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SITE INVESTIGATION REPORT

LAND ADJACENT WESTMERE FARM
OFF NEW ROAD
SUTTON BRIDGE
LINCOLNSHIRE

Report Reference C14691

On behalf of:-

Mr & Mrs Hoyles
c/o Trundley Design Services
Salgate Barn
Islington Road
Tilney All Saints
King's Lynn
PE34 4RY

April 2019

MR & MRS HOYLES

TRUNDLEY DESIGN SERVICES

CONTAMINATION INVESTIGATION REPORT

FOR

PROPOSED RESIDENTIAL REDEVELOPMENT

AT

BARN ADJACENT WESTMERE FARM

OFF NEW ROAD

SUTTON BRIDGE

LINCOLNSHIRE

Report Reference No. C14691 **April 2019**

INTRODUCTION

The client, Mr & Mrs Hoyles, proposes to convert and extend a barn at land adjacent Westmere Farm, off New Road, Sutton Bridge in Lincolnshire.

Ground Engineering Limited was commissioned by the client, under the direction of Trundley Design Services, to carry out a site investigation to determine the nature and chemical properties of the underlying soils, and provide a contamination assessment report. A desk study including historical and environmental aspects of the site is included within this report. No foundation design recommendations were required within the scope of this report.

LOCATION, TOPOGRAPHY AND GEOLOGY OF THE SITE

The site is located on a plot of land on the north-eastern side of Westmere Farm, off New Road, Sutton Bridge in Lincolnshire. The site is approximately 1.5km north of Sutton Bridge in a rural area. The site is approximately 80m long fronting a field boundary to the south, and is approximately 40m deep. The National Grid Reference for the centre of the site is TF 4737 2286 and its location is shown on a plan following this report text.

At the time of the investigation in January 2019, an old brick barn was present in the northern part of the site, and the area around the barn had been cleared of undergrowth. An area with fragments of suspected asbestos containing roof sheets was present in the southern part of the site. A Cypress hedge was present along the south-western boundary, beyond which were residential properties. The site was bounded by fields to the north, east and south. The site was accessed from a track in the south-western corner of the site. Photographs from a site walkover on 28th January 2019 are presented following the plans.

This part of Sutton Bridge stands at about 4.0mOD, within the low lying Lincolnshire Fens. The site is approximately 130m west of the eastward flowing Westmere Creek, and 1.3km west of the River Nene.

The geological map, sheet 145 (1978) at 1:50,000 scale, shows superficial Terrington Beds (now named Tidal Flat Deposits), overlying the solid geology of the Ampthill Clay Formation at depth. Previous investigations by Ground Engineering Limited in this area found Marine Sand below the anticipated near surface Terrington Beds. The site is within land reclaimed during the 17th Century.

HISTORY OF THE SITE

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

Extract studied	*Description*
1887 Lincolnshire Sheets 136SE & 144NE Scale 1:10,560 **Figure A**	The site contains barns on the north-eastern side of Westmere Farm. A pond is shown in the south-western corner of the site. A track is present along the western edge of the site. The site is surrounded by fields, and a small orchard to the east. A pump is shown within a field 25m west of the site, and a small pond is shown 90m south of the site. Westmere Creek is shown approximately 130m east of the site.
1888 Lincolnshire Sheets 136.15 & 144.3 Scale 1:2500 **Figure B**	The site and immediate surrounding area are unchanged. A pump is denoted on the northern side of the barns.
1904 Lincolnshire Sheets 136.15 & 144.3 Scale 1:2500 **Figure C**	The eastern part of the barns is no longer shown. A new pump is denoted on the southern edge of the site, and a well is shown in the north-western part of the site. The orchard is no longer denoted to the east of the site, however a new orchard is shown on the western side of the farm. The pump in the field to the west is no longer shown.
1929-31 Lincolnshire Sheets 136SE & 144NE Scale 1:10,560 **Figure D**	The barns remain on the site, however the pond in the south-western part of the site is no longer shown. A second pump is denoted on the southern edge of the site. A new building in an enclosure is shown to the west of the site. The footpath has been re-routed around the northern edge of the site. New buildings are also shown in the fields to the south and south-east of the site. Two new buildings are also shown approximately 130m south-west of the site beyond Westmere Farm.
1958 OS Sheet TF42SE Scale 1:10,560 **Figure E**	The site and immediate surrounding area appear unchanged, however the pumps are no longer denoted on the southern edge of the site.
1971 OS sheets TF4722 & TF4723 Scale 1:2500 **Figure F**	The western part of the barns is no longer shown, and the well in this area is no longer denoted. A new outbuilding is shown in the eastern part of the site. A drain is shown to the north of the site, along the line of the former footpath which is no longer denoted. A new drain is also shown 50m south-east of the site, connecting to Westmere Creek. Buildings have been cleared 25m and 130m to the south-west of the site, and new buildings are shown to the south-west and south of the site.

Extract studied	*Description*
1991 OS Sheet TF42SE Scale 1:10,000 **Figure G**	Only the northern part of the former barns remains on the site. Buildings have also been cleared to the south and south-west of the site, and the drain to the south-east is no longer denoted.
1995 OS sheets TF4722 & TF4723 Scale 1:2500 **Figure H**	The site and immediate surrounding area appear generally unchanged. The farmhouse to the south-west has been extended.
2002 Raster Map Scale 1:10,000 **Figure I**	The site area appears unchanged. Part of the drain to the north of the site has been infilled.
2010 OS Sheet TF42SE Scale 1:10,000 **Figure J**	The site area appears unchanged. A building has been cleared to the south-west of the site, and another section of the drain to the north of the site has been infilled.
2015 GroundSure Aerial Photograph of Site (Appendix 2)	The site contains the barn in the northern area, and is otherwise grassed and overgrown. Houses are evident to the south-west, and the remainder of the site is surrounded by fields.
2018 OS sheets TF4722 & TF4723 Not to Scale **Figure K**	The site area appears unchanged. A small drain is denoted along a field boundary to the south-west of the site.

Summary of Historical Information

The Ordnance Survey map of 1887 showed that the site contained barns, part of Westmere Farm, and with a pond in its south-western corner. Parts of the barns had been demolished by 1904, and in the 1970s and 1980s, leaving the northern section of the barns which is on the site today. The pond in the south-western part of the site was infilled between 1904 and 1929. The site had the barn in the north, and the surrounding area had been cleared of any overgrowth at the time of this investigation.

Off-site, Westmere Farm house and outbuildings were present to the south-west. Outbuildings were built to the south and south-west, and others demolished to the present day. Houses are currently present to the south-west of the site.

SUMMARY OF ENVIRONMENTAL DATA

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

1. Historical Industrial Sites	**On-Site**	**0 - 250m**
Potentially Contaminative Uses (1:10,000 mapping)	0	1
Historical Tank Database	No data	No data
Historical Energy Features Database	No data	No data
Historical Petrol & Fuel Site Database	No data	No data
Historical Garage & Motor Vehicle Repair Database	No data	No data
Potentially Infilled Land	0	0
2. Environmental Permits, Incidents and Registers	**On-Site**	**0 - 250m**
Sites Holding Environmental Permits/Authorisations	0	0
Records of COMAH and NIHHS Sites	0	0
Environment Agency Recorded Pollution Incidents	0	0
Sites Determined as Contaminated Land under Part IIA EPA 1990	0	0
3. Landfill and Other Waste Sites	**On-Site**	**0 - 250m**
Landfill Sites	0	0
Landfill and Other Waste Sites	0	0
4. Current Land Use	**On-Site**	**0 - 250m**
Current Industrial Sites Data	0	0
Records of Petrol and Fuel Sites	0	0
Underground High Pressure Oil and Gas Pipelines	0	0
5. Geology		
Artificial Ground or Made Ground records	No	
Superficial Ground and Drift Geology records	Yes	
6. Hydrogeology and Hydrology	**On-Site**	**0 - 250m**
Productive strata within superficial geology	No	
Productive strata within solid geology	No	
Groundwater Abstraction Licences	0	0
Surface Water Abstraction Licences	0	0
Potable Water Abstraction Licences	0	0
Source Protection Zones	0	0
River Quality Data	No	No
Water Network Entries	0	10
Surface Water Features	No	Yes

7. Flooding		
Environment Agency indicative Zone 2 floodplains within 250m of site	Yes	
Environment Agency indicative Zone 3 floodplains within 250m of site	Yes	
Risk of flooding from rivers & the sea (RoFRaS) rating	Low	
Flood defences within 250m of site	No	
Any areas benefitting from flood defences within 250m of site	No	
Flood storage areas within 250m of site	No	
Maximum BGS groundwater flooding susceptibility within 50m of site	Not prone	
BGS confidence rating for groundwater susceptibility areas	Not applicable	
8. Designated Environmentally Sensitive Sites	**On Site**	**0 - 250m**
Environmentally sensitive sites	0	0

9. Natural Hazards (on site)					
Hazard	**Negligible**	**Very Low**	**Low**	**Moderate**	**High**
Shrinking or Swelling Clay	-	-	On-site	-	-
Landslides	-	On-site	-	-	-
Soluble rocks	On-site	-	-	-	-
Compressible Ground	-	-	-	On-site	-
Collapsible Rocks	On-site	-	-	-	-
Running Sand	-	-	-	On-site	-

9.2. Radon
The property is not in a Radon Affected Area, as less than 1% of properties are above the action level. No Radon Protective Measures are required for new properties or extensions.

10. Mining	
Coal mining areas within 75m of site	No
Non coal-mining areas within 50m of site	No
Brine affected areas within 75m of study site	No

Database Summary

Historical maps identify a pump 3m south of the site. No areas of potentially infilled land are recognised on, or around the site, with the former ponds and drains not recognised.

No pollution incidents, landfills or other waste sites are recorded within 250m of the site.

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

The closest surface water features comprise a drain, recorded 102m south-west, and Westmere Creek recorded 112m south-east of the site. The site is within a Zone 2 and Zone 3 floodplain, and has a low risk of flooding. The site is not within an environmentally sensitive area.

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

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

PRELIMINARY RISK ASSESSMENT

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

In order to assess the risks associated with the presence of ground contamination the linkages between the sources and potential receptors to contamination need to be established and evaluated. This is in accordance with the Environmental Protection Act 1990, which provides a statutory definition of Contaminated Land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that;

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

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

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

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

Table 1: Identified Potential Contaminant Sources

Contaminant Source	*Comments*
Drainage/Existing Building	Drains could provide a contaminant source. The barn appears to have cement-bound asbestos containing roof sheets.
Soil Beneath Site	Contamination may be present within made ground on the site, such as from spillages during its farm use and infilling the former pond in the south-west of the site.
Soil Gas	Potential soil gas generated from made ground or natural soils, or infill to drains or ponds.
Ground Contamination Outside Site Boundary	Ground contamination migrating from adjoining sites, such as the nearby farm to the south-west.

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

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

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

Table 2: Human Receptors and Pathways

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

Table 3: Water Receptors and Pathways

Receptor-Water Environment	*Typical Exposure Pathway*
Groundwater The Superficial Tidal Flat Deposits are indicated to be an ôUnproductiveõ stratum. The underlying solid geology Ampthill Clay is also indicated to be an ôUnproductiveõ stratum. The site is not within a Source Protection Zone.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and migrate to underlying groundwater. Contamination leads to restriction/prevention of use as a resource, for example, drinking water, and can have secondary impacts on other resources, which depend on it.
Surface Water/Watercourses The nearest surface water features are a drain 102m to the south-west and Westmere Creek 112m to the south-east of the site.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and laterally migrate. Contamination leads to a restriction/prevention of use: -as drinking water resource -for amenity use Effects on aquatic life.

Preliminary Conceptual Model

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

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

Table 4: Preliminary Conceptual Model Relative to Residential Development

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

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

SITE WORK

The site work conducted on 28th January 2019 comprised four hand excavated trial pits (HA1, HA2, HA3 and HA4). The positions are shown on the exploratory hole location plan following this report text.

Public utility service drawings were consulted prior to determining the exploratory hole positions. Prior to excavation, a service scan was made at each position using a CAT (Cable Avoidance Tool) to check for the absence of detectable buried services that may otherwise have been damaged by the investigation.

The exploratory hole records, presented following the plans, give the descriptions and depths of the various strata encountered, details of all samples taken, and the groundwater conditions observed during and on completion of excavation.

Hand Excavated Trial Pits

Trial pits HA1, HA2, HA3 and HA4 were excavated using hand digging tools across the site which included proposed garden areas. The exposed strata were logged and sampled by a Geoenvironmental Engineer, and samples collected for subsequent laboratory testing.

Representative disturbed samples were taken at regular intervals throughout the depth of the pits.

On completion, the trial pits were backfilled with arisings and the surfaces reinstated.

LABORATORY WORK

The samples were inspected in the laboratory and assessments of the soil characteristics have been taken into account during preparation of the exploratory hole records. The soil descriptions have been made in accordance with BS5930:2015. The chemical test results are presented following the exploratory hole records.

Chemical analysis of four soil samples recovered from the exploratory holes was undertaken by an independent laboratory, primarily for characterisation purposes. The samples were tested for a suite encompassing a wide range of potential contaminants outlined by the Environment Agency (EA) and National House Building Council (NHBC) document R&D 66; 2008 ó Guidance for the Safe Development of Housing on Land Affected by Contaminationô.

GROUND CONDITIONS

The ground conditions comprised a 0.70m to 1.00m thick surface layer of made ground, and was in turn underlain by the expected superficial Tidal Flat Deposit soils, which were proved to at least the base of the exploratory holes at a maximum depth of 1.50m. No groundwater was recorded within 1.50m depth.

Made Ground

A 0.70m to 1.00m thick surface layer of made ground, which generally comprised brown and dark brown, slightly gravelly, sandy silt/clay fill, varying to clayey, silty, sand and gravel fill, was encountered at all positions. The gravel fraction comprised angular to rounded, flint, quartzite, ash, clinker, brick, mortar, with occasional wire and wood fragments.

At surface in the southern part of the site, fragments of roof sheets which may have contained asbestos were observed. These are suspected to be remnants from the previous demolition of barns in this area. The remaining part of the barn on the site has corrugated roof sheets which look similar.

Tidal Flat Deposits

Beneath the made ground at between 0.70m and 1.00m depth, light brown and orange brown, locally clayey, silty fine sand, considered to represent Tidal Flat Deposits, was encountered to at least the base of these holes, and were proved to a maximum depth of 1.50m below ground level in HA1.

Groundwater

The 1.20m to 1.50m deep holes were dry during excavation and on completion.

Observations

Live roots were observed to a maximum 0.50m depth in HA2. The pit sides were stable during excavation and on completion.

Evidence of Contamination

The made ground encountered during this investigation was not noted to have olfactory or visual evidence of fuel contamination. The made ground contained fragments of brick, concrete, clinker, ash and rare bone. Other than the broken roof sheet fragments suspected to contain asbestos, at surface in the southern part of the site, no asbestos containing materials were noted in the soils during excavation or examination in the laboratory.

COMMENTS ON THE SOIL CHEMICAL TEST RESULTS

The results of the laboratory chemical testing on near surface soil samples have primarily been compared to soil screening values (SSVs) produced by Land Quality Management Limited (LQM) and the Chartered Institute for Environmental Health (CIEH) presented in their document ôThe LQM/CIEH S4ULs for Human Health Risk Assessment: 2015 (Publication Number S4UL3608)ô. 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 ótrigger valuesô 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 1.04 and 1.06 software. With the absence of a S4UL for cyanide the ATRISKsoil SSV has been used as the soil screening criteria within this report.

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

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

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

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

Table 5 compares the test results for the made ground with the SSVs in relation to the specified uses. The number of test results, which exceed these values, are also provided.

Table 5: Comparison of Chemical Test Results with SSVs for Made Ground Soils

Determinand	Number of Samples	Min Value mg/kg	Max Value mg/kg	Number of Samples Exceeding SSV for			Assessment Method	Soil Screening Criteria 2.5% SOM		
				Residential with home grown produce	Residential without home grown produce	Commercial/ Industrial		Residential with home grown produce mg/kg	Residential without home grown produce mg/kg	Commercial/ Industrial mg/kg
Organic Matter	4	2.6%	12%	-	-	-	-	-	-	-
Arsenic	4	15	32	0	0	0	S4UL	37	40	640
Cadmium	4	0.14	1.7	0	0	0	S4UL	11	85	190
Chromium (III)*	4	13	21	0	0	0	S4UL	910	910	8600
Chromium (VI)	4	<0.50	<0.50	0	0	0	S4UL	6	6	33
Lead	4	21	130	0	0	0	C4SL	200	310	2330
Mercury	4	<0.10	0.20	0	0	0	S4UL	11	15	320
Selenium	4	<0.20	0.86	0	0	0	S4UL	250	430	12,000
Nickel	4	15	30	0	0	0	S4UL	130	180	980
Phenols	4	<0.30	<0.30	0	0	0	S4UL	200	690	690
Benzo[a]pyrene	4	<0.10	6.5	1	1	0	S4UL	0.98	1.2	15
Copper	4	11	56	0	0	0	S4UL	2400	7100	68,000
Zinc	4	56	440	0	0	0	S4UL	3700	40,000	730,000
Free Cyanide	4	<0.50	<0.50	0	0	0	ATRISK	34	34	34

Notes

*The concentration of Trivalent Chromium is assumed to be equivalent to the Total Chromium concentration. This is because most naturally occurring chromium is in the trivalent (chromic) state.

S4UL and C4SL for metals were derived using 6% SOM. These values are not sensitive to SOM and would also be applicable for 1% SOM and 2.5% SOM.

LQM/CIEH S4ULs ©Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3608. All rights reserved©.

ATRISKsoil SSVs produced by Atkins Limited and provided under licence to Ground Engineering Limited.

Discussion of Soil Results

The results of the laboratory analysis indicate that the made ground in the area of HA4, in the northern part of site, contains an elevated concentration of benzo[a]pyrene at 0.40m depth, which exceeded the soil screening criteria for residential with home grown produce and residential without home grown produce end uses. This elevated concentration of benzo[a]pyrene is thought to be due to the ash and clinker within the sample.

The benzo[a]pyrene concentrations did not exceed the associated soil screening criteria for a commercial/industrial end use, representative of areas to be covered by buildings and permanent hardstanding.

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

Statistical analysis would not be meaningful for such a small dataset and has not been undertaken.

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

No asbestos containing materials (ACM) were noted within the near surface soils during sampling, or during analysis in the chemical laboratory. Fragments of cement-bound roof sheet which may contain asbestos were observed at surface in part of the southern area of the site.

The results indicate that the made ground would be suitable for retention beneath areas of buildings and permanent hardstanding, and at the surface in the proposed residential setting, as long as the soils from the area of HA4 are not within a soft landscaped area and any fragments of roof sheeting are hand-picked from the soil.

The client has indicated that the southern part of the site, which is understood to contain the proposed garden areas, is to be raised by approximately 0.60m above the existing ground level. This should be done with certified clean imported topsoil.

UPDATED CONCEPTUAL MODEL

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

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

Table 6: General Conceptual Model Relative to Future Residential Development

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

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

COMMENTS ON GROUND CONTAMINATION IN RELATION TO PROPOSED DEVELOPMENT

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

The proposed development is understood to comprise converting and extending an existing barn, with associated garden and hardstanding areas.

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

Contaminated Soil

On the basis of the ground investigation, the site is underlain by between 0.70m and 1.00m of made ground resting on naturally deposited Tidal Flat Deposits. The chemical testing has identified a single elevated benzo[a]pyrene concentration (HA4), within the soils in respect to gardens and landscaped areas of the proposed residential end use. The concentration of benzo[a]pyrene recorded however does not exceed the guidance level for hardstanding areas, representative of the proposed end use of this part of the site, and therefore would be considered suitable for retention if the soils are suitable for engineering purposes.

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

It is understood from Trundley Design Services that it proposed to build up the southern garden part of the site by approximately 0.60m. The existing made ground soils in the area of HA4 would not be suitable for re-use. Any soil imported to site must be certified as "suitable for use".

Drainage/Existing Building

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

It is recommended that an asbestos survey of the building is conducted prior to any demolition or extension works. Suitable precautions, in line with current best practice, should be put in place to protect workers from the effects of asbestos containing materials, during demolition or building works.

Soil Gas

There are no landfills within 250m of the site. The site is underlain by a layer of made ground, covering superficial, silty sand soils.

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

The site lies within an area where less than 1% of homes are above the BRE action level for radon and that no radon protection measures are required.

Human Health - Construction Workers

With the exception of the suspected cement-bound asbestos containing roof sheet fragments at surface in the southern part of the site, the made ground would be considered unlikely to affect the groundworkers during the construction phase of development.

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

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

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

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

c) Suitable precautions, in line with current best practice, should be put in place to protect workers from the effects of asbestos containing material, during the construction phase. The existing roof sheets should be removed, and roof sheet fragments should be hand-picked and disposed of at a suitably licensed facility.

d) Generation of dust should be limited by damping-down and asbestos fragments should not be crushed.

e) 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.

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

Human Health - Users of Completed Development

The risk of the made ground affecting the site users in a residential setting, would be considered to be very low.

The results of the chemical analysis undertaken would indicate that the made ground could be considered suitable for retention/re-use at the surface in any garden, landscaped or planted areas, as long as the soils from the HA4 area are not used or re-used within proposed garden or landscaped areas.

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

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

Water Environment

The site is underlain by superficial Tidal Flat Deposits, indicated by the EA to be an ôUnproductiveô stratum, which covers the solid geology Ampthill Clay Formation, also indicated by the EA to be an ôUnproductiveô stratum. The nearest surface water feature is a drain 102m south-west of the site. The site does not lie within a source protection zone.

No groundwater was recorded within 1.50m depth during this investigation.

The risk to the water environment is considered very low as it is unlikely that the proposed development would impact the quality of the water environment.

Effects on Buried Services

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

Off-Site Disposal of Soil Arisings

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

determined by the waste type. Asbestos containing materials would be considered hazardous and should be appropriately disposed of.

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

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

CONCLUSIONS

The proposed development is understood to comprise converting and extending an existing barn, with associated gardens and hardstanding areas.

Remediation Strategy

The results of the chemical analysis would indicate that the made ground, except that from the HA4 area, should be considered to be suitable for retention/re-use at the surface within any new garden or landscaped areas.

The made ground could be considered for re-use beneath proposed buildings and permanent hardstanding, if suitable for engineering purposes, where it is unlikely to affect future users, however these soils could affect buried services.

Asbestos containing roof-sheet fragments should be removed from site and the existing barn by specially trained operatives and disposed of a suitably licensed landfill.

Topsoil

Any imported topsoil should have appropriate certificates confirming its suitability prior to placement.

REMEDIATION METHOD STATEMENT

The following points will constitute a plan for remedial works considered necessary in order to ensure that soils retained within the development are fit for use.

- The groundworks contractor should undertake a watching brief during works to check for polluted soil.
- It is understood from the client that 0.60m of imported soil is to be placed in garden and landscaped areas of the site, and the made ground on-site should be considered suitable for retention in the areas where it was found. Clean granular fill should be imported for use beneath proposed buildings and permanent hardstanding, where it is unlikely to affect future site users.
- Cement-bound roof sheet fragments suspected to contain asbestos should be removed from site by qualified operatives, and disposed of a suitably licensed landfill.
- If soils are revealed which are different to those encountered by this ground investigation, the advice of a specialist should be sought. Any such soils will either be immediately removed off site to a licensed disposal or treatment facility or placed within a designated quarantine zone on a membrane for future classification, treatment and/or removal.
- A photographic record of such remediation should be undertaken by the contractor.
- Any imported ócleanô inert topsoil and granular fill should be supported by verification certificates to provide proof of its suitability. Documentation relating to the source of clean inert topsoil should be presented to the Local Planning Authority for approval prior to infilling. Samples of any imported clean topsoil placed in the garden areas should be tested to verify that the soil is suitable for use.
- The Local Authority should also be informed regarding each stage of the works and photographic evidence together with copied waste transfer receipts for any arisings should be gathered, as they are essential to demonstrate the works.
- The local water supply company should be consulted if new buried plastic water pipes within the made ground soils on this site are proposed.

VALIDATION

No remediation will be required within the site for the proposed residential scheme if the soils remain in the current locations. A watching brief should be undertaken during construction and on completion, and appropriate records kept so that a Validation Report can be compiled and subsequently submitted to the local authority.

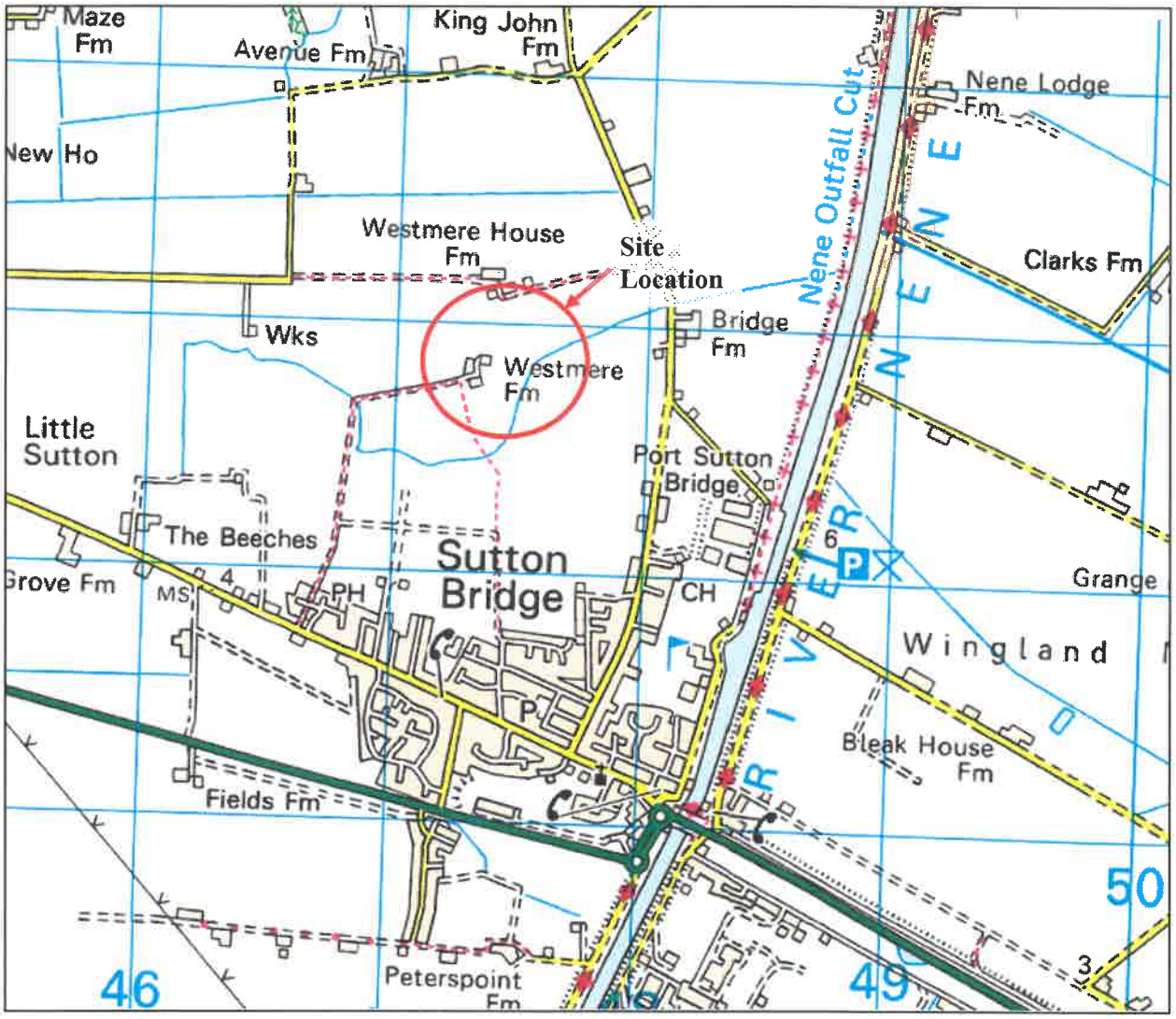
GROUND ENGINEERING LIMITED

S. WEATHERLEY
B.Eng.(Hons.),
C.Geol., F.G.S.,
Senior Geo-Environmental Engineer

C. M. J. EBELING
M.Sc., M.A.E.G.
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Director

Site Location Plan

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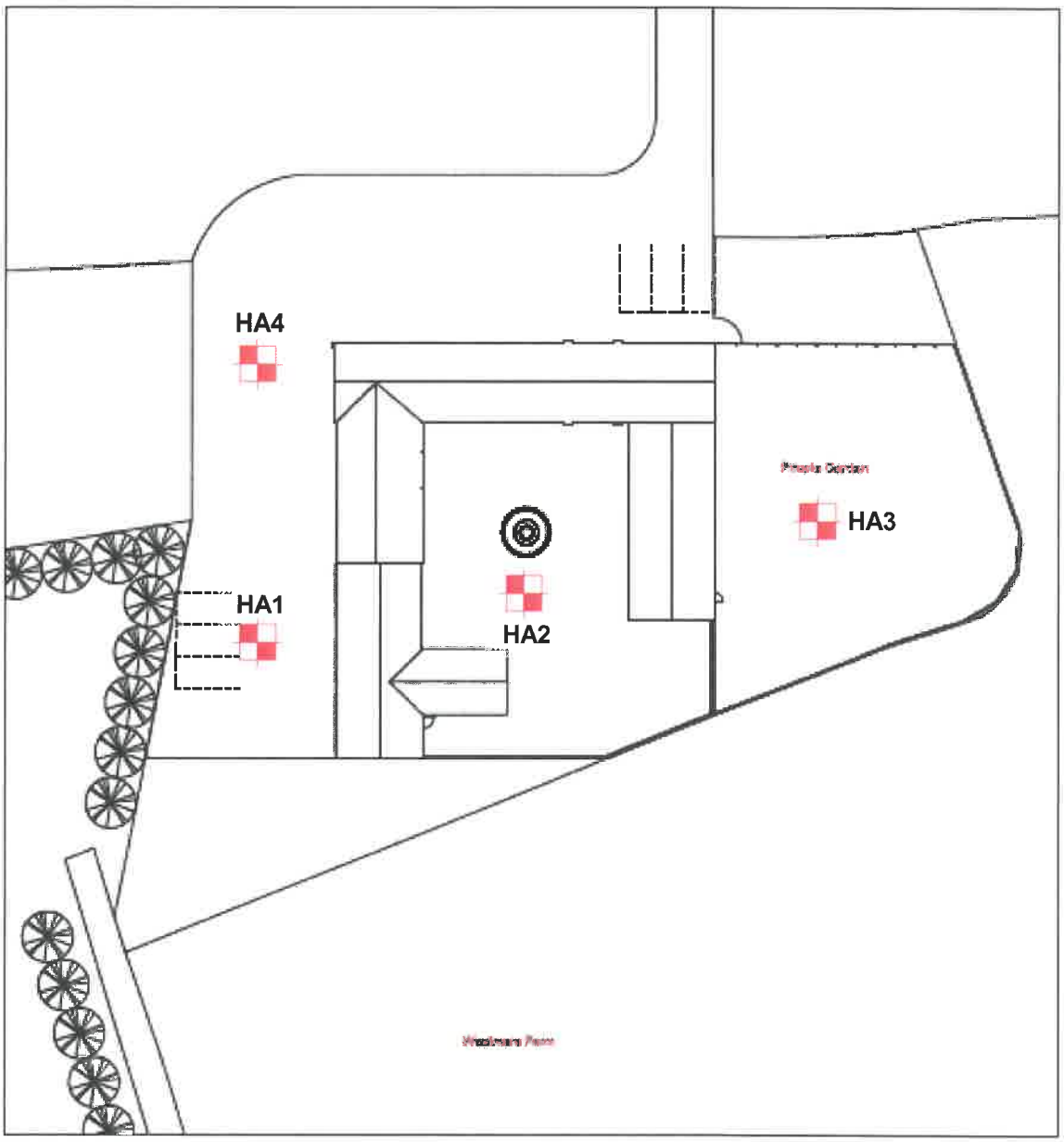


Not To Scale

Project : Land adjacent Westmere Farm, off New Road, Sutton Bridge, Lincolnshire **Client :** Mr & Mrs Hoyles	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** C14691

Exploratory Hole Location Plan

Based on proposed development plan provided by the client.





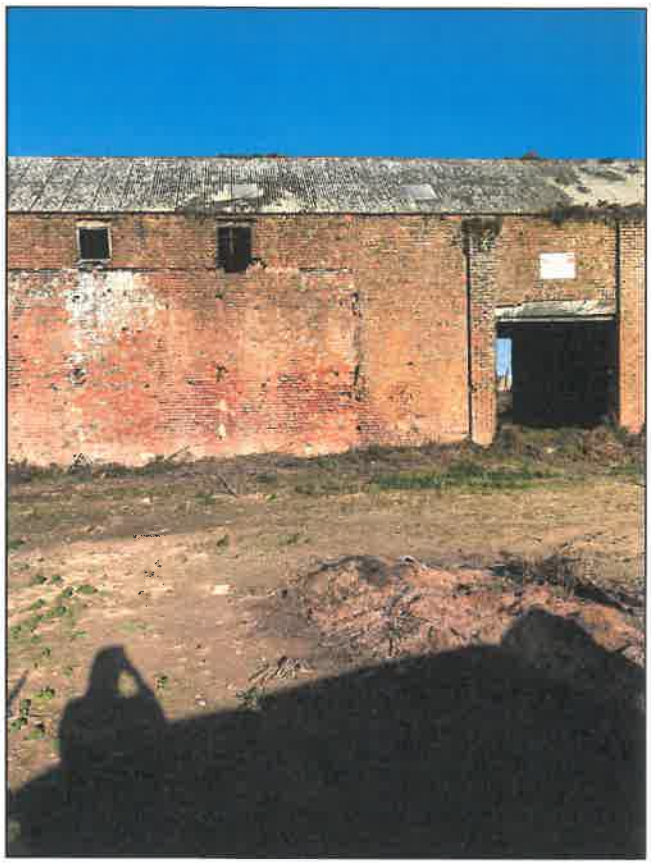
Not To Scale

Project : Land adjacent Westmere Farm, off New Road, Sutton Bridge, Lincolnshire **Client :** Mr & Mrs Hoyles	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No. C14691**

Site Photographs

Site Walkover 28th January 2019







Project : Land adjacent Westmere Farm, off New Road, Sutton Bridge, Lincolnshire **Client : Mr & Mrs Hoyles**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No. C14691**

Site Photographs

Site Walkover 28th January 2019







Project : Land adjacent Westmere Farm, off New Road, Sutton Bridge, Lincolnshire **Client : Mr & Mrs Hoyles**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No. C14691**

GROUND ENGINEERING LIMITED

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

Site: **LAND ADJ. WESTMERE FARM, SUTTON BRIDGE**

TRIAL PIT
HA1

Date: 28/01/19

Pit Size: 0.30m L x 0.30m W x 0.70m D.
Hole Size: 70mm dia to 1.50m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			MADE GROUND - Grey, silty, gravelly SAND. Gravel is angular and sub-angular clinker, ash, brick and mortar fragments.		0.20	
0.10	ES1						
0.50	D2			MADE GROUND - Brown and dark brown, slightly gravelly, sandy SILT. Sand is fine grained. Gravel is angular to rounded flint, quartzite, ash and brick fragments.			
0.50	ES2						
0.80	D3						
0.80	ES3					1.00	
1.10	D4			Brown and orange brown, clayey, sandy SILT with occasional carbonaceous traces. Sand is fine grained.			
1.30	D5			(TIDAL FLAT DEPOSIT)			
1.50	D6					1.50	
				Hole completed at 1.50m depth			

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

REMARKS
1. Live roots observed to 0.30m depth
2. Pit sides stable

Project No 14691

Scale 1:25

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GROUND ENGINEERING LIMITED

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

Site: **LAND ADJ. WESTMERE FARM, SUTTON BRIDGE**

TRIAL PIT
HA2

Date: 28/01/19

Pit Size: 0.30m L x 0.30m W x 0.80m D.
Hole Size: 70mm dia to 1.20m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			MADE GROUND - Brown, slightly gravelly, sandy SILT. Sand is fine grained. Gravel is angular to sub-rounded brick, quartzite and flint.			
0.10	ES1						
0.40	D2						
0.40	ES2					0.50	
				MADE GROUND - Yellow brown and brown, silty SAND AND GRAVEL. Gravel is angular to rounded quartzite, flint and occasional brick fragments.			
0.70	D3					0.80	
0.70	ES3						
1.00	D4			Light brown and orange brown, silty SAND. Sand is fine grained. (TIDAL FLAT DEPOSIT)			
1.20	D5					1.20	
				Hole completed at 1.20m depth			

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

REMARKS
1. Live roots observed to 0.50m depth
2. Pit sides stable

Project No 14691

Scale 1:25

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GROUND ENGINEERING LIMITED

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

Site: **LAND ADJ. WESTMERE FARM, SUTTON BRIDGE**

TRIAL PIT
HA3

Date: 28/01/19

Pit Size: 0.30m L x 0.30m W x 0.70m D.
Hole Size: 70mm dia to 1.20m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			MADE GROUND - Brown and light brown, slightly gravelly, sandy SILT with pockets of topsoil. Gravel is angular to sub-rounded flint, quartzite, occasional wire and wood fragments.			
0.10	ES1						
0.40	D2						
0.40	ES2						
0.60	D3						
0.60	ES3					0.70	
				Light brown and orange brown, silty SAND. Sand is fine grained.			
1.00-1.20	D4			(TIDAL FLAT DEPOSIT)			
						1.20	
				Hole completed at 1.20m depth			

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

REMARKS
1. Live roots observed to 0.30m depth
2. Pit sides stable

Project No	
14691	
Scale	Page
1:25	1/1

GROUND ENGINEERING LIMITED

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

Site: **LAND ADJ. WESTMERE FARM, SUTTON BRIDGE**

TRIAL PIT
HA4

Date: 28/01/19

Pit Size: 0.30m L x 0.30m W x 0.70m D.
Hole Size: 70mm dia to 1.20m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10 0.10	D1 ES1			MADE GROUND - Brown and dark brown, silty SAND AND GRAVEL. Gravel is angular to rounded flint.		0.20	
0.40 0.40	D2 ES2			MADE GROUND - Firm, brown, dark brown and light brown, sandy, gravelly, silty CLAY. Gravel is angular to rounded flint, quartzite, ash, clinker and brick fragments.		0.80	
0.70 0.70	D3 ES3			Orange brown and light brown, sandy, clayey SILT. Sand is fine grained. (TIDAL FLAT DEPOSIT)		1.20	
1.00-1.20	D4			Hole completed at 1.20m depth			

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

REMARKS
1. No live roots observed
2. Pit sides stable

Project No 14691

Scale 1:25

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

UKAS TESTING
2183

Final Report

Report No.:	19-03149-1
Initial Date of Issue:	07-Feb-2019
Client	Ground Engineering Limited
Client Address:	Newark Road Peterborough Cambridgeshire PE1 5UA
Contact(s):	Simon Weatherley
Project	SW/C14691 Land adjacent Westmere Farm, Sutton Bridge

Quotation No.:		**Date Received:**	29-Jan-2019
Order No.:	SW/C14691	**Date Instructed:**	29-Jan-2019
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	04-Feb-2019
Date Approved:	06-Feb-2019		

Approved By:

Details: Robert Monk, Technical Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: SW/C14691 Land adjacent Westmere Farm, Sutton Bridge

Client: Ground Engineering Limited			**Chemtest Job No.:**		19-03149	19-03149	19-03149	19-03149
Quotation No.:			**Chemtest Sample ID.:**		762885	762886	762887	762888
			Client Sample ID.:		D2	D2	D1	D2
			Sample Location:		HA1	HA2	HA3	HA4
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.40	0.10	0.40
			Date Sampled:		28-Jan-2019	28-Jan-2019	28-Jan-2019	28-Jan-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
pH	U	2010		N/A	7.8	8.7	8.4	8.2
Moisture	N	2030	%	0.020	17	15	16	16
Stones and Removed Materials	N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	1.4	0.73	0.72	0.80
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.019	0.043	< 0.010	0.013
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	1.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	3.5	0.96	1.5	3.7
Arsenic	U	2450	mg/kg	1.0	19	19	15	32
Cadmium	U	2450	mg/kg	0.10	1.7	0.26	0.14	0.24
Chromium	U	2450	mg/kg	1.0	21	15	13	20
Copper	U	2450	mg/kg	0.50	40	11	16	56
Mercury	U	2450	mg/kg	0.10	0.15	0.12	< 0.10	0.20
Nickel	U	2450	mg/kg	0.50	30	15	15	29
Lead	U	2450	mg/kg	0.50	120	57	21	130
Selenium	U	2450	mg/kg	0.20	< 0.20	0.76	0.60	0.86
Zinc	U	2450	mg/kg	0.50	440	75	56	99
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	11	2.6	2.8	12
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.19
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.4
Anthracene	U	2700	mg/kg	0.10	0.11	< 0.10	< 0.10	3.6
Benzo[a]anthracene	U	2700	mg/kg	0.10	0.28	< 0.10	< 0.10	7.1
Benzo[a]pyrene	U	2700	mg/kg	0.10	0.32	< 0.10	< 0.10	6.5
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	0.52	< 0.10	< 0.10	6.1
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.33	< 0.10	< 0.10	3.9
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.14	< 0.10	< 0.10	3.2
Chrysene	U	2700	mg/kg	0.10	0.26	< 0.10	< 0.10	6.3
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.0
Fluoranthene	U	2700	mg/kg	0.10	1.2	0.29	0.47	18
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.2
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.31	< 0.10	< 0.10	4.4
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.57
Phenanthrene	U	2700	mg/kg	0.10	0.74	< 0.10	0.35	11
Pyrene	U	2700	mg/kg	0.10	0.97	0.33	0.43	16
Total Of 16 PAH's	U	2700	mg/kg	2.0	5.2	< 2.0	< 2.0	91
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30

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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.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser. using N.N–dimethyl-p-phenylenediamine.
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.
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

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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"

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 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

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

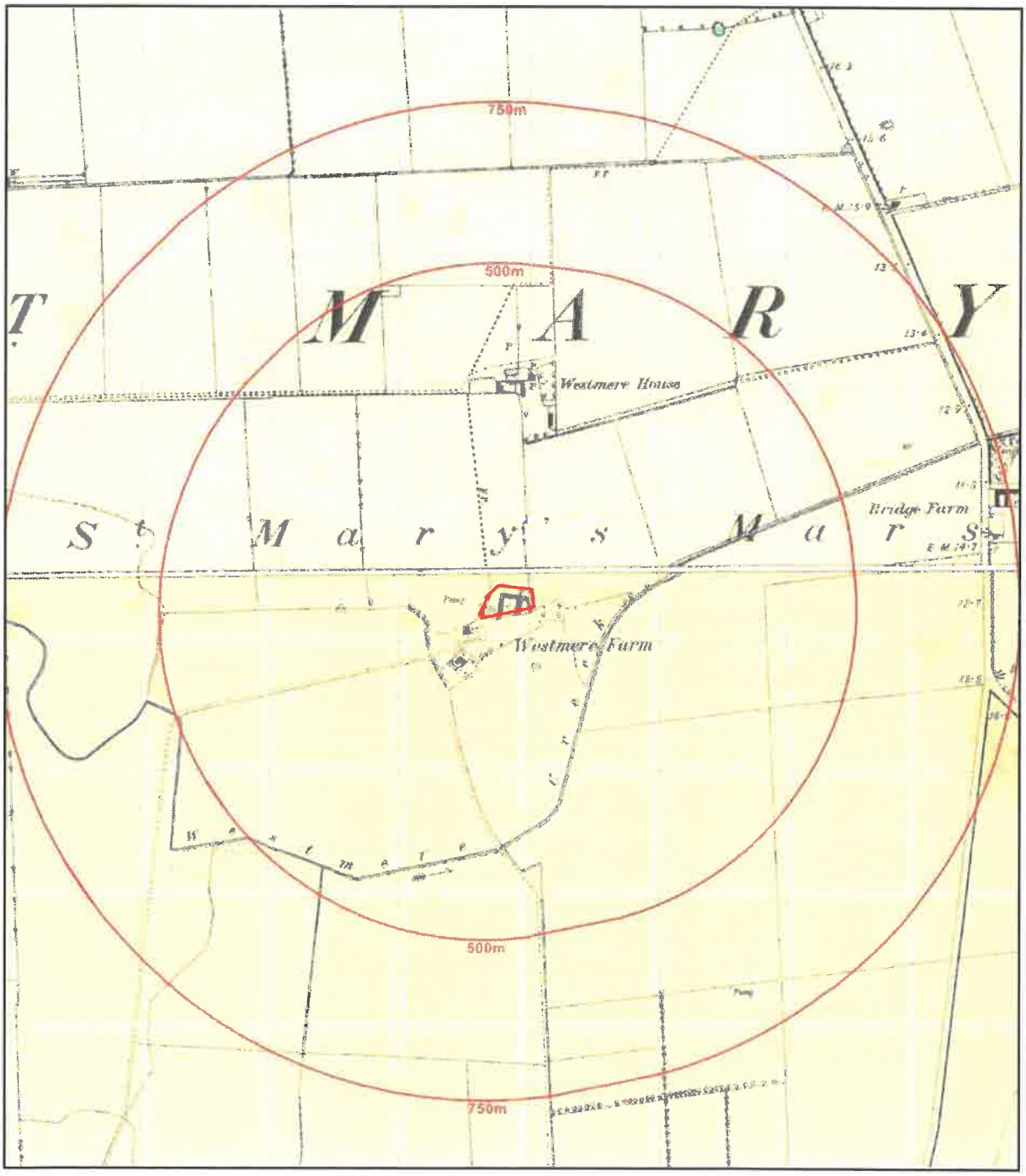
APPENDIX 1

HISTORICAL MAP EXTRACTS

Site History

Figure A

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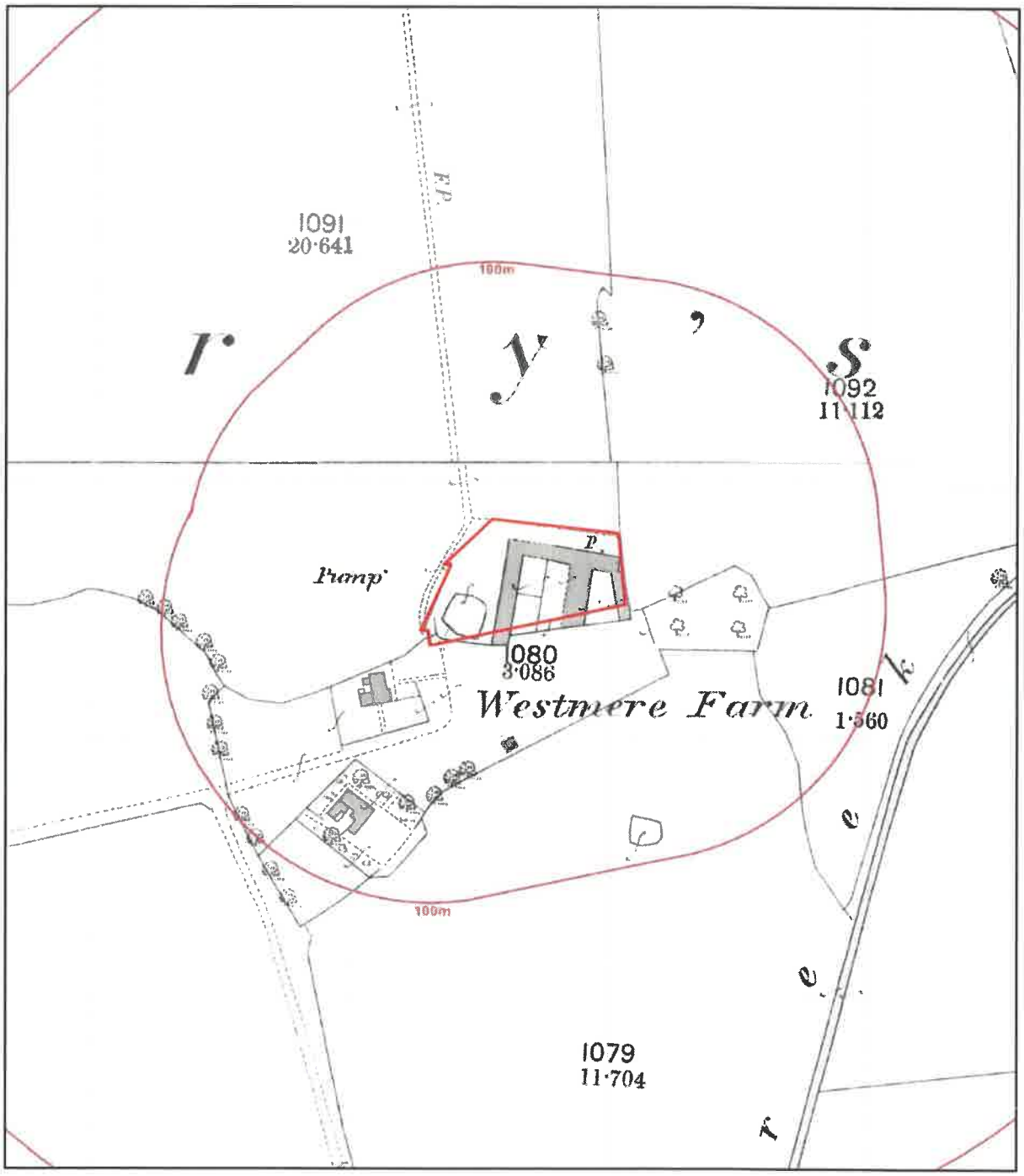


Project : Land Adjacent Westmere Farm, Sutton Bridge, Lincolnshire **Client : Trundley Design Services**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C14691**

Site History

Figure B

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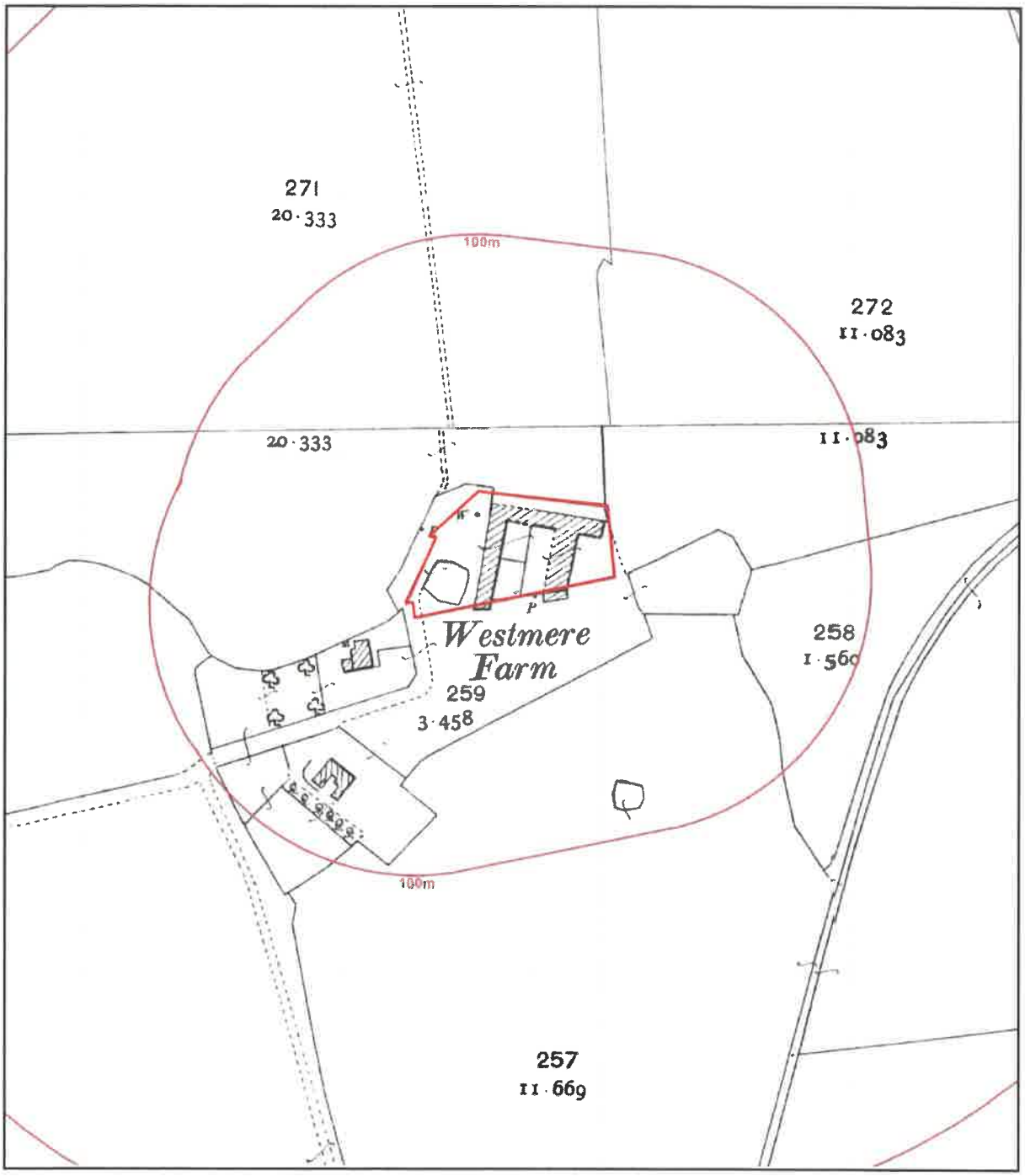


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Site History

Figure C

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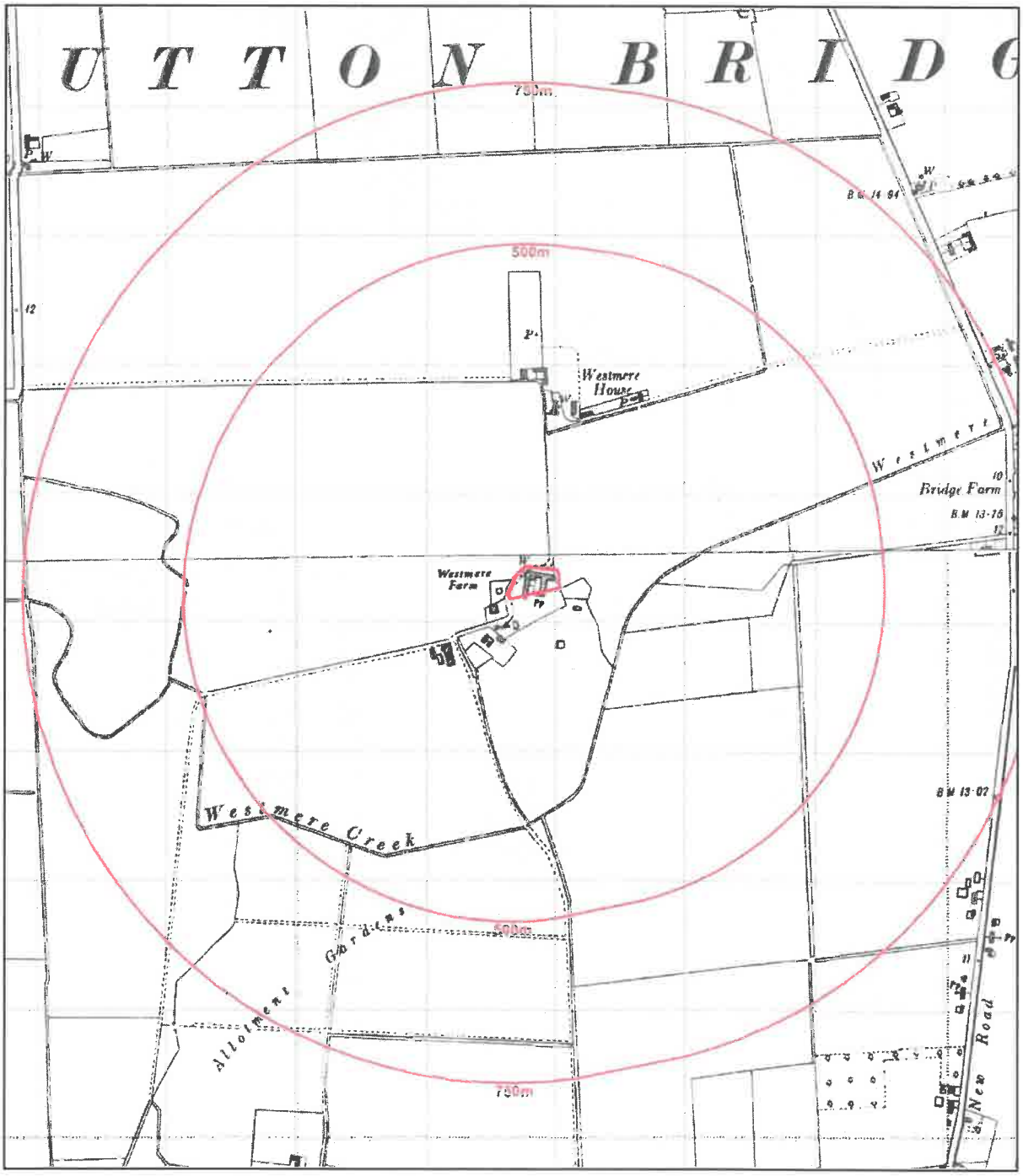


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Site History

Figure D

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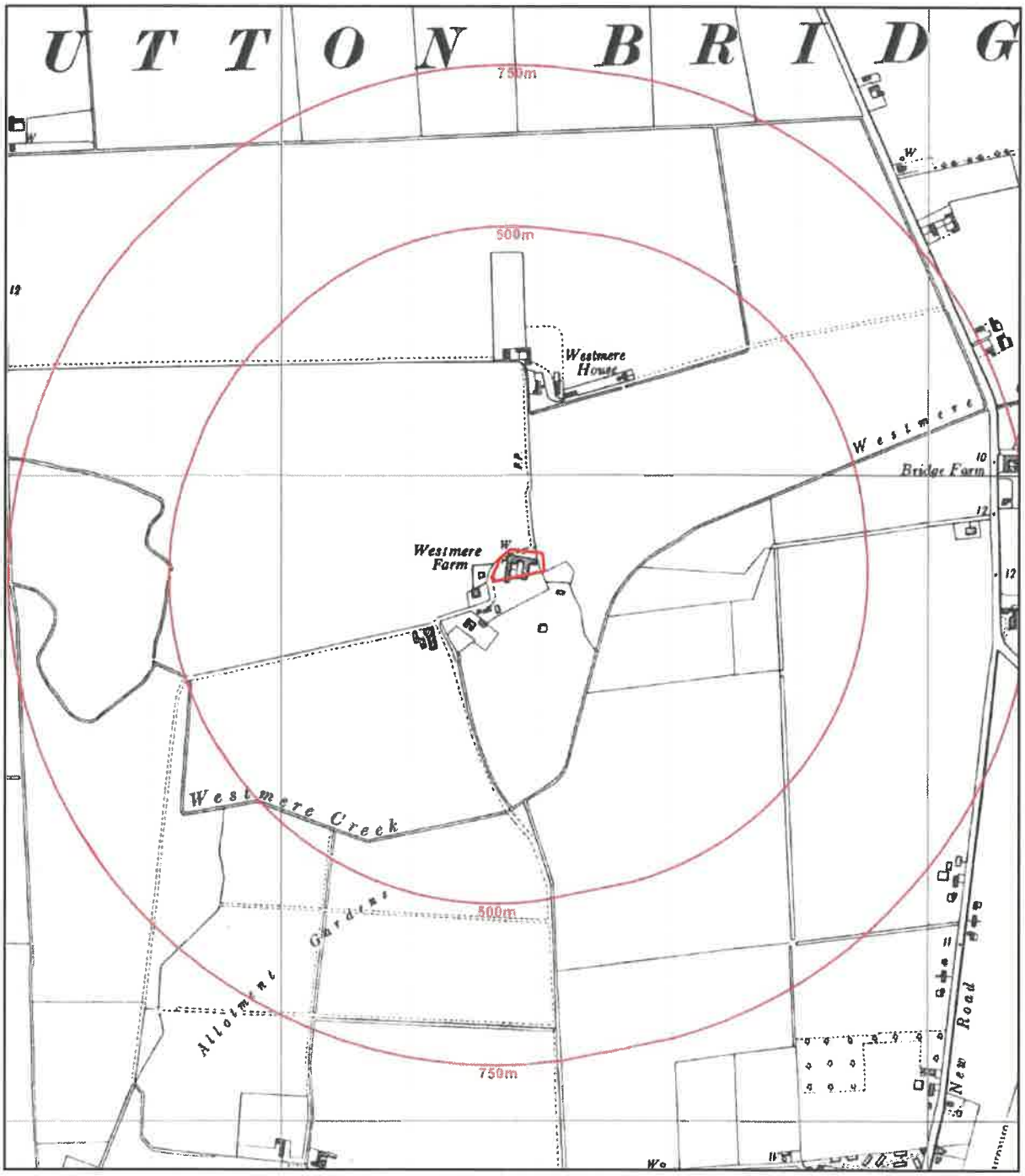


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Site History

Figure E

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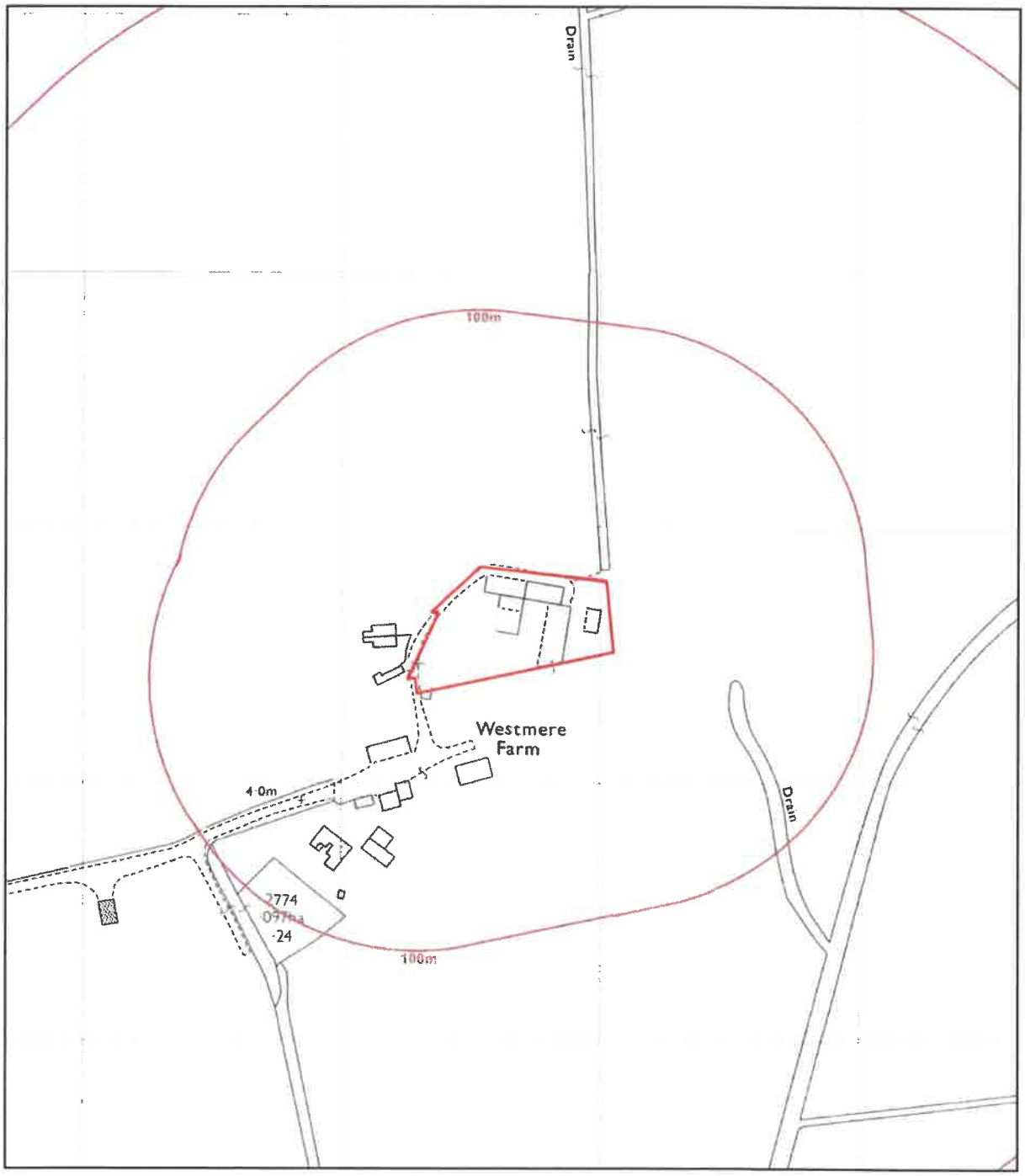


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Site History

Figure F

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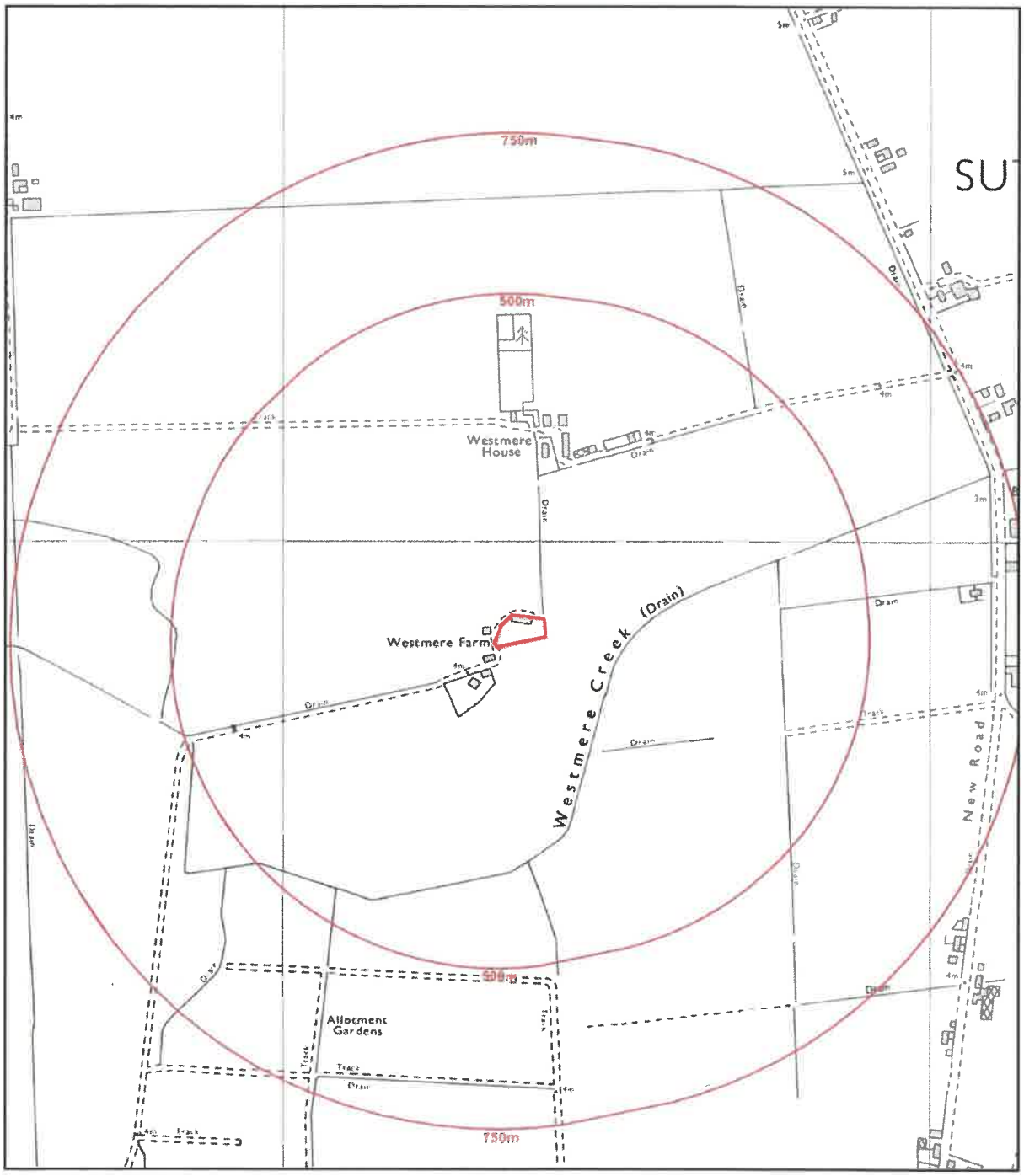


Project : Land Adjacent Westmere Farm, Sutton Bridge, Lincolnshire **Client : Trundley Design Services**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C14691**

Site History

Figure G

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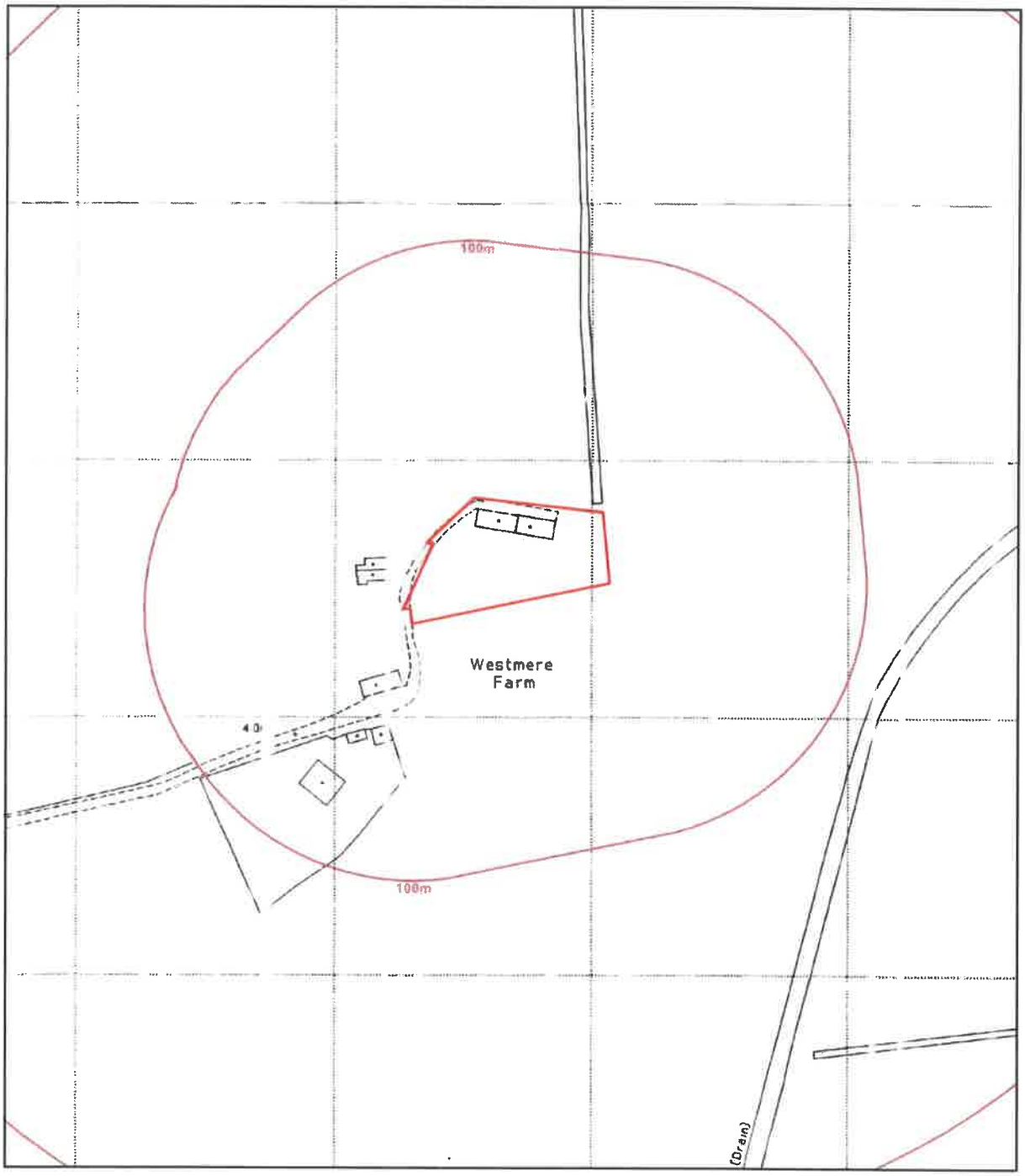


Project : Land Adjacent Westmere Farm, Sutton Bridge, Lincolnshire **Client : Trundley Design Services**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C14691**

Site History

Figure H

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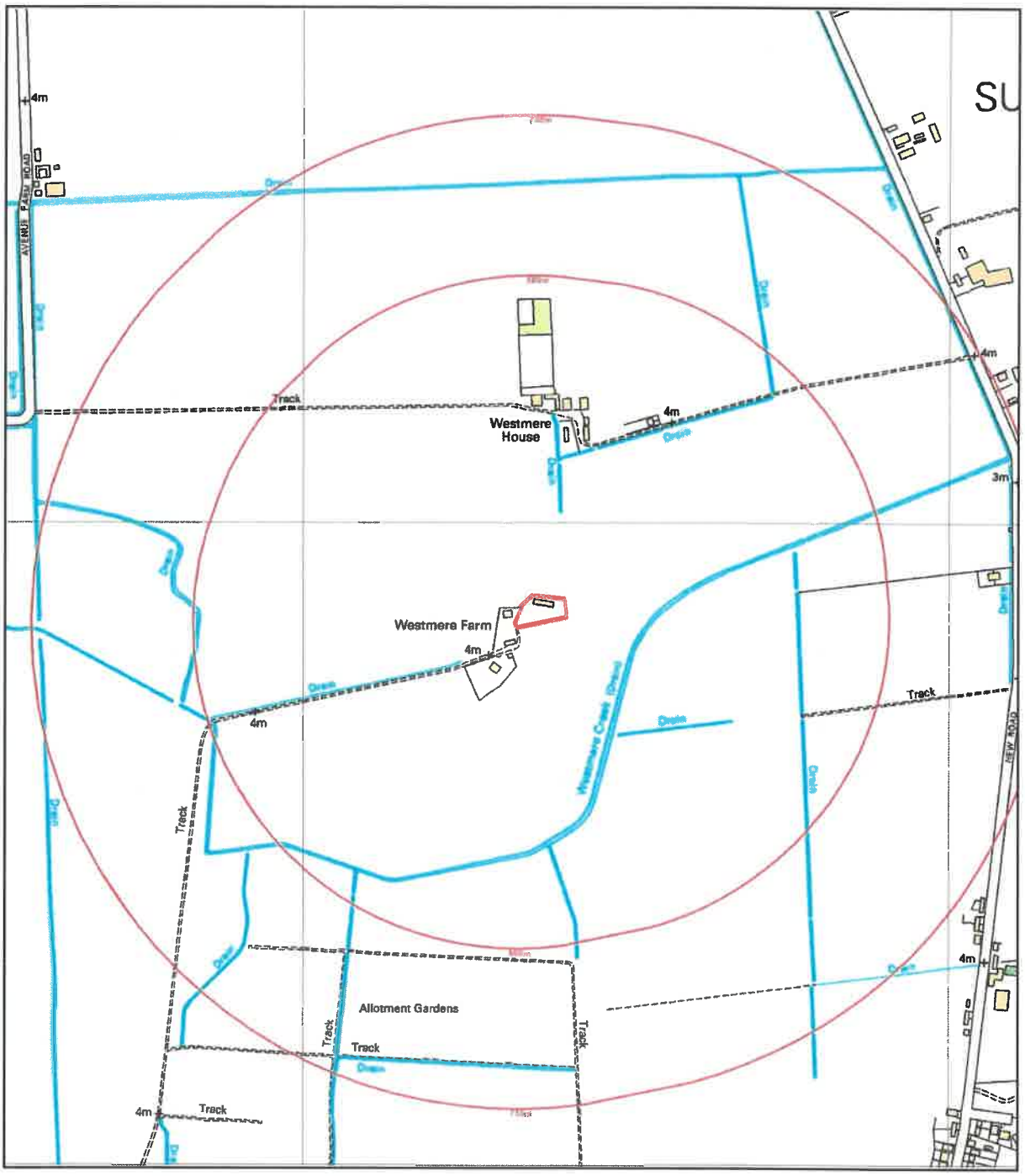


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Site History

Figure I

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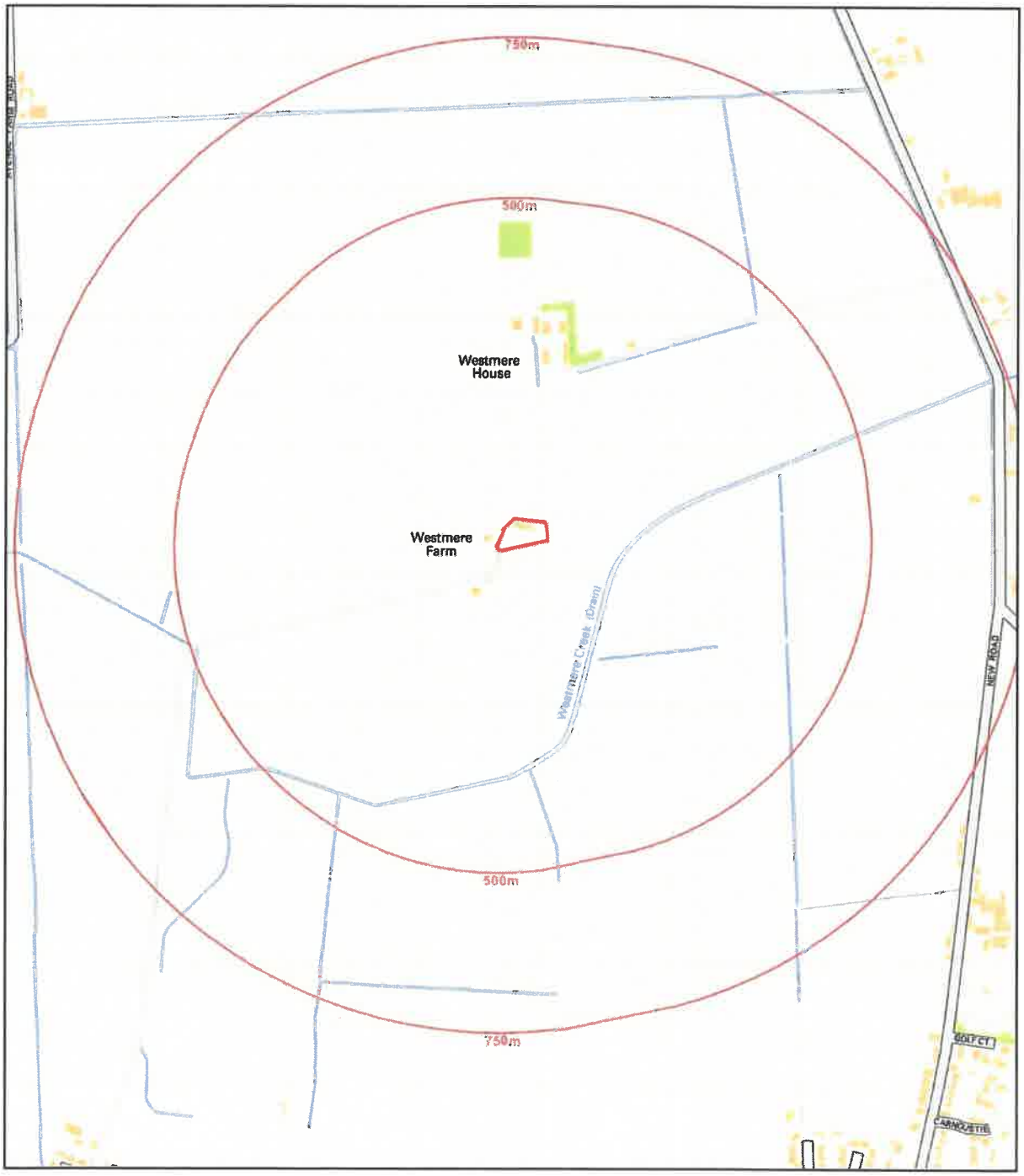


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Site History

Figure J

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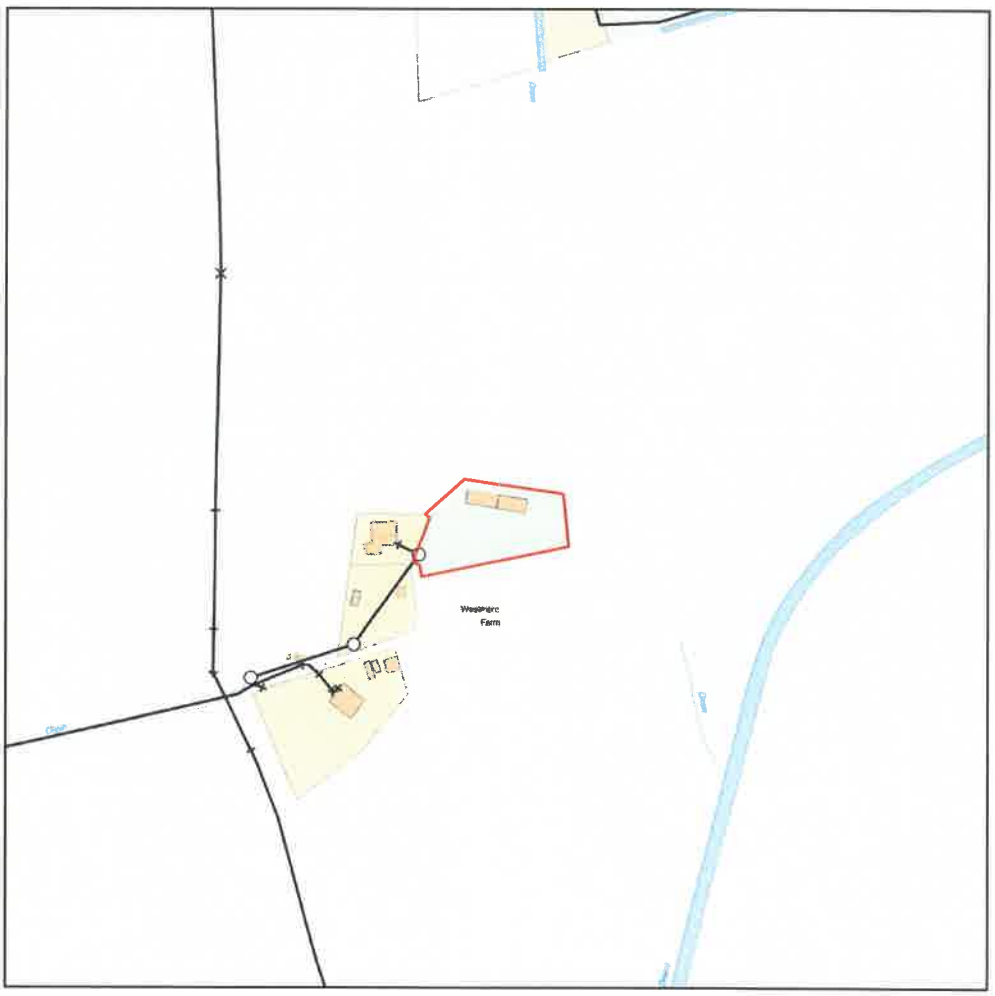


Project : Land Adjacent Westmere Farm, Sutton Bridge, Lincolnshire **Client : Trundley Design Services**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C14691**

Site History

Figure K

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APPENDIX 2

ENVIRONMENTAL DATABASE SEARCH

Groundsure
LOCATION INTELLIGENCE

Enviro Insight

Address:	LAND ADJ. WESTMERE FARM, NEW ROAD, SUTTON BRIDGE, SPALDING, PE12 9QD
Date:	**24 Jan 2019**
Reference:	**GS-5773872**
Client:	**Ground Engineering Limited**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	06-Apr-2015
Grid Reference:	547368,322862
Site Size:	0.26ha

Report Reference: GS-5773872
Client Reference: SWC14691

Groundsure
LOCATION INTELLIGENCE

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Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	1	0	0
1.2 Additional Information – Historical Tank Database	N/A	N/A	N/A	N/A
1.3 Additional Information – Historical Energy Features Database	N/A	N/A	N/A	N/A
1.4 Additional Information – Historical Petrol and Fuel Site Database	N/A	N/A	N/A	N/A
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	N/A	N/A	N/A	N/A
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	0	0	0	0

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	0	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	1

Section 4: Current Land Use

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

Section 5: Geology

5.1 Records of Artificial Ground and Made Ground present beneath the study site	None identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	Identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology

	0-500m
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	Identified
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	1
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	#250GWV #	#500GWV #	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

		0-500m				
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	No
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	0	10	36	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Enviroment Agency Zone 2 floodplains within 250m of the study site	Identified
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Identified
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Low
7.4 Flood Defences within 250m of the study site	None identified
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified
7.6 Areas used for Flood Storage within 250m of the study site	None identified
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Not Prone
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	Not Applicable

Section 8: Designated Environmentally Sensitive Sites

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

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence	Moderate
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Low
9.1.2 Maximum Landslides hazard rating identified on the study site	Very Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Negligible
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Moderate
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Negligible
9.1.6 Maximum Running Sand hazard rating identified on the study site	Moderate
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	None identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	None identified
10.3 Brine affected areas within 75m of the study site	None identified

Groundsure
LOCATION INTELLIGENCE

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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

8. Designated Environmentally Sensitive Sites

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

9. Natural Hazards

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

10. Mining

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

11. Contacts

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

Note: Maps

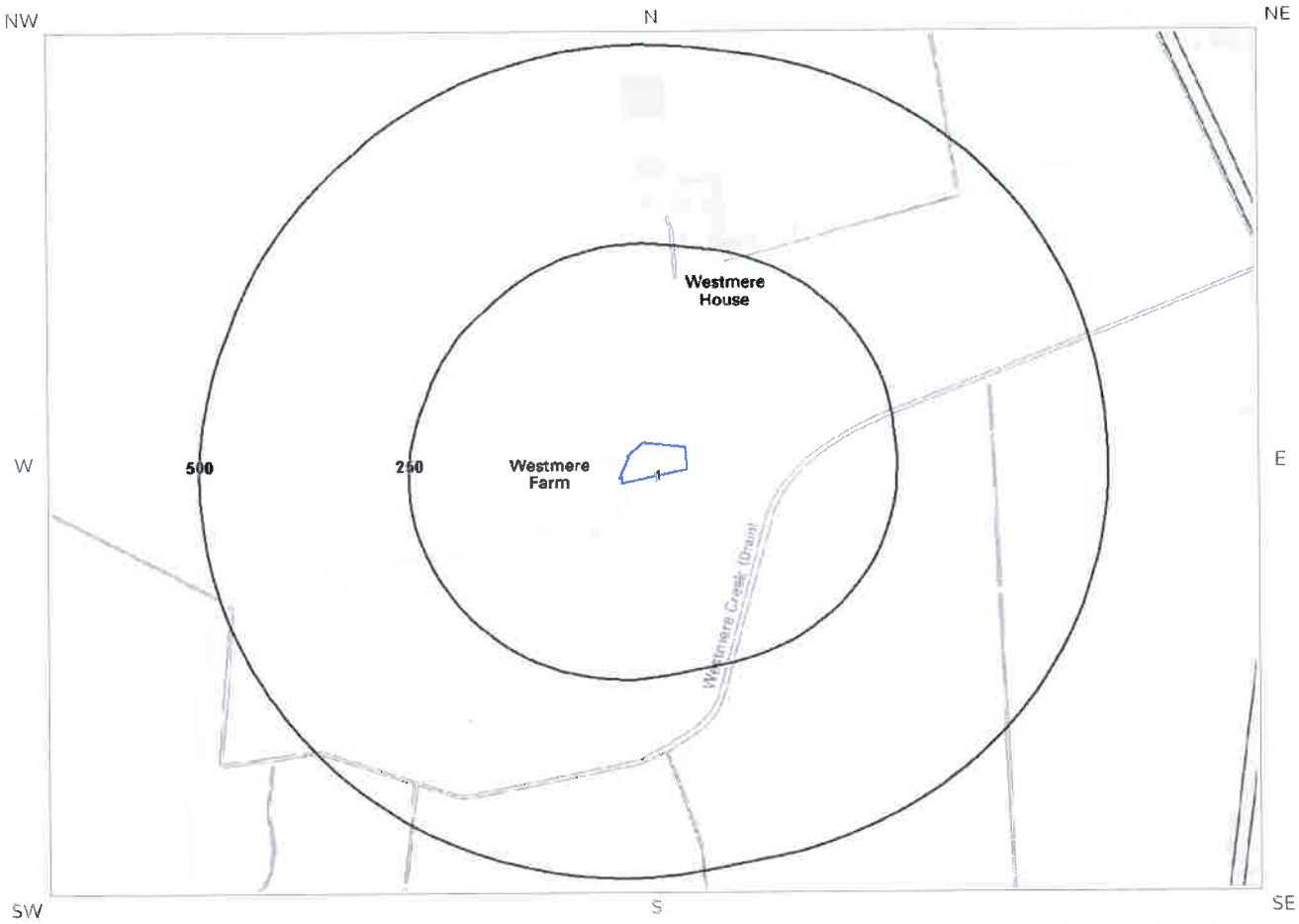
Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes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

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

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

Groundsure
LOCATION INTELLIGENCE

1. Historical Land Use



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Site Outline

250
500
Search Buffers (m)

Historical 1:10,000 and 1:10,560 scale mapping

Industrial Land Use

Potentially Infilled Land

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Historical military sites

Tanks

Garages

1. Historical Industrial Sites

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

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

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 1

ID	Distance [m]	Direction	Use	Date
1	3	S	Unspecified Pump	1929

1.2 Additional Information – Historical Tank Database

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

No data available in this area.

1.3 Additional Information – Historical Energy Features Database

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

No data available in this area.

1.4 Additional Information – Historical Petrol and Fuel Site Database

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

No data available in this area.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

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

No data available in this area.

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

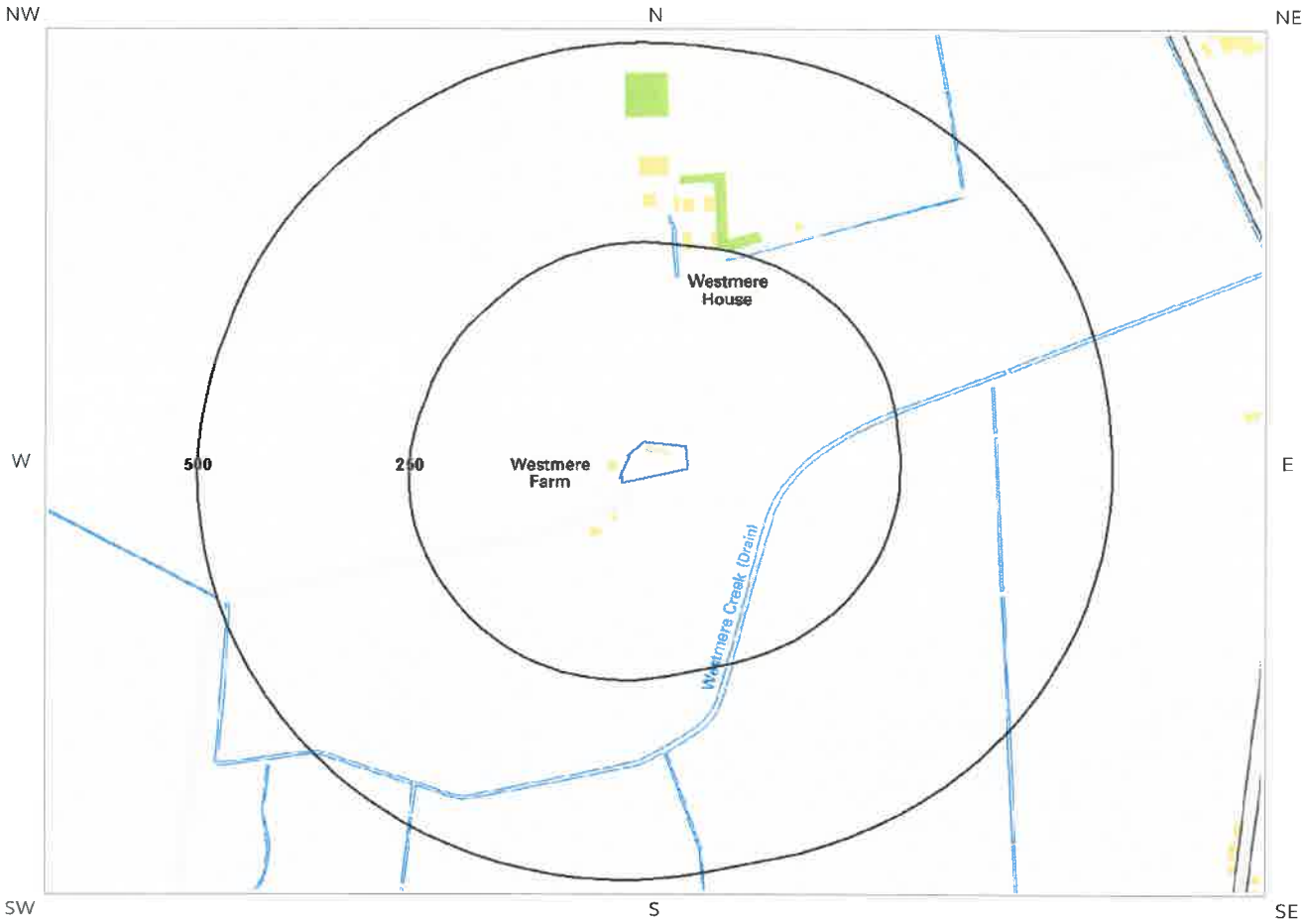
1.7 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 0

Database searched and no data found.

Groundsure
LOCATION INTELLIGENCE

2. Environmental Permits, Incidents and Registers Map



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Site Outline

250
500
Search Buffers (m)

Recorded Pollution Incident
Dangerous Substances (List 1)
Dangerous Substances (List 2)
Water Industry Referrals
Licenced Discharge Consents
Red List Discharge Consents

RAS 3 & 4 Authorisations
Part A(1) Authorised Processes and Historic IPC Authorisations
Part A(2) and Part B Authorised Processes
COMAH / NIHHS Sites
Sites Determined as Contaminated Land
Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations: 0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site: 0

Database searched and no data found.

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: 0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

0

Database searched and no data found.

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

0

Database searched and no data found.

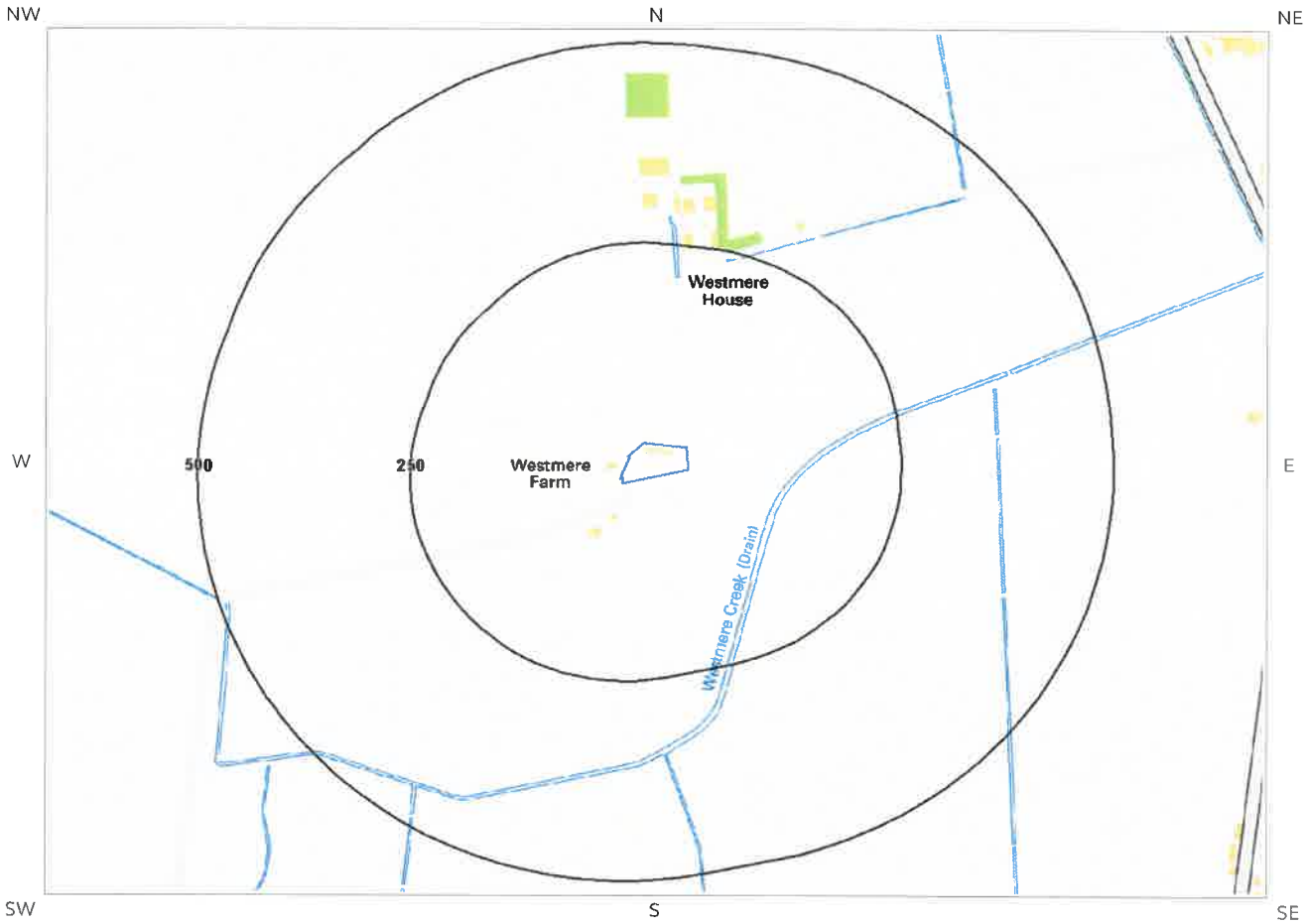
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

Records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site 0

Database searched and no data found.

---

3. Landfill and Other Waste Sites Map



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Site Outline

250
500
Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

3.2 Other Waste Sites

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

0

Database searched and no data found.

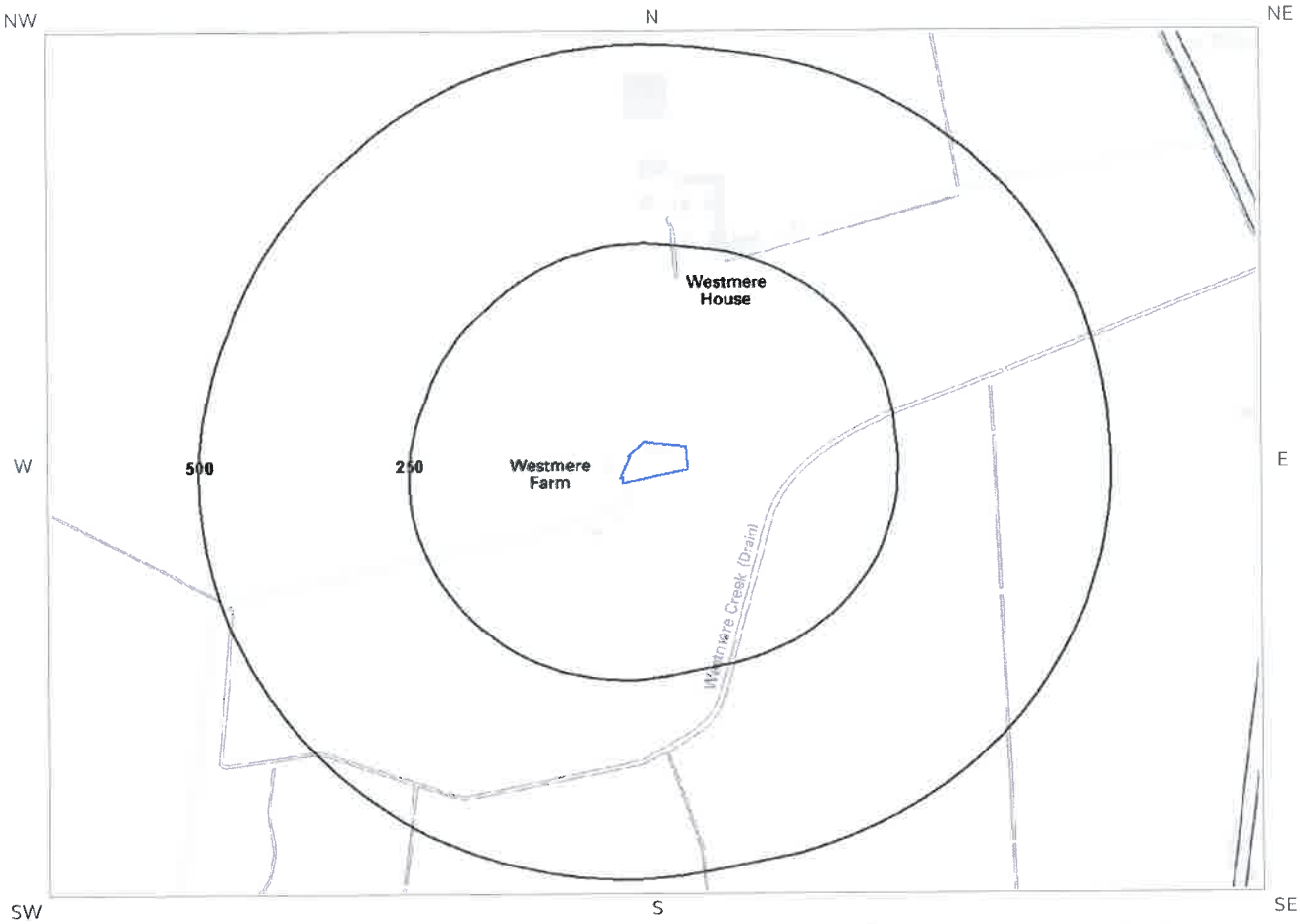
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

1

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1267	SE	548478 322176	Site Address: Port Sutton Bridge, West Bank, Sutton Bridge, Spalding, Lincolnshire, PE12 9QR Type: Household, Commercial & Industrial Waste T Stn Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CRO135 EPR reference: EA/EPR/CB3807GE/A001 Operator: C. R O Ports Sutton Bridge Limited Waste Management licence No: 402342 Annual Tonnage: 8499.0	Issue Date: 29/04/2016 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: C. R O Ports Sutton Bridge Correspondence Address: -

4. Current Land Use Map



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Site Outline

250
500
Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 0

Database searched and no data found.

4.2 Petrol and Fuel Sites

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

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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

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

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

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

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

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

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

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
TFD-XCZ	TIDAL FLAT DEPOSITS	CLAY AND SILT

5.3 Bedrock and Solid Geology

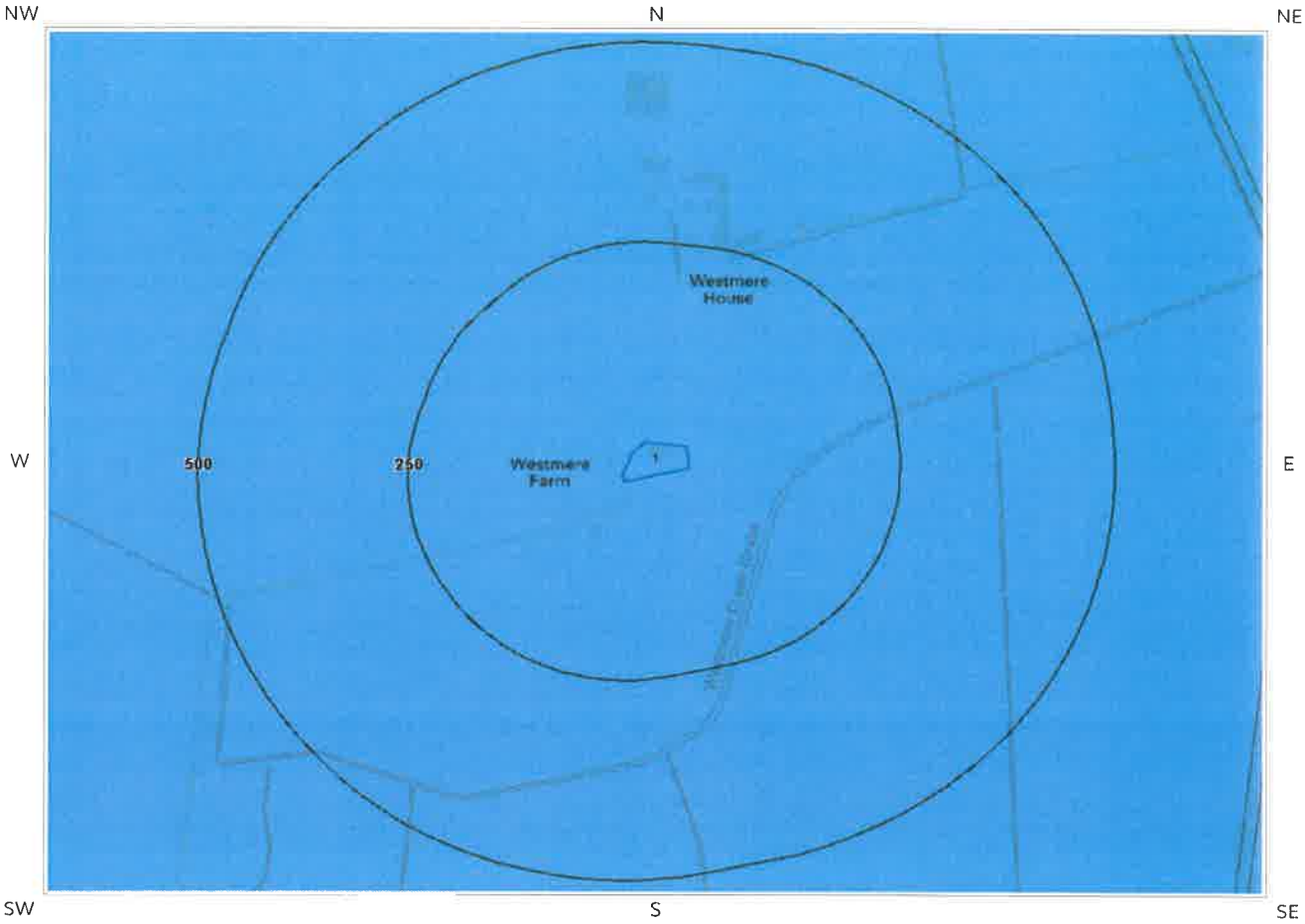
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
AMC-MDST	AMPTHILL CLAY FORMATION	MUDSTONE

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

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



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Site Outline

250 500 Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

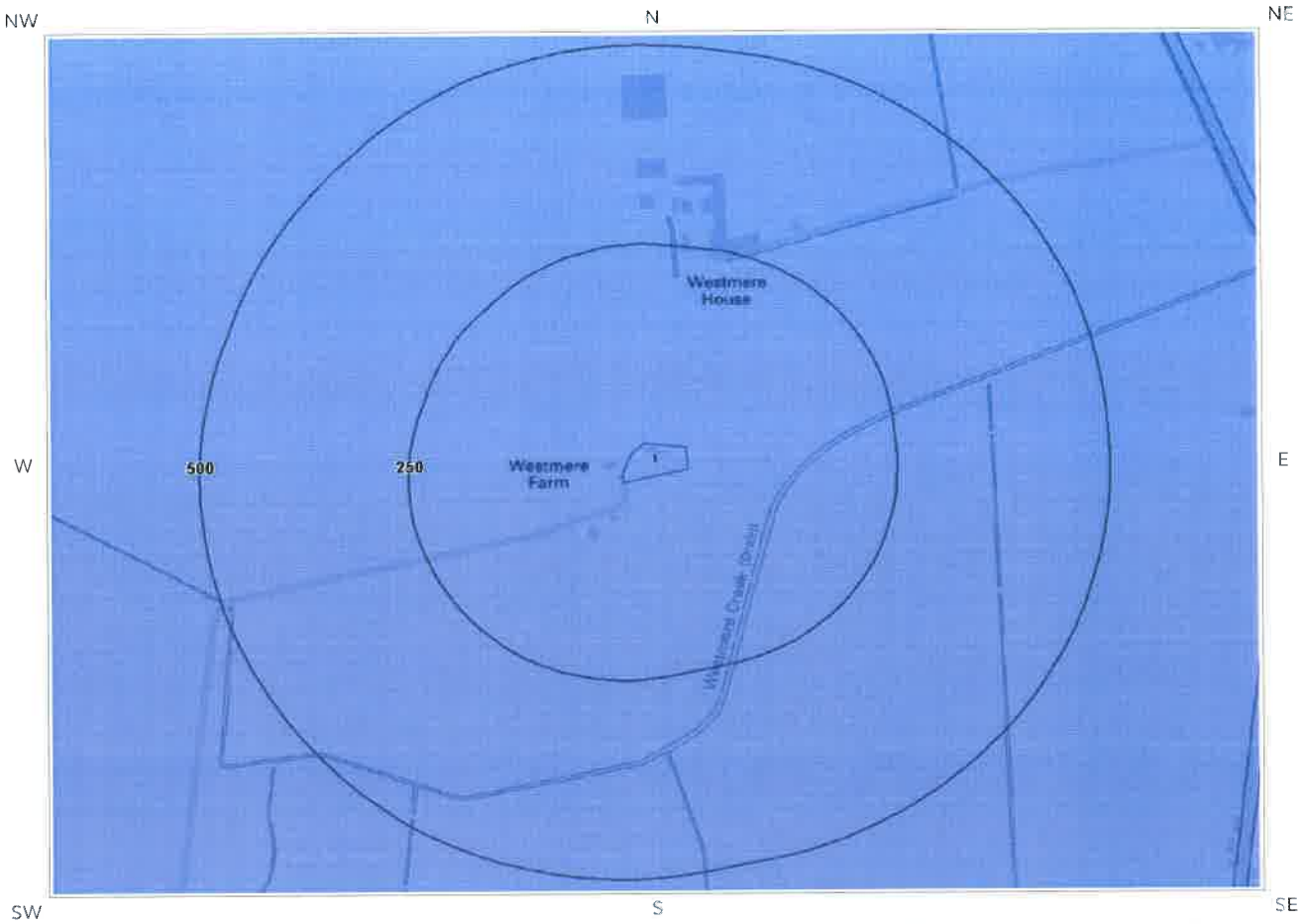
Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

6b. Aquifer Within Bedrock Geology and Abstraction Licences



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Site Outline

250 / 500 Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

Secondary Aquifer - Undifferentiated Layers

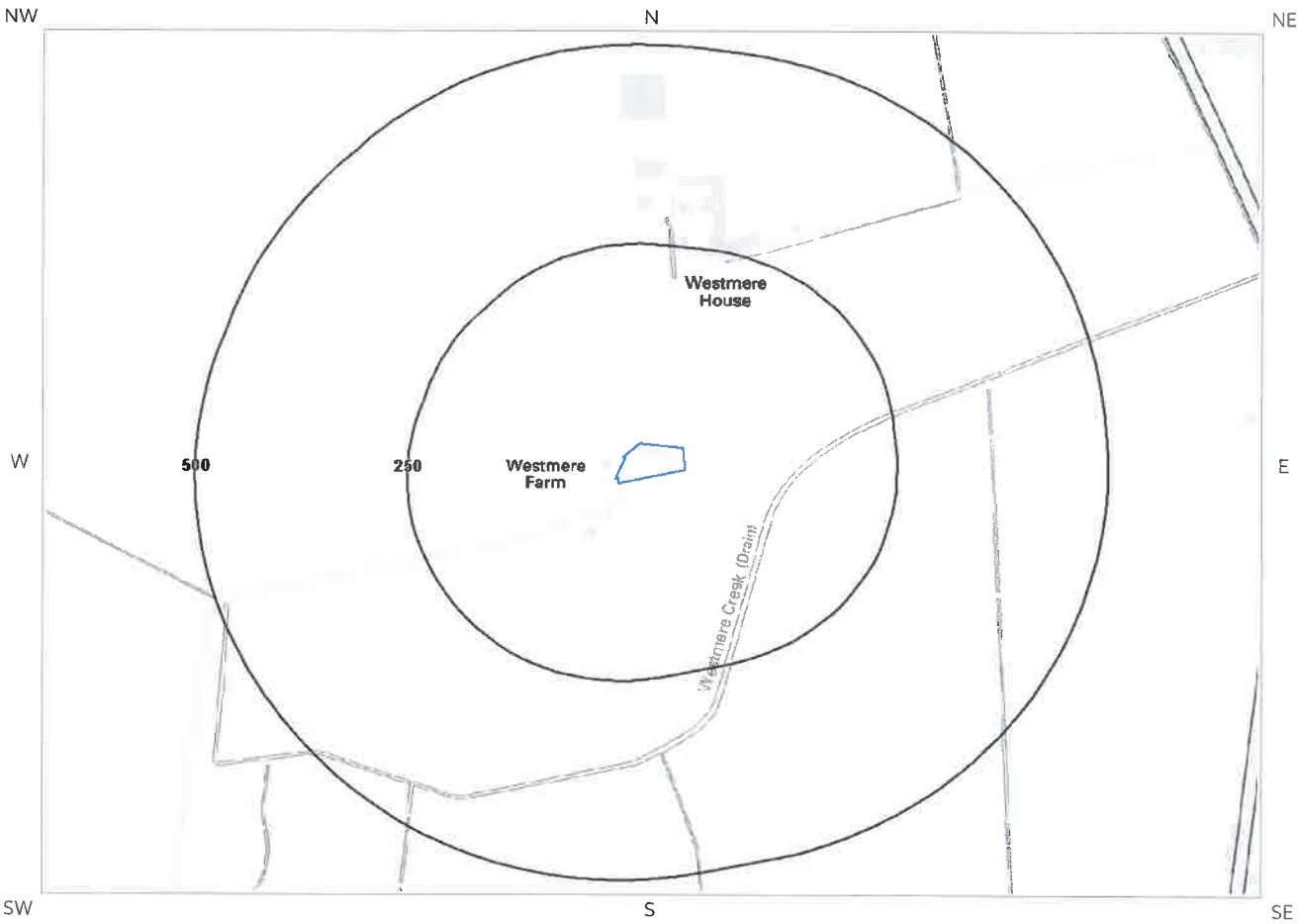
Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

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



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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2 - Outer Catchment

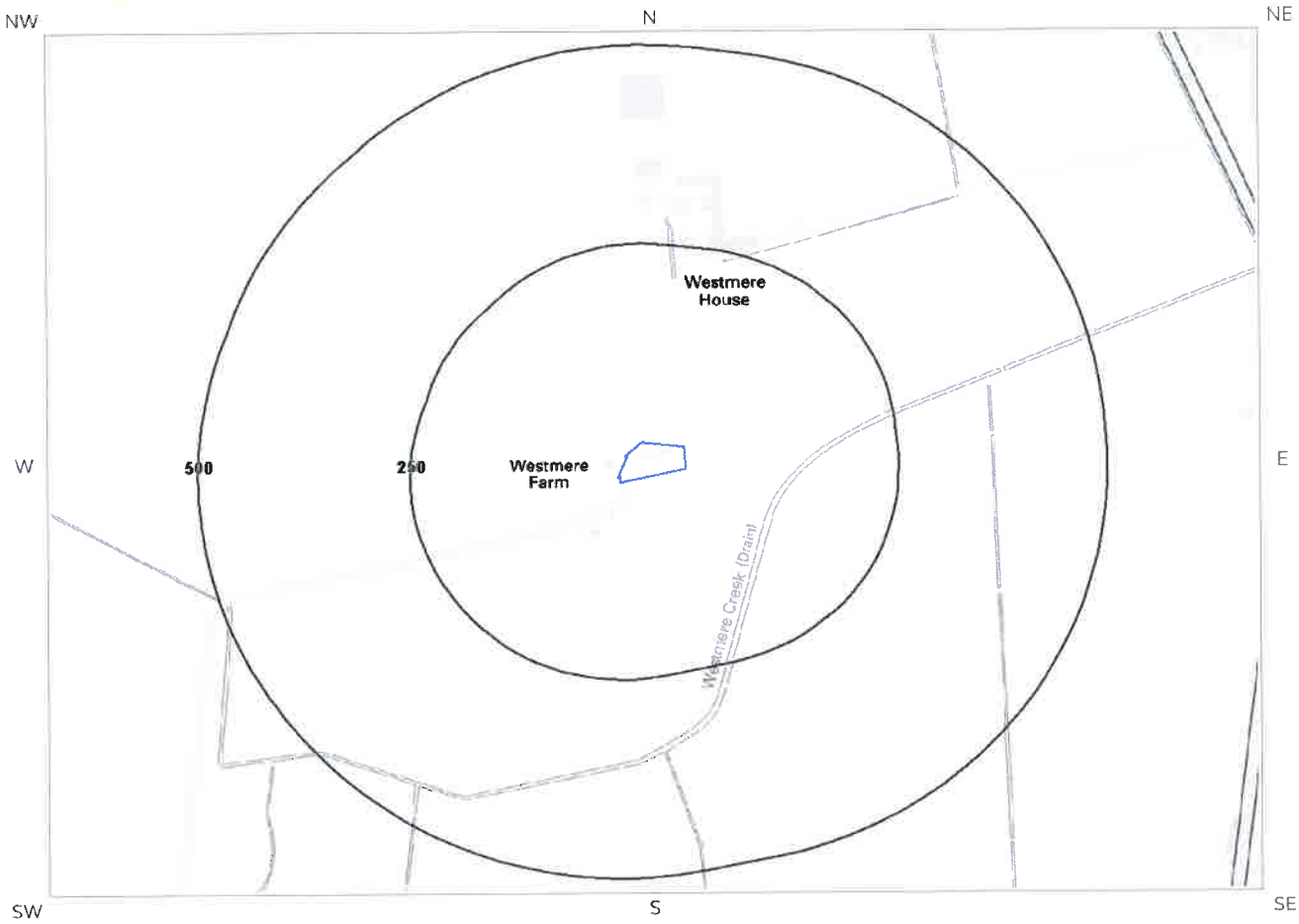
Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

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6d. Hydrogeology – Source Protection Zones within confined aquifer



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Site Outline

250 — 500 — Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

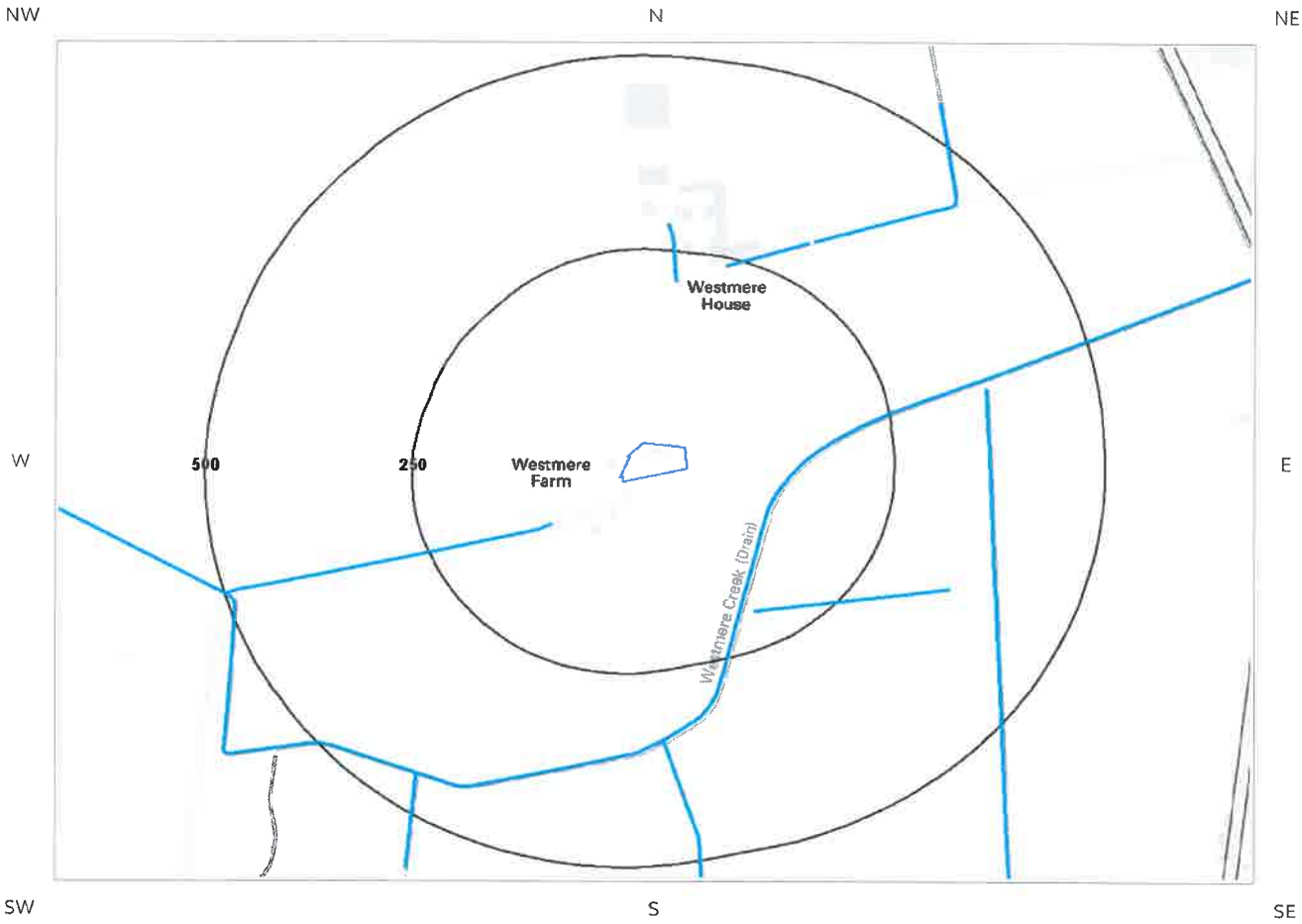
Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

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6e. Hydrology – Watercourse Network and River Quality



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Site Outline

250 / 500 Search Buffers (m)

Tidal River

Inland River

Underground or Elevated Tidal River

Underground or Elevated Inland River

Foreshore

General Quality Assessment: Chemistry

Canal

Underground or Elevated Canal

Lock or Flight of Locks

Lake, Reservoir, or Marsh

Drain or Transfer

General Quality Assessment: Biology

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property Yes

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

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

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.2 Aquifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property Yes

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

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

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site Identified

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1389	S	547250 321450	Status: Historical Licence No: 5/32/11/*G/0031 Details: General Farming & Domestic Direct Source: GROUND WATER SOURCE OF SUPPLY Point: WELL AT BRIDGE ROAD Data Type: Point Name: HAYES	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/02/1966 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site — None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site — None identified

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

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site — None identified

Database searched and no data found.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site — None identified

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

This watercourse information is provided by Ordnance Survey MasterMap Water Network. The data provides a detailed centre line following the curve of the waterway precisely, so all distances provided in the report should be understood as measurements to the centreline rather than a measurement to the nearest point of the watercourse. Underground watercourses are inferred from entry and exit points so caution is advised in using these to indicate precise locations of underground watercourses when planning site investigation and development.

The following Ordnance Survey MasterMap Water Network records are represented on the Hydrology Map (6e):

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	102 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
5	102 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
2	112 SE	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 5.6
6	112 SE	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 5.6
3	202 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				conditions) Average Width in Watercourse Section (m): 3.8
7	202 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.8
4	211 N	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.2
8	211 N	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.2
5	240 N	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.3
9	240 N	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.3
6	308 NE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
Not shown	308 NE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.2
7	339 S	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
8	339 S	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 5.6
Not shown	339 S	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
Not shown	339 S	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 5.6
9	347 S	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
Not shown	347 S	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
10	349 S	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
Not shown	349 S	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
11	363 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.8
Not shown	363 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.8
12	385 E	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	385 E	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
13	391 E	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.8
Not shown	391 E	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.8
14	398 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	398 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
15	401 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.2
Not shown	401	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	SE			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.2
16	452 NE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
17	452 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
18	452 SW	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
Not shown	452 NE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	452 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
Not shown	452 SW	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.2
19	454 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	454 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
20	458 NE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
Not shown	458 NE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.7
21	465 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 3.1
Not shown	465 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions)

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				Average Width in Watercourse Section (m): 3.1
22	492 W	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	492 W	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: Underground Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
23	499 W	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9
Not shown	499 W	Westmere Creek	Inland river not influenced by normal tidal action.	Catchment Area: Nene Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 2.9

6.11 Surface Water Features

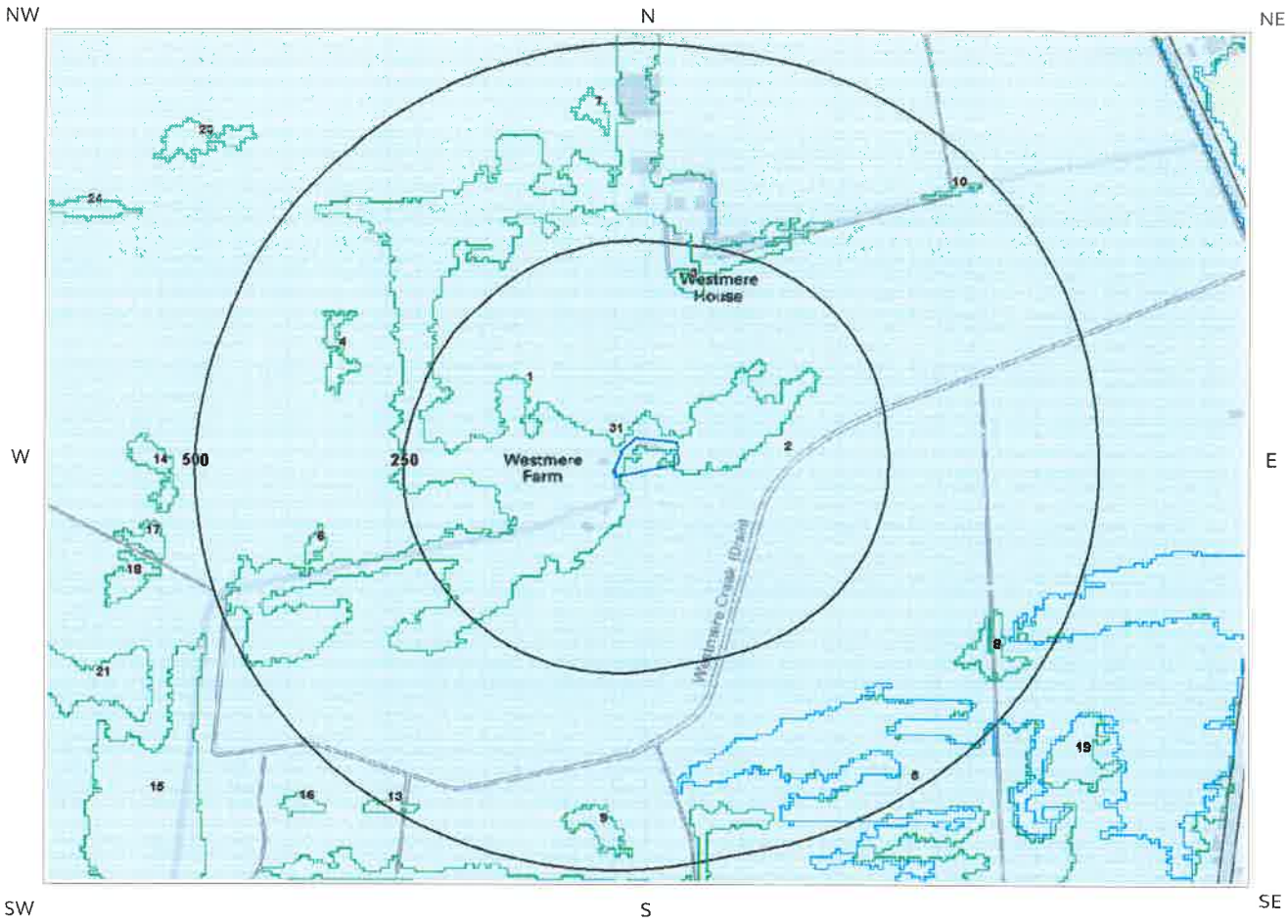
Surface water features within 250m of the study site — Identified

The following surface water records are not represented on mapping:

Distance (m)	Direction
102	SW
108	SE
238	N

Groundsure
LOCATION INTELLIGENCE

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



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Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

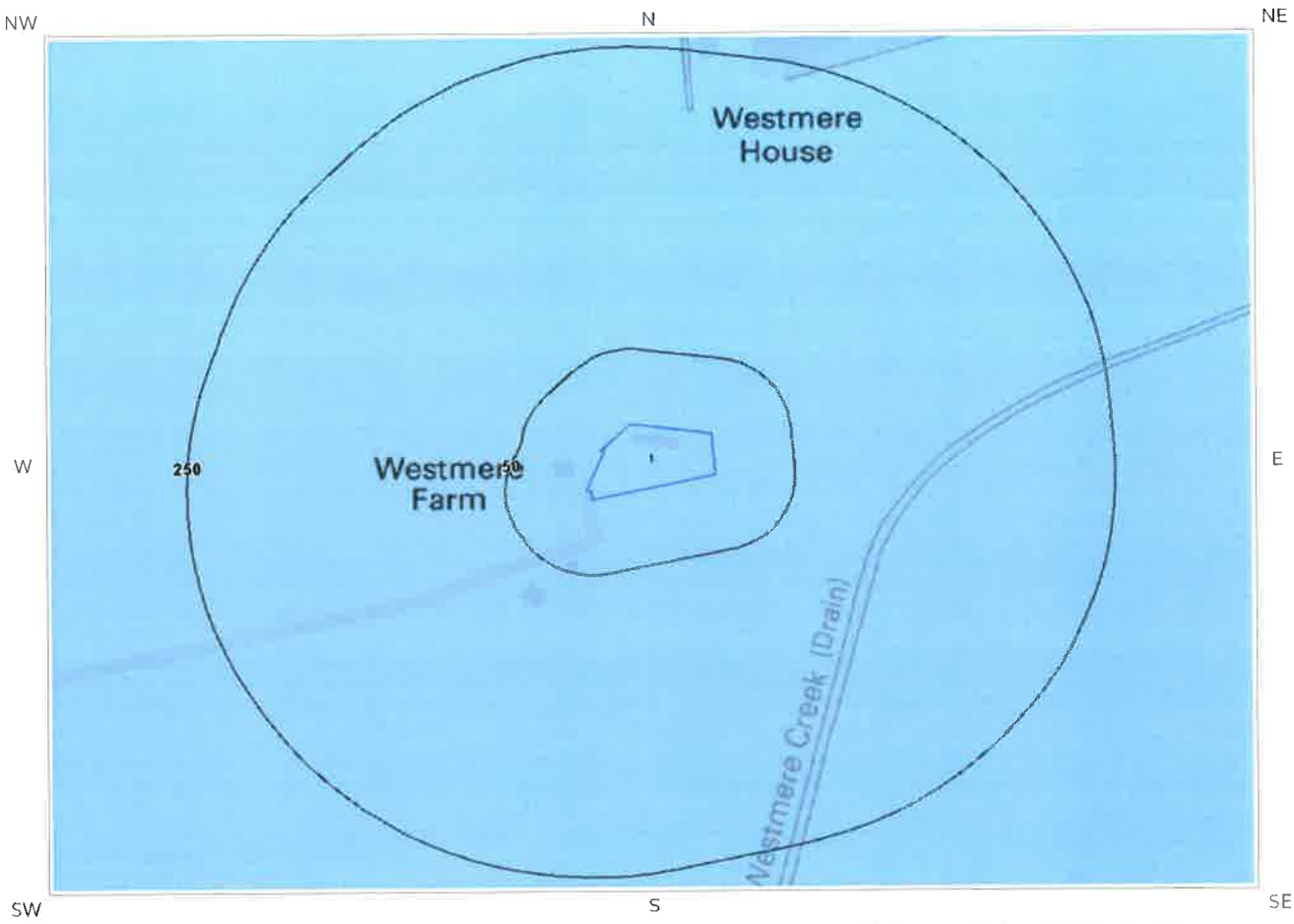
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

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



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Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m — Identified

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

ID	Distance (m)	Direction	Update	Type
1	0	On Site	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
2	0	On Site	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)
3	186	N	12-Oct-2018	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m — Identified

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

ID	Distance (m)	Direction	Update	Type
1	0	On Site	12-Oct-2018	Zone 3 - (Fluvial Models)

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

Highest risk of flooding onsite — Low

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

RoFRaS data for the study site indicates the property is in an area with a Low (greater than 1 in 1000 but less than 1 in 100) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRas flood Risk
1	0.0	On Site	Low

7.4 Flood Defences

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site — None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site — None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site — None identified

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

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Not Prone

The area is not considered to be prone to groundwater flooding based on rock type.

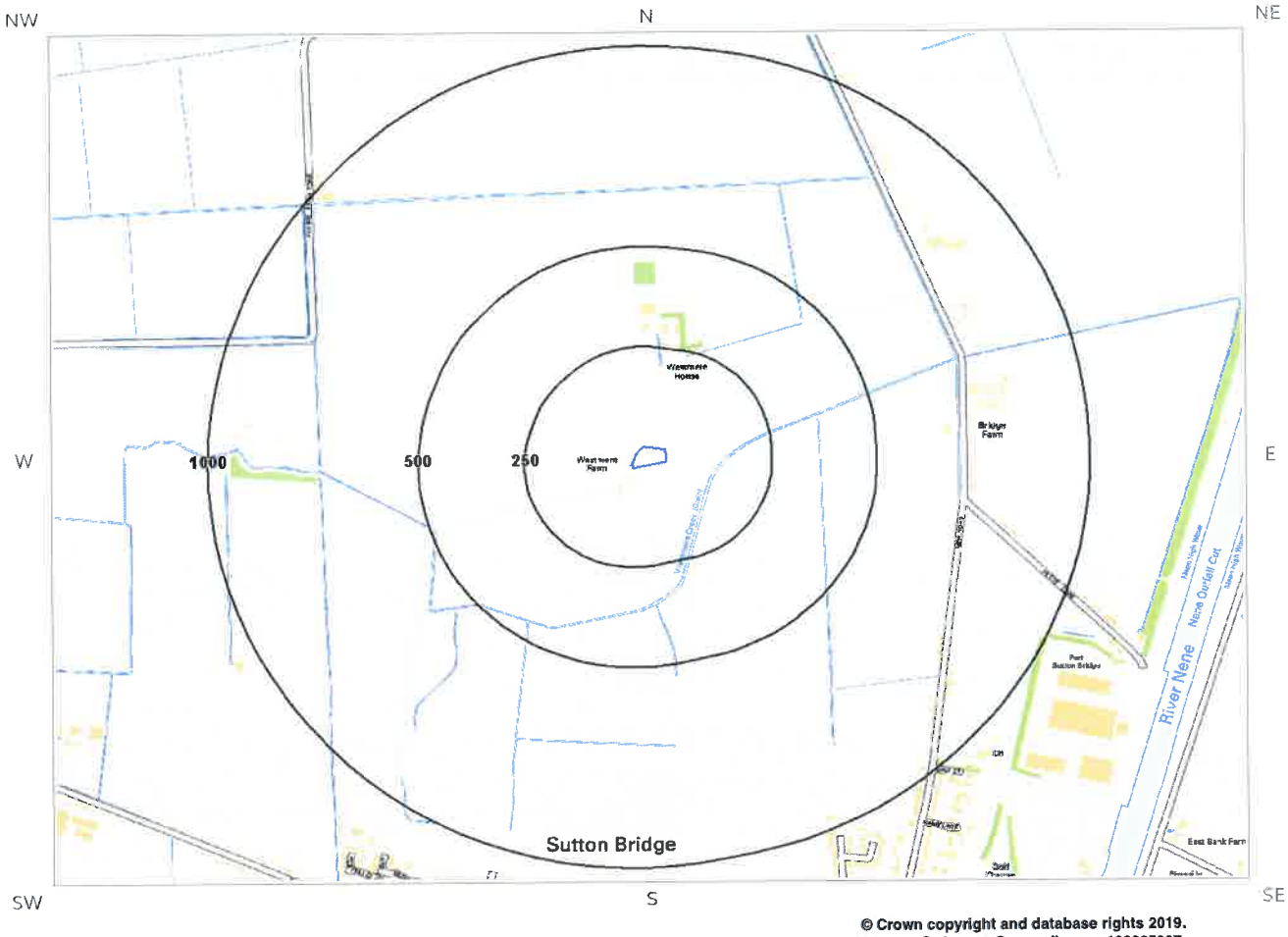
7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result	Not Applicable

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

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

8. Designated Environmentally Sensitive Sites Map



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Site Outline

100
250
Search Buffers (m)

AONB
National Park
SSSI
Special Protection Areas
Nitrate Vulnerable Zones
Green Belt
Environmentally Sensitive Areas
Special Areas of Conservation
World Heritage Sites
Nitrate Sensitive Areas
Ancient Woodland
National Nature Reserve
Local Nature Reserves
Ramsar Sites

8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site	None identified

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

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

9.1.1 Shrink Swell

Maximum Shrink-Swell* hazard rating identified on the study site — Low

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

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site — Very Low

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

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

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site — Negligible

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

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

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

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site — Moderate

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

Hazard
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site — Negligible

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

Hazard
No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

Maximum Running Sand** hazard rating identified on the study site — Moderate

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

Hazard
Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

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

9.2 Radon

9.2.1 Radon Affected Areas

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

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

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

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site	None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary	None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site Guidance: No Guidance Required.	None identified

Contact Details

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