Type: Line Name: A H CLARK FARMS LTD Easting: 530030 Northing: 316720	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 01/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 02/04/1966 Version End Date: -
1	38m N	Status: Historical Licence No: 5/32/11/*S/0052B Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FRESH WATER DRAIN, CROWN HALL Data Type: Point Name: A H CLARK FARMS LTD Easting: 530000 Northing: 316800	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 01/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 02/04/1966 Version End Date: -
2	452m E	Status: Historical Licence No: 5/32/11/*S/0052B Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FRESH WATER DRAIN, CROWN HALL Data Type: Line Name: A H CLARK FARMS LTD Easting: 530240 Northing: 318290	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 01/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 02/04/1966 Version End Date: -



ID	Location	Details	
-	1126m SW	Status: Historical Licence No: 5/32/11/*S/0052C Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: SOUTH HOLLAND MAIN DRAIN Data Type: Line Name: A H CLARK FARMS LTD Easting: 528100 Northing: 316100	Annual Volume (m ³): 4000 Max Daily Volume (m ³): 818.3 Original Application No: - Original Start Date: 01/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 02/04/1966 Version End Date: -
-	1275m NE	Status: Historical Licence No: 5/32/11/*S/0052B Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FRESH WATER DRAIN, CROWN HALL Data Type: Line Name: A H CLARK FARMS LTD Easting: 530240 Northing: 318290	Annual Volume (m ³): 4091 Max Daily Volume (m ³): 818.3 Original Application No: - Original Start Date: 01/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 02/04/1966 Version End Date: -

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

5.8 Potable abstractions

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

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

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

5.9 Source Protection Zones

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

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

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

5.10 Source Protection Zones (confined aquifer)

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

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

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

6 Hydrology



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

6.1 Water Network (OS MasterMap)

Records within 250m

8

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

Features are displayed on the Hydrology map on **page 33**

ID	Location	Type of water feature	Ground level	Permanence	Name
1	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Freshwater Drain

ID	Location	Type of water feature	Ground level	Permanence	Name
A	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Freshwater Drain
B	1m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
4	14m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
5	171m S	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Freshwater Drain
C	212m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Freshwater Drain
D	217m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
7	221m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

6

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

Features are displayed on the Hydrology map on **page 33**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site

1

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



Features are displayed on the Hydrology map on **page 33**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	On site	River	South Holland Main Drain	GB205032050405	Nene Lower	Nene

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

6.4 WFD Surface water bodies

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

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

Features are displayed on the Hydrology map on **page 33**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	1080m S	River	South Holland Main Drain	GB205032050405	Moderate	Fail	Good	2019

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

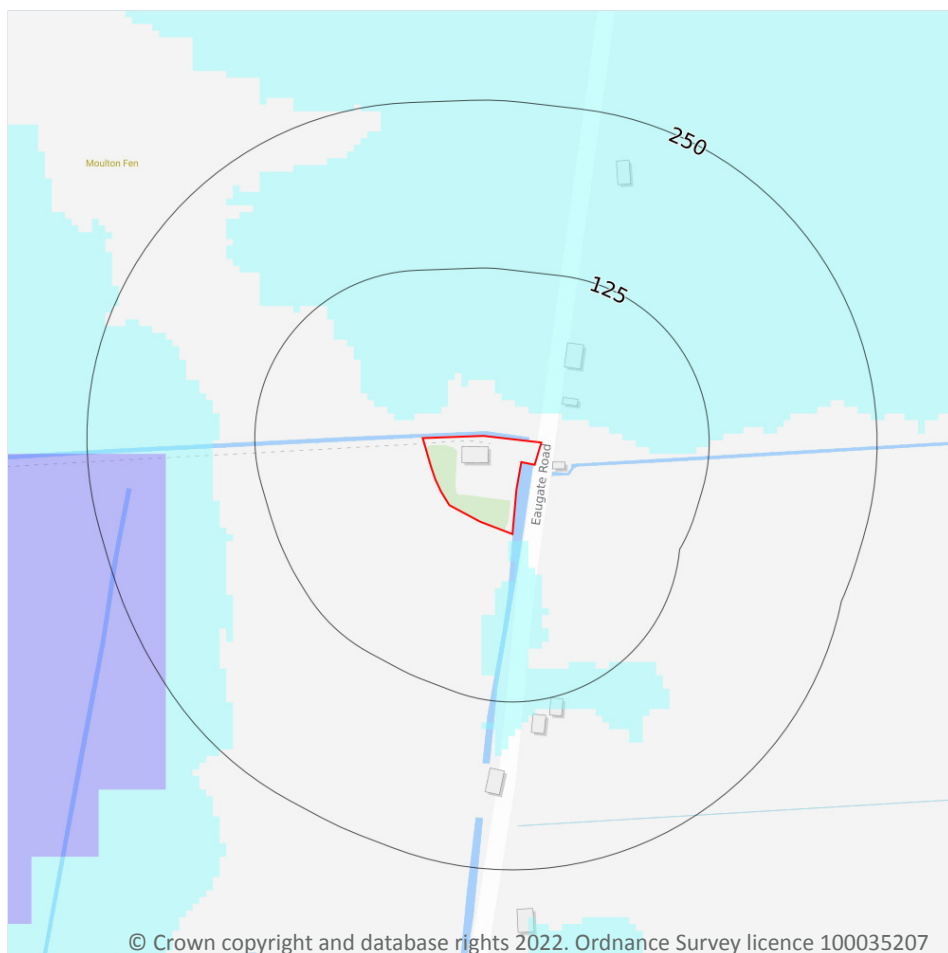
6.5 WFD Groundwater bodies

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

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

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

7 River and coastal flooding



- Site Outline
- Search buffers in metres (m)
- River and coastal flooding:
- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m

2

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

Features are displayed on the River and coastal flooding map on **page 36**

Distance	Flood risk category
On site	N/A
0 - 50m	Low

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

7.2 Historical Flood Events

Records within 250m	0
----------------------------	----------

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

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

7.3 Flood Defences

Records within 250m	0
----------------------------	----------

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

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

7.4 Areas Benefiting from Flood Defences

Records within 250m	0
----------------------------	----------

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

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

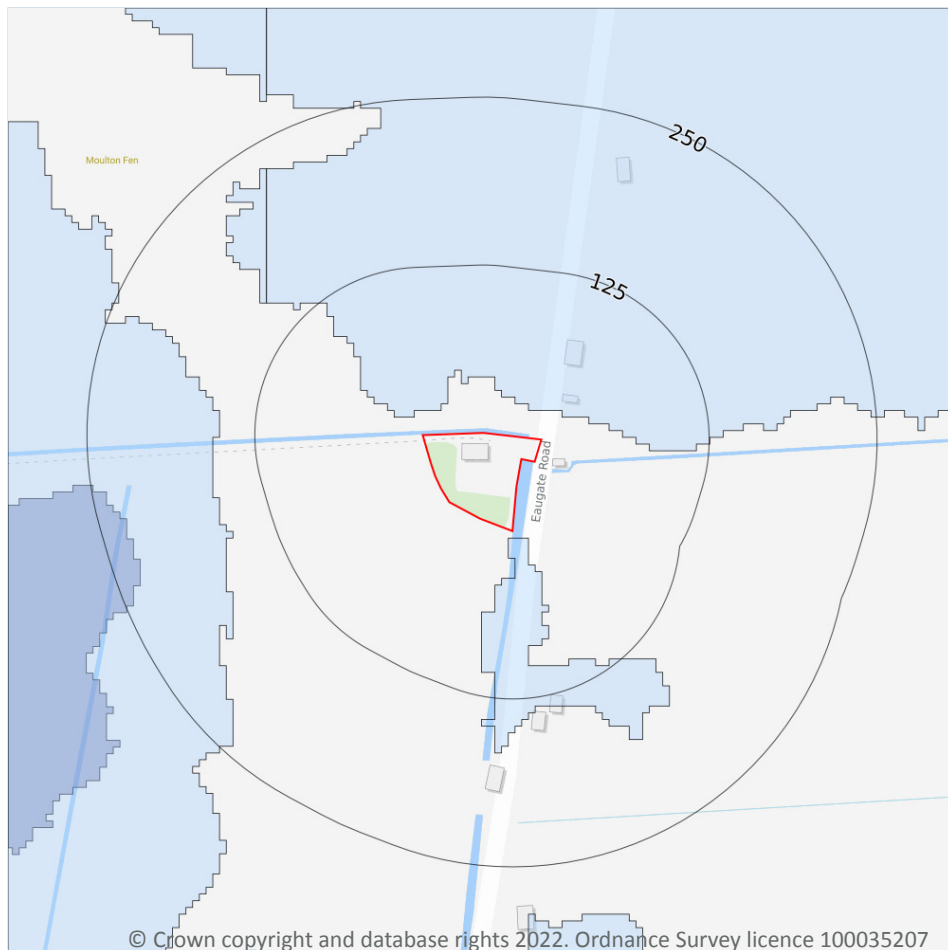
7.5 Flood Storage Areas

Records within 250m	0
----------------------------	----------

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

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

River and coastal flooding - Flood Zones



- Site Outline
- Search buffers in metres (m)
- Flood zone 2
- Flood zone 3

7.6 Flood Zone 2

Records within 50m

1

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

Features are displayed on the River and coastal flooding map on **page 36**

Location	Type
5m S	Zone 2 - (Fluvial /Tidal Models)

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

7.7 Flood Zone 3

Records within 50m

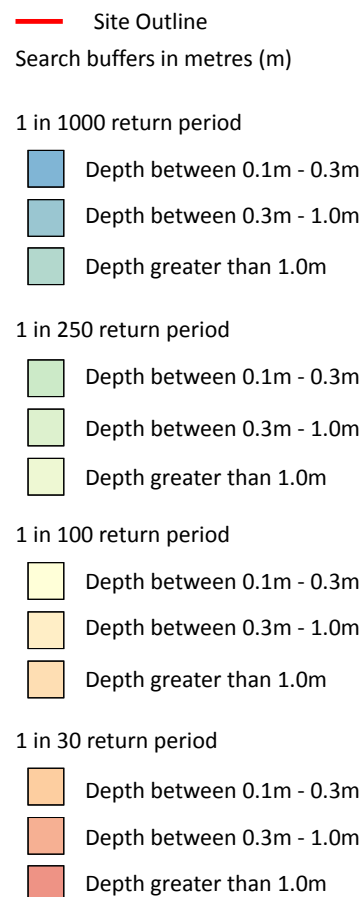
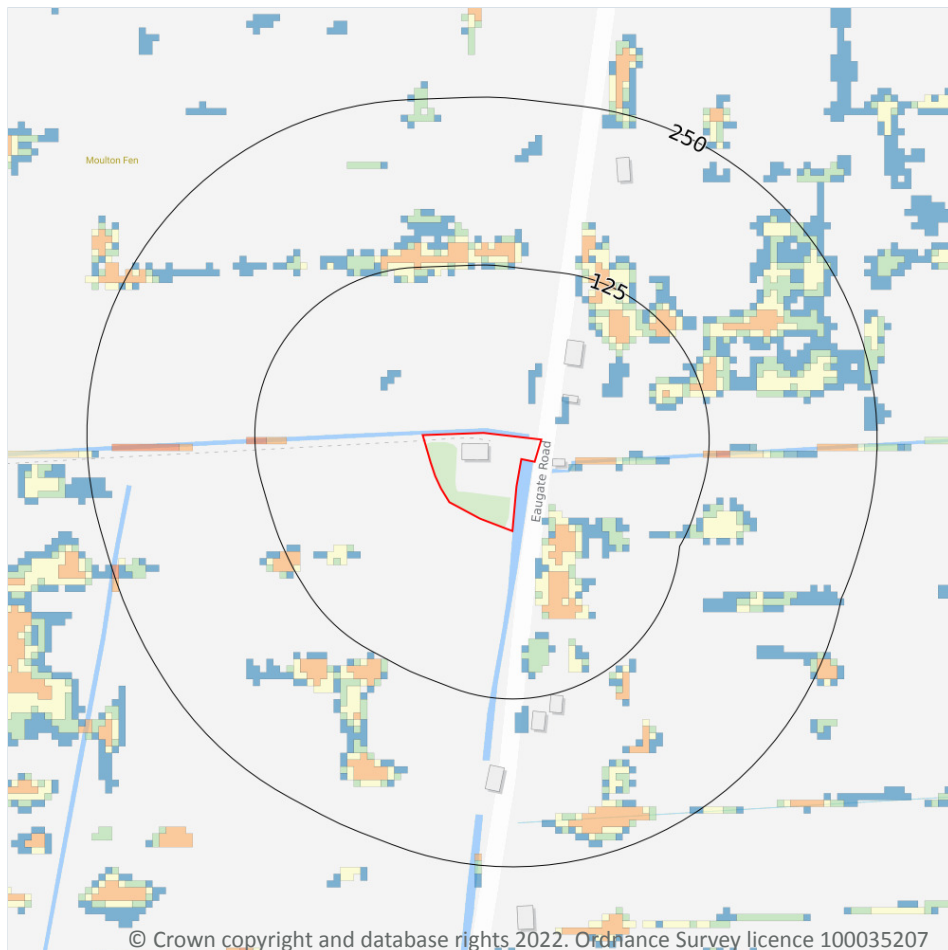
0

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

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



8 Surface water flooding



8.1 Surface water flooding

Highest risk on site

Negligible

Highest risk within 50m

1 in 30 year, 0.1m - 0.3m

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

Features are displayed on the Surface water flooding map on **page 40**

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

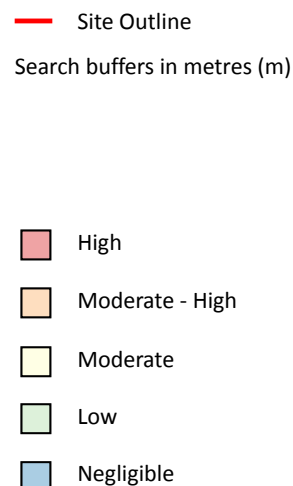
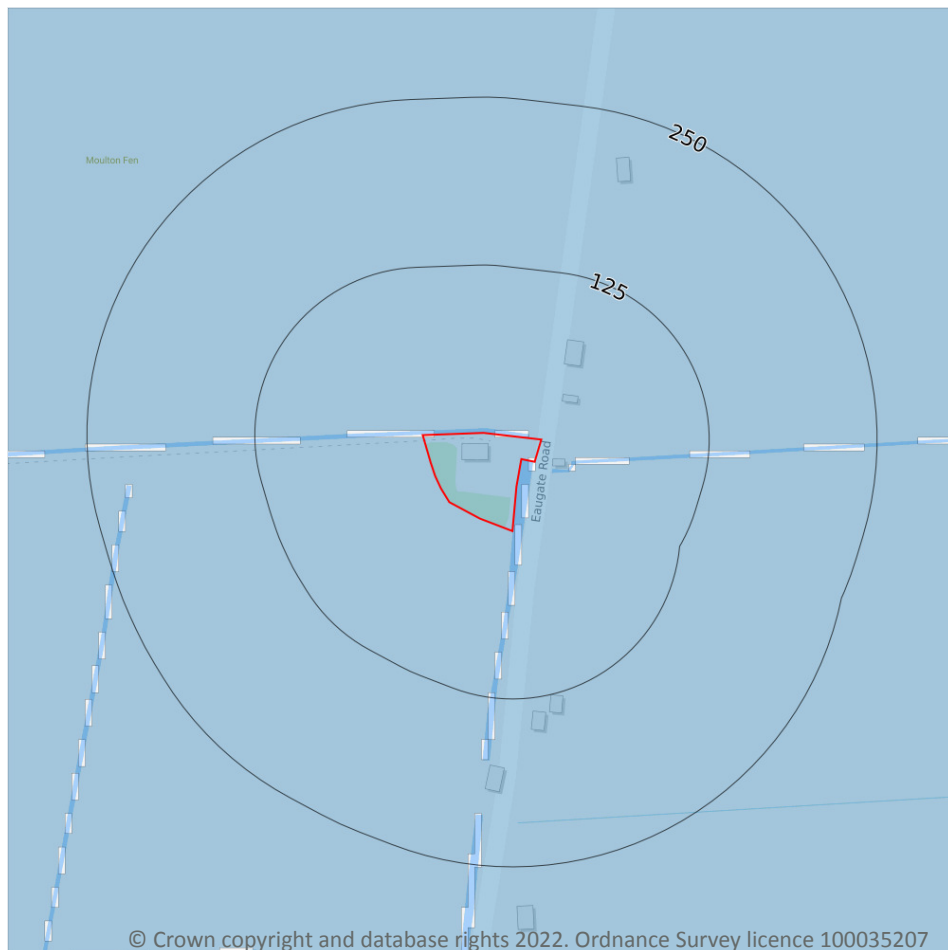
The table below shows the maximum flood depths for a range of return periods for the site.

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

This data is sourced from Ambiantal Risk Analytics.



9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site

Negligible

Highest risk within 50m

Negligible

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

Features are displayed on the Groundwater flooding map on **page 42**

This data is sourced from Ambiantal Risk Analytics.

10 Environmental designations

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m**0**

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

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

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m**0**

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

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

10.3 Special Areas of Conservation (SAC)

Records within 2000m**0**

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

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

10.4 Special Protection Areas (SPA)

Records within 2000m**0**

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

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



10.5 National Nature Reserves (NNR)

Records within 2000m**0**

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

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

10.6 Local Nature Reserves (LNR)

Records within 2000m**0**

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

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

10.7 Designated Ancient Woodland

Records within 2000m**0**

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

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

10.8 Biosphere Reserves

Records within 2000m**0**

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

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



10.9 Forest Parks

Records within 2000m

0

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

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m

0

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

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

10.11 Green Belt

Records within 2000m

0

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

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

10.12 Proposed Ramsar sites

Records within 2000m

0

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

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

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

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

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

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

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m

0

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

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

0

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

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

SSSI Impact Zones and Units

10.17 SSSI Impact Risk Zones

Records on site

0

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

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m

0

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

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



11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m

0

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

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

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

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

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

11.3 National Parks

Records within 250m

0

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

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

11.4 Listed Buildings

Records within 250m

0

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



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

11.5 Conservation Areas

Records within 250m

0

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

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

11.6 Scheduled Ancient Monuments

Records within 250m

0

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

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

11.7 Registered Parks and Gardens

Records within 250m

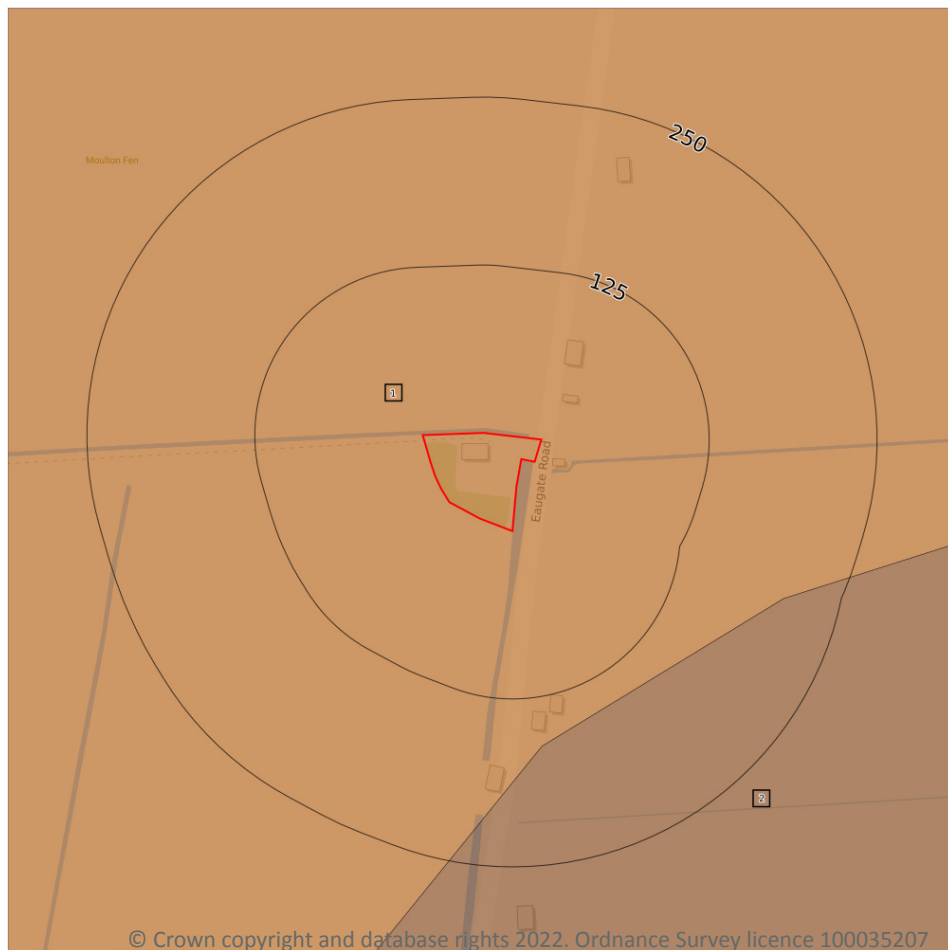
0

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

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



12 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m

2

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

Features are displayed on the Agricultural designations map on **page 50**

ID	Location	Classification	Description
1	On site	Grade 2	Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.
2	148m SE	Grade 1	Excellent quality agricultural land. Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m

0

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

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

12.3 Tree Felling Licences

Records within 250m

0

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

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m

0

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

This data is sourced from Natural England.



12.5 Countryside Stewardship Schemes

Records within 250m**1**

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

Location	Reference	Scheme	Start Date	End Date
1m NW	1052666	Countryside Stewardship (Middle Tier)	01/01/2021	31/12/2025

This data is sourced from Natural England.



13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m

0

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

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

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

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

0

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

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m

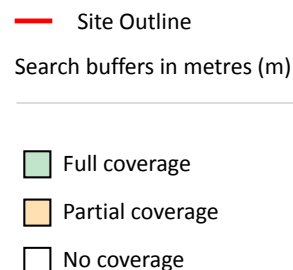
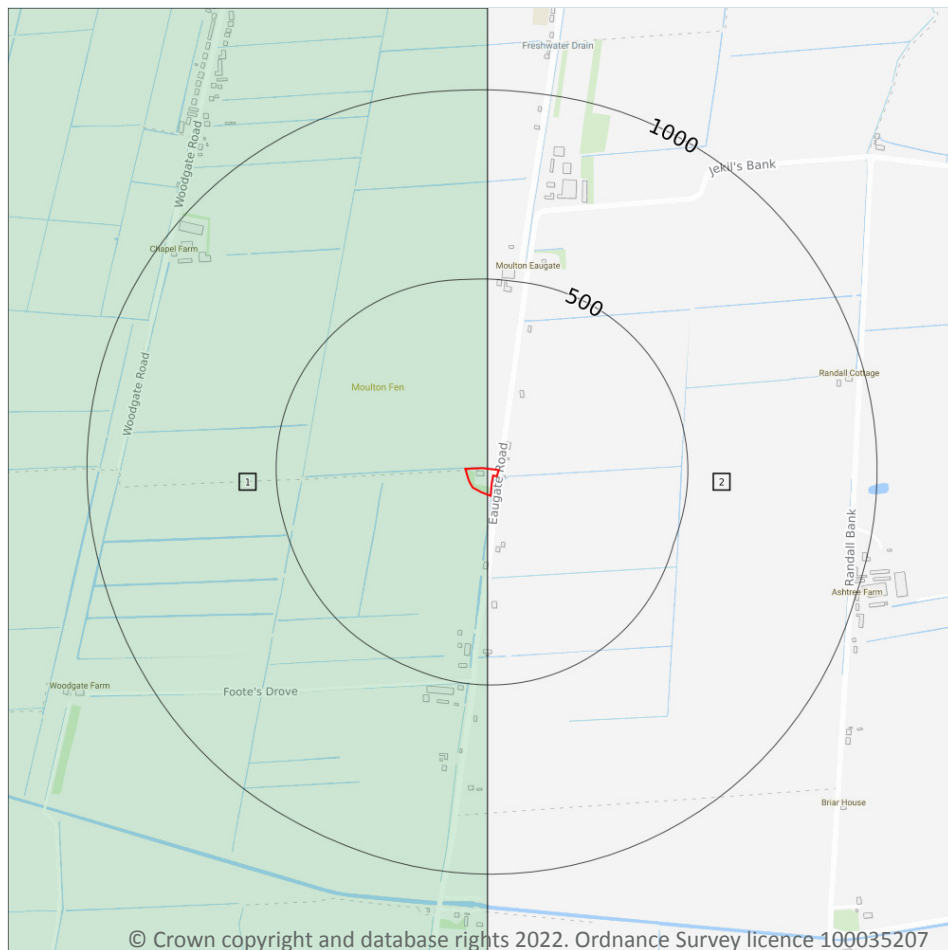
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Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable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

This data is sourced from Natural England.



14 Geology 1:10,000 scale - Availability



14.1 10k Availability

Records within 500m

2

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

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 54**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	TF21NE
2	On site	No coverage	No coverage	No coverage	No coverage	NoCov

This data is sourced from the British Geological Survey.



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

14.2 Artificial and made ground (10k)

Records within 500m

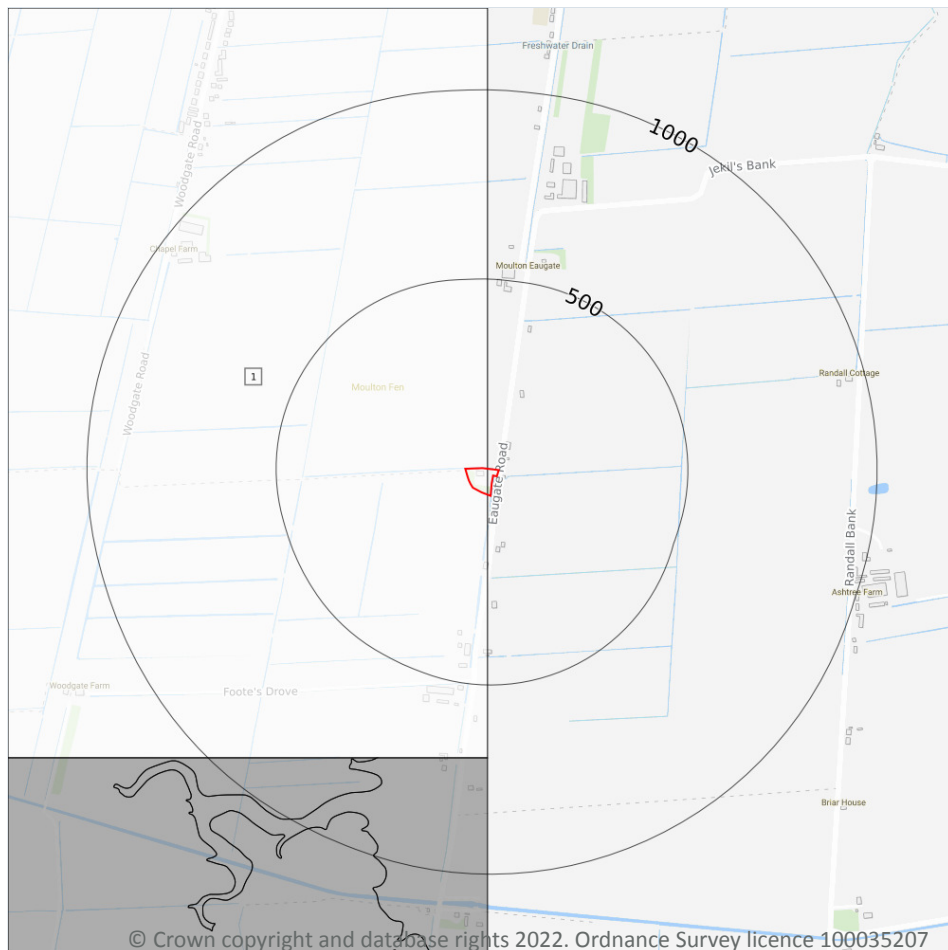
0

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

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

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

14.3 Superficial geology (10k)

Records within 500m

1

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

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 56**

ID	Location	LEX Code	Description	Rock description
1	On site	SUPNM-UKNOWN	Superficial Theme Not Mapped [for Digital Map Use Only] - Unknown/unclassified Entry	Unknown/unclassified Entry

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

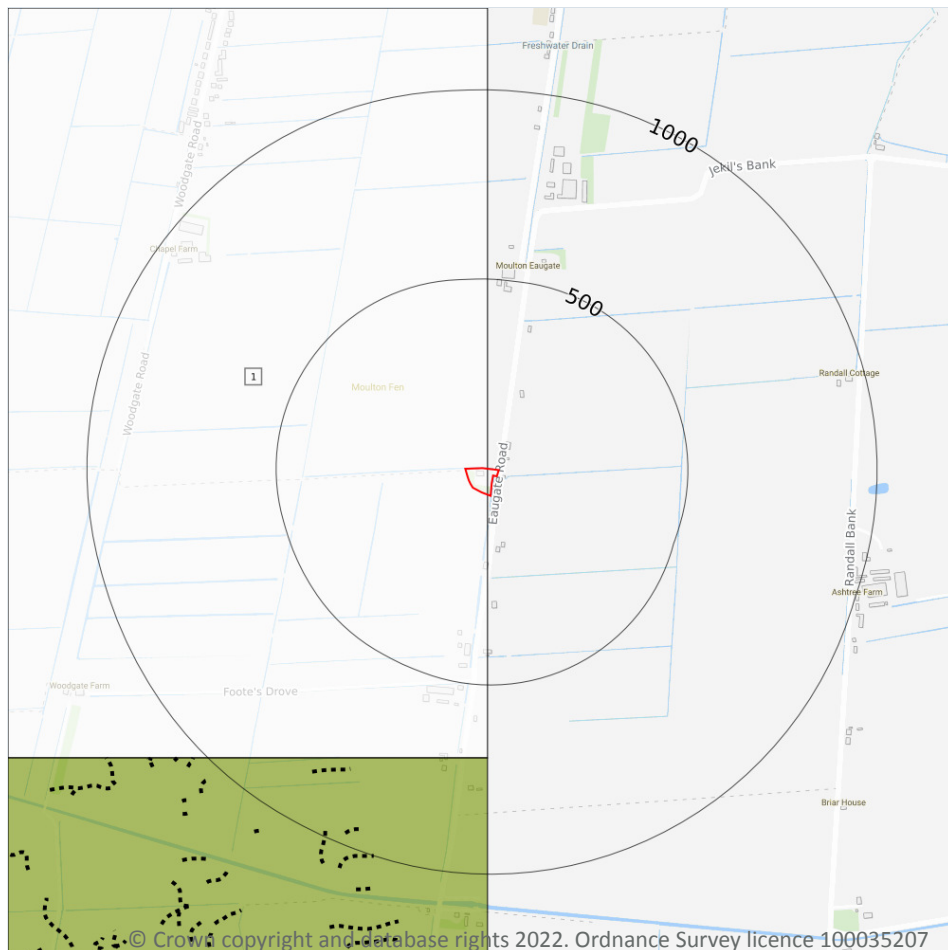
0

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

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

..... Bedrock faults and other linear features (10k)

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

14.5 Bedrock geology (10k)

Records within 500m

1

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

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 58**

ID	Location	LEX Code	Description	Rock age
1	On site	BEDNM-UNKNOWN	Bedrock Theme Not Mapped [for Digital Map Use Only] - Unknown/unclassified Entry	No Details

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

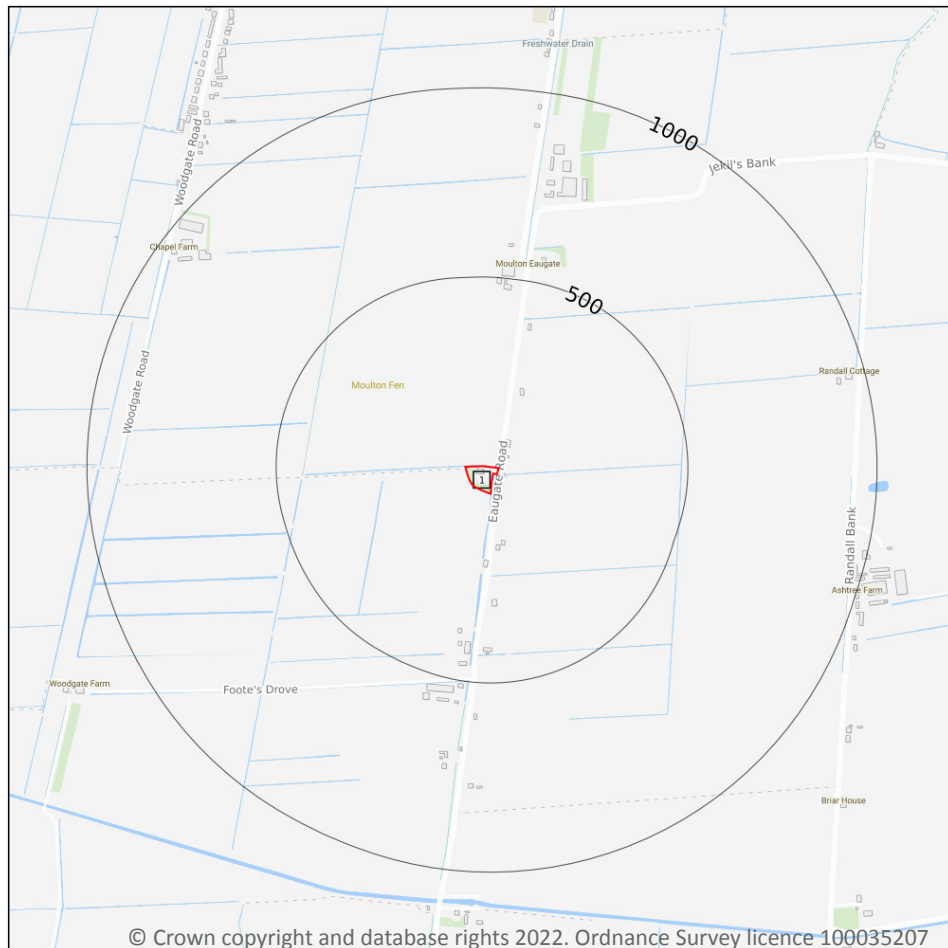
0

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

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



— Site Outline

Search buffers in metres (m)

□ Geological map tile

15.1 50k Availability

Records within 500m

1

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

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 60**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	No coverage	EW144_spalding_v4

This data is sourced from the British Geological Survey.



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

15.2 Artificial and made ground (50k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

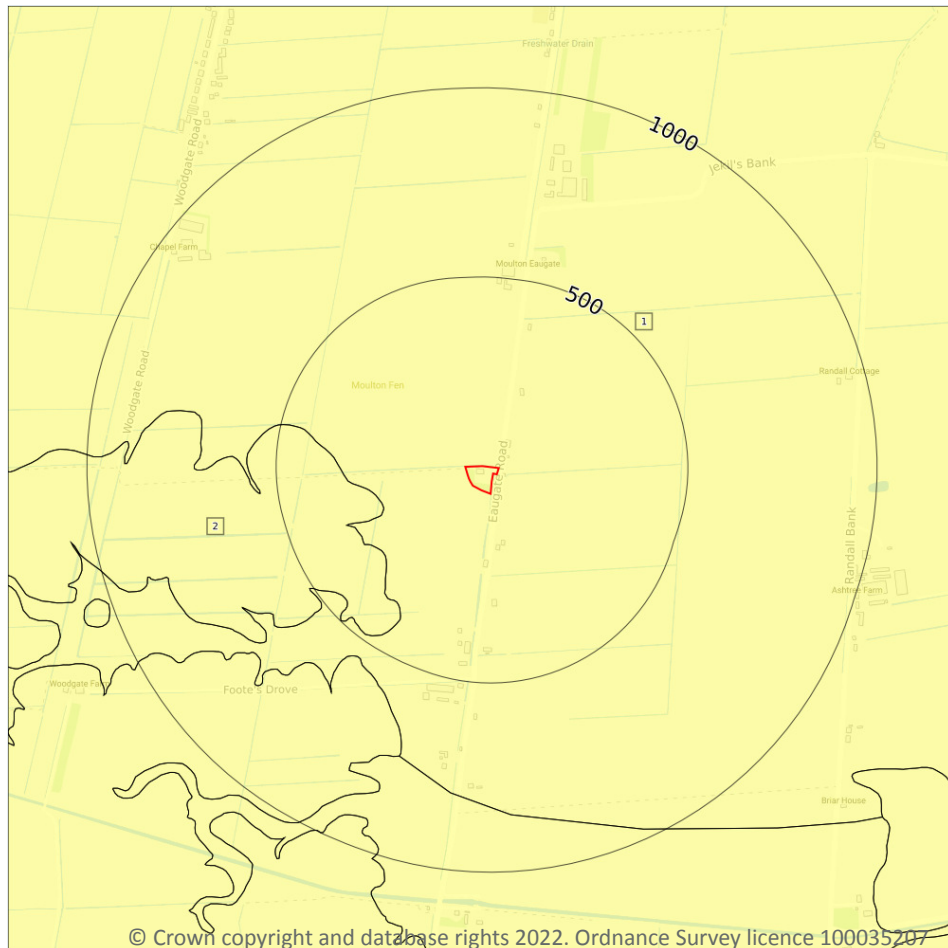
0

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

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

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

15.4 Superficial geology (50k)

Records within 500m

2

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

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 62**

ID	Location	LEX Code	Description	Rock description
1	On site	TFD-XCZ	TIDAL FLAT DEPOSITS	CLAY AND SILT
2	238m W	TFD1-XCZ	TIDAL FLAT DEPOSITS, 1	CLAY AND SILT

This data is sourced from the British Geological Survey.



15.5 Superficial permeability (50k)

Records within 50m**2**

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

Location	Flow type	Maximum permeability	Minimum permeability
On site	Intergranular	Low	Very Low
On site	Intergranular	Low	Very Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m**0**

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

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

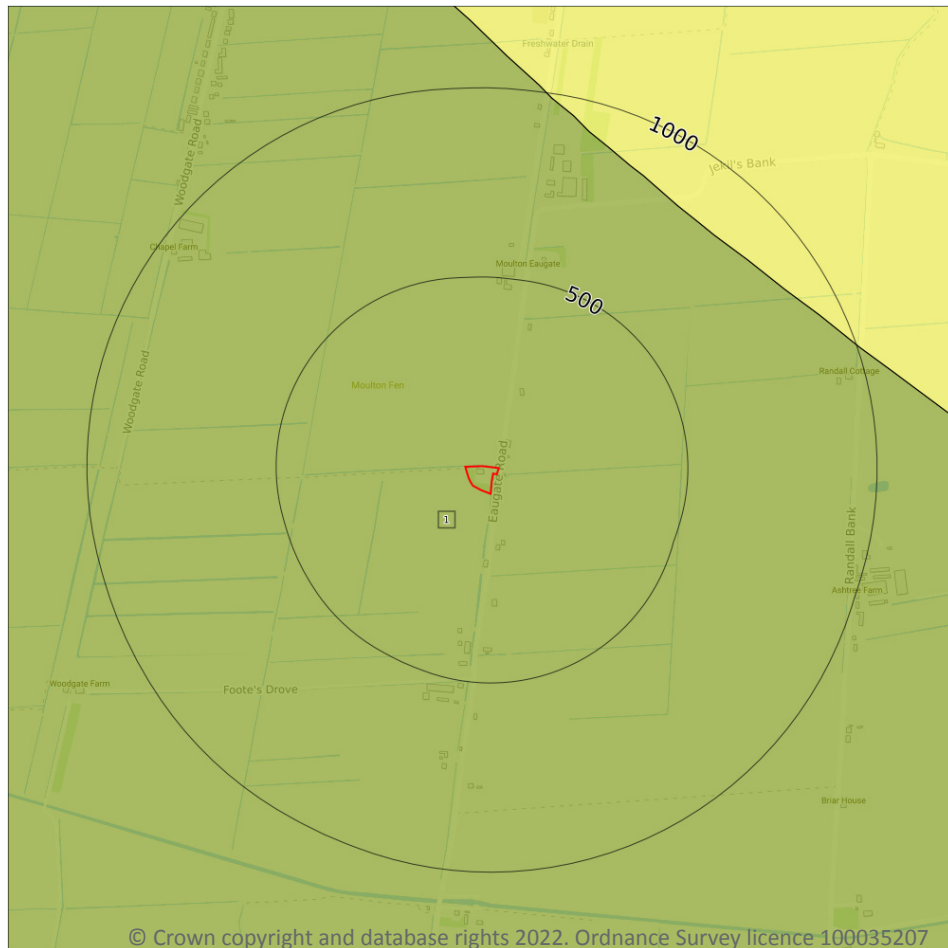
Records within 50m**0**

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

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Bedrock



— Site Outline

Search buffers in metres (m)

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

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

15.8 Bedrock geology (50k)

Records within 500m

1

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

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 64**

ID	Location	LEX Code	Description	Rock age
1	On site	OXC-MDST	OXFORD CLAY FORMATION - MUDSTONE	CALLOVIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m**2**

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

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

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m**0**

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

This data is sourced from the British Geological Survey.



16 Boreholes

16.1 BGS Boreholes

Records within 250m

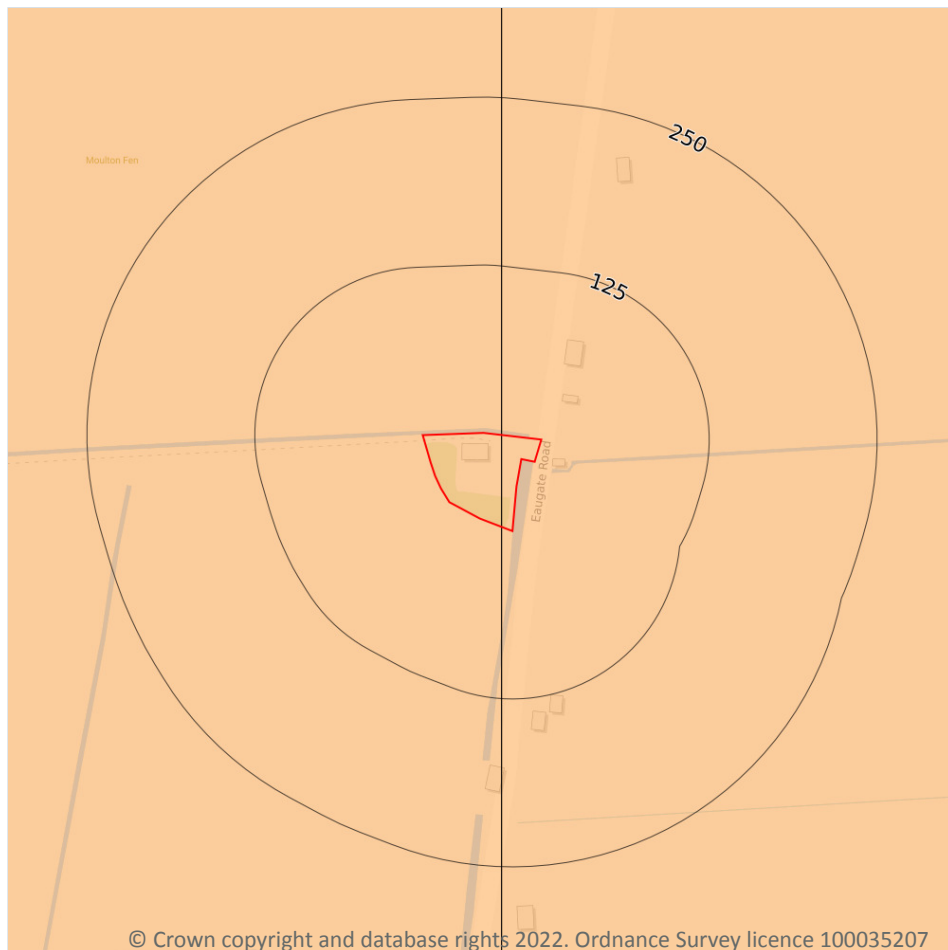
0

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

This data is sourced from the British Geological Survey.



17 Natural ground subsidence - Shrink swell clays



— Site Outline
Search buffers in metres (m)

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

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17.1 Shrink swell clays

Records within 50m

1

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

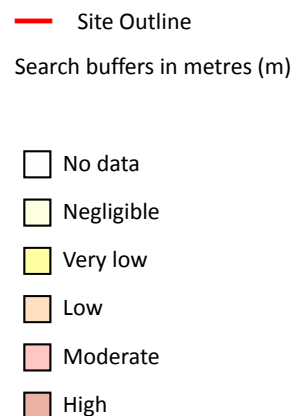
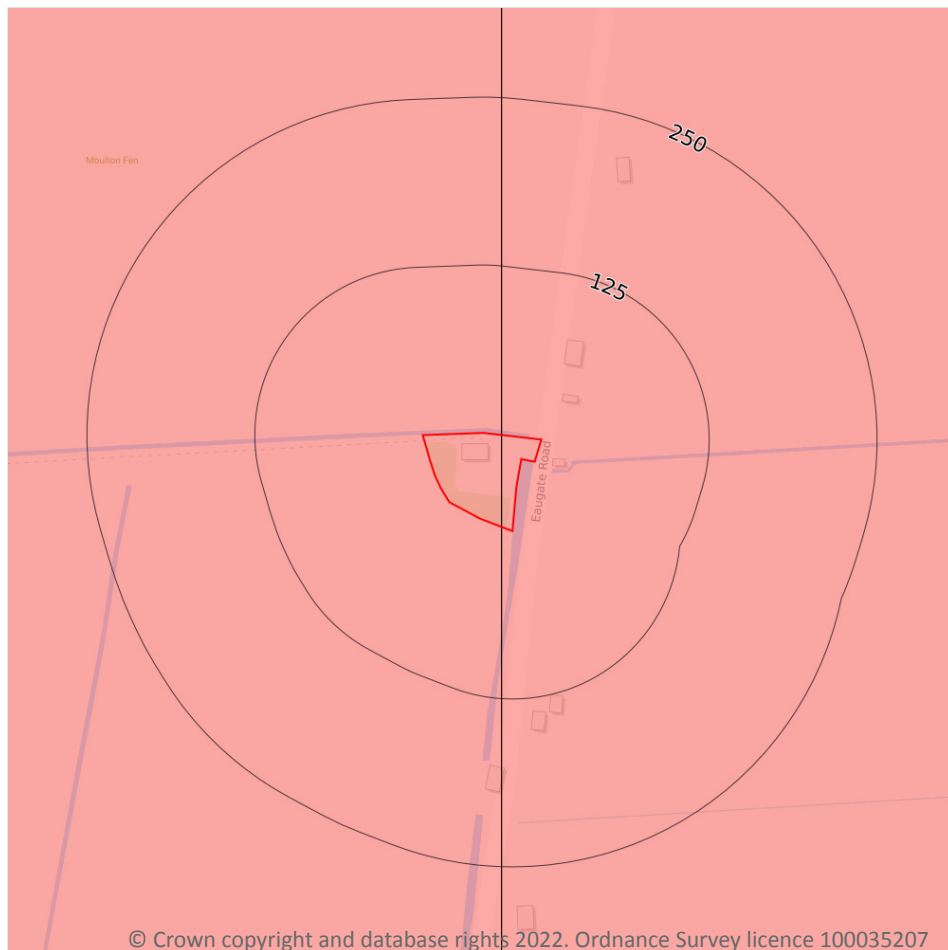
Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 67**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Running sands



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17.2 Running sands

Records within 50m

1

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

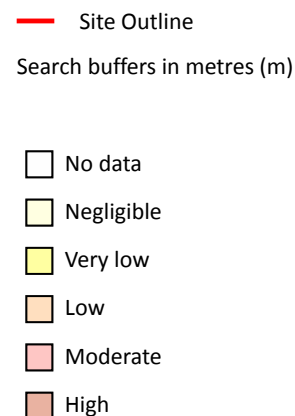
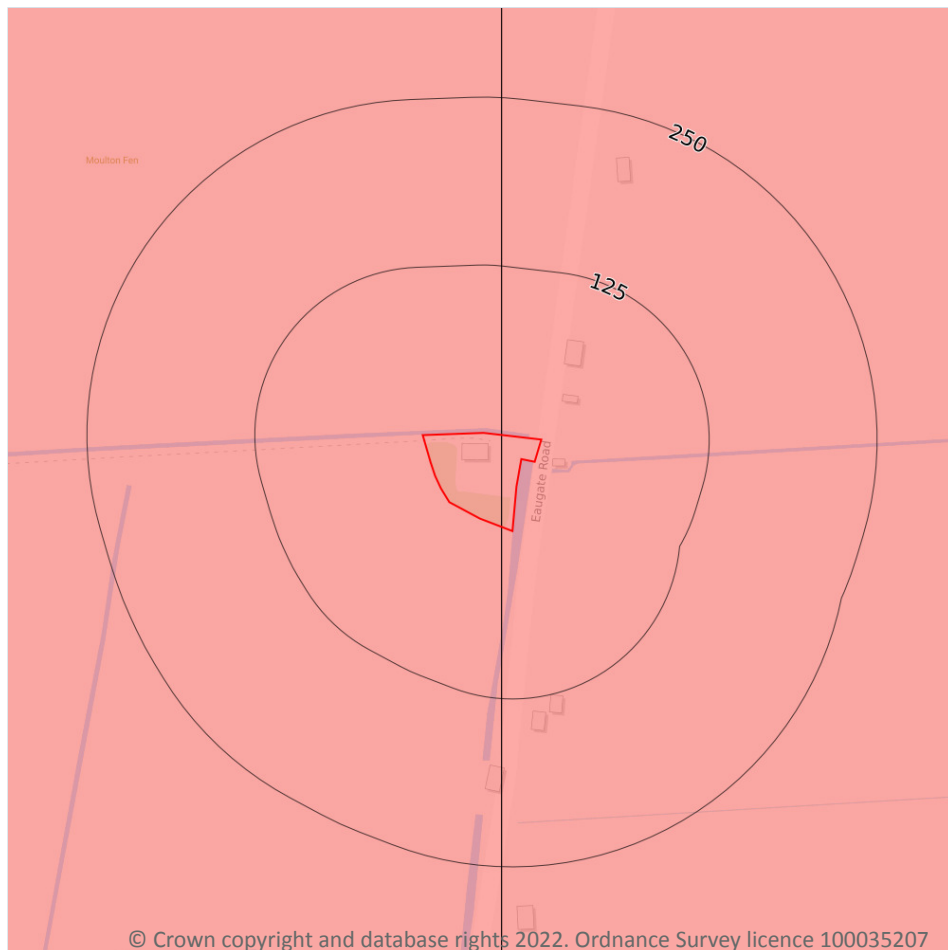
Features are displayed on the Natural ground subsidence - Running sands map on **page 68**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Compressible deposits



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17.3 Compressible deposits

Records within 50m

1

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

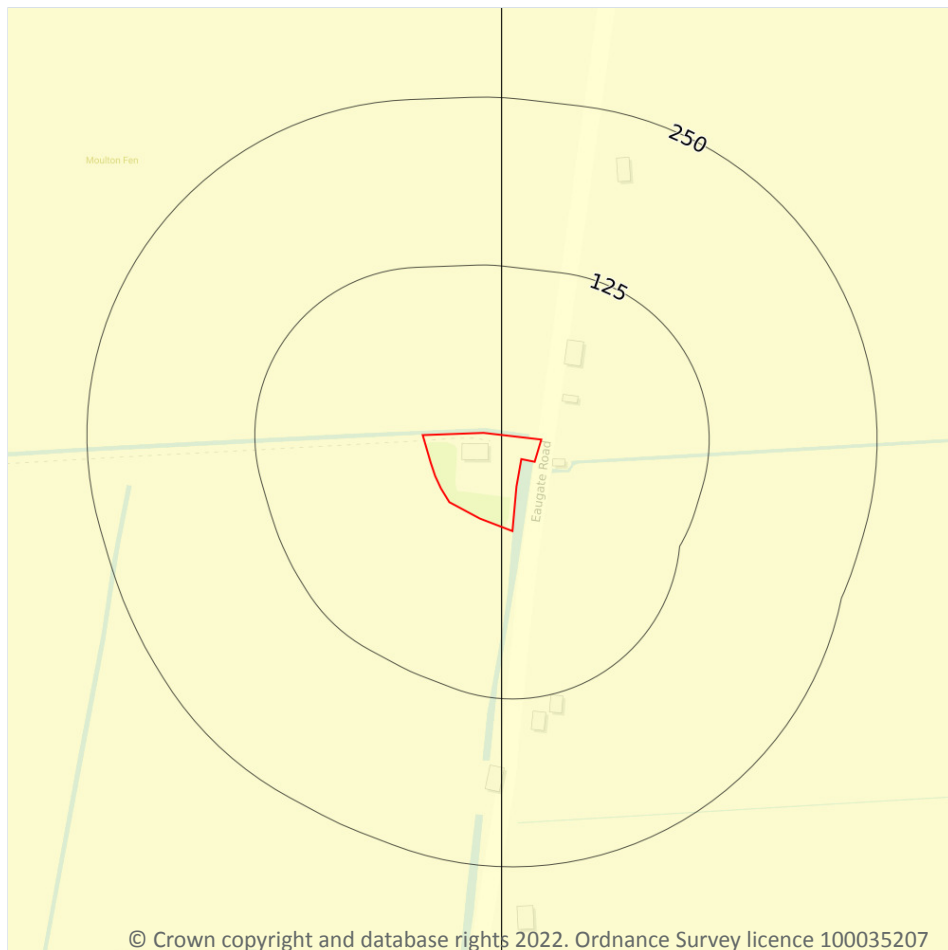
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 69**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Collapsible deposits



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

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17.4 Collapsible deposits

Records within 50m

1

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

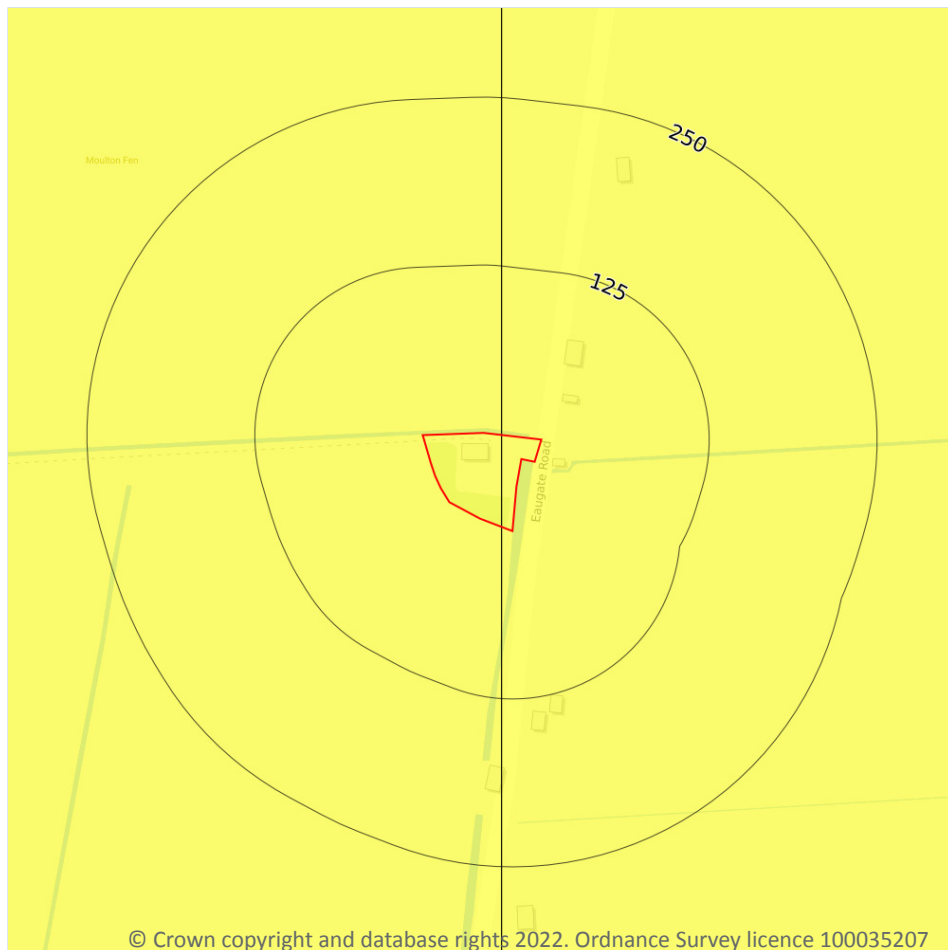
Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 70**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Landslides



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

17.5 Landslides

Records within 50m

1

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

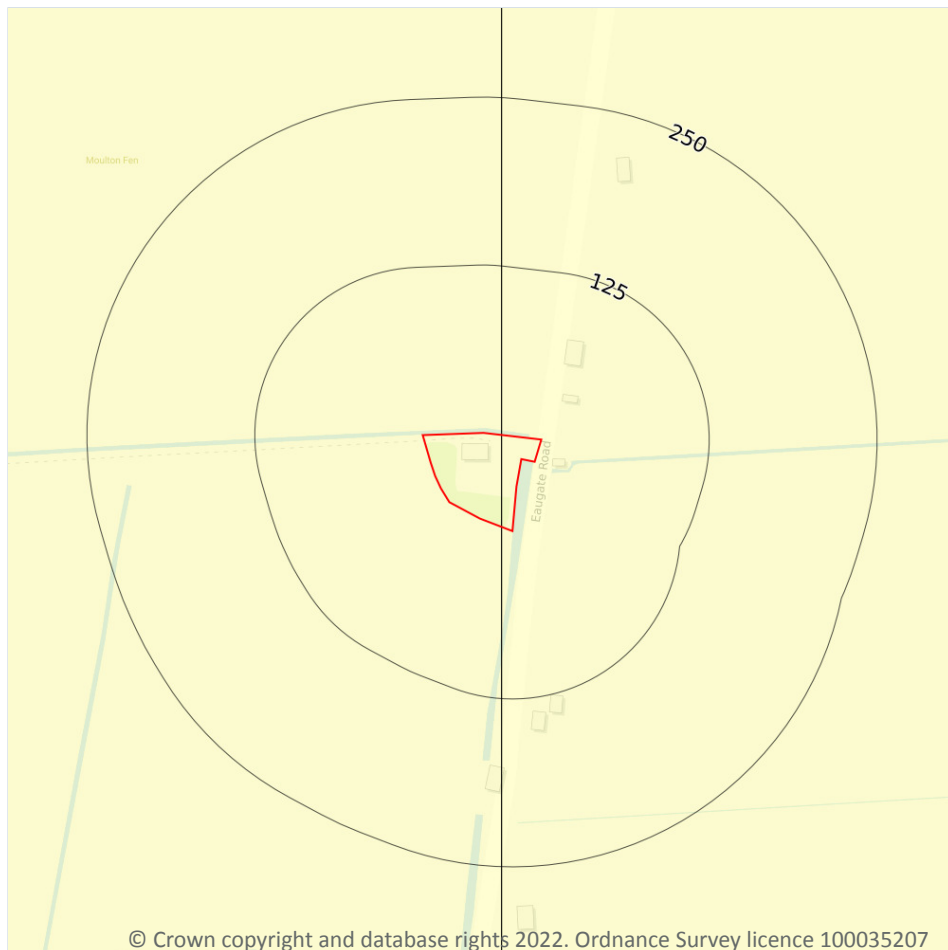
Features are displayed on the Natural ground subsidence - Landslides map on **page 71**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Ground dissolution of soluble rocks



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

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17.6 Ground dissolution of soluble rocks

Records within 50m

1

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

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 72**

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

This data is sourced from the British Geological Survey.



18 Mining, ground workings and natural cavities

18.1 Natural cavities

Records within 500m

0

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

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m

0

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

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m

0

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

This data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m

0

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

This data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

0

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

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

0

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

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m

0

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

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site

0

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

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site

0

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

This data is sourced from the Coal Authority.



18.10 Brine areas

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

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

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

18.11 Gypsum areas

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

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

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

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

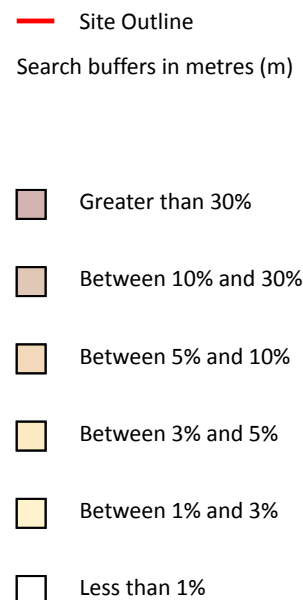
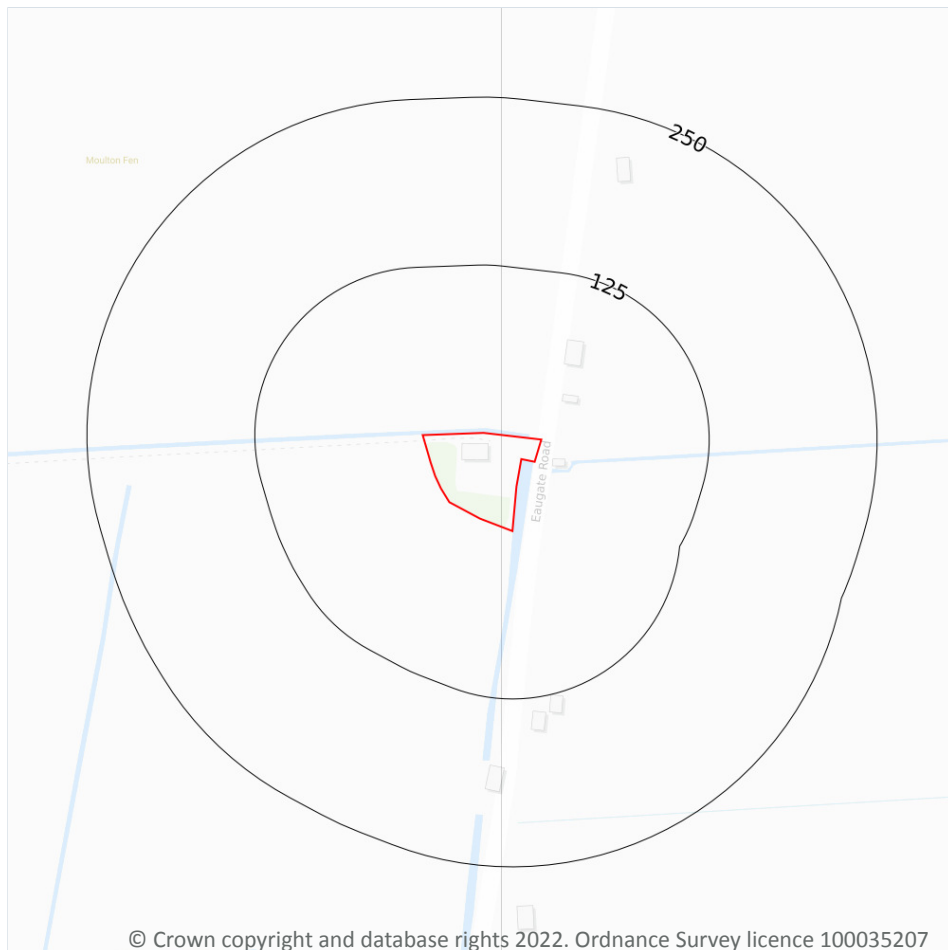
18.13 Clay mining

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

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

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

19 Radon



19.1 Radon

Records on site

1

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

Features are displayed on the Radon map on **page 76**

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

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



20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

3

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

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

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

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

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m

0

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

This data is sourced from the British Geological Survey.



21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0
---------------------	---

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

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0
---------------------	---

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

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0
---------------------	---

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0
---------------------	---

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

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0
---------------------	---

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



This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m

0

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

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m

0

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

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m

0

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

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m

0

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

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m

0

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

This data is sourced from HS2 Ltd.



Data providers

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

Terms and conditions

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



Appendix 3

Records of Boreholes WS1 to WS5 Results of gas/water monitoring

L I M I T E D
Tel: 01733-566566
www.groundengineering.co.uk

Date: 10/02/22

Hole Size:	67mm dia to 2.00m
	57mm dia to 3.00m

Ground
Level:

REMARKS	1. Starter pit excavated from 0.00m to 1.20m depth 2. Hole collapsed at 2.20m depth	Project No 15587	
		Scale 1:25	Page 1/1

[illegible]

L I M I T E D
Tel: 01733-566566
www.groundengineering.co.uk

Date: 10/02/22

Hole Size: 87mm dia to 2.00m
77mm dia to 3.00m

Ground
Level:

REMARKS	1. Starter pit excavated from 0.00m to 1.20m depth 2. Gas monitoring standpipe installed to 3.00m depth	Project No 15587	
		Scale 1:25	Page 1/1

KEY		Groundwater Strikes						Groundwater Observations			
		Depth m						Date	Depth m		
		No	Struck	Rose to	Rate	Cased	Sealed		Hole	Casing	Water
D - Disturbed Sample	J - Jar Sample	1	3.00	2.61			not	10/02/22	3.00		2.61
U - Undisturbed Sample	V - Vane Shear Test							08/03/22	3.00		2.46
W - Water Sample	Cohesion () kPa							15/03/22	3.00		2.50
☒ Water Strike	P () - Hand Penetrometer							22/03/22	3.00		2.46
☒c Depth to Water on completion	☒s Standpipe Level										

L I M I T E D
Tel: 01733-566566
www.groundengineering.co.uk

Date: 10/02/22

Hole Size: 77mm dia to 2.00m
57mm dia to 3.00m

Ground
Level:

REMARKS	1. Starter pit excavated from 0.00m to 1.20m depth	Project No 15587	
		Scale 1:25	Page 1/1

KEY		Groundwater Strikes						Groundwater Observations			
		Depth m						Date	Depth m		
		No	Struck	Rose to	Rate	Cased	Sealed		Hole	Casing	Water
D - Disturbed Sample	J - Jar Sample							10/02/22	2.30		dry
U - Undisturbed Sample	V - Vane Shear Test										
W - Water Sample	Cohesion () kPa										
∇ Water Strike	P () - Hand Penetrometer										
∇c Depth to Water on completion	Cohesion () kPa										
	∇s Standpipe Level										

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: EAUGATE ROAD, MOULTON EAUGATE, SPALDING				WINDOW SAMPLE WS4																																	
			Date: 10/02/22		Hole Size: 87mm dia to 2.00m 77mm dia to 3.00m		Ground Level:																																	
Samples and in-situ Tests			(Date) Water	Inst.	Description of Strata	Legend	Depth m	O.D. Level m																																
Depth m	Type	Result																																						
0.10	D1			MADE GROUND - Dark brown, clayey SILT.		0.20																																		
0.30	D2			MADE GROUND - Brown, silty SAND AND GRAVEL of brick, ash and clinker.		0.40																																		
0.60	D3			MADE GROUND - Stiff, friable, dark brown, fine sandy SILT.		0.70																																		
0.90	D4			Brown, locally mottled orange brown, very silty, fine SAND.		2.00																																		
1.20 1.20-2.00	D5 U1			(TIDAL FLAT DEPOSIT)																																				
2.00 2.00-3.00	D6 U2			Brown, very silty, fine SAND.																																				
3.00	D7			(TIDAL FLAT DEPOSIT)		3.00																																		
			Hole completed at 3.00m depth																																					
REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth 2. Gas monitoring standpipe installed to 3.00m depth						Project No 15587																																		
						Scale 1:25	Page 1/1																																	
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed Sample W - Water Sample Water Strike Depth to Water on completion J - Jar Sample MP - Mackintosh Probe V - Vane Shear Test Cohesion () kPa P() - Hand Penetrometer Cohesion () kPa Standpipe Level			Groundwater Strikes Depth m <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>No</th> <th>Struck</th> <th>Rose to</th> <th>Rate</th> <th>Cased</th> <th>Sealed</th> </tr> <tr> <td>1</td> <td>3.00</td> <td>2.61</td> <td></td> <td></td> <td>not</td> </tr> </table>			No	Struck	Rose to	Rate	Cased	Sealed	1	3.00	2.61			not	Groundwater Observations Depth m <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Date</th> <th>Hole</th> <th>Casing</th> <th>Water</th> </tr> <tr> <td>10/02/22</td> <td>3.00</td> <td></td> <td>2.61</td> </tr> <tr> <td>08/03/22</td> <td>3.00</td> <td></td> <td>2.40</td> </tr> <tr> <td>15/03/22</td> <td>3.00</td> <td></td> <td>2.40</td> </tr> <tr> <td>22/03/22</td> <td>3.00</td> <td></td> <td>2.37</td> </tr> </table>			Date	Hole	Casing	Water	10/02/22	3.00		2.61	08/03/22	3.00		2.40	15/03/22	3.00		2.40	22/03/22	3.00		2.37
No	Struck	Rose to	Rate	Cased	Sealed																																			
1	3.00	2.61			not																																			
Date	Hole	Casing	Water																																					
10/02/22	3.00		2.61																																					
08/03/22	3.00		2.40																																					
15/03/22	3.00		2.40																																					
22/03/22	3.00		2.37																																					

GROUND ENGINEERING LIMITED Tel: 01733-566566 www.groundengineering.co.uk			Site: EAUGATE ROAD, MOULTON EAUGATE, SPALDING				WINDOW SAMPLE WS5					
			Date: 10/02/22		Hole Size: 87mm dia to 2.00m 77mm dia to 3.00m		Ground Level:					
Samples and in-situ Tests			(Date)	Inst.	Description of Strata		Legend	Depth m	O.D. Level m			
			Water									
Depth m	Type	Result										
0.10	D1				MADE GROUND - Dark brown, silty SAND AND GRAVEL of black siltstone and clinker.			0.20				
0.30	D2				MADE GROUND - Dark brown, fine sandy SILT.							
0.60	D3											
0.90	D4				Brown and orange brown, very silty, fine SAND.			0.80				
1.20 1.20-2.00	D5 U1											
2.00 2.00-3.00	D6 U2			(TIDAL FLAT DEPOSIT)			3.00					
3.00	D7			Pit completed at 3.00m depth								
REMARKS			1. Starter pit excavated from 0.00m to 1.2m depth 2. Gas monitoring standpipe installed to 3.00m depth						Project No 15587			
									Scale 1:25	Page 1/1		
KEY D - Disturbed Sample J - Jar Sample B - Bulk Sample MP - Mackintosh Probe U - Undisturbed Sample V - Vane Shear Test W - Water Sample Cohesion () kPa ∇ - Water Strike P() - Hand Penetrometer ∇c - Depth to Water Cohesion () kPa on completion ∇s - Standpipe Level			Groundwater Strikes						Groundwater Observations			
			Depth m						Depth m			
			No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
			1	3.00	2.60			not	10/02/22	3.00		2.60
							08/03/22	3.00		2.44		
							15/03/22	3.00		2.43		
							22/03/22	3.00		2.41		

GROUND ENGINEERING LIMITED

Groundwater/Gas Monitoring Record

Site: Former Agricultural Premises, Eaugate Road, Moulton Eaugate, Spalding

Report Ref: C15587

Date	Borehole No.	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Flow Rate (l/hr)	Atmosph. Pressure (mb)	Depth of Well (m bgl)	Depth to Groundwater (m bgl)
		Peak	Steady	Peak	Steady	Min.	Max.				
8/03/22	WS2	<0.1	<0.1	4.0	4.0	17.0	17.0	<0.1	1012	3.00	2.46
15/03/22	WS2	<0.1	<0.1	3.9	3.9	16.7	16.7	<0.1	1020	3.00	2.50
22/03/22	WS2	<0.1	<0.1	3.8	3.8	16.7	16.7	<0.1	1028	3.00	2.46
8/03/22	WS4	<0.1	<0.1	2.3	2.3	18.0	18.0	<0.1	1012	3.00	2.40
15/03/22	WS4	<0.1	<0.1	2.3	2.3	18.1	18.1	<0.1	1020	2.70	2.40
22/03/22	WS4	<0.1	<0.1	2.3	2.3	17.6	17.6	<0.1	1028	3.00	2.37
8/03/22	WS5	<0.1	<0.1	3.8	3.8	17.6	17.6	<0.1	1013	3.00	2.44
15/03/22	WS5	<0.1	<0.1	3.0	3.0	19.1	19.1	<0.1	1020	3.00	2.43
22/03/22	WS5	<0.1	<0.1	3.2	3.2	18.1	18.1	<0.1	1028	3.00	2.41

Appendix 4

Laboratory Chemical Test Results



Final Report

Report No.: 22-05314-1
Initial Date of Issue: 18-Feb-2022
Client Ground Engineering Limited
Client Address: Newark Road
Peterborough
Cambridgeshire
PE1 5UA
Contact(s): John Gibb
Project C15587 Eaugate Road, Moulton
Eaugate, Spalding

Quotation No.:		Date Received:	14-Feb-2022
Order No.:	C15587	Date Instructed:	14-Feb-2022
No. of Samples:	15		
Turnaround (Wkdays):	5	Results Due:	18-Feb-2022
Date Approved:	18-Feb-2022		

Approved By:

Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: C15587 Eaugate Road, Moulton Eaugate, Spalding

Client: Ground Engineering Limited	Chemtest Job No.:				22-05314	22-05314	22-05314	22-05314	22-05314	22-05314	22-05314	22-05314
Quotation No.:	Chemtest Sample ID.:				1371404	1371405	1371406	1371407	1371408	1371409	1371410	1371411
Order No.: C15587	Client Sample Ref.:				D2	D5	D7	D1	D5	D7	D3	D5
	Sample Location:				WS1	WS1	WS1	WS2	WS2	WS2	WS3	WS3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.3	1.2	2.0	0.1	1.2	3.0	0.6	1.2
	Date Sampled:				10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022
	Asbestos Lab:				DURHAM			DURHAM			DURHAM	
Determinand	Accred.	SOP	Units	LOD								
pH	M	2010		4.0	8.2			8.2			8.0	
Moisture	N	2030	%	0.020	19	16	27	16	18	27	17	14
Stones and Removed Materials	N	2030	%	0.020	< 0.020			< 0.020			< 0.020	
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	2.0			1.6			1.9	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.20			0.032			0.031	
Cyanide (Free)	M	2300	mg/kg	0.50	16			12			10	
Cyanide (Total)	M	2300	mg/kg	0.50	27			24			15	
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.5			1.5			1.6	
Arsenic	M	2450	mg/kg	1.0	13			12			7.1	
Cadmium	M	2450	mg/kg	0.10	0.11			0.18			0.10	
Chromium	M	2450	mg/kg	1.0	26			28			15	
Copper	M	2450	mg/kg	0.50	14			24			23	
Mercury	M	2450	mg/kg	0.10	< 0.10			0.12			0.38	
Nickel	M	2450	mg/kg	0.50	19			14			9.7	
Lead	M	2450	mg/kg	0.50	19			38			36	
Selenium	M	2450	mg/kg	0.20	0.31			0.21			0.24	
Zinc	M	2450	mg/kg	0.50	58			72			92	
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50			< 0.50			< 0.50	
Organic Matter	M	2625	%	0.40	2.2			7.2			4.3	
Acenaphthene	M	2700	mg/kg	0.10	< 0.10			1.5			0.34	
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10			0.84			0.21	
Anthracene	M	2700	mg/kg	0.10	0.26			5.0			0.57	
Benzo[a]anthracene	M	2700	mg/kg	0.10	0.85			15			1.5	
Benzo[a]pyrene	M	2700	mg/kg	0.10	1.1			18			1.4	
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	1.3			21			1.8	
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10			11			2.0	
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	0.53			8.7			0.95	
Chrysene	M	2700	mg/kg	0.10	0.73			14			2.0	
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10			3.9			0.28	
Fluoranthene	M	2700	mg/kg	0.10	1.6			31			3.5	
Fluorene	M	2700	mg/kg	0.10	< 0.10			1.0			0.27	
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10			13			0.94	
Naphthalene	M	2700	mg/kg	0.10	< 0.10			2.4			3.1	
Phenanthrene	M	2700	mg/kg	0.10	0.52			14			2.7	
Pyrene	M	2700	mg/kg	0.10	1.7			31			3.2	
Total Of 16 PAH's	M	2700	mg/kg	2.0	8.6			190			25	
Total Phenols	M	2920	mg/kg	0.10	< 0.10			< 0.10			< 0.10	
ACM Type	U	2192		N/A	-			-			-	

Results - Soil

Project: C15587 Eaugate Road, Moulton Eaugate, Spalding

Client: Ground Engineering Limited	Chemtest Job No.:				22-05314	22-05314	22-05314	22-05314	22-05314	22-05314	22-05314	22-05314
Quotation No.:	Chemtest Sample ID.:				1371404	1371405	1371406	1371407	1371408	1371409	1371410	1371411
Order No.: C15587	Client Sample Ref.:				D2	D5	D7	D1	D5	D7	D3	D5
	Sample Location:				WS1	WS1	WS1	WS2	WS2	WS2	WS3	WS3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.3	1.2	2.0	0.1	1.2	3.0	0.6	1.2
	Date Sampled:				10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022
	Asbestos Lab:				DURHAM			DURHAM			DURHAM	
Determinand	Accred.	SOP	Units	LOD								
Asbestos Identification	U	2192		N/A	No Asbestos Detected			No Asbestos Detected			No Asbestos Detected	
Soil Colour	N	2040		N/A	Brown	Brown	Grey	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	None	Stones and Roots	None	None	Roots	None
Soil Texture	N	2040		N/A	Loam	Sand	Sand	Loam	Sand	Sand	Loam	Sand
Total TPH >C6-C40	M	2670	mg/kg	10	< 10	< 10	< 10	930	< 10	< 10	78	< 10

Results - Soil

Project: C15587 Eaugate Road, Moulton Eaugate, Spalding

Client: Ground Engineering Limited	Chemtest Job No.:				22-05314	22-05314	22-05314	22-05314	22-05314	22-05314	22-05314
Quotation No.:	Chemtest Sample ID.:				1371412	1371413	1371414	1371415	1371416	1371417	1371418
Order No.: C15587	Client Sample Ref.:				D7	D2	D5	D7	D2	D5	D7
	Sample Location:				WS3	WS4	WS4	WS4	WS5	WS5	WS5
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				3.0	0.3	1.2	3.0	0.1	1.2	3.0
	Date Sampled:				10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022
	Asbestos Lab:					DURHAM			DURHAM		
Determinand	Accred.	SOP	Units	LOD							
pH	M	2010		4.0		8.1			8.0		
Moisture	N	2030	%	0.020	28	17	13	26	20	16	26
Stones and Removed Materials	N	2030	%	0.020		< 0.020			< 0.020		
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40		1.4			1.2		
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010		0.025			0.017		
Cyanide (Free)	M	2300	mg/kg	0.50		10			7.3		
Cyanide (Total)	M	2300	mg/kg	0.50		12			8.6		
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50		1.6			1.6		
Arsenic	M	2450	mg/kg	1.0		14			11		
Cadmium	M	2450	mg/kg	0.10		0.12			0.16		
Chromium	M	2450	mg/kg	1.0		21			18		
Copper	M	2450	mg/kg	0.50		26			25		
Mercury	M	2450	mg/kg	0.10		0.38			0.51		
Nickel	M	2450	mg/kg	0.50		12			12		
Lead	M	2450	mg/kg	0.50		140			150		
Selenium	M	2450	mg/kg	0.20		0.20			0.29		
Zinc	M	2450	mg/kg	0.50		85			120		
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50			< 0.50		
Organic Matter	M	2625	%	0.40		5.3			7.8		
Acenaphthene	M	2700	mg/kg	0.10		0.89			0.34		
Acenaphthylene	M	2700	mg/kg	0.10		0.42			0.23		
Anthracene	M	2700	mg/kg	0.10		1.4			0.49		
Benzo[a]anthracene	M	2700	mg/kg	0.10		3.2			2.0		
Benzo[a]pyrene	M	2700	mg/kg	0.10		3.0			2.1		
Benzo[b]fluoranthene	M	2700	mg/kg	0.10		3.4			2.6		
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10		1.8			2.0		
Benzo[k]fluoranthene	M	2700	mg/kg	0.10		1.2			1.2		
Chrysene	M	2700	mg/kg	0.10		4.2			2.7		
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10		0.43			0.31		
Fluoranthene	M	2700	mg/kg	0.10		7.1			4.4		
Fluorene	M	2700	mg/kg	0.10		0.80			0.34		
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10		1.7			1.3		
Naphthalene	M	2700	mg/kg	0.10		6.1			2.4		
Phenanthrene	M	2700	mg/kg	0.10		6.8			3.2		
Pyrene	M	2700	mg/kg	0.10		6.8			4.1		
Total Of 16 PAH's	M	2700	mg/kg	2.0		49			30		
Total Phenols	M	2920	mg/kg	0.10		< 0.10			< 0.10		
ACM Type	U	2192		N/A		-			-		

Results - Soil

Project: C15587 Eaugate Road, Moulton Eaugate, Spalding

Client: Ground Engineering Limited	Chemtest Job No.:				22-05314	22-05314	22-05314	22-05314	22-05314	22-05314	22-05314
Quotation No.:	Chemtest Sample ID.:				1371412	1371413	1371414	1371415	1371416	1371417	1371418
Order No.: C15587	Client Sample Ref.:				D7	D2	D5	D7	D2	D5	D7
	Sample Location:				WS3	WS4	WS4	WS4	WS5	WS5	WS5
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				3.0	0.3	1.2	3.0	0.1	1.2	3.0
	Date Sampled:				10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022	10-Feb-2022
	Asbestos Lab:					DURHAM			DURHAM		
Determinand	Accred.	SOP	Units	LOD							
Asbestos Identification	U	2192		N/A		No Asbestos Detected			No Asbestos Detected		
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	None	Stones	None	None	Stones	None	None
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Loam	Sand	Sand
Total TPH >C6-C40	M	2670	mg/kg	10	< 10	30	< 10	< 10	51	< 10	< 10

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline 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.
2450	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; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
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