# geosphere environmental Itd

PHASE 1 AND 2 - DESK STUDY AND SITE INVESTIGATION REPORT FOR A PROPOSED RESIDENTIAL DEVELOPMENT ON LAND TO THE NORTH WEST OF HAVERHILL, SUFFOLK

**Prepared For** 

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# **EXECUTIVE SUMMARY**

Desk Study Data Review						
Project Details	Geosphere Environmental Ltd was commissioned by Savills to undertake a Phase 1 Desk Study and Phase 2 Site Investigation Report on land to the north west of Haverhill, Suffolk,					
	It was understood that the site is to be developed to include a number of residential properties with associated gardens and parking, primary school, areas of public open space, roads and associated infrastructure.					
Site Location / Description	The site was situated to the north west of Haverhill, adjacent and to the west of the A143 and north of Ann Suckling Road, and approximately 0.4km to the north east of Withersfield Road. The site may be located by National Grid Reference (NGR) TL 670 469.					
	The site covered an area of approximately 47ha and comprised of open undeveloped agricultural land together with a number of field boundaries and drainage ditches.					
History	A review of historical maps provided information about changes to the site and its surroundings between 1884 and 2014.					
	Based on the historical information it has been concluded that the site has undergone little change from the earliest maps studied and had comprised of open undeveloped agricultural land together with a number of field boundaries and drainage ditches.					
	The surrounding area had largely remained open and undeveloped from the earliest maps studied with large scale residential development occurring to the south of the site from 1971 until present day.					
Geology and Hydrogeology	The geological records indicated the site to be underlain by the Lowestoft Formation, which was underlain by the Undifferentiated Lewes nodular and Seaford Chalk Formations.					
	The hydrogeological records indicated that the site was located upon a Principal Aquifer within the bedrock chalk formations. The Lowestoft Formation is classified as an Unproductive stratum for groundwater.					
	An area of the site, to the north west, was located within a 'Zone II' (Outer Zone) groundwater source protection zone (SPZ) whilst elsewhere the site is not located within an SPZ. The SPZ relates to the underlying chalk formations.					
Hydrology	A number of surface water features were noted to be on site and relate to land drains.					
	The site was not located within an area at risk of flooding by surface water, rivers or the sea and therefore was not likely to be subject to flood warnings.					
Basic Conceptual Model	It has been assessed that the former uses of the site are likely to result in potential contamination that could pose risks to human health. However, the presence of contaminants is considered constrained in a specific area rather than being site-wide, and therefore the risk is considered to be very low.					

Site Investigation Data Review						
Site Works	Site works were carried out between 20 October and 19 November 2014 and comprised the following:					
	• Excavation of eight boreholes extending to depths ranging from 8.4m to 10.0m bgl using light cable percussion techniques;					
	• Excavation of twenty eight window sampler boreholes extending to depths ranging from 1.8m to 4.0m bgl;					
	• Excavation of thirty two trial holes to depths ranging from 1.05m to 1.90m bgl using a mechanical digger;					
	• Soil, logging, environmental and geotechnical sampling and in-situ testing of the soils encountered within excavations;					
	• Undertaking of soil infiltration tests within a number of excavations broadly in line with the guidance of BS5930: 1999;					
	• Installation of ground gas monitoring wells within eleven window sample boreholes and subsequent monitoring.					
Ground Conditions	The geotechnical ground conditions at the site largely comprised of Topsoil at the surface and was underlain by cohesive Lowestoft Formation soils. Head was encountered overlying the Lowestoft Formation within a number of excavations.					
	Groundwater was encountered within the Head Deposits and Lowestoft Formation and was considered to be perched.					
Gas Monitoring	Based upon the results of the ground gas monitoring visits the site has been placed in the NHBC Green category for low rise developments with ventilated underfloor voids.					
Laboratory Results	The chemical analyses were carried out on sixteen soil samples and indicated that no contaminants considered to present a risk to human health were above the appropriate screening values.					
Advanced Conceptual Model	Based on the results of chemical analysis it was not considered necessary to provide a conceptual model and the site may be considered low risk.					
Geotechnical Considerations	Given the presence of high water demand trees adjacent to field boundaries, the volume change potential of the cohesive soils and the visual evidence of desiccation, it is recommended that foundations are extended in accordance with the guidance provided within NHBC Standards Chapter 4.2.					
	Based on the findings of the ground investigation, it is considered that conventional spread foundations may be adopted. A Nett Allowable Bearing Pressure of 80kN/m <sup>2</sup> would be appropriate within the Head Deposits, which is increased to 120kN/m <sup>2</sup> should foundations extend into the Lowestoft Formation.					
	It is recommended that fully suspended floor slabs are adopted, with a void space designed to accommodate any clay shrinkage/heave.					
	A recommended CBR value of 4% should be adopted for pavements.					
	The infiltration rate of the underlying soils was proven to be very poor and therefore an alternative drainage solution should be adopted.					
This Executive Summ	pary only provides a summary of the site data and its assessment. It does not provide a					

This Executive Summary only provides a summary of the site data and its assessment. It does not provide a definitive engineering analysis and is for guidance only. It is recommended that the reader reviews the reporting its entirety and any material referenced therein.

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# 1. INTRODUCTION

Geosphere Environmental Ltd was commissioned by Savills, to undertake a Phase 1 Desk Study and Phase 2 Ground Investigation for a proposed residential development on land to the north west of Haverhill, Suffolk.

It was understood that the site is to be developed to comprise a number of residential properties with associated gardens and parking, primary school, areas of public open space, hall roads and associated infrastructure.

### 1.1 Objectives of Phase 1 - Desk Study

The primary objectives of the desk study were to:

- Provide an assessment of environmental sensitivity at the site and the surrounding area in relation to any suspected or known contamination which may significantly affect the site and the proposed development;
- Indicate whether further works are required, and the nature of the works, to enable a more complete assessment of the site.

These were to be achieved by:

- Undertaking a walkover of the site;
- Researching and assessing the available information regarding the current site status, recorded geology, hydrogeology and hydrology of the site and surrounding area, and details of the history of the site.

#### 1.2 Objectives of Phase 2 - Ground Investigation

The primary objectives of this ground investigation were to:

- Assess the ground conditions at the site;
- Assess the potential risk to human health and the environment based on the findings of the investigation.

These were to be achieved by:

- o Undertaking an intrusive investigation of the site, based upon the findings of the desk study;
- o Logging and sampling the soils on the site and noting any visual or olfactory evidence of contamination;
- Installing monitoring wells for groundwater sampling and monitoring and ground gas measurements Undertaking a statistical analysis of the laboratory results in accordance with CL:AIRE document (ref. R.25);
- o Providing additional data to enable a Quantitative Risk Assessment of the site, if required.

A Proposed Development Plan, drawing ref. 995,SI 003/Rev0, is provided within Appendix 11.

# 2. SITE SETTINGS

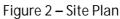
# 2.1 Site Description

The subject site was situated to the north west of Haverhill, adjacent and to the west of the A143 and north of Ann Suckling Road, and approximately 0.4km to the eorth east of Withersfield Road. The site may be located by National Grid Reference (NGR) TL 670 469.

A Site Location Plan, drawing ref. 995,SI 001/Rev0, is included in Appendix 11 at the back of the report and in Figure 1 below.



Figure 1 – Site Location Plan



The site undulated from an approximate level of 106mAOD to 84mAOD and was irregular in shape, with approximate maximum dimensions of 1.73km east to west by 0.65km north to south, and covered an area of approximately 47 hectares. The site comprised of open undeveloped agricultural fields with a number of drainage ditches largely crossed the site from north east to south west, whilst the topography undulated with a maximum fall of approximately 25m north east to south west.

The northern boundary was largely open across agricultural fields which extended northwards off site. Adjacent and beyond a section of boundary, towards the middle, was a water tower together with settling ponds and covered reservoir. The eastern boundary was formed by and adjacent to the A143. The southern boundary was largely open to the east, beyond which was Ann Suckling Road and the property of Boyton Hall. To the west and along the majority of the western boundary, the boundaries were largely formed by a mix of wooden panelled fencing associated with the adjacent residential properties. To the north, the western boundary extended westwards toward a roundabout with Hales Barn Road.

At the time of the walkover the site had largely been ploughed with few crop shoots beginning to grow. A section of field to the south was noted as being covered with unmanaged grassland together with a number of sycamore saplings. A number of drainage ditches were noted across the site, which had a small flow near bed level, with mixed hedgerows and trees, including sycamore, growing alongside. A small pond was noted adjacent to the northern boundary.

A Site Plan, drawing ref. 995,SI 002/Rev0, is included in Appendix 11 at the end of this report and in Figure 2 above.

#### 2.2 Site Walkover

A walkover survey of the site was carried out on 16 October 2014. The walkover was conducted in accordance with CLR 2,(ref. R.2). Photographs taken during the site walkover are included in Appendix 12.

Relevant information from the site walkover has been described in subsection 2.1 above and in addition to the information already detailed, the following observations are considered relevant to this study:

- A number of mature trees were noted alongside a number of field boundaries and drainage ditches which have the potential to cause desiccation in the underlying cohesive soils;
- An antenna mast was noted adjacent to the southern boundary, to the rear of the property of Boyton Hall;
- No visual or olfactory evidence of contamination was noted during the site walkover.

### 2.3 Geological Setting

Details of the geology underlying the site have been obtained from the British Geological Survey (BGS) map, Sheet Number 205, "Saffron Walden", Solid and Drift Edition, 1:50,000 scale.

The geological map indicated the site to be underlain by superficial deposits of the Lowestoft Formation, which is a glacial deposit comprising largely of clay with varying amounts of chalk and flint gravel. The Lowestoft Formation is also known to contain rare sand and gravel pockets or lenses.

The superficial deposits were underlain by Undifferentiated Lewes nodular and Seaford Chalk Formations, which typically comprise of a white chalk with several distinct flint bands and marl seams.

A number of ground workings were noted within the desk study information and related to the pond located adjacent to the site boundary to the north. Elsewhere, ground workings relating to ponds are also noted approximately 13m south east and 50m east. A covered reservoir was noted approximately 20m north west.

Whilst the desk study information notes an occasional minor chalk mining potential for the site, it was considered to be a restricted operation and was considered unlikely to have occurred on the site.

Table 1, below, summarises the factors that may have a potential impact upon the engineering of the proposed development.

Table 1 - Geological Constraints						
Potential Hazard	Recor	Comments				
	On-site	Within 250m	Within 500m			
Shrink Swell Clay	Low	Low	Negligible/400m SW			
Collapsible Deposits	Very Low	Very Low	Very Low			
Landslides	Very Low	Low/42m N	Very Low			
Running Sands	Very Low	Very Low	Very Low			

# 2.4 Hydrogeological Setting

The hydrogeological data provided within the GroundSure report indicated that the site was located upon unproductive strata within the superficial Lowestoft Formation and therefore has negligible significance for groundwater supplies.

The underlying chalk bedrock was classified as a Principal Aquifer.

The Environment Agency (ref. R.7) defines a Principal Aquifer as 'these layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale'.

Information on the groundwater vulnerability of the site, provided within the Groundsure Report, indicated the soil to be of a medium to high leaching potential. The site was classified as being within an urban setting as designated by the Environment Agency, which therefore means that the soils are classified as having a high leaching potential.

Soils of high leaching potential are soils that readily transmit liquid discharges because they are either shallow or susceptible to rapid by-pass flow directly to rock, gravel or groundwater.

An area of the site, to the north west, was located within a 'Zone II' (Outer Zone) groundwater source protection zone, i.e. it was within the 400-day travel time of groundwater reaching the point of abstraction. Elsewhere, the site was not located within a groundwater source protection zone.

There were a number of groundwater abstraction wells noted within the Groundsure Report, however none were noted within 1km of the site.

### 2.5 Hydrological Setting

A number of surface water features were noted to be on site and relate to land drains, the majority of which continue off site and are connected to Stour Brook approximately 305m to the south west.

There was no available river quality classification data for the nearest watercourse.

The site was not located within an area at risk of flooding by surface water, rivers or the sea and therefore was not likely to be subject to flood warnings.

### 2.6 Radon

The HPA 'Indicative Atlas of Radon' 2007 (ref. R.14), indicates the site to lie within an area where there is a probability of less than 1% of present or future homes being above the action level of 200Bq/m<sup>3</sup>. As such, the site is not classified as a Radon Affected Area. This is confirmed by the Building Research Establishment, Report 211, 2007, (ref. R.16).

# 3. ENVIRONMENTAL SEARCHES

# 3.1 Environmental Searches Summary

The environmental searches are detailed fully within the GroundSure Report presented within Appendix 4. Table 2 below summarises the most relevant findings.

Table 2 - Environmental Searches Summary				
	Distance From The Site			Comments
Activity	On- site	Within 250m	250m to 500m	[m]/[direction]
1. Incidents and Registers				
Red List Discharge Consents	-	-	-	
Dangerous Substances Inventory Sites – List 1	-	-	-	
Dangerous Substances Inventory Sites – List 2	-	-	-	
Radioactive Substances	-	-	-	
COMAH and NIHHS sites	-	-	-	
Environment Agency Recorded Pollution Incidents	-	-	4	460m/S – Crude sewage: Minor 485m – 492m/SW – Crude Sewage: No Impact
IPPC	-	-	-	
Discharge Consents		1	7	<ul> <li>(Historic Only)</li> <li>92m/SE – Sewage discharge (treated)</li> <li>306m/S – Miscellaneous (surface water)</li> <li>306m/NE – Sewage discharge (storm overflow)</li> <li>403m/SW - Miscellaneous (surface water)</li> <li>427m/SW – Unspecified</li> <li>456m/SW - Sewage discharge (storm overflow)</li> <li>461m/S - Miscellaneous (surface water)</li> <li>472m/SW - Miscellaneous (surface water)</li> </ul>
Sites Determined as Contaminated Land under Part IIA EPA 1990	-	-	-	
Part A(2) and Part B Activities and Enforcements	-	-	-	

	Distance From The Site			Comments
Activity	On- site	Within 250m	250m to 500m	[m]/[direction]
Records of Licensed Discharge consents	-	-	-	
2. Landfills and Waste Treatment	/ Dispo	sal Sites		
Registered Landfill Site	-	-	1	480m/SW – Old Meldham Bridge Brickyard Unspecified waste type.
Historical Landfills	-	-	-	
Non-operational Landfills	-	-	-	
BGS - Landfill	-	-	-	
Environmental Agency Licensed Waste Sites	-	-	-	
3. Contemporary Trade Entries of	Concer	'n		
Potentially Contaminative Sites		11	n/a	Electrical: 10m/SW – Pylon 47m – 238m/S, SE and SW – Substation (5 No.) Commercial: 106m – 208m/SW and S – • Electrical and electronic engineers • Measurement and inspection equipment • Construction completion services Misc: 10m/SW – Telecommunications mast 80m/W – Water tower
Fuel Sites	-	-	1	487m/S – Mount Pleasant Service Station, Withersfield Road, Haverhill, Suffolk, CB9 7RN – Obsolete
4. Designed Environmentally Sen	sitive Si	tes	I	r
Sites of Special Scientific Interest (SSSI)	-	-	-	
National Nature Reserves (NNR)	-	-	-	
Local Nature Reserves (LNR)	-	-	2	321m – 346m/S – Haverhill Railway Walks (Natural England)

Table 2 - Environmental Searches Summary						
Distance From The Site			Comments			
On- site	Within 250m	250m to 500m	[m]/[direction]			
-	-	-				
-	-	-				
2	-	-	67m – 116m/N – Norney Plantation (Ancient Woodland)			
	Dista On- site -	Distance From On-Within site 250m	JDistance From The SiteOn- siteWithin 250m250m to 500m			

NOTE: \* The distance from the site is given in relation to the site centre on the GroundSure maps.

### 3.2 Nitrate Vulnerable Zone

The site was located within an area designated as a nitrate vulnerable zone.

The Nitrates Directive, (ref. R.19) defines a nitrate vulnerable zone as:

- Surface freshwater which contains or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l;
- Groundwater which contains or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l;
- Natural freshwater lakes or other freshwater bodies, estuaries, coastal waters and marine waters, which are eutrophic or may become so in the near future if protective action is not taken.

# 4. SITE HISTORY

#### 4.1 Historical Maps

A review of the history of the site has been conducted based on readily available historical maps provided by GroundSure. The most significant changes are detailed in the table below and the historical ordnance survey maps are included in Appendix 5.

Table 3 - Hist	Table 3 - Historical Summary					
Date	Potentially Cont	aminative Land Uses / Significant Changes				
Date	On-site [direction]	Off-site [distance/direction]				
1884 - 1899	<ul> <li>Site was shown as largely open and undeveloped and comprised a number of field boundaries, drainage ditches and tracks.</li> <li>A small pond was located adjacent to the boundary to the north.</li> </ul>	<ul> <li>Surrounding area shown as largely open and undeveloped, formed by a number of fields.</li> <li>A Rising Sun Public House was located adjacent to the site to the east together with a number of wells.</li> <li>Chapel Farm was noted adjacent to the site to the south west and comprises a number of structures and a pond.</li> <li>Hales Barn was located approximately 250m SW.</li> <li>The Great Eastern Railway was located approximately 400m/SE, with a number of brick works adjacent.</li> <li>A gas works was located approximately 550m/S.</li> </ul>				
1901 - 1905	<ul> <li>No significant changes of note.</li> </ul>	<ul> <li>Chapel Farm renamed Boyton Hall.</li> <li>A corn mill and brickworks was noted approximately 550m/S.</li> <li>A Clay pit was noted approximately 350m/SW.</li> <li>Burton Ley Plantation was noted approximately 250m/NE.</li> </ul>				
1924 -1949	<ul> <li>Butts Targets were noted on site to the south west, with a rifle range continuing off site to the south west.</li> <li>No significant changes of note in larger area.</li> </ul>	<ul> <li>Norney Plantation was noted approximately 100m/N.</li> <li>Croft Villa and allotments were noted adjacent to the site to the south east.</li> <li>The Gables was noted approximately 250/S, with small scale residential development occurring in the surrounding area from 1938.</li> <li>A rifle range was noted to continue from the NE of Hales Barn towards the site.</li> <li>Single brickworks to SW no longer noted.</li> <li>A pond was noted approximately 250m/W.</li> </ul>				
1959 - 1967	<ul> <li>Rifle range no longer noted, with the Butts Targets removed by 1967.</li> <li>No significant changes of note in larger area.</li> </ul>	<ul> <li>Further small scale development in the area of The Gables, which was no longer named by 1967.</li> <li>Gas Works no longer noted, with small scale residential development occurring in the immediate surrounding area.</li> <li>All brickworks no longer noted.</li> <li>A mill and works was noted approximately 500m/S.</li> </ul>				

Table 3 - Historical Summary					
Date	Potentially Contaminative Land Uses / Significant Changes				
	On-site [direction] Off-site [distance/direction]				
1971 - 1979	<ul> <li>No significant changes of note.</li> <li>A covered reservoir was noted adjacent to the site to the north, with a further water tower added by 1979.</li> <li>Large scale residential development of land in the former area of The Gables.</li> <li>Hales Barn no longer noted by 1979, large scale residential development occurred in the immediate area.</li> <li>The railway to the south west was dismantled by</li> </ul>				
	<ul> <li>1971.</li> <li>Ground workings were noted approximately 400m/SW.</li> </ul>				
1991	<ul> <li>No significant changes of note.</li> <li>Further large scale residential development noted to the south, adjacent to the site.</li> <li>Mill and works no longer noted, redeveloped as a garage.</li> </ul>				
2002	<ul> <li>No significant changes of note.</li> <li>Expansion of water infrastructure to north.</li> <li>Small scale residential development to south of site.</li> <li>A mast was noted adjacent to the site to the south west.</li> </ul>				
2010 - 2014	<ul> <li>No significant changes of note.</li> <li>Site remained open and undeveloped with a number of field boundaries, drainage ditches and tracks.</li> <li>Large scale residential development of land adjacent to the site to the south west.</li> <li>Surrounding area to the south east, south and south west largely developed to include residential properties, whilst to the north the land was largely undeveloped fields.</li> </ul>				
Notes:					
It should be noted that the dates of the maps do not always correspond with the time of the surveys.					

The review of historical maps provided information about changes to the site and its surroundings between 1884 and 2014.

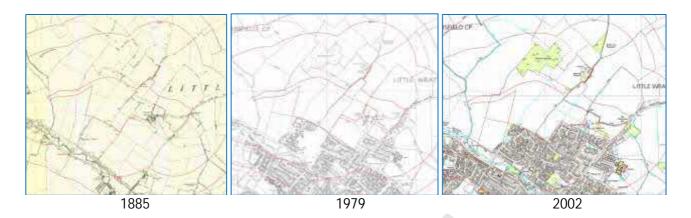


Figure 3 – Extracts from Historical Ordnance Survey Maps between 1885 and 2002

# 4.2 History of the Site – Summary

The review of historical maps provided information about changes to the site and its surroundings between 1884 and 2014.

Based on the historical information it has been concluded that the site has undergone little change from the earliest maps studied and has comprised of open undeveloped agricultural land together with a number of field boundaries and drainage ditches.

The surrounding area has largely remained open and undeveloped from the earliest maps studied with large scale residential development occurring to the south of the site from 1971 to present day.

# 5. CONCEPTUAL MODEL

The risk assessment methodology is based on current guidelines (ref. R.1, R.7 and R.5), and legislation (ref. R.20 and R.21).

The current guidance requires that a conceptual model be formulated, based upon the findings of the research. The conceptual model is limited at this stage to the identification and assessment of potential 'hazards', identified or suspected from the results of the research; the potential 'receptors' that may be affected and the anticipated 'pathways' to those receptors. The findings are summarised in the following subsections.

The guidance proposes a four-stage approach for the assessment of contamination and the associated risks. The four stages are listed below:

- Hazard Identification;
- Hazard Assessment;
- o Risk Estimation;
- Risk Evaluation.

In accordance with the guidance, (ref. R.7), only the first two stages are addressed in a desk study; should hazards exist which are a potential risk then more intrusive investigation works are recommended.

#### 5.1 Hazard Identification: On-Site

The desk based research and historical review identified the following potential hazard on the site:

• Heavy metal contamination associated with the rifle range.

#### 5.2 Hazard Identification: Off-Site

The desk based research and historical review did not identify any potential hazards off-site that may impact upon the site.

# 5.3 Hazard Assessment

The desk study has identified potential sources of contamination that may pose risk to human health and the Controlled Waters. Potential pollutant linkages that require further consideration are presented in the table shown below:

Table 4 - Preliminary Conceptual Model				
Source	Pathway	Receptor		
<ul> <li>On-site: Heavy Metals</li> </ul>	<ul> <li>Ingestion of contaminated soil by direct contact</li> <li>Ingestion of contaminants through vegetables</li> <li>Entry of contaminants by skin or eye contact with contaminated soils or dust</li> <li>Inhalation of contaminated dust</li> </ul>	<ul> <li>Humans</li> <li>Future Site occupants</li> <li>Construction workers</li> <li>Neighbouring site users</li> </ul>		
<ul> <li>Off-site:</li> <li>None</li> </ul>	o Direct uptake and accumulation of contaminants	Flora and Fauna • Landscaped areas		

Based upon the findings of the data search as well as the site walkover, it has been assessed that the former uses of the site are likely to result in potential contamination that could pose risks to human health. However, the presence of contaminants is considered constrained in a specific area rather than being site-wide.

### 5.4 Constraints to Development

The following constrains to the development should be taken into consideration during redevelopment of the site:

- o Potential for foundations to be extended due to soil desiccation;
- Poor infiltration rates associated with predominantly cohesive soils.

#### 6. PHASE 2 - SITE WORKS

#### 6.1 Methodology

This ground investigation was carried out in accordance with the practices set out in BS 10175: 2001 (ref. R.22) and BS 5930: 1999 (ref. R.23). The location of exploratory holes has been planned, where possible, in general accordance with CLR 4, (ref. R.4).

#### 6.2 Scope

Site works were carried out between 20 October and 19 November 2014 and comprised the following:

- Excavation of eight boreholes (BH1 to BH8) extending to depths ranging from 8.4m to 10.0m bgl using light cable percussion techniques;
- Excavation of twenty eight window sampler boreholes (WS1 to WS19 and WSA to WSI) extending to depths ranging from 1.8m to 4.0m bgl;
- Excavation of thirty three trial holes (TP1 to TP33) to depths ranging from 1.05m to 1.90m bgl using a mechanical digger;
- Soil, logging, environmental and geotechnical sampling and in-situ testing of the soils encountered within excavations;
- Undertaking of soil infiltration tests within a number of excavations broadly in line with the guidance of BS5930: 1999;
- Installation of ground gas monitoring wells within eleven window sample boreholes and subsequent monitoring (WS1, WS2, WS7, WS9, WS11, WS13, WS19, WSA, WSC, WSE and WSI).

### 6.3 Ground Conditions Encountered

The sequence of the strata encountered during the investigation generally confirms the anticipated geology as detailed on the BGS maps and within subsection 2.3.

Table 5 - Ground Conditions				
Strata	Depth Encountered (mbgl)		Strata Thickness	Commonition
	From	То	(m)	Composition
Topsoil	GL	0.1 to 0.47	0.1 to 0.47	Brown clay with varying amounts of silt, sand and gravel of flint, brick, charcoal, clinker and chalk
Head	0.2 to 0.4	0.7 to 5.2	0.4 to 5.2 (Where proven)	Encountered within: TP7, TP9, TP10, TP20, TP22, TP23, TP28, TP29, TP30, WS17, WS18, WSC, WSE, WSF, WSG, WSH, BH2 and BH8. Firm yellow/orange brown clay
				with varying amounts of sand, chalk and flint gravel and sandy pockets.
Lowestoft Formation	0.1 to 0.47	Unproven	Unproven	Firm to stiff clay with varying amounts of flint, chalk and occasional hard rocks/fossils (limestone, metamorphics, belemnites).

The sequence and indicative thickness of strata are provided below:

#### 6.4 Groundwater

Groundwater was encountered within BH1, BH2, BH8, WS18, WSC, WSE, WSF, TP6, TP7, TP20, TP23 and TP26 at depths ranging from 1.0m to 4.5m bgl during the site investigation.

During subsequent gas monitoring visits, groundwater was noted in a number of boreholes, the results of which are presented on the borehole logs and gas monitoring visits within Appendices 6 and 8 respectively and are summarised within Table 8. Below.

### 6.5 Visual and Olfactory Evidence of Contamination

With the exception of brick and charcoal noted within the Topsoil within a number of boreholes, no visual or olfactory signs of significant contamination were noted during the intrusive works.

### 7. LABORATORY TESTING

#### 7.1 Methodology

Representative disturbed and undisturbed samples were taken at the depths shown on the exploratory hole records and despatched to the laboratory. The exploratory hole logs are included in Appendix 6.

Samples were collected for environmental purposes in amber glass jars and kept in a cool box with cooling aid.

Geotechnical samples were recovered in plastic bulk bags and undisturbed U100 liners.

No field techniques were undertaken for the soil samples, all analyses of the soil samples took place in the laboratory.

#### 7.2 Environmental Testing Suite

#### 7.2.1 Quality Control

The environmental laboratory used (Jones Environmental Forensics Ltd) was an accredited laboratory by the United Kingdom Accreditation Service (UKAS), and at least 50% of individual parameters are from methods pending accreditation to the Environment Agency Monitoring Certification Scheme (MCERTS) for the range of analyses undertaken as part of this investigation. The MCERTS performance standard for the chemical testing of soil is an application of ISO 17025: 2000, specifically for the chemical testing of soil.

### 7.2.2 Environmental Testing Suite – Soils

The suite of chemical analyses has been based upon the findings of the desk study, the conceptual model and observations on site. The chemical analyses were carried out on a total of 16 samples of soil. The nature of the analyses is detailed below:

- Metals screen arsenic, cadmium, chromium, lead, mercury, selenium, boron (water soluble), beryllium, copper, nickel, vanadium and zinc;
- Organic screen total petroleum hydrocarbons (TPH) with specific carbon banding; benzene, toluene, ethylbenzene and xylenes (BTEX); polyaromatic hydrocarbons (PAH);
- o Inorganics screen Hexavalient Chromium, Chromium III, sulphate (water soluble);
- Others pH, organic matter.

A copy of the laboratory test results is included in Appendix 9 at the back of this report.

### 7.3 Geotechnical Testing

The geotechnical testing has been chosen based on the soils encountered during the site investigation and was undertaken in accordance with BS 1377 at a UKAS accredited laboratory.

The following tests were undertaken:

- Moisture content determination;
- Plasticity testing;
- o pH and soluble sulphate testing;
- o Determination of undrained shear strength;
- Determination of California Bearing Ratio;

A copy of the laboratory test results is included in Appendix 10 at the back of this report.

# 8. MONITORING

# 8.1 Ground Gas

Ground gas monitoring was undertaken by a suitably qualified environmental consultant, using a GA2000 landfill gas analyser. The main determinants recorded were methane ( $CH_4$ ), carbon dioxide ( $CO_2$ ), oxygen ( $O_2$ ) as well as flow and groundwater levels.

Ground gas monitoring was carried out in accordance with current guidance (ref. R.31). Three consecutive monitoring visits have been undertaken thus far, with a further three visits planned. The initial three visits were undertaken between 21 November and 5 December 2014.

The results of the initial ground gas monitoring visits are included in Appendix 8 and a summary is presented in the table below.

Table 6 - Gro	Table 6 - Ground Gas Monitoring Results Summary				
	Typical Concentration				
Location	Methane (CH <sub>4</sub> )	Carbon Dioxide (CO <sub>2</sub> ) [% v/v]		Oxygen (O <sub>2</sub> ) [% v/v]	
	[% v/v]	(Maximum)	(Minimum)	(Maximum)	(Minimum)
WS1	<0.1	2.1	1.6	20.2	20.1
WS2	<0.1	1.2	0.2	21.8	21.3
WS7	<0.1	1.6	0.4	21.3	20.1
WS9	<0.1	2.1	2.0	19.9	18.8
WS11	<0.1	0.4	0.3	21.7	21.4
WS13	<0.1	1.2	1.1	21.0	20.5
WS19	<0.1	1.8	1.1	19.9	17.7
WSA	<0.1	1.8	0.8	21.1	18.2
WSC	<0.1	1.0	0.8	21.2	20.5
WSE	<0.1	0.8	0.3	21.4	21.2
WSI	<0.1	2.2	1.1	20.7	20.0

The results show no significant methane generation within soils, with carbon dioxide ranging from 0.2% to 2.2%. No significant gas flow was detected within the wells across the site.

On the basis of the recorded methane concentration a gas screening value of  $<\!0.01I_{CH4}/hr$  has been calculated. Similarly, on the basis of the recorded carbon dioxide concentrations a gas screening value of  $<\!0.01\,I_{CO2}/hr$  has been calculated.

#### 8.2 Groundwater

The groundwater levels were monitored over a period of approximately 2.5 weeks.

The water levels and dates of monitoring and are presented in the table below:

Table 7 - Groundwater Monitoring Results					
Monitoring Well	Depth of Monitoring Well (mbgl)	Groundwater Encountered at (mbgl)			
		Visit 1	Visit 2	Visit 3	
		21/11/14	01/12/14	08/12/14	
WS1	3.90	3.40	2.91	2.70	
WS2	3.80	0.72	1.11	0.76	
WS7	4.00	2.10	0.68	0.92	
WS9	1.92	Dry	1.90	2.39	
WS11	4.05	0.40	0.26	0.78	
WS13	4.00	1.20	1.17	1.26	
WS19	3.90	Dry	Dry	Dry	
WSA	3.93	Dry	0.94	1.07	
WSC	3.52	1.20	0.86	1.22	
WSE	2.22	0.37	0.36	0.65	
WSI	2.00	Dry	1.68	1.82	
Notes: Dry - no groundwater encountered n/m – not measured 0 - well filled with water					

#### 9. RISK ASSESSMENT

#### 9.1 Risk to Human Health

#### 9.1.1 Methodology

The current guidance requires that a conceptual model be formulated, based upon the findings of the research. The conceptual model is limited at this stage to the identification and assessment of potential 'hazards', identified or suspected from the results of the research; the potential 'receptors' that may be affected and the anticipated 'pathways' to those receptors. The findings are summarised in the following subsections.

The guidance proposes a four-stage approach for the assessment of contamination and the associated risks. The four stages are listed below:

- Hazard Identification;
- Hazard Assessment;
- o Risk Estimation;
- Risk Evaluation.

#### 9.1.2 Ground Contamination

The results of the soil analyses have been compared to the CLEA Soil Guideline Values (SGVs) where available, or the LQM/CIEH, EIC/AGS/CL:AIRE Generic Assessment Criteria (GAC) (ref. R.27 and ref. R.25).

Where the concentrations determined on site are at or below the respective Guidance Level, they are considered not to pose a risk and are removed from further consideration, unless otherwise stated.

The contaminants tested for were found at the level below the guidance values.

#### 9.1.3 Ground Gas

The results of the soil gas monitoring have been compared with current guidance (ref. R.31 and R.30). A graphical representation of the gas monitoring results is included in Appendix 8 at the end of this report.

On the basis of the recorded methane concentration, a gas screening value of <0.01  $I_{CH4}$ /hr has been calculated. Similarly, on the basis of the recorded carbon dioxide concentrations, a gas screening value of <0.01  $I_{CO2}$ /hr has been calculated.

Comparison of the above results to the NHBC traffic light system for a Situation B, which allows for a 150mm underfloor void beneath proposed structures, at the concentrations detailed above it is considered that the site falls within the green category, which requires no special gas protection measures.

#### 9.1.4 Asbestos

From the findings of the desk study, asbestos was not considered to pose a risk to the site and therefore testing was not required.

# 9.2 Risk to Controlled Waters

The risks to Controlled Waters have been assessed with respect to soil contamination only as groundwater analysis was outside the scope of this investigation.

The results of chemical analysis indicated a very low risk of contamination within the soils tested and therefore presents a very low risk to any Controlled Waters. The Lowestoft Formation is considered an unproductive strata for groundwater and whilst groundwater may exist within Head Deposits, it is unlikely that the soils would provide any appreciable groundwater storage.

The risk to the underlying principal chalk aquifer is considered negligible given the significant thicknesses of impermeable strata overlying and the very low risk of contamination within the soils.

### 9.2.1 Ground Contamination

Risks to humans include construction workers, site neighbours and end users of the site. Theoretically exposure to contaminant can take the form of direct contact with the skin, consumption of contaminants through transfer of contaminants to the food chain or inhalation of contaminants through wind-blown soils of vapours.

To reduce the risk of exposure and distribution of contaminants during construction it is recommended that short term mitigation measures specified in the Additional Information (Section B – page 32) section of this report should be adhered to. The exposure of contaminants is only considered to be a risk where soil is exposed, for example in garden areas of areas of soft landscaping. Where soils are covered by proposed on-site structure or areas of paving, a pathway by which contaminants can reach the end user is removed and the risk to the end user is negligible.

Results of chemical analysis did not indicate the presence of contaminants above the thresholds for human health. It is therefore considered that the risk of contamination is very low and a remediation strategy is not considered necessary for the site.

### 9.3 Risk to Plants

A review of the commonly occurring phytotoxic chemicals boron, copper, nickel and zinc, has been undertaken based upon the now superseded ICRCL guidance. Although the ICRCL trigger threshold levels have been withdrawn, there are no equivalent guidance values for phytotoxicity.

Concentrations of metals were recorded at concentrations below the thresholds considered to have phytotoxic effects.

#### 9.4 Risk to Services

#### 9.4.1 Pipes

A comparison has been undertaken of the recent contamination levels with the Anglian Water Standard (ref. R.29) and the WRAS standard (ref. R.28).

It is advised that the WRAS standard (ref. R.28) is adopted and consultation with the local water company is sought prior to laying any services.

#### 9.4.2 Concrete

The results of chemical tests indicate a sulphate concentration in the soil of between <10g/l and 408g/l as a 2:1 water/soil extract with pH values in the range of 5.1 to 7.7.

Based on the above values, and in reference to the guidelines given in the BRE Special Digest 1 (ref. R.16), a design sulphate class of DS-1 should be adopted, with an Aggressive Chemical Environment for Concrete (ACEC) classification of AC-1. Given the presence of groundwater in a number of boreholes, and in the presence of groundwater, an ACEC classification of AC-2z should be adopted.

#### 9.5 Conceptual Model

Following the findings of the site investigation the Conceptual Model has been revisited. In the absence of any significant chemical contaminants, a Conceptual Model is no longer considered relevant and the risk to the site is considered to be very low.

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#### 10. GEOTECHNICAL CONSIDERATIONS

The ground conditions encountered beneath the site largely comprised of Topsoil at the surface and was underlain by firm to stiff cohesive soils of the Lowestoft formation. In parts, the Topsoil was underlain by both loose to medium dense granular and soft to firm cohesive materials considered to represent Head Deposits.

The Head Deposits were found to be confined to specific locations, typically around:

- WS17, WS18, TP7, TP9 and TP10;
- BH8, and;
- o BH2, WSC, WSE, WSF, WSG, TP20, TP22, TP23, TP28, TP29 and TP30.

Groundwater was encountered within a number of excavations and was considered to be perched within granular Head Deposits or confined within cohesive strata. The depth at which groundwater was encountered ranged from 1.0m to 4.5m bgl and was confined to an area consistent with the distribution of the Head Deposits.

The proposed development is understood to comprise a number of residential properties with associated gardens and parking, primary school, areas of public open space, hall roads and associated infrastructure.

#### 10.1 Foundations

#### 10.1.1 Ground Desiccation

Results of Atterberg Limit testing within the cohesive Head Deposits and Lowestoft Formation indicated the soils to be of low to medium plasticity and low to medium volume change potential, as defined in the NHBC Standards Chapter 4.2 Building near Trees, (Ref. R.35).

A number of high water demand trees were noted on site, largely adjacent to field boundaries and drainage ditches, including sycamore, oak and hawthorn. Furthermore, visual evidence of desiccation was noted within the soils at a number of excavation locations, typically adjacent to field boundaries and drainage ditches. The Lowestoft Formation is typically naturally desiccated with depth.

Based on the above it is recommended that foundations are extended in accordance with the guidance provided within NHBC Standards Chapter 4.2, (Ref. R.35).

#### 10.1.2 Foundation Options

Given the findings of the ground investigation it is considered that conventional spread foundations would be appropriate for the site.

A Nett Allowable Bearing Pressure (NABP) of 80kN/m<sup>2</sup> would be considered appropriate within the Head Deposits, based on the results of in-situ testing. The above NABP is increased to 120kN/m<sup>2</sup> within the Lowestoft Formation. The NABP is the permissible strength of the soil above existing overburden pressure, which may be calculated on the basis of a soil density of 18kg/m<sup>3</sup> (Head Deposits) and 20kg/m<sup>3</sup> (Lowestoft Formation).

At the above NABP settlements are unlikely to exceed in the region of 25mm. Settlements in granular materials are likely to comprise of immediate settlement whereas settlements in cohesive are likely to

comprise of a small amount of immediate settlement and a larger amount of consolidation settlement, which will occur over a period of time. Where foundations cross from granular to cohesive materials, a nominal amount of reinforcement should be incorporated into the design to counter the effects of differential settlement.

A minimum foundation depth of 0.9m is considered appropriate based on the following provisos:

- Where influenced by trees, foundations will need designing in accordance with NHBC Chapter 4.2 "Building near Trees", (Ref. R.35). A number of potentially high water demand trees exist adjacent to the boundaries of the areas mentioned previously and the soils are of medium to high volume change potential;
- Should foundations extend beyond 2.5m due to the influence of trees, an alternative foundation solution should be adopted, i.e. Piles.

Should piles be adopted, it is considered that they will terminate within the Lowestoft Formation. It is recommended that the design of piles be undertaken by an experienced and competent professional who will reflect their own experience and expertise on the design of piles.

#### 10.1.3 Tree Planting

As mentioned previously, the soils encountered are of low to medium volume change potential, therefore it is recommended that any future tree planting that may form part of the proposed development is undertaken in accordance with the guidance laid out in the NHBC Standard Chapter 4.2 (ref. R.35) and foundations extended where appropriate.

#### 10.1.4 Excavations, Temporary Works and Groundwater Ingress

The investigation encountered perched groundwater within the soils encountered within the area mentioned previously. It is therefore considered that a potential exists for groundwater to be encountered during foundation and service run excavations in the short term.

Side slopes within the Lowestoft Formation are likely to remain stable in the short term without support, whilst side slopes within the Head Deposits may experience some instability during excavation. It is therefore considered that some battering back to a safe slope gradient may be prudent. A detailed inspection of the side slopes should be made during excavation and a risk assessment carried out to fully assess the support measures required.

It is recommended that further guidance is obtained from CIRIA document Report 97 (Second Edition) 'Trenching Practice', (Ref. R.36).

### 10.2 Floor Slabs

Where the thickness of Made Ground is proven to exceed 0.6m or where foundations are extended beyond 1.2m depth due to the influence of trees, suspended ground floors should be adopted.

The investigation did not record any Made Ground across the site.

The investigation noted a number of potentially high water demand trees (sycamore, oak and hawthorn), located adjacent to field boundaries and drainage ditches, and the underlying soils were found to be of low to medium volume change potential.

It is therefore recommended that fully suspended floor slabs are adopted, with a void space designed to accommodate any clay shrinkage/heave.

# 10.3 Pavement Design

Pavements at the site are likely to be constructed on a subgrade of either Head Deposits or Lowestoft Formation, which is likely to comprise of a gravelly clay.

Laboratory analysis on samples of Head Deposits/Lowestoft Formation recorded plasticity indices ranging from 14% to 31% and therefore reference of these values to Table 5.1 of the Highways Agency's, 'Design Manual for Roads and Bridges, Volume 7, 'Interim advice note Design Guidance for Road Pavement Foundations Draft HD 25' (ref. R.33), for a thin pavement under average construction conditions and a low water table indicate an estimated CBR ranging from 3.0% to 4.5%.

A total of six samples of soil were tested in the laboratory to determine the California Bearing Ratio of the soil for use in the design and construction of roadways and pavements. Laboratory CBR testing on the soils returned values ranging from 2.1% and 7.5%, which is indicative of poor to good construction conditions.

Based on the above, a recommended CBR value of 4.0% should be adopted.

It is recommended that once the site has been graded to the appropriate pavement formation level, it is inspected and, if necessary, in-situ CBR testing be conducted on the subgrade to confirm the appropriate pavement design (i.e.to determine the sub-base and capping thickness). In addition, the formation should be proof-rolled and any soft/loose pockets encountered should be excavated and replaced with well compacted granular fill prior to pavement construction. Requirements for the design of road pavements are given in the Highways Agency, 'Design Manual for Roads and Bridges, Volume 7. Interim advice note Design Guidance for Road Pavement Foundations Draft HD 25 (ref. R.33).

### 10.4 Soakaway Design

Soakaway testing was undertaken at ten locations across the site, with infiltration confined within the Head Deposits or Lowestoft Formation.

Results of testing largely proved unsuccessful given the absence of any appreciable infiltration. It is therefore recommended that an alternative drainage strategy for surface water drainage should be adopted and will need to be agreed with the local water company and planning authority.

### 10.5 Buried Concrete

The results of chemical tests indicate a sulphate concentration in the soil of between <10g/l and 408g/l as a 2:1 water/soil extract with pH values in the range of 5.1 to 7.7.

Based on the above values, and in reference to the guidelines given in the BRE Special Digest 1 (ref. R.16), a design sulphate class of DS-1 should be adopted, with an Aggressive Chemical Environment for Concrete

(ACEC) classification of AC-1. Given the presence of groundwater in a number of boreholes, and in the presence of groundwater, an ACEC classification of AC-2z should be adopted.

# 11. CONCLUSIONS

Based upon the findings of the desk study and walkover, a number of potential contaminant sources and pathways to potential receptors were identified.

The intrusive investigation encountered a nominal amount of Topsoil overlying Head Deposits and/or Lowestoft Formation soils, which were largely recorded as cohesive. Groundwater was recorded as perched within the soils at varying depths.

Results of chemical analysis indicated that none of the samples tested contained contaminants above the thresholds for human health and therefore the risk to the proposed development is very low. Furthermore the risk to Controlled Waters is also very low.

Given the presence of high water demand trees adjacent to field boundaries, the volume change potential of the cohesive soils and the visual evidence of desiccation, it is recommended that foundations are extended in accordance with the guidance provided within NHBC Standards Chapter 4.2.

Based on the findings of the ground investigation, it is considered that conventional spread foundations may be adopted. A Nett Allowable Bearing Pressure of 80kN/m<sup>2</sup> would be appropriate within the Head Deposits, which is increased to 120kN/m<sup>2</sup> should foundations extend into the Lowestoft Formation.

It is recommended that fully suspended floor slabs are adopted, with a void space designed to accommodate any clay shrinkage/heave.

A recommended CBR value of 4% should be adopted for pavements.

The infiltration rate of the underlying soils was proven to be very poor and therefore an alternative drainage solution should be adopted.

# ADDITIONAL INFORMATION

# A. CONSULTATION

During the development of a contaminated site, consultation may be required for a number of reasons with a number of Regulatory Authorities. The following provides an indication as to the most likely Authorities with which consultation may be required. The remediation strategy would have to be agreed with the following:

- Local Authority. Consultation is likely to be required with a designated Contaminated Land Officer within the Environmental Health Department, as part of the planning process. The Local Authority is generally concerned with human health risks. Some Authorities now require 'Completion Certificates' to be signed off following remediation works.
- Environment Agency. Where a site is within a groundwater protection zone or has been designated as a special site, the Environment Agency is likely to be involved to ensure that controlled waters are protected.

In addition, the following may also be involved in the consultation process: National House Building Council, NHBC. Section 4.1 of the NHBC Standards requires land management to be addressed.

• Water Authorities. They are likely to impose constraints on the nature of water supply pipes that are to be laid in contaminated land. Guidance on the selection of materials for water pipes is provided by the Water Regulations Advisory Scheme (ref. R.28).

Based on the results of any consultation, there may be specific remediation requirements imposed by one or more of the aforementioned Authorities.

# B. SHORT-TERM MITIGATION MEASURES

During site preparatory works of any potential development/construction works, some short-term mitigation measures will be required to protect the site workers, neighbouring sites users and the environment from the potential effects of exposure to potentially contaminated materials and soils. The majority of the proposed measures represent good practice for the construction industry and include:

- Briefing all of the site workers of the identified contamination on site, and ensuring they are aware of the potential health effects from exposure.
- Where appropriate, workers who are at potentially risk due to their working in areas of identified contamination will be provided with suitable PPE.
- Ensuring good hygiene is enforced on site and washing facilities are maintained on the site. Workers are discouraged from smoking, eating or drinking without washing their hands first.
- Ensuring site personnel report any unusual complaints, such as skin rashes, nausea, light-headedness etc. which may be attributable to the contamination on the site.
- Ensuring that dust suppression measures are put into practice where contamination is becoming airborne.

- Site drainage should be prevented from entering the adjacent watercourse.
- Where necessary contamination will be prevented from dirtying adjacent highways, a wheel-wash or other method for cleaning vehicles may be required.

Where contaminated materials are being removed from the site they should be disposed of at a suitably licensed landfill, with a 'duty of care' system in place and maintained throughout the disposal operations. The classification of contaminated soils for disposal is dependent upon the individual landfill operator, which is in term dependent upon the operator's license.

# C. DISCOVERY STRATEGY

There is the possibility that other sources of contamination may be present on the site which were not detected during the investigation. Should such contamination be identified or suspected during the site clearance or ground works, these should be dealt with accordingly. A number of options are available for handling this material, which include:

- The removal from site and disposal to a suitably licensed tip of all material suspected of being contaminated.
- Short-term storage of the suspected material while undertaking verification testing for suspected contamination. The storage area should be a contained area to ensure that contamination does not migrate and affect other areas of the site. Depending upon the amounts of material under consideration, this could be either a skip or a lined area.
- Treatment of the identified contamination in accordance with the site-specific Remediation Method Statement.
- Having a suitably experienced Environmental Engineer either on-call or with a watching brief for the visual and olfactory assessment of the material, and sampling for verification purposes.

Should any anomalous materials be identified within the soils, Geosphere Environmental and Regulatory Authorities should be informed and where necessary the remedial strategy agreed.

# **APPENDICES**



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### **APPENDIX 1 - ACRONYMS AND ABBREVIATIO NS**

Acronym /	Definition
Abbreviation	
ACM	Asbestos containing material
ADE	Average daily exposure
ASPT	Average score per Taxon
BAP	Biodiversity Action Plan
BOD	Biochemical oxygen demand
BH	Borehole
BRE	Building Research Establishment
BS	British Standard
BTEX	Benzene, Toluene, Ethyl benzene and Xylenes
CIRIA	Construction Industry Research and Information Association
CLEA	Contaminated Land Exposure Assessment
CLR	Contaminated Land Research reports
DEFRA	Department of the Environment, Food and Rural Affairs (formerly the DoE and DETR)
DETR	Department of the Environment, Transport and the Regions (formerly the DoE and now Defra)
DO	Dissolved oxygen
DoE	Department of the Environment (then DETR and later Defra)
DQRA	Detailed quantitative risk assessment (Tier 2)
EA	Environment Agency
EC	Equivalent Carbon
EPH	Extractable Petroleum Hydrocarbons
EQI	Environmental Quality Index
EQS	Environmental Quality Standards
FRA	Flood Risk Assessment
GQRA	Generic quantitative risk assessment (Tier 1)
IPC	Integrated Pollution Control
IPPC	Integrated Pollution Prevention Control
mAOD	Metres above ordnance datum
mbgl	Metres below ground level
NGR	National grid reference
NHBC	National House Building Council
NRA	National Rivers Authority (now the Environment Agency)
PACM	Potentially asbestos containing material

### APPENDIX 2 - REPORT LIMITATIONS AND CONDITIONS

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

The comments given in this report, and the opinions expressed herein, are based upon the readily available information collated for the report and an assessment based upon the current UK guidance, primarily the Contaminated Land Research (CLR) Reports, and most importantly CLR Report 3 (ref. R.1).

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Geosphere Environmental Limited. The report has been prepared in relation to the proposed end-use should another end-use been intended a further re-assessment may be required. It is likely that over time practises will improve and the relevant guidance and legislation be amended or superseded, which may necessitate a re-assessment of the site.

The report is limited to those aspects of land contamination specifically reported on and is necessarily qualified accordingly, no liability shall be accepted for other aspects which may be the result of gradual or sudden pollution incidents, past or present unrecorded land uses both on- and off-site and the potential for associated contaminant migration. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed on site, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

The conceptual model is based on the information available at the time of conducting this assessment and is an interpretative assessment of the conditions at the site. It should be noted that the redevelopment and/or further investigation of the site may reveal additional information and therefore alter the conceptual model and the conclusion of this report.

#### **APPENDIX 3 – REFERENC ES**

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### APPENDIX 4 – GROUNDSURE DATA SEARCH REPORT

EnviroInsight Data GeoInsight Data



Geosphere Environmental Ltd	GroundSure Reference:	HMD-369-1706442
BRIGHTWELL BARNS, IPSWICH ROAD, Suffolk, Brightwell, IP10 0BJ	ROAD, Your Reference: 995,SI	
	Report Date	Oct 9, 2014
	Report Delivery Method:	Email - pdf

### GroundSure EnviroInsight

Address: Land to NW of Haverhill, CB9 0EH

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Enviroinsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above GroundSure reference number.

Yours faithfully,

Managing Director Groundsure Limited

Enc. GroundSure EnviroInsight



## GroundSure EnviroInsight

Land to NW of Haverhill, CB9 0EH

Geosphere Environmental Ltd

Oct 9, 2014

HMD-369-1706442

Address:	
Date:	
Reference:	
Client:	

N



S

NW

SW

Aerial Photograph Capture date:24-MGrid Reference:5670Site Size:47.10

24-May-2009 567002,246841 47.10ha

SE

NE

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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.

			51-250	251-500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
1.1.1 Records of historic IPC Authorisations	0	0	0	0
1.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0
1.1.5 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
1.1.6 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
1.1.7 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
1.1.9 Records of Licensed Discharge Consents	0	0	1	7
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0
1.2 Records of COMAH and NIHHS sites	0	0	0	0
1.3 Environment Agency Recorded Pollution Incidents				
1.3.1 National Incidents Recording System, List 2	0	0	0	4
1.3.2 National Incidents Recording System, List 1	0	0	0	0
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000- 5000
2.1 Landfill Sites						
2.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
2.1.2 Environment Agency Historic Landfill Sites	0	0	0	1	0	3
2.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	2
2.1.4 GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
2.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
2.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	0	0

Section 3: Current Land Use	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	0	3	8	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	0	1
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0

Section 4: Geology	
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site	

see the detailed findings section.

Section 5: Hydrogeology and Hydrology	<b>/</b> 0-500m						
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes						
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes						
	On-site	0-50m	51-250	251-500	501-1000	1000- 2000	
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	26	
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2	
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	3	
5.6 Source Protection Zones (within 500m of the study site)	2	0	1	0	Not searched	Not searched	
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched	
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	2	0	0	0	Not searched	Not searched	
	On-site	0-50m	51-250	251-500	501-1000	1000- 1500	
5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	Yes	
5.10 Detailed River Network entries within 500m of the site	13	1	9	19	Not searched	Not searched	
5.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched	

Section 6: Flooding	
6.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No
6.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site?	No
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 7: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000- 2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
7.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.5 Records of Ramsar sites	0	0	0	0	0	0
7.6 Records of Ancient Woodlands	0	0	2	0	0	3
7.7 Records of Local Nature Reserves (LNR)	0	0	0	2	2	4
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	1	0	0	0	0	0

### Section 8: Natural Hazards

1 What is the maximum risk of natural ground subsidence?	Low
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Very Low
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low

Section 9: Mining	
9.1 Are there any coal mining areas within 75m of the study site?	No
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Negligible
9.3 Are there any brine affected areas within 75m of the study site?	No

## 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. 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.

### 2. 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.

### 3. 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 underground oil and gas pipelines.

### 4. Geology

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

### 5. Hydrogeology and Hydrology

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

### 6. Flooding

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

### 7. 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.

### 8. 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.

### 9. Mining

Provides information on areas of coal and shallow mining.

### 10. 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

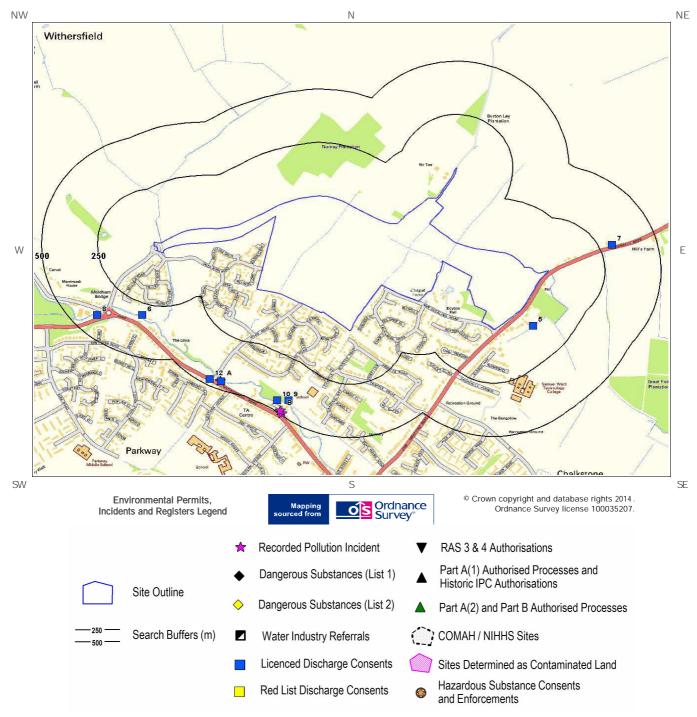
Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes 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.

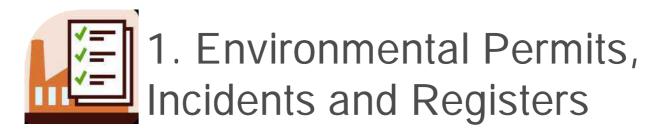


### 1. Environmental Permits, Incidents and Registers Map



Report Reference: HMD-369-1706442 Client Reference: 995,SI





1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

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

Database searched and no data found.

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

Database searched and no data found.

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

Database searched and no data found.

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

Database searched and no data found.

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

0

0

0

0

0

Database searched and no data found.



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

0

0

0

Database searched and no data found.

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

Database searched and no data found.

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

Database searched and no data found.

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

8

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Det	alls
5	92.0	SE	567840 246550	Address: The Oakes, Haverhill Road, Little Wratting, Haverhill, Suffolk, CB9 7UD Effluent Type: Sewage Discharges - Final/treated Effluent - Not Water Company Permit Number: PRENF11024 Permit Version: 1	Receiving Water: Tributary River Stour Status: Post Nra Legislation Where Issue Date > 31-aug-89 (historic Only) Issue date: 26/8/1997 Effective Date: 26/8/1997 Revocation Date: -
6	306.0	S	566100 246600	Address: Parkway Extension, Withersfield Road, Haverhill, Suffolk Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: PR2NFE01471 Permit Version: 1	Receiving Water: Stour Brook Status: Pre Nra Legislation Where Issue Date < 01-sep-89 (historic Only) Issue date: 19/3/1971 Effective Date: 19/3/1971 Revocation Date: 7/3/1994
7	306.0	NE	568190 246930	Address: Little Wratting Ps, Haverhill Road, Little Wratting, Haverhill, Suffolk, CB9 7UD Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: AW2NFE02280 Permit Version: 1	Receiving Water: Trib Stour Brook Status: Pre Nra Legislation Where Issue Date < 01-sep-89 (historic Only) Issue date: 22/6/1983 Effective Date: 22/6/1983 Revocation Date: -
8	403.0	SW	565900 246600	Address: Withersfield Road, Haverhill, Suffolk, CB9 7RR Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: PR2NFE04176 Permit Version: 1	Receiving Water: Stour Brook Status: Pre Nra Legislation Where Issue Date < 01-sep-89 (historic Only) Issue date: 1/7/1976 Effective Date: 1/7/1976 Revocation Date: 15/3/1994
9	427.0	SW	566750 246200	Address: Ann Suckling's Ln, Haverhill, Suff CB9 7TA Effluent Type: Unspecified Permit Number: AW2NFE01573 Permit Version: 1	Receiving Water: Stour Brook Status: Pre Nra Legislation Where Issue Date < 01-sep-89 (historic Only) Issue date: 16/2/1973 Effective Date: 16/2/1973 Revocation Date: 5/11/2001



ID	ID Distance Direction NGR			Details		
10	456.0	SW	566700 246200	Address: Eastern Av/withersfld Rd, Haverhill. Effluent Type: Sewage Discharges - Stw Storm Overflow/storm Tank - Water Company Permit Number: AW2NFE07659 Permit Version: 1	Receiving Water: Stour Brook Status: Pre Nra Legislation Where Issue Date < 01-sep-89 (historic Only) Issue date: 18/1/1960 Effective Date: 18/1/1960 Revocation Date: -	
11 A	461.0	S	566450 246290	Address: Hales Barn Farm, Withersfield Road, Haverhill, Suffolk Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: PR2NFE11773 Permit Version: 1	Receiving Water: Unknown Trib. Stour Brook Status: Pre Nra Legislation Where Issue Date < 01-sep-89 (historic Only) Issue date: 10/8/1973 Effective Date: 10/8/1973 Revocation Date: 4/3/1993	
12	472.0	SW	566400 246300	Address: Withersfield Road, Haverhill, Suffolk Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: PR2NFE16864 Permit Version: 1	Receiving Water: Stour Brook Status: Pre Nra Legislation Where Issue Date < 01-sep-89 (historic Only) Issue date: - Effective Date: - Revocation Date: -	

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

0

0

Database searched and no data found.

#### 1.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

### 1.3 Environment Agency Recorded Pollution Incidents

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

4

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
1A	460.0	S	566446 246293	Incident Date: 03/01/2003 Incident Identification: 129058 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
2A	460.0	S	566446 246293	Incident Date: 03/01/2003 Incident Identification: 129058 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3B	485.0	SW	566714 246154	Incident Date: 30/12/2002 Incident Identification: 128033 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)



ID	Distance	Direction	NGR		Details
4B	492.0	SW	566720 246141	Incident Date: 13/03/2003 Incident Identification: 142752 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

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

0

0

Database searched and no data found.

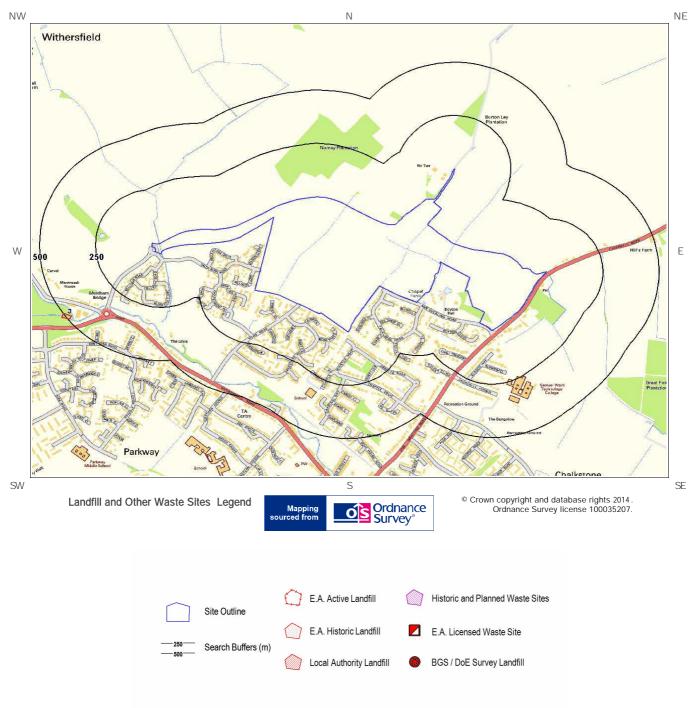
### 1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

Database searched and no data found.



## 2. Landfill and Other Waste Sites Map







## 2. Landfill and Other Waste Sites

### 2.1 Landfill Sites

2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

4

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
3	480.0	SW	565700 246500	Site Address: Old Meldham Bridge Brickyard, Old Meldham Bridge Brickyard, Withersfield Waste Licence: - Site Reference: SE22 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1205.0	S	568000 245200	Site Address: Junction Hole, Relief Road, Haverhill, Suffolk Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Haverhill Urban District Council
Not shown	1344.0	S	567900 245100	Site Address: Railway Cutting, Relief Road, Haverhill, Suffolk Waste Licence: - Site Reference: - Waste Type: Commercial, Household, Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Haverhill Urban District Council
Not shown	1344.0	S	568100 245100	Site Address: Millfields Way, Millfields Way, Haverhill Waste Licence: - Site Reference: SE08 Waste Type: Household, Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: St Edmonsbury Borough Council



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

2

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR		Details
Not shown	1372.0	S	56800 0.0 24520 0.0	Address: Junction Hole, Relief Rd, Haverhill, Suffolk BGS Number: 2413.0	Risk: Risk to major aquifer Waste Type: N/A
Not shown	1400.0	S	56810 0.0 24520 0.0	Address: Junction Hole, Relief Rd, Haverhill, Suffolk BGS Number: 2414.0	Risk: Risk to major aquifer Waste Type: N/A

2.1.4 Records of Local Authority landfill sites within 1500m of the study site:

0

#### Database searched and no data found.

### 2.2 Other Waste Sites

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

0

### Database searched and no data found.

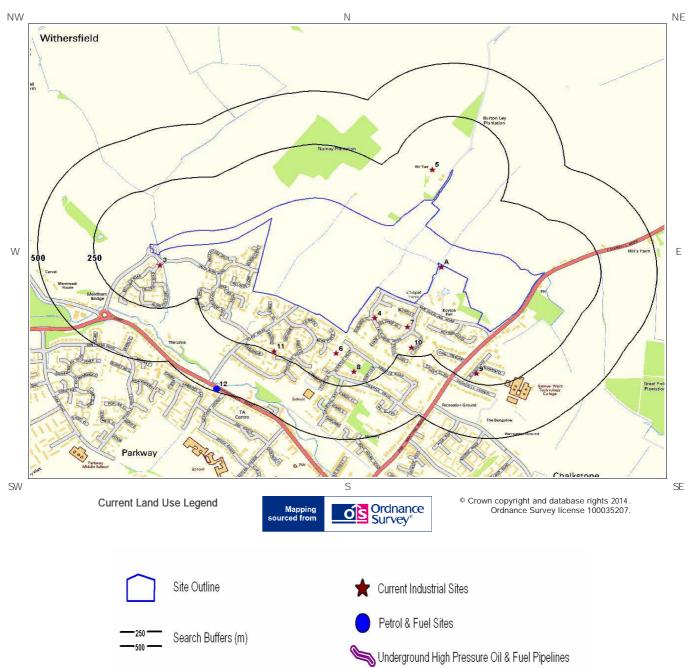
2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

0

Database searched and no data found.



### 3. Current Land Use Map







## 3. Current Land Uses

### 3.1 Current Industrial Data

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

11

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1A	10.0	SW	Pylon	567449 246835	CB9	Electrical Features	Infrastructure and Facilities
2A	10.0	SW	Communica tions Mast	567449 246834	CB9	Telecommunications Features	Infrastructure and Facilities
3	47.0	S	Electricity Sub Station	566198 246844	CB9	Electrical Features	Infrastructure and Facilities
4	75.0	SE	Electricity Sub Station	567153 246596	CB9	Electrical Features	Infrastructure and Facilities
5	80.0	W	Water Tower	567410 247292	CB9	Water Pumping Stations	Industrial Features
6	106.0	SW	Teletherm Ltd	566981 246430	25, Minster Road, Haverhill, CB9 0DR	Electrical and Electronic Engineers	Engineering Services
7	117.0	S	Test Plugs Ltd	567298 246553	12, Falklands Road, Haverhill, CB9 0EA	Measurement and Inspection Equipment	Industrial Products
8	185.0	S	Electricity Sub Station	567061 246344	CB9	Electrical Features	Infrastructure and Facilities
9	205.0	S	Electricity Sub Station	567605 246335	CB9	Electrical Features	Infrastructure and Facilities
10	208.0	S	Style Carpets	567316 246457	20, Cross Close, Haverhill, CB9 0EB	Construction Completion Services	Construction Services
11	238.0	SW	Electricity Sub Station	566705 246440	CB9	Electrical Features	Infrastructure and Facilities

### 3.2 Petrol and Fuel Sites

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

1

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
12	487.0	S	566449 246263	Obsolete	Mount Pleasant Service Station, Withersfield Road, Withersfield Road, Haverhill, Suffolk, CB9 7RN	Not Applicable	Obsolete



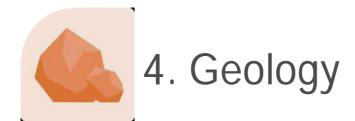
0

### 3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site:

Database searched and no data found.





4.1 Artificial Ground and Made Ground

Database searched and no data found.

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

### 4.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON

### 4.3 Bedrock and Solid Geology

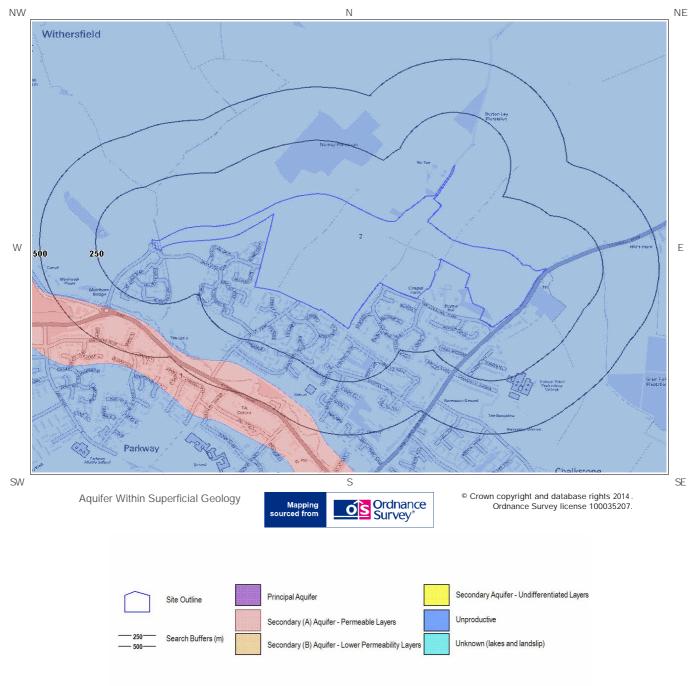
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LES E-CHLK	LEWES NODULAR CHALK FORMATION AND SEAFORD CHALK FORMATION (UNDIFFERENTIATED)	CHALK

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

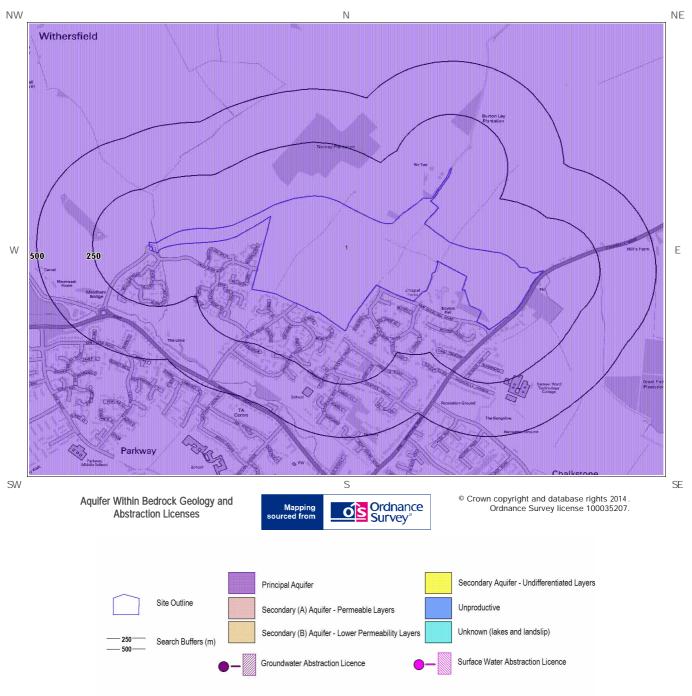


# 5. Hydrogeology and Hydrology5a. Aquifer Within Superficial Geology



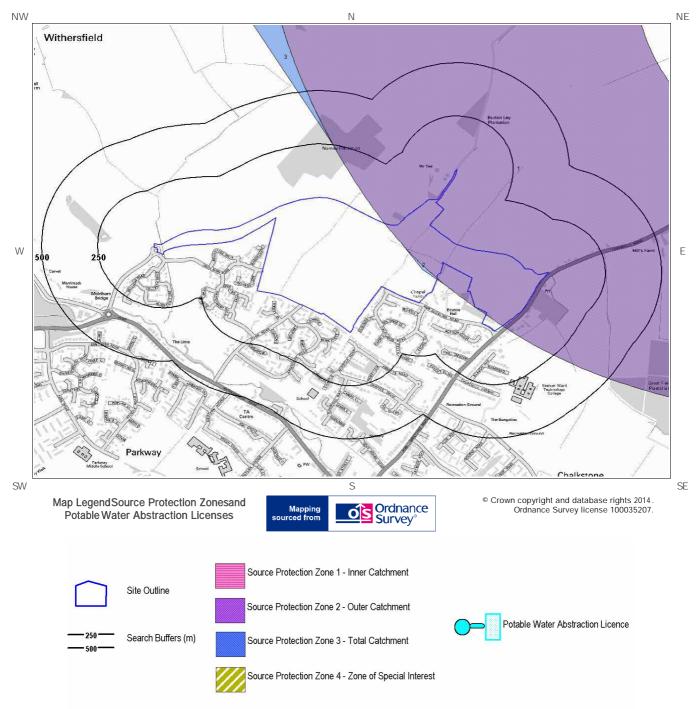


## 5b. Aquifer Within Bedrock Geology and Abstraction Licenses



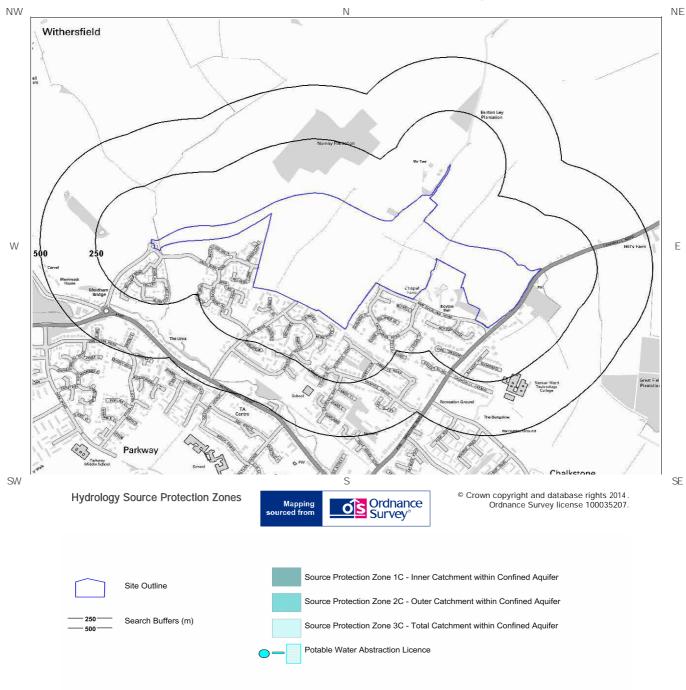


### 5c. Hydrogeology –Source Protection Zones and Potable Water Abstraction Licenses





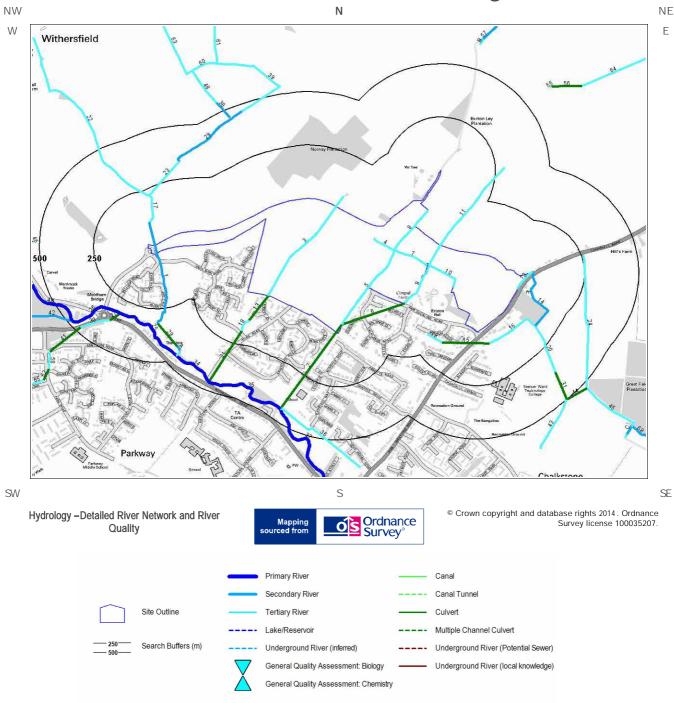
## 5d. Hydrology Source Protection Zones within confined aquifer



Report Reference: HMD-369-1706442 Client Reference: 995,SI

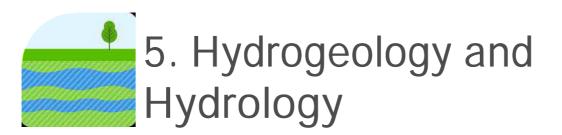


## 5 e. Hydrology – Detailed River Network and River Quality



Report Reference: HMD-369-1706442 Client Reference: 995,SI





### 5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency'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 Environisight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
2	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
1	329.0	SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

### 5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency'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 Environsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level o water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers



### 5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site?

Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	<b>Distance</b> (m) 1026.0	m) Direction	NGR 567000 245500	Details		
Not shown				Licence No: 8/36/11/*G/0002 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water Source Of Supply Point: Borehole At Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/6/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/1/1997 Version End Date:	
Not shown	1705.0	S	566850 244830	Licence No: 8/36/11/*G/0001 Details: Non-Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: Borehole 1 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV2472 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/12/2008 Version End Date:	
Not shown	1705.0	S	566850 244830	Licence No: 8/36/11/*G/0001 Details: Process Water Direct Source: Ground Water Source Of Supply Point: Borehole 1 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV2472 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/12/2008 Version End Date:	
Not shown	1705.0	S	566850 244830	Licence No: 8/36/11/*G/0001 Details: Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: Borehole 1 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV1968 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:	
Not shown	1705.0	S	566850 244830	Licence No: 8/36/11/*G/0001 Details: Boiler Feed Direct Source: Ground Water Source Of Supply Point: Borehole 1 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV2472 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/12/2008 Version End Date:	
Not shown	1705.0	S	566850 244830	Licence No: 8/36/11/*G/0001 Details: Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: Borehole 1 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV2472 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/12/2008 Version End Date:	
Not shown	1705.0	S	566850 244830	Licence No: 8/36/11/*G/0001 Details: Boiler Feed Direct Source: Ground Water Source Of Supply Point: Borehole 1 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV1968 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:	



ID	<b>Distance</b> (m) 1705.0	) Direction	NGR	Details		
Not shown			566850 244830	Licence No: 8/36/11/*G/0001 Details: Non-Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: Borehole 1 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV1968 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:	
Not shown	1741.0	S	566800 244800	Licence No: 8/36/11/*G/0001 Details: Non-Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: I.f.f. Bore 2, Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1994 Version End Date:	
Not shown	1741.0	S	566800 244800	Licence No: 8/36/11/*G/0001 Details: Process water Direct Source: Ground Water Source Of Supply Point: I.f.f. Bore 2, Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1994 Version End Date:	
Not shown	1741.0	S	566800 244800	Licence No: 8/36/11/*G/0001 Details: Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: I.f.f. Bore 2, Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1994 Version End Date:	
Not shown	1741.0	S	566800 244800	Licence No: 8/36/11/*G/0001 Details: Boiler Feed Direct Source: Ground Water Source Of Supply Point: I.f.f. Bore 2, Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1994 Version End Date:	
Not shown	1821.0	S	566790 244720	Licence No: 8/36/11/*G/0001 Details: Non-Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: Borehole 2 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV2472 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/12/2008 Version End Date:	
Not shown	1821.0	S	566790 244720	Licence No: 8/36/11/*G/0001 Details: Non-Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: Borehole 2 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV1968 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:	
Not shown	1821.0	S	566790 244720	Licence No: 8/36/11/*G/0001 Details: Boiler Feed Direct Source: Ground Water Source Of Supply Point: Borehole 2 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV1968 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:	



ID	Distance (m)	Birection S	NGR	Details		
Not shown	1821.0		566790 244720	Licence No: 8/36/11/*G/0001 Details: Boiler Feed Direct Source: Ground Water Source Of Supply Point: Borehole 2 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV2472 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/12/2008 Version End Date:	
Not shown	1821.0	S	566790 244720	Licence No: 8/36/11/*G/0001 Details: Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: Borehole 2 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV1968 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:	
Not shown	1821.0	S	566790 244720	Licence No: 8/36/11/*G/0001 Details: Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: Borehole 2 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV2472 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/12/2008 Version End Date:	
Not shown	1821.0	S	566790 244720	Licence No: 8/36/11/*G/0001 Details: Process Water Direct Source: Ground Water Source Of Supply Point: Borehole 2 Duddery Hill Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): 180000 Max Daily Volume (m <sup>3</sup> ): 720 Original Application No: EV2472 Original Start Date: 20/4/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/12/2008 Version End Date:	
Not shown	1826.0	NE	569200 248100	Licence No: 8/36/11/*G/0070 Details: Potable Water Supply - Direct Direct Source: Ground Water Source Of Supply Point: Chalk Bore 1 - Gt Wratting Data Type: Point	Annual Volume (m <sup>3</sup> ): 6314500 Max Daily Volume (m <sup>3</sup> ): 17300 Original Application No: - Original Start Date: 1/1/1989 Expiry Date: - Issue No: 103 Version Start Date: 1/4/2010 Version End Date:	
Not shown	1826.0	NE	569200 248100	Licence No: 8/36/11/*G/0070 Details: Potable Water Supply - Direct Direct Source: Ground Water Source Of Supply Point: Chalk Bore 2 - Gt Wratting Data Type: Point	Annual Volume (m <sup>3</sup> ): 6314500 Max Daily Volume (m <sup>3</sup> ): 17300 Original Application No: - Original Start Date: 1/1/1989 Expiry Date: - Issue No: 103 Version Start Date: 1/4/2010 Version End Date:	
Not shown	1840.0	S	566800 244700	Licence No: 8/36/11/*G/0001 Details: Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: I.f.f. Bore 1, Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1994 Version End Date:	
Not shown	1840.0	S	566800 244700	Licence No: 8/36/11/*G/0001 Details: Boiler Feed Direct Source: Ground Water Source Of Supply Point: I.f.f. Bore 1, Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1994 Version End Date:	



ID	Distance (m) 1840.0	Direction	NGR 566800 244700	Details		
Not shown				Licence No: 8/36/11/*G/0001 Details: Non-Evaporative Cooling Direct Source: Ground Water Source Of Supply Point: I.f.f. Bore 1, Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1994 Version End Date:	
Not shown	1840.0	S	566800 244700	Licence No: 8/36/11/*G/0001 Details: Process water Direct Source: Ground Water Source Of Supply Point: I.f.f. Bore 1, Haverhill Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1994 Version End Date:	
Not shown	1849.0	E	569640 247460	Licence No: 8/36/11/*G/0070 Details: Potable Water Supply - Direct Direct Source: Ground Water Source Of Supply Point: Borehole At Kedington Suffolk Data Type: Point	Annual Volume (m <sup>3</sup> ): 6314500 Max Daily Volume (m <sup>3</sup> ): 17300 Original Application No: - Original Start Date: 1/1/1989 Expiry Date: - Issue No: 103 Version Start Date: 1/4/2010 Version End Date:	

### 5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site?

Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m) 1973.0	Direction	NGR	Details		
Not shown			569400 248100	Licence No: 8/36/11/*S/0080 Details: Make-Up Or Top Up Water Direct Source: Surface Water Source Of Supply Point: Trib Of R Stour At Great Wratting Data Type: Point	Annual Volume (m <sup>3</sup> ): 5000 Max Daily Volume (m <sup>3</sup> ): 20 Application No: - Original Start Date: 1/7/1998 Expiry Date: - Issue No: 103 Version Start Date: 1/5/2000 Version End Date:	
Not shown	1973.0	NE	569400 248100	Licence No: 8/36/11/*S/0080 Details: Make-Up or Top Up Water Direct Source: Surface Water Source Of Supply Point: River Stour At Great Wratting Data Type: Point	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Application No: - Original Start Date: 1/7/1998 Expiry Date: - Issue No: 101 Version Start Date: 1/4/2000 Version End Date:	



# 5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (5c):

ID	Distance (m)	Direction	Licence No: 8/36/11/*G/0070 Details: Potable Water Supply - DirectAnnual Volume (m³): 6314500 Max Daily Volume (m³): 17300 Original Application No: - 		
Not shown	1826.0	NE		Details: Potable Water Supply - Direct Direct Source: Ground Water Source Of Supply Point: Chalk Bore 1 - Gt Wratting	Max Daily Volume (m <sup>3</sup> ): 17300 Original Application No: - Original Start Date: 1/1/1989 Expiry Date: - Issue No: 103 Version Start Date:
Not shown	1826.0	NE		Details: Potable Water Supply - Direct Direct Source: Ground Water Source Of Supply Point: Chalk Bore 2 - Gt Wratting	Max Daily Volume (m <sup>3</sup> ): 17300 Original Application No: - Original Start Date: 1/1/1989 Expiry Date: - Issue No: 103 Version Start Date:
Not shown	1849.0	E	569640 247460	Licence No: 8/36/11/*G/0070 Details: Potable Water Supply - Direct Direct Source: Ground Water Source Of Supply Point: Borehole At Kedington Suffolk Data Type: Point	

# 5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

Yes

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (5c):

ID	Distance (m)	Direction	Туре	Description
1	0.0	On Site	2	Outer Catchment
2	0.0	On Site	3	Total Catchment
3	236.0	Ν	3	Total Catchment



# 5.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

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.

# 5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Major Aquifer/Intermediate Leaching Potential	11	Soils which can possibly transmit a wide range of pollutants.
0	On Site	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assume to be highly permeable in the absence of site-specific information.

# 5.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site?

Yes

# 5.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following	Dialogical (	Juglity	rocorde	are chown or	the Uvdrole	av Man (Ed)
The following	DIDIDUICAL	Juanty	records	are shown or		
						JJ

ID	Distance	Direction	NGR	River Quality Grade		Biolog	ical Quality	Grade	
ID	(m)	Direction	NGK	River Quality Grade	2005	2006	2007	2008	2009
Not shown	1282.0	NW	565200 247800	River Name: Stour Brook Reach: Withersfieldhaverhill Stw End/Start of Stretch: Start of Stretch NGR	С	В	В	В	С



5.9.2 Chemical Quality:

Database searched and no data found.



# 5.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

Yes

The following Detailed River Network records are represented on the Hydrology Map (5d):



ID	Distance (m)	Direction	Det	ails
1	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
2	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
3	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
5	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
6	0.0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
7	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
8	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
9	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
10	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
11	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
12	0.0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
13	0.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
14	13.0	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
15	51.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
16	76.0	SE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
17	105.0	Ν	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
18	130.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
19	135.0	SW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
20	157.0	SE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
21	184.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined



D	Distance (m)	Direction	D	etails
22	216.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
23	216.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
24	251.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
25	305.0	S	River Name: Stour Brook Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
26	316.0	SW	River Name: Stour Brook Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
27	316.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
28	318.0	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
29	332.0	Ν	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
30	368.0	SW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
31	370.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
32 A	414.0	SW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
33 A	418.0	SW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
34	424.0	SW	River Name: Stour Brook Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
35	426.0	SW	River Name: Stour Brook Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
36	436.0	SW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
37	443.0	SW	River Name: Stour Brook Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
38	459.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
39	466.0	Ν	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
40	466.0	SW	River Name: Stour Brook Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
41	476.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
42	484.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined



# 5.11 Surface Water Features

### Are there any surface water features within 250m of the study site?

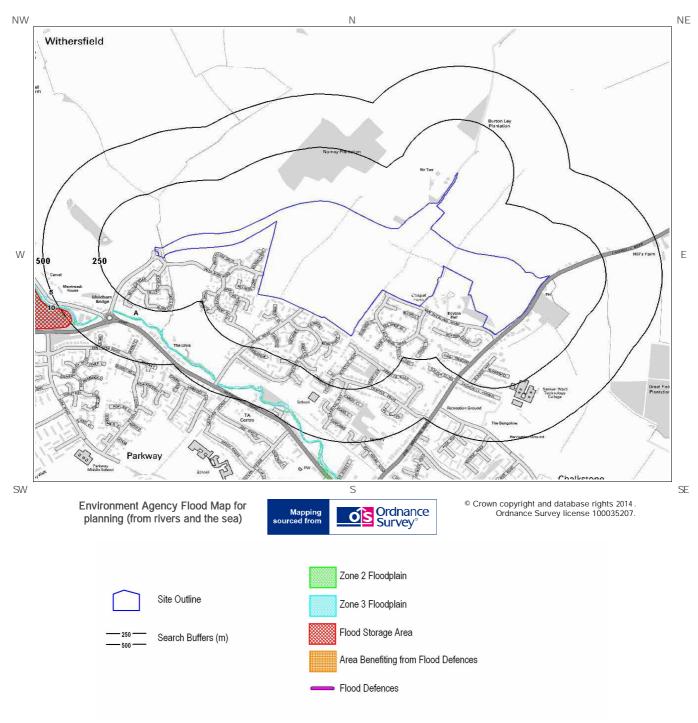
Yes

The following surface water records are not represented on mapping:

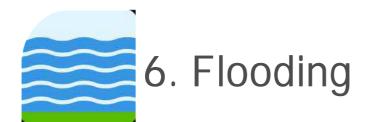
Distance (m)	Direction
0.0	On Site
35.0	SE
74.0	Ν
76.0	SE
105.0	Ν
130.0	S
135.0	SW
158.0	SE
224.0	NW
224.0	NW
248.0	SE



# 6. Environment Agency Flood Map for planning (from rivers and the sea)







### 6.1 Zone 2 Flooding

Environment Agency 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 1 –Environment Agency Flood Map for Planning:

Is the site within 250m of an Environment Agency Zone 2 floodplain?

No

No

No

No

No

Database searched and no data found.

### 6.2 Zone 3 Flooding

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 1 –Environment Agency Flood Map for Planning.

Is the site within 250m of an Environment Agency Zone 3 floodplain?

Database searched and no data found.

# 6.3 Flood Defences

Are there any Flood Defences within 250m of the study site?

Database searched and no data found.

### 6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site?

### 6.5 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

# 6.6 Groundwater Flooding Susceptibility Areas

6.6.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?

Does this relate to Clearwater Flooding or Superficial Deposits Flooding?

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

6.6.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

6.7 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?

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.



Yes

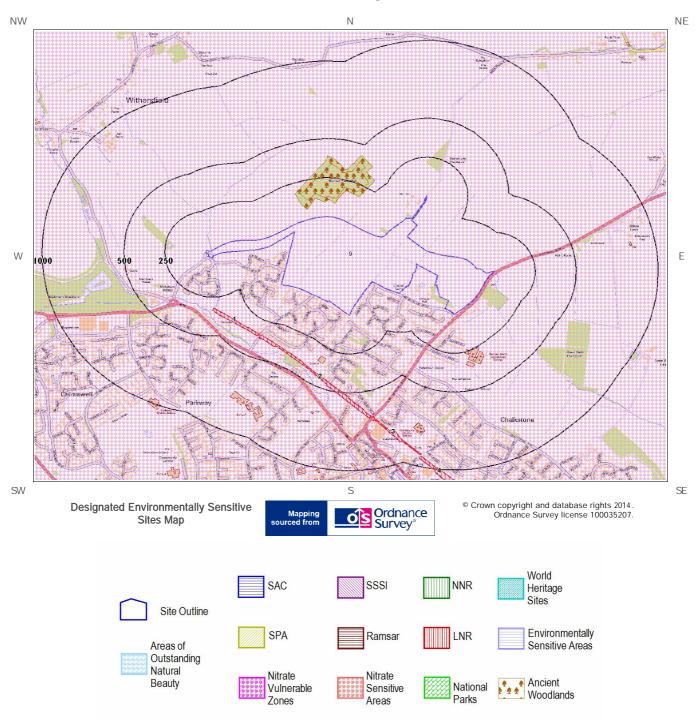
Clearwater Flooding

High

41



# 7. Designated Environmentally Sensitive Sites Map





# 7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site?	Yes
7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:	0
Database searched and no data found.	
7.2 Records of National Nature Reserves (NNR) within 2000m of the study site:	0
Database searched and no data found.	Ū
7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:	0
Database searched and no data found.	
7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:	0
Database searched and no data found.	-
7.5 Records of Ramsar sites within 2000m of the study site:	0
Database searched and no data found.	0



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

The following Ancient Woodland records are supplied by English Nature/Scottish Natural Heritage/Countryside Council for Wales and are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
10A	67.0	Ν	NORNEY PLANTATION	Ancient and Semi-Natural Woodland
11A	116.0	Ν	NORNEY PLANTATION	Ancient Replanted Woodland
Not shown	1101.0	W	HOWE WOOD	Ancient and Semi-Natural Woodland
Not shown	1404.0	NW	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1943.0	NW	LITTLEY WOOD	Ancient Replanted Woodland

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

8

The following Local Nature Reserve (LNR) records provided by Natural England/Countryside Council for Wales and Scottish Natural Heritage are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
1	321.0	S	Haverhill Railway Walks	Natural England
2	346.0	S	Haverhill Railway Walks	Natural England
3	667.0	S	Haverhill Railway Walks	Natural England
4	932.0	S	Haverhill Railway Walks	Natural England
Not shown	1311.0	S	Haverhill Railway Walks	Natural England
Not shown	1783.0	S	Haverhill Railway Walks	Natural England
Not shown	1811.0	S	Haverhill Railway Walks	Natural England
Not shown	1912.0	S	Haverhill Railway Walks	Natural England

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

0

Database searched and no data found.



'.9 Records of Environmentally Sensitive Areas within 2000m of the study site:	
Database searched and no data found.	
.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:	
Database searched and no data found.	
.11 Records of National Parks (NP) within 2000m of the study site:	
Database searched and no data found.	
12 Records of Nitrate Sensitive Areas within 2000m of the study site:	
Database searched and no data found.	
7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:	

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
9	0.0	On Site	NVZ Area	DEFRA





# 8.1 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 GeoInsight, available from our website. The following information has been found:

# 8.1.1 Shrink Swell

What is the 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.

# 8.1.2 Landslides

What is the maximum Landslide\* 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

Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.

<sup>\*</sup> This indicates an automatically generated 50m buffer and site.

# 8.1.3 Soluble Rocks

What is the maximum Soluble Rocks\* 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:

Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.

# 8.1.4 Compressible Ground

What is the maximum Compressible Ground\* hazard rating identified on the study site?

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

No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

# 8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks\* hazard rating identified on the study site?

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

Hazard

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.



Hazard

Hazard

Very Low

Negligible

47



# 8.1.6 Running Sand

What is the maximum Running Sand\*\* 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

Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

<sup>\*</sup> This indicates an automatically generated 50m buffer and site.





# 9.1 Coal Mining

Are there any coal mining areas within 75m of the study site?

Database searched and no data found.

### 9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site\*?

\*Please note this data is searched with a 150m buffer.

# 9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? Guidance: No Guidance Required.

Negligible

No



# **Contact Details**

GroundSure Helpline Telephone: 08444 159 000 info@groundsure.com



**Geological Survey** 

British

British Geological Survey Enquiries

Kingsley Dunham Centre Keyworth, Nottingham NG12 5GG Tel: 0115 936 3143. Fax: 0115 936 3276. Email: enquiries@bgs.ac.uk Web:www.bgs.ac.uk BGS Geological Hazards Reports and general geological enquiries

**Environment Agency** 

National Customer Contact Centre, PO Box 544 Rotherham, S60 1BY Tel: 08708 506 506 Web:www.environment-agency.gov.uk Email:enquiries@environment-agency.gov.uk

Public Health England

Public information access office Public Health England, Wellington House 133-155 Waterloo Road, London, SE1 8UG https://www.gov.uk/government/organisations/public-healthengland Email:enquiries@phe.gov.uk Main switchboard: 020 7654 8000

The Coal Authority

200 Lichfield Lane Mansfield Notts NG18 4RG Tel: 0345 7626 848 DX 716176 Mansfield 5 www.coal.gov.uk

Ordnance Survey

Adanac Drive, Southampton SO16 0AS Tel: 08456 050505

Local Authority Authority: St Edmundsbury Borough Council Phone: 01284 763 233 Web: www.stedmundsbury.gov.uk Address: Borough Offices, Angel Hill, Bury St Edmunds, Suffolk, IP33 1XB

Gemapping PLC

Virginia Villas, High Street, Hartley Witney, Hampshire RG27 8NW Tel: 01252 845444



Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, English Nature who retain the Copyright and Intellectual Property Rights for the data. PointX © Database Right/Copyright, Thomson Directories Limited © Copyright Link Interchange Network Limited © Database Right/Copyright and Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028]. This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.



NATURAL ENVIRONMENT RESEARCH COUNCIL







#### Standard Terms and Conditions

#### 1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

**"GroundSure Materials"** means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

**"Order"** means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

**"Ordnance Survey"** means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

**"Third Party Content"** means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

#### 2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions

implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In additic

acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSu GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

#### 3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services ar appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmer information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amenc GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

#### 4 Reliance

(iv)

4.1The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any persor providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

#### 5 Fees and Disbursements

5.1GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred t GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Service (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

#### 6 Intellectual Property and Confidentiality

6.1 Subject to

#### (i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

 not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

 (v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

#### 7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

 any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death

or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

(i)	loss of profits;
(ii)	loss of business;
(iii)	depletion of goodwill and/or similar losses;
(iv)	loss of anticipated savings;
(v)	loss of goods;
(vi)	loss of contract;

- (vii) loss of use:
- (viii) loss or corruption of data or information;
- (ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of us GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

#### 8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

#### 9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure' acceptance of the Order; and

- the Reports and/or Mapping provided under this Contract are
  - (a) supplied to the Client's specification(s) and in any event
    - (b) by their nature cannot be returned.

#### 10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(ii)

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficia

#### GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

#### 11 Anti-Bribery

11.1 The Client warrants that it shall:

 comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anticorruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

#### 12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

- (ii) fire, storm, flood, tempest or epidemic;
- (iii) Acts of God or the public enemy;
- (iv) riot, civil commotion or war;
- (v) strikes, labour disputes or industrial action;
- (vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix)

any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English

law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) u Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the required by law. © GroundSure Limited June 2013



Geosphere Environmental Ltd GroundSure HMD-369-1706443 BRIGHTWELL BARNS, IPSWICH ROAD, Suffolk, Brightwell, IP10 0BJ Report Date Oct 9, 2014 Report Delivery Email - pdf Method:

# **GroundSure Geoinsight**

Address: Land to NW of Haverhill, CB9 0EH

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure GeoInsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above GroundSure reference number.

Yours faithfully,

Managing Director Groundsure Limited

Enc. GroundSure GeoInsight



# GroundSure GeoInsight

Address:
Date:
Reference:

Land to NW of Haverhill, CB9 0EH

Geosphere Environmental Ltd

Oct 9, 2014

HMD-369-1706443

Client:

NW

Ν

NE



SW

Aerial Photograph Capture date:24-May-2009Grid Reference:567002,246841Site Size:47.10ha

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# **Overview of Findings**

The GroundSure GeoInsight provides high quality geo-environmental information that allows geoenvironmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the 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:Geology							
1.1 Artificial Ground	.1 Artificial Ground 1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?						
	1.1.2 Are there any records relating to per ground within the study site* boundary?	No					
1.2 Superficial Geology and Landslips	Geology prese	ent	Yes				
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?						
	1.2.3 Are there any records of landslip with site boundary?	nin 500m of the	e study	No			
	1.2.4 Are there any records relating to per within the study site boundary?	meability of lan	idslips	No			
1.3 Bedrock, Solid Geology & Faults							
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?				Yes		
	1.3.3 Are there any records of faults within boundary?	500m of the s	tudy site	No			
1.4 Radon data	1.4.1 Is the property in a Radon Affected A Health Protection Agency (HPA) and if so homes are above the Action Level?						
	1.4.2 Is the property in an area where Rade are required for new properties or extensic described in publication BR211 by the Build Establishment?	ons to existing o		No radon protective measures are necessary			
Section 2:Ground W	/orkings	On-site	0-50m	51-250	251-500	501-1000	
2.1 Historical Surface Gr Mapping	ound Working Features from Small Scale	2	10	1	Not Searched	Not Searched	
2.2 Historical Undergrou	0	0	0	0	0		
2.3 Current Ground Wor	kings	0	0	0	3	2	
Section 3:Mining, Ex	straction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000	
3.1 Historical Mining		0	0	0	0	0	



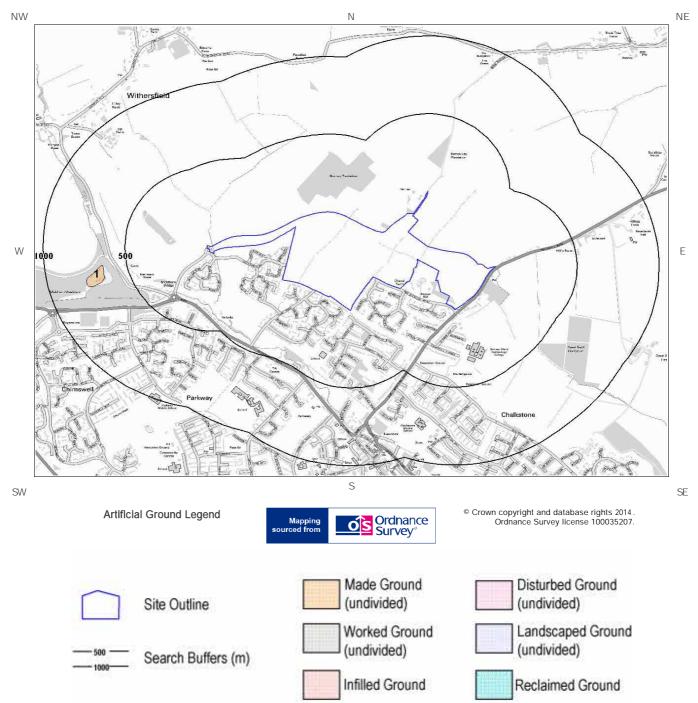
Section 3:Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.2 Coal Mining	0	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	1	0	0	0	0
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0
Section 4:Natural Ground Subsidence	On-si	te			
4.1 Shrink Swell Clay	Low				
4.2 Landslides	Low				
4.3 Ground Dissolution of Soluble Rocks	Very Lo	WC			
4.4 Compressible Deposits	Negligi	ble			
4.5 Collapsible Deposits	Very Lo	WC			
4.6 Running Sand	Very Lo	WC			
Section 5:Borehole Records	On-site	0-50m	51-250		
5 BGS Recorded Boreholes	0	1	3		
Section 6:Estimated Background Soil Chemistry	On-site	0-50m	51-250		
6 Records of Background Soil Chemistry	4	0	4		
Section 7:Railways and Tunnels	On-site	0-50m	51-250	251-500	
7.1 Tunnels	0	0	0	Not Searched	
7.2 Historical Railway and Tunnel Features	0	0	0	Not Searched	
7.3 Historical Railways	0	0	0	Not Searched	
7.4 Active Railways	0	0	0	Not Searched	



Section 7:Railways and Tunnels	On-site	0-50m	51-250	251-500	
7.5 Railway Projects	0	0	0	0	



# 1 Geology 1.1 Artificial Ground Map







# 1.1.1 Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:205

Are there any records of Artificial/Made Ground within 500m of the study site boundary?

Database searched and no data found.

# 1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary?

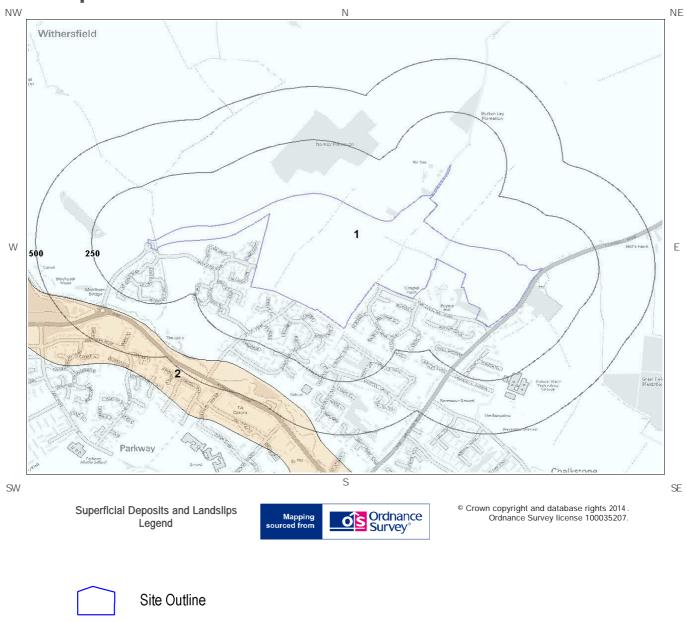
No

No

Database searched and no data found.



# 1.2 Superficial Deposits and Landslips Map





Search Buffers (m)



# 1.2 Superficial Deposits and Landslips

# 1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
 1	0.0	On Site	LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
2	329.0	SW	RTDU-SAGR	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL

# 1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Moderate	Low

# 1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary?

No

### Database searched and no data found.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

# 1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site\* boundary?

No

Database searched and no data found.

<sup>\*</sup> This includes an automatically generated 50m buffer zone around the site



# 1.3 Bedrock and Faults Map





# 1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:205

# 1.3.1 Bedrock/ Solid Geology

Records of Bedrock/ Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	LESE-CHLK	Lewes Nodular Chalk Formation And Seaford Chalk Formation (undifferentiated) - Chalk	Santonian / Turonian

# 1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Very High	Very High

# 1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary?

No

### Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

<sup>\*</sup> This includes an automatically generated 50m buffer zone around the site



# 1.4 Radon Data

# 1.4.1 Radon Affected Areas

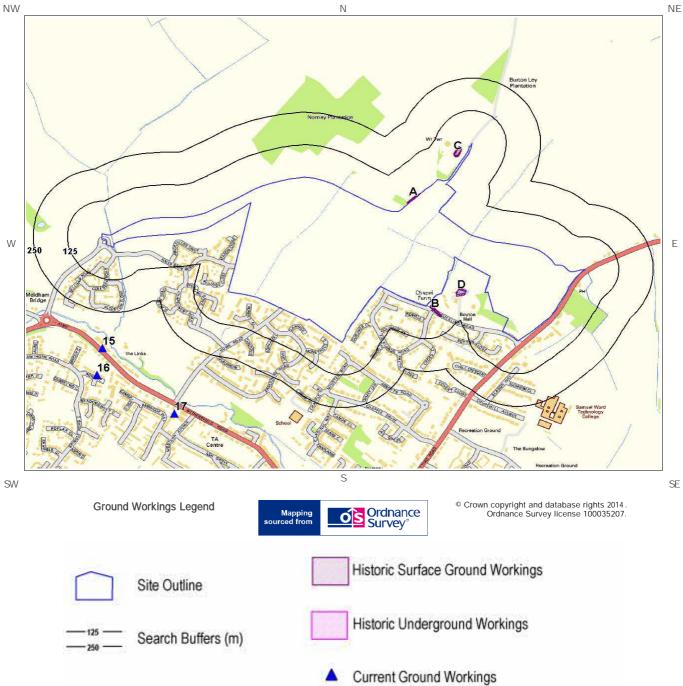
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level

# 1.4.2 Radon Protection

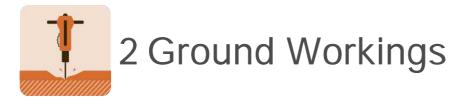
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary











### 2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

The following Historical Surface Ground Working Features are provided by GroundSure:

D	Distance (m)	Direction	NGR	Use	Date
1A	0.0	On Site	567289 247079	Pond	1924
2A	0.0	On Site	567289 247080	Pond	1885
3B	13.0	SE	567367 246647	Ponds	1924
4B	13.0	SE	567367 246647	Ponds	1876
5B	14.0	SE	567369 246648	Ponds	1896
6C	20.0	NW	567448 247255	Covered Reservoir	1971
7C	21.0	NW	567449 247258	Covered Reservoir	1979
8C	22.0	NW	567449 247261	Covered Reservoir	1991
9D	49.0	E	567460 246722	Pond	1967
10D	49.0	E	567460 246722	Pond	1979
11D	49.0	E	567460 246722	Pond	1971
12D	49.0	E	567460 246722	Pond	1991
13D	51.0	E	567461 246717	Pond	1896

### 2.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.



# 2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	359.0	SW	565867 246705	Clay & Shale	Hanchett End Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
15	389.0	S	566154 246504	Clay & Shale	Mount Pleasant Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
16	494.0	S	566133 246401	Clay & Shale	Mount Pleasant Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
17	510.0	SW	566415 246252	Clay & Shale	Mount Pleasant Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	519.0	W	565639 246853	Clay & Shale	Hanchett End Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased



# 3 Mining, Extraction & Natural Cavities Map





# 3 Mining, Extraction & Natural Cavities

### 3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

### 3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

### 3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary?

No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

### 3.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Not available	Chalk	Occasional minor mining may have occurred but of restricted extent.



## 3.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary?	No
Database searched and no data found.	
3.6 Natural Cavities	
This dataset provides information based on Peter Brett Associates natural cavities database.	
Are there any Natural Cavities within 1000m of the study site boundary?	No
Database searched and no data found.	
3.7 Brine Extraction	
This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsi Compensation Board.	dence
Are there any Brine Extraction areas within 1000m of the study site boundary?	No
Database searched and no data found.	
3.8 Gypsum Extraction	
This dataset provides information on Gypsum extraction from British Gypsum records.	
Are there any Gypsum Extraction areas within 1000m of the study site boundary?	No
Database searched and no data found.	
3.9 Tin Mining	
This dataset provides information on tin mining areas and is derived from tin mining records. This se based upon postcode information to a sector level.	arch is
Are there any Tin Mining areas within 1000m of the study site boundary?	No

Database searched and no data found.



# 3.10 Clay Mining

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

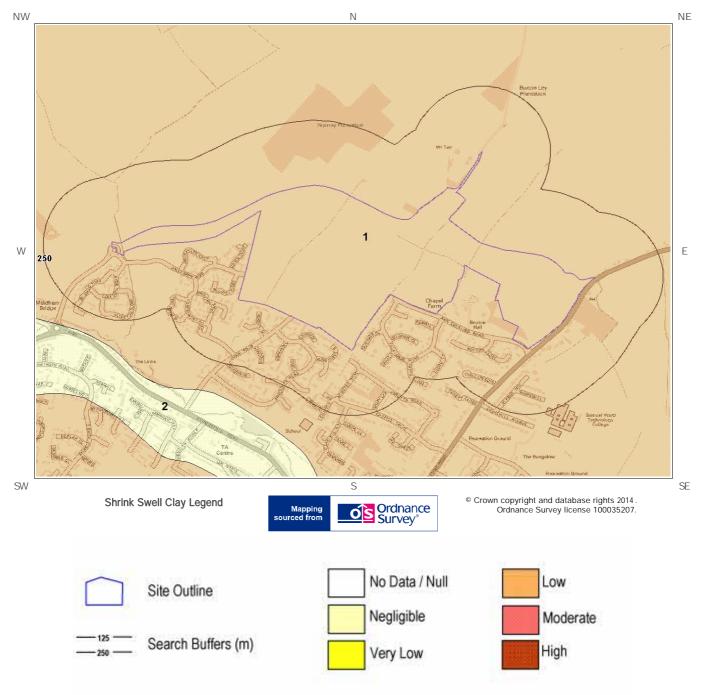
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

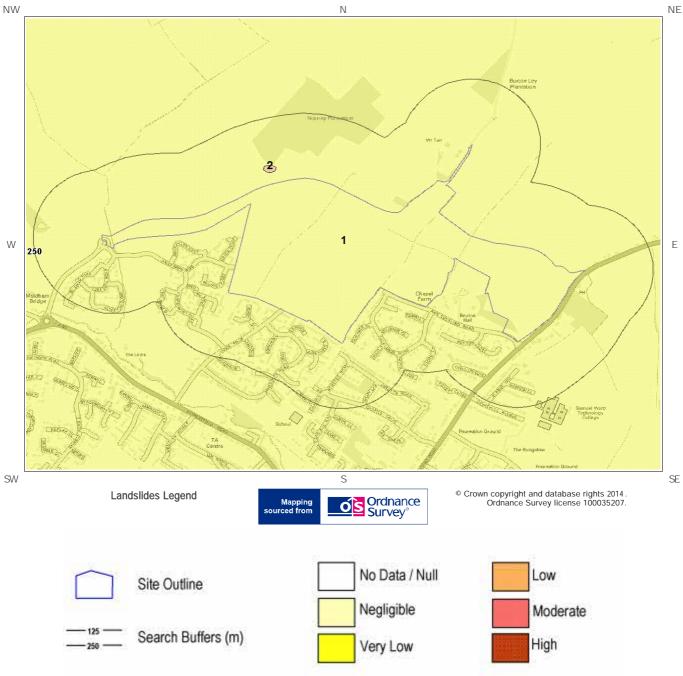


# 4 Natural Ground Subsidence4.1 Shrink-Swell Clay Map



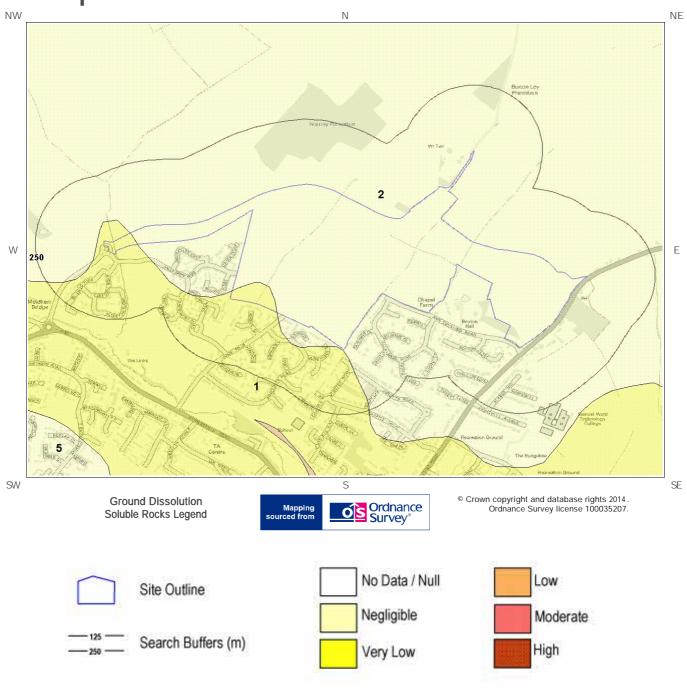






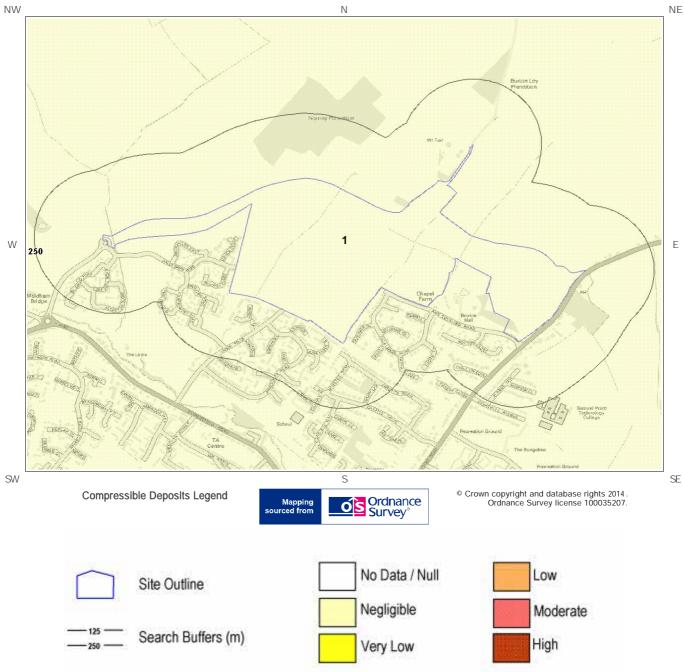


# 4.3 Ground Dissolution Soluble Rocks Map



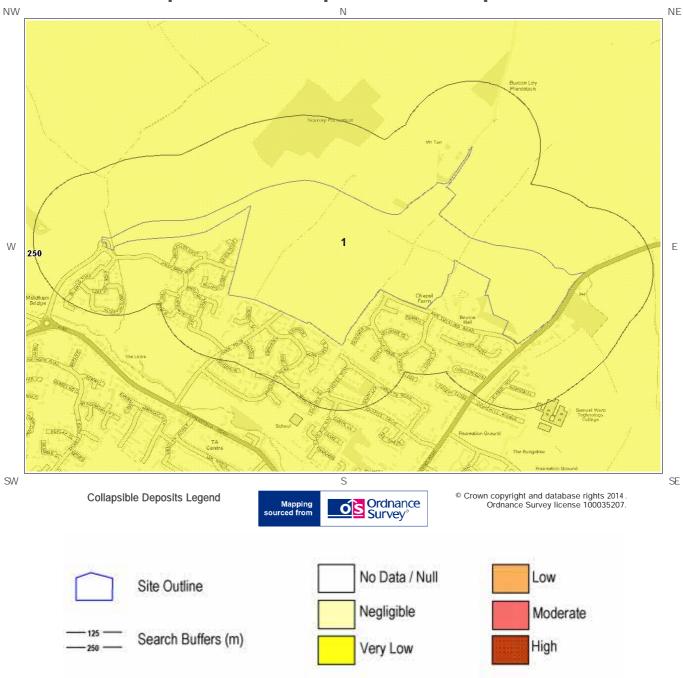


# 4.4 Compressible Deposits Map



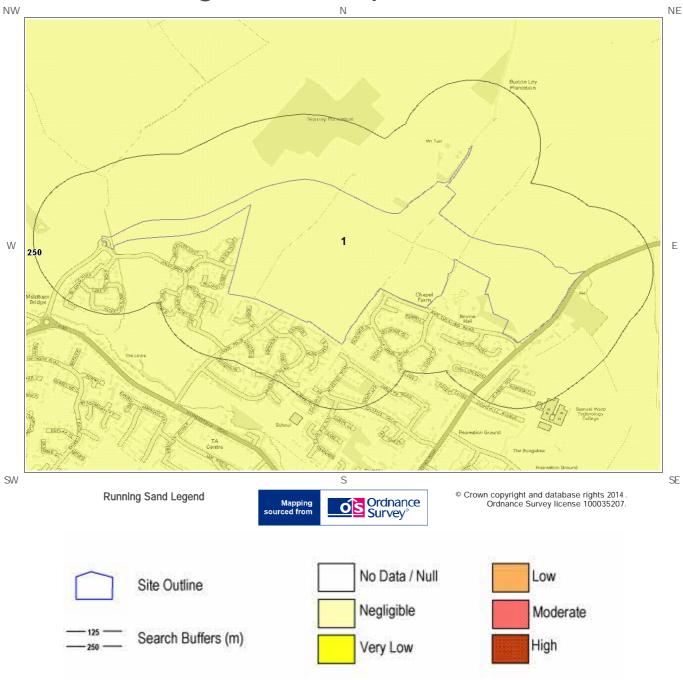


# 4.5 Collapsible Deposits Map

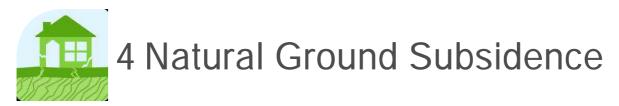




# 4.6 Running Sand Map







The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site\* boundary?

Low

### 4.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high so 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.

### 4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	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.
2	2 42.0 N Low		Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natura slope instability problems.

### 4.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.

<sup>\*</sup> This includes an automatically generated 50m buffer zone around the site



ID	Distance (m)	Direction	Hazard Rating	Details
2	0.0	On Site	Negligible	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.

## 4.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

## 4.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

ID	Distanco (m)	<sup>e</sup> Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

### 4.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

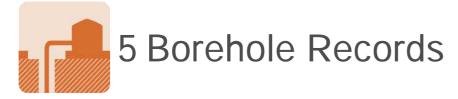
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata ar exposed to water. No special actions required, to avoid problems due to running sand No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.











The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary:

4

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	49.0	NW	567440 247280	TL64NE36	9.15	BOYTON HALL C
2A	75.0	NW	567410 247280	TL64NE34	9.15	BOYTON HALL A
3A	82.0	W	567410 247300	TL64NE35	9.15	BOYTON HALL B
4	153.0	SW	567500 246462	TL64NE37	14.8	EHRINGHAUSEN WA HAVERHILL 1

Additional online information is available for the following boreholes listed above:

#1: scans.bgs.ac.uk/sobi\_scans/boreholes/12832511
#2A: scans.bgs.ac.uk/sobi\_scans/boreholes/12832505
#3A: scans.bgs.ac.uk/sobi\_scans/boreholes/12832509
#4: scans.bgs.ac.uk/sobi\_scans/boreholes/18393264



# 6 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

8

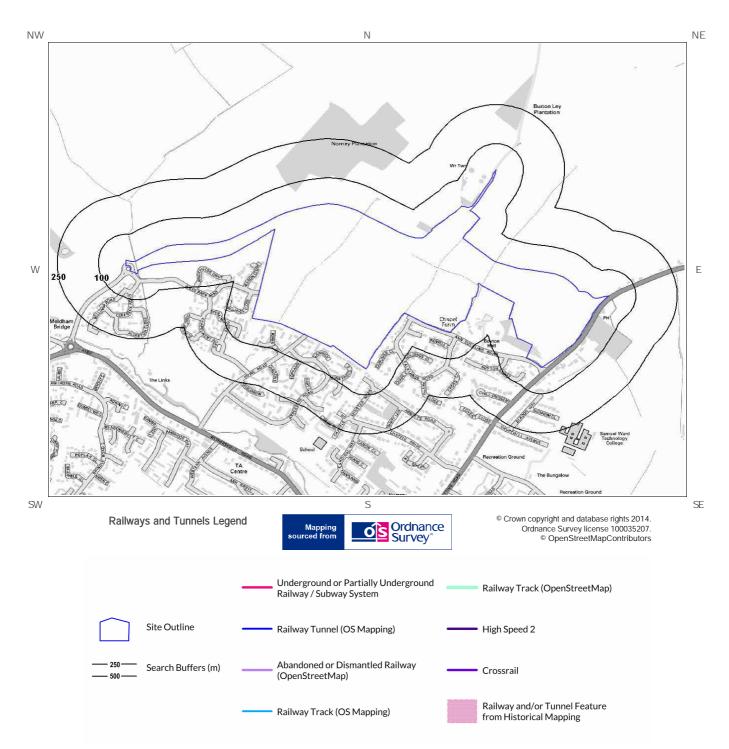
For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg
90.0	E	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg
153.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg
163.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg
213.0	NE	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg

\*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.



# 7 Railways and Tunnels Map







# 7 Railways and Tunnels

### 7.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary?	No
Have any other railway tunnels been identified within 250m of the site boundary?	No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

### 7.2 Historical Railway and Tunnel Features

This data is derived from GroundSure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel	features been identified within the study site boundary?	No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

### 7.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary?	No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.



### 7.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary?	No
Have any active railway lines been identified within 250m of the study site boundary?	No
Database searched and no data found.	
Note: multiple sections of the same track may be listed in the detail above Any records that have been identified are represented on the Railways and Tunnels Map.	
7.5 Railway Projects	
These datasets provide information on the location of large scale railway projects High Speed 2 and Cross	ssrail.
Is the study site within 5km of the route of the High Speed 2 rail project?	No
Is the study site within 500m of the route of the Crossrail rail project?	No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a GroundSure HS2 and Crossrail Report.



GroundSure Helpline Telephone: 08444 159 000 info@groundsure.com





**Geological Survey** 

NATURAL ENVIRONMENT RESEARCH COUNCIL

**British Gypsum** 

British

British Geological Survey Enquiries

Kingsley Dunham Centre Keyworth, Nottingham NG12 5GG Tel: 0115 936 3143. Fax: 0115 936 3276. Email:**enquirles@bgs.ac.uk** Web:**www.bgs.ac.uk** 

BGS Geological Hazards Reports and general geological enquiries

British Gypsum

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LE12 6HX

The Coal Authority

200 Lichfield Lane Mansfield Notts NG18 4RG Tel: 0345 7626 848 DX 716176 Mansfield 5 www.coal.gov.uk The Coal Authority

Public Health England Public information access office Public Health England, Wellington House 133-155 Waterloo Road, London, SE1 8UG https://www.gov.uk/government/organisations/public-health-england Email: enquiries@phe.gov.uk Main switchboard: 020 7654 8000

> Johnson Poole & Bloomer Limited Harris and Pearson Building, Brettel Lane Brierley Hill, West Midlands DY5 3LH Tel: +44 (0) 1384 262 000 Email:enquiries.gs@jpb.co.uk Website: www.jpb.co.uk

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JOHNSON	
POOLE &	Contract of
BLOOMER	
CONSULTANTS	







Acknowledgements: Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028]. This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Report Reference: HMD-369-1706443 Client Reference: 995,SI

#### 1 Definitions

In these terms and conditions unless the context otherwise requires: "Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure. "Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

any information which is in the public domain (other than by (ii) virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

#### 2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract. 2.2 GroundSure shall exercise reasonable skill and care in the provision of the

Services 2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

### 3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and

procure that the Beneficiary or any third party relying on the (i) Services complies with and acts as if it is bound by the Contract and

be liable to GroundSure for the acts and omissions of the (ii) Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services ar appropriate and suitable for its and/or the Beneficiary's needs

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmer

information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amenc

GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

#### 4 Reliance

(iv)

4.1The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

the Beneficiary,

the Beneficiary's professional advisers, (iii) any persor (ii) providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

#### 5 Fees and Disbursements

5.1GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred t GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Servic€ (together "Fees")

5.2 The Client shall pay all outstanding Fees to GroundSure in full witho deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or af judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days

#### 6 Intellectual Property and Confidentiality

6.1 Subject to

(i)

full payment of all relevant Fees and

compliance with this Contract, the Client is granted (and is (ii) permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, nc assignable and (save to the extent set out in this Contract) non-transferable licence

to make use of the GroundSure Materials. 6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the

Third Party Data Providers) the Client acknowledges, and shall pro acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services

use the information obtained as part of the Services in (ii) respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

not reformat or otherwise change (whether by modification, (v) addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

### 7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

> (i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or

subcontractors

(ii) any use made of the Reports, Services, Materials or any part of them: and

any representation, statement or tortious act or omission (iii) (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

- loss of profits;
- loss of business:

depletion of goodwill and/or similar losses; (iii)

- (iv) loss of anticipated savings;
- (v) loss of goods;
- (vi) loss of contract;
  - loss of use

loss or corruption of data or information; (viii)

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

loss or damage that arise as a result of the use of all or part of (xi) the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

#### 8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

the Client (being an individual) has a bankruptcy order made (ii) against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of th Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

#### 9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure' acceptance of the Order; and

the Reports and/or Mapping provided under this Contract are (a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

### 10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

GroundSure shall take steps to bring to an end the Services in (i) an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficia GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination suspension of the Contract.

### 11 Anti-Bribery

(ii)

11.1 The Client warrants that it shall:

comply with all applicable laws, statutes and regulations (i) relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010:

comply with such of GroundSure's anti-bribery and anti-(ii) corruption policies as are notified to the Client from time to time; and

promptly report to GroundSure any request or demand for (iii) any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

#### 12 General

12.1 The Mapping contained in the Services is protected by Cro

must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report o Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authori representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

the Client or Beneficiary's failure to provide facilities, access or information;

- (ii) fire, storm, flood, tempest or epidemic;
- Acts of God or the public enemy; (iiii)
- (iv) riot, civil commotion or war;
- (v) strikes, labour disputes or industrial action;
- (vi) acts or regulations of any governmental or other agency;

suspension or delay of services at public registries by Third (vii) Party Data Providers:

(viii) changes in law; or

any other reason beyond GroundSure's reasonable control.

(ix) In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly

given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

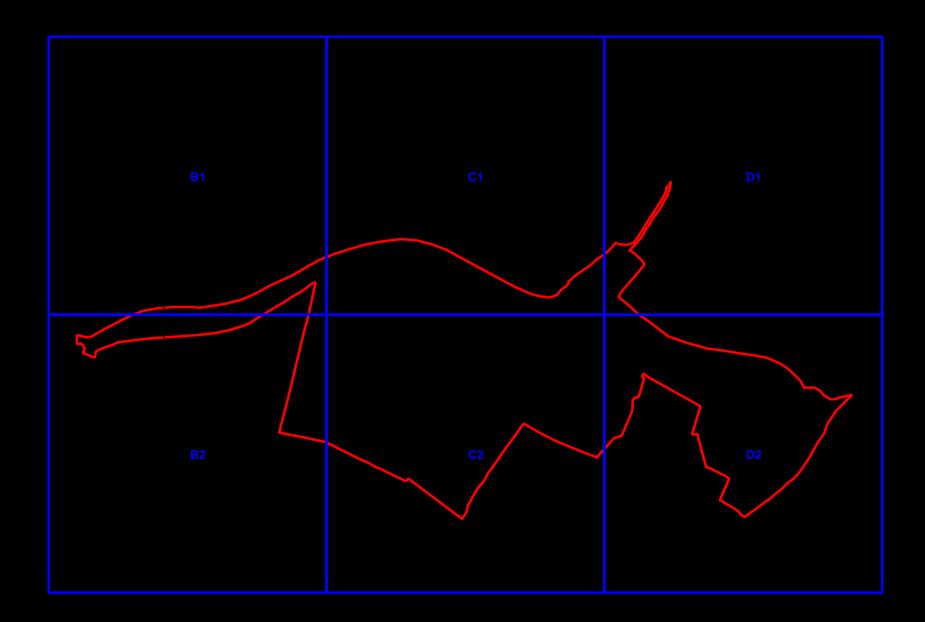
12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law

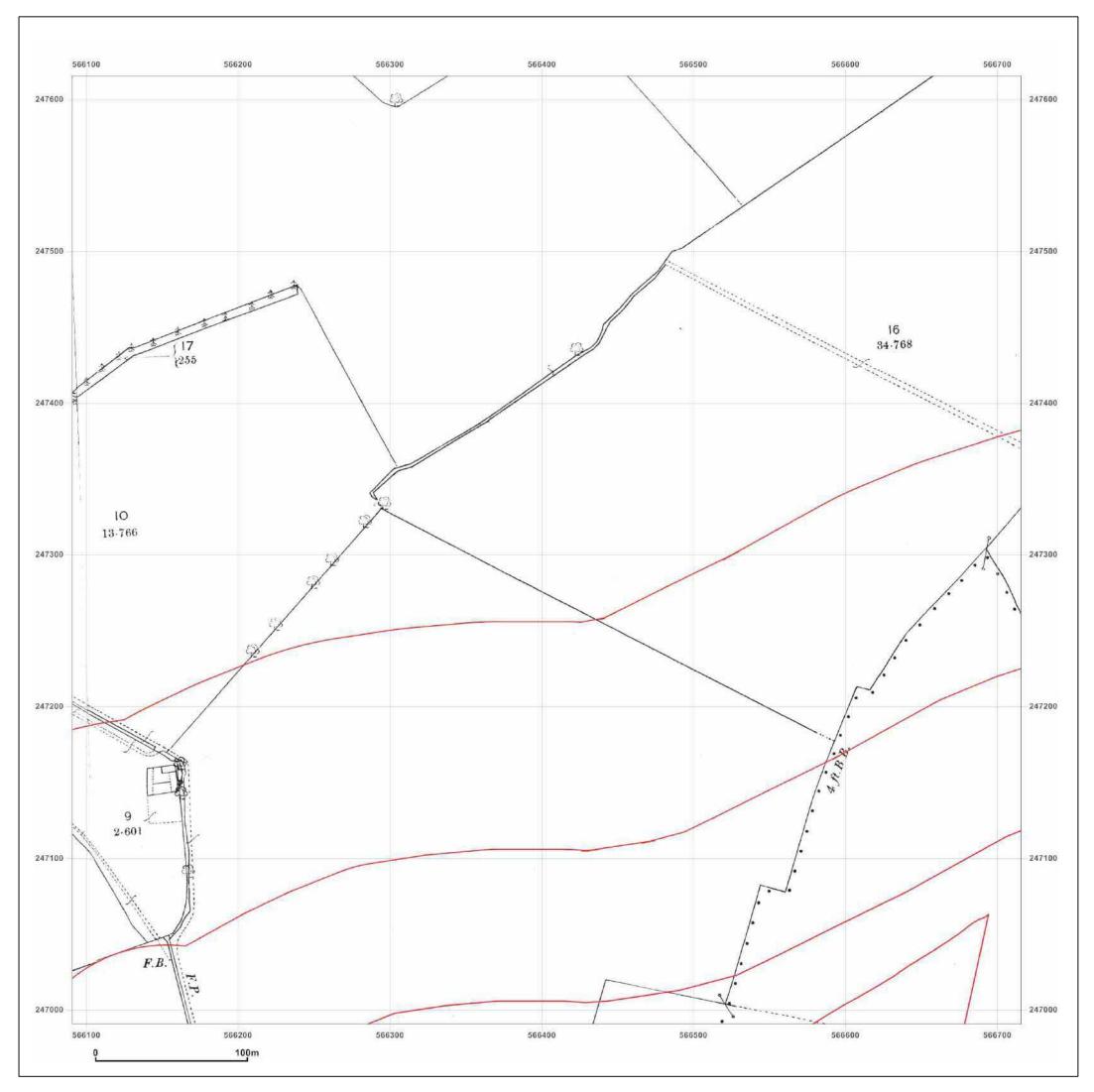
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### APPENDIX 5 – GROUNDSURE HISTORICA L MAPS

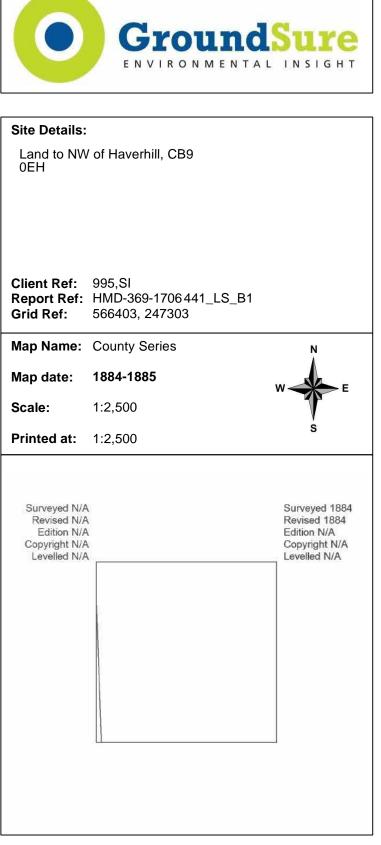
Large scale Ordnance Survey Map Extracts at: 1:2,500 scales (see maps B1, B2, C1, C2, D1 and D2) 1:1,250 scales (see maps A2, B2, C2 and D2)

Small scale Ordnance Survey Map Extracts at: 1:10,000 and 1:10,560 scales



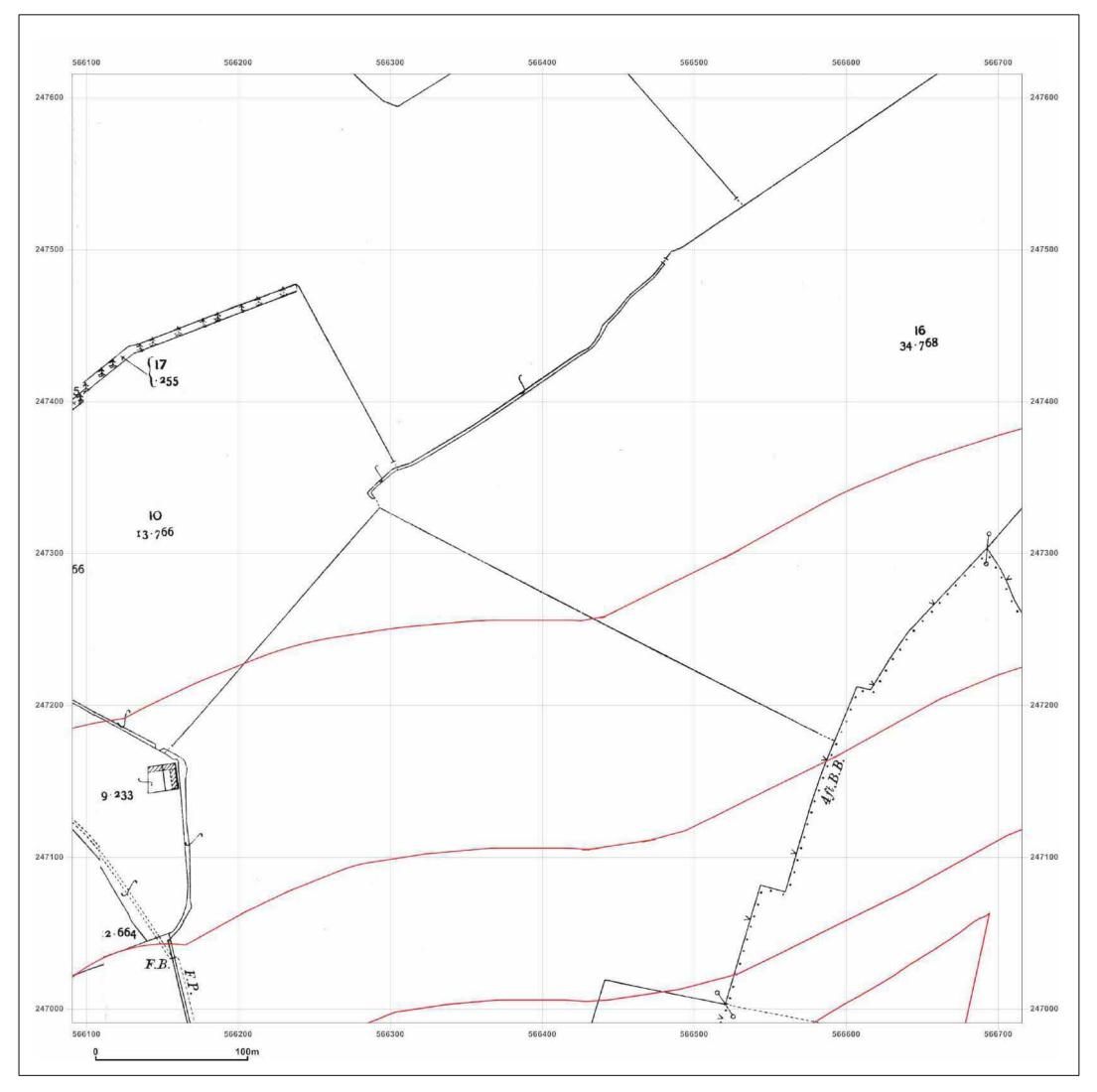


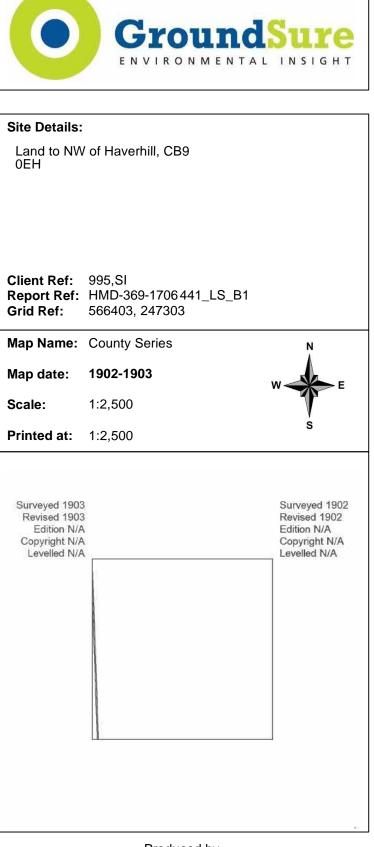
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Production date: 10 October 2014



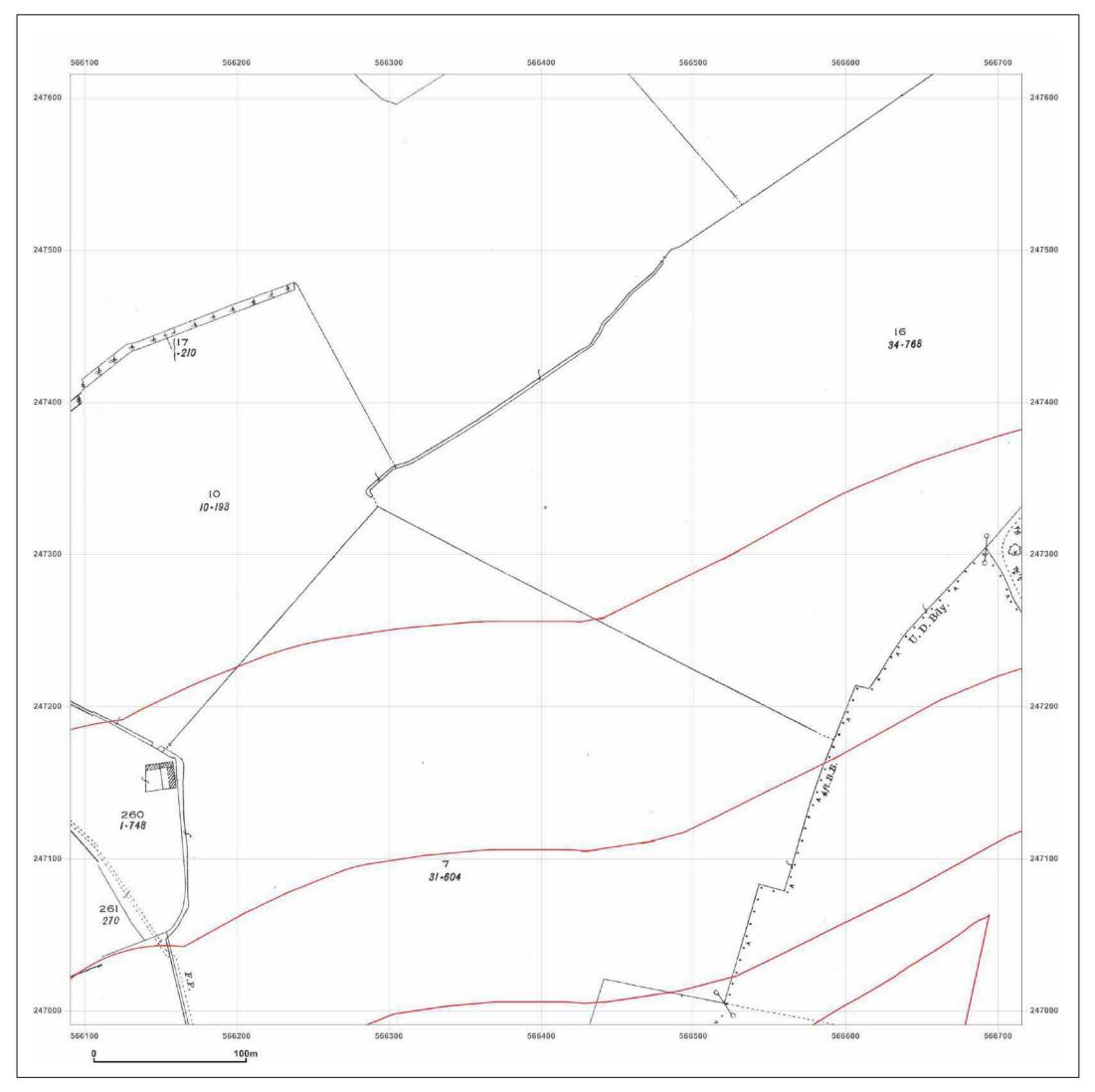


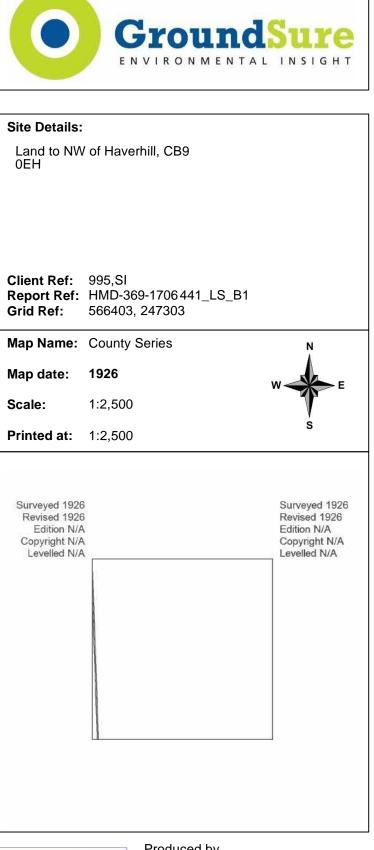


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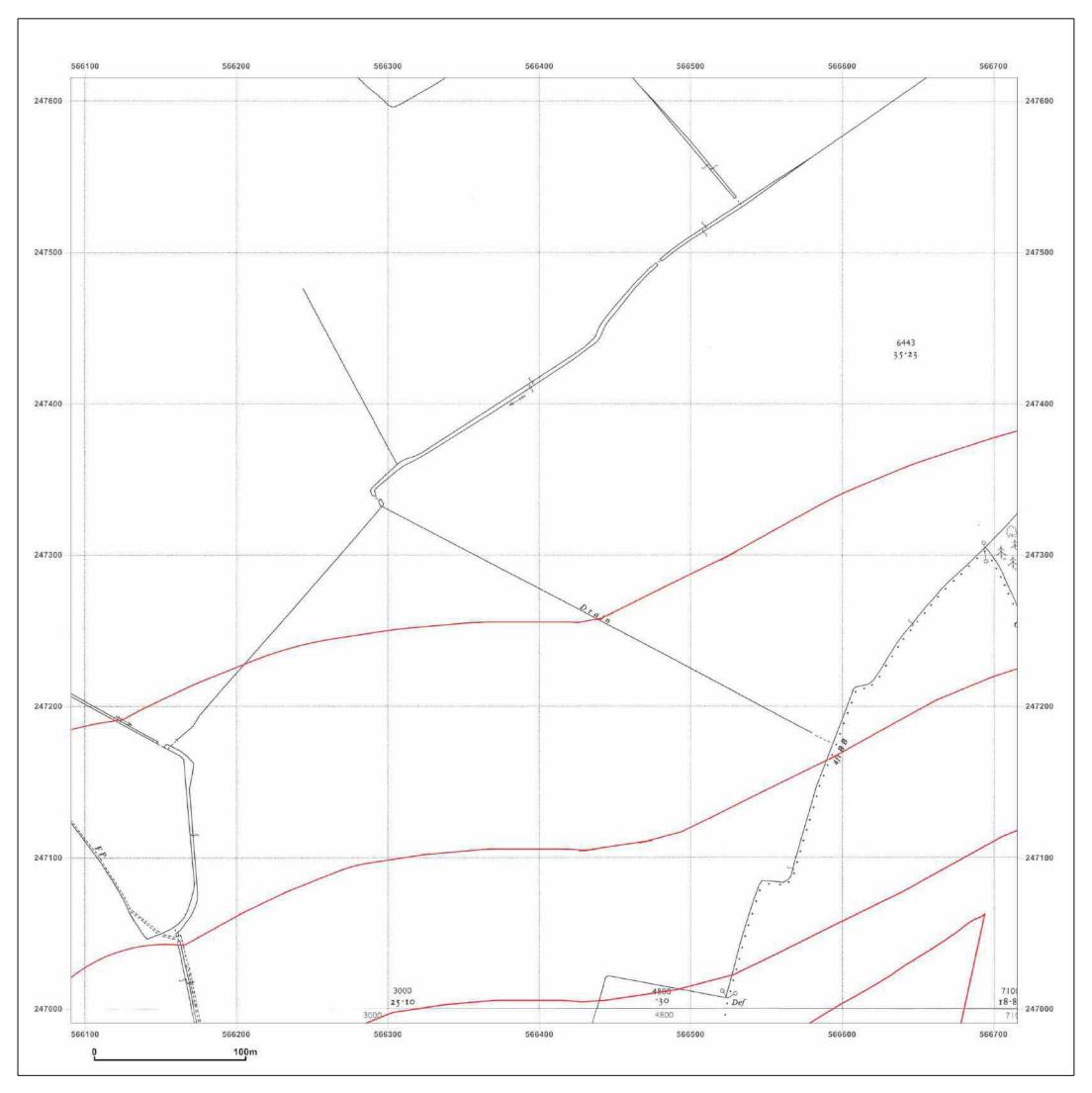




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Production date: 10 October 2014





Site Details:

Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_B1 Grid Ref: 566403, 247303 Map Name: National Grid

Map date: 1959

Scale: 1:2,500

**Printed at:** 1:2,500



Surveyed 1959 Revised 1959 Edition N/A Copyright 1960 Levelled 1956

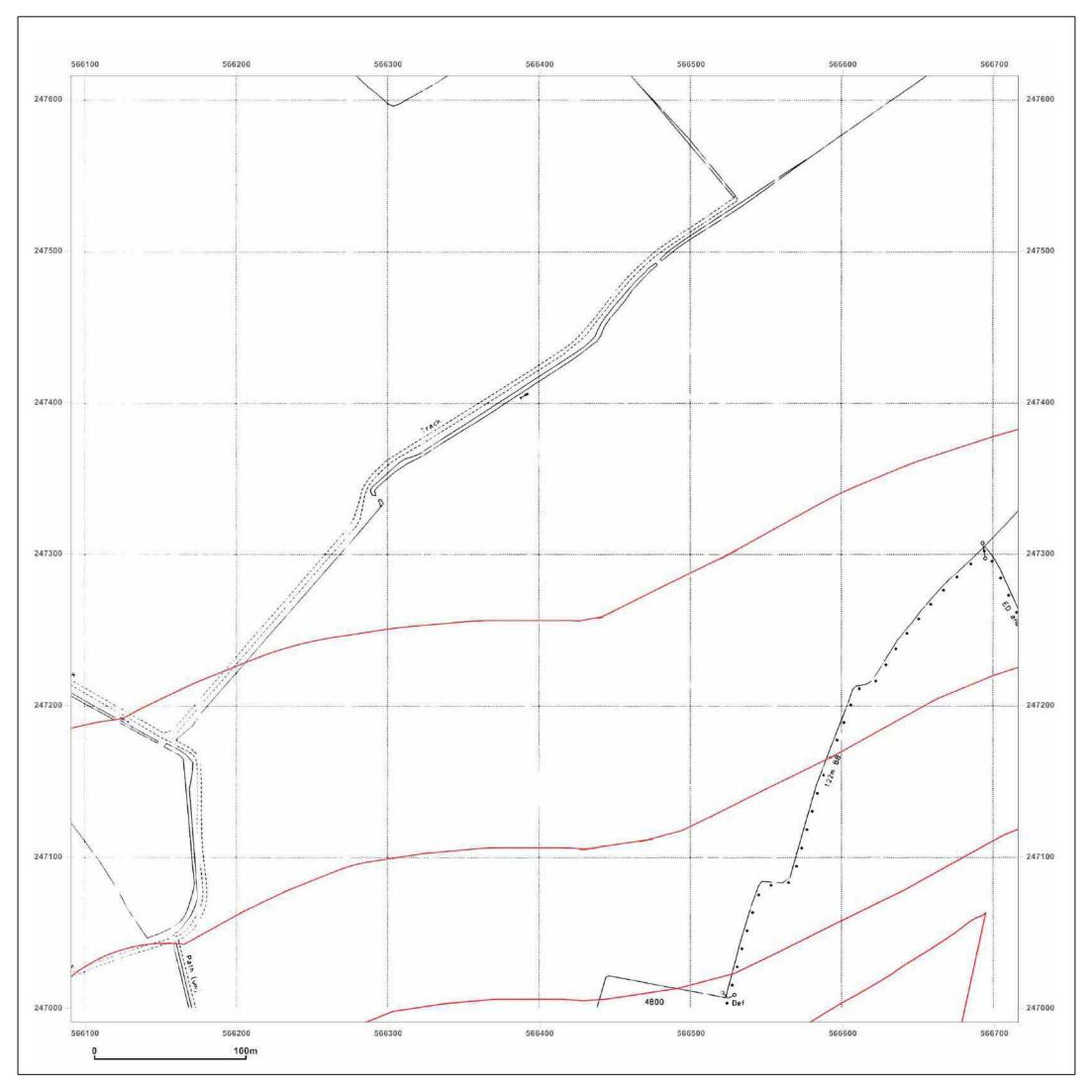
Surveyed 1959 Revised 1959 Edition N/A Copyright 1960 Levelled 1956



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Production date: 10 October 2014





Site Details:

Land to NW of Haverhill, CB9 0EH

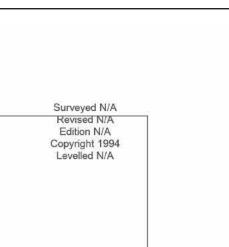
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Map Name: National Grid

Map date: 1994

Scale: 1:2,500

**Printed at:** 1:2,500

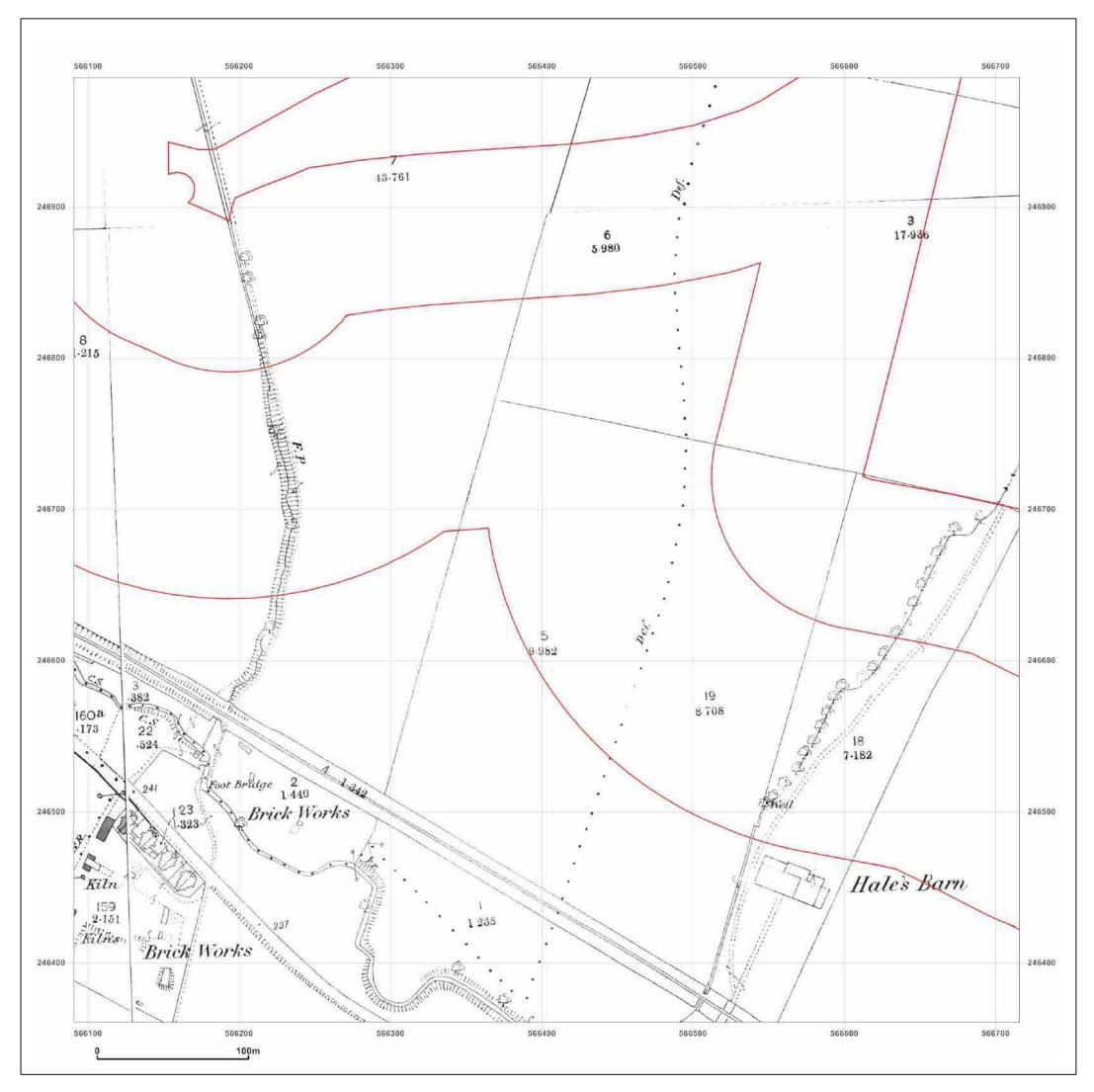


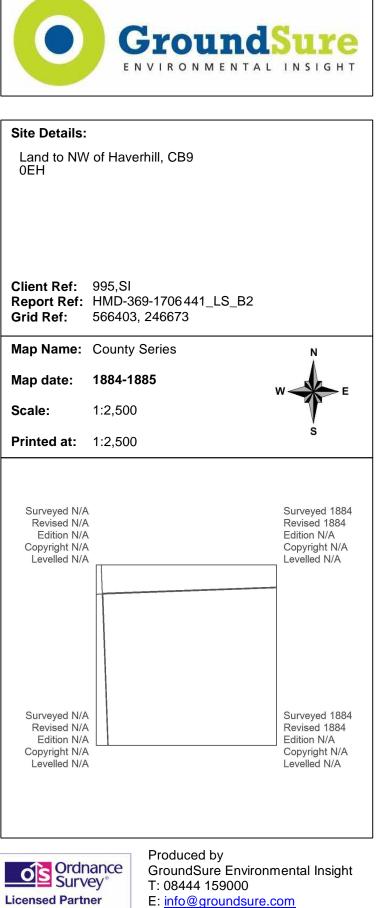


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Production date: 10 October 2014

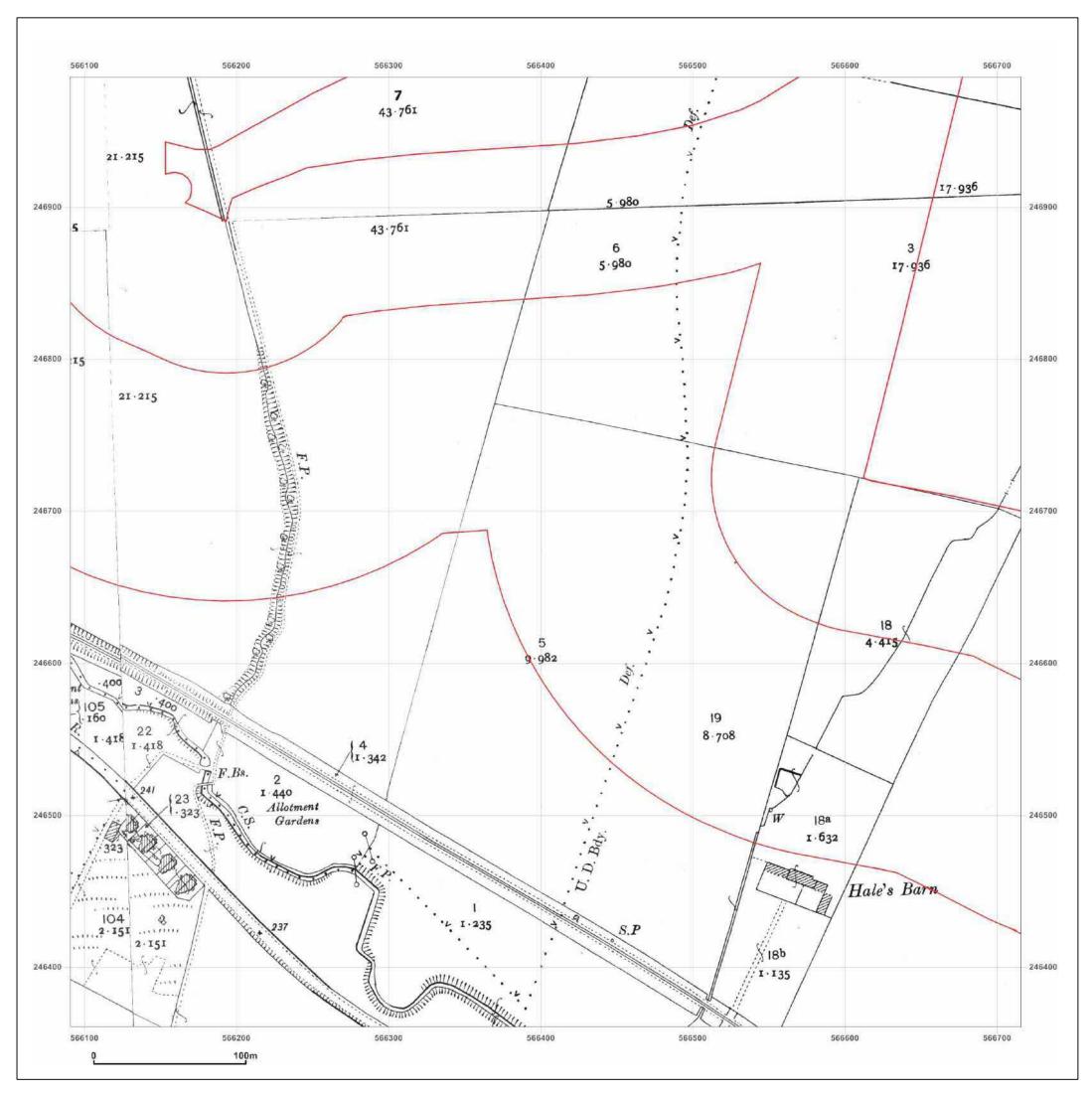


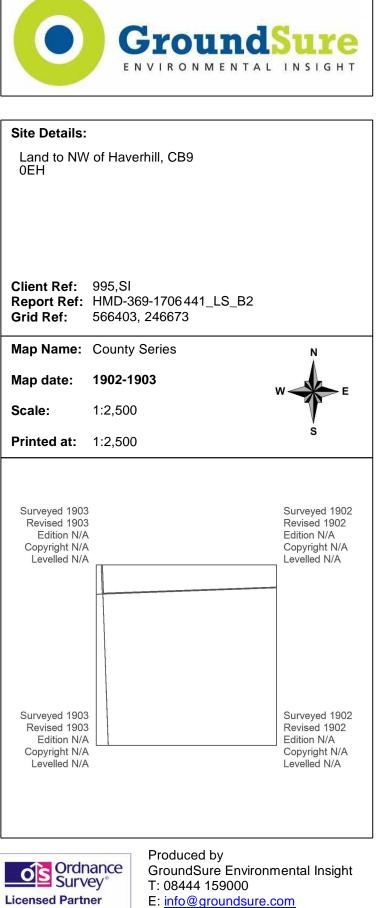


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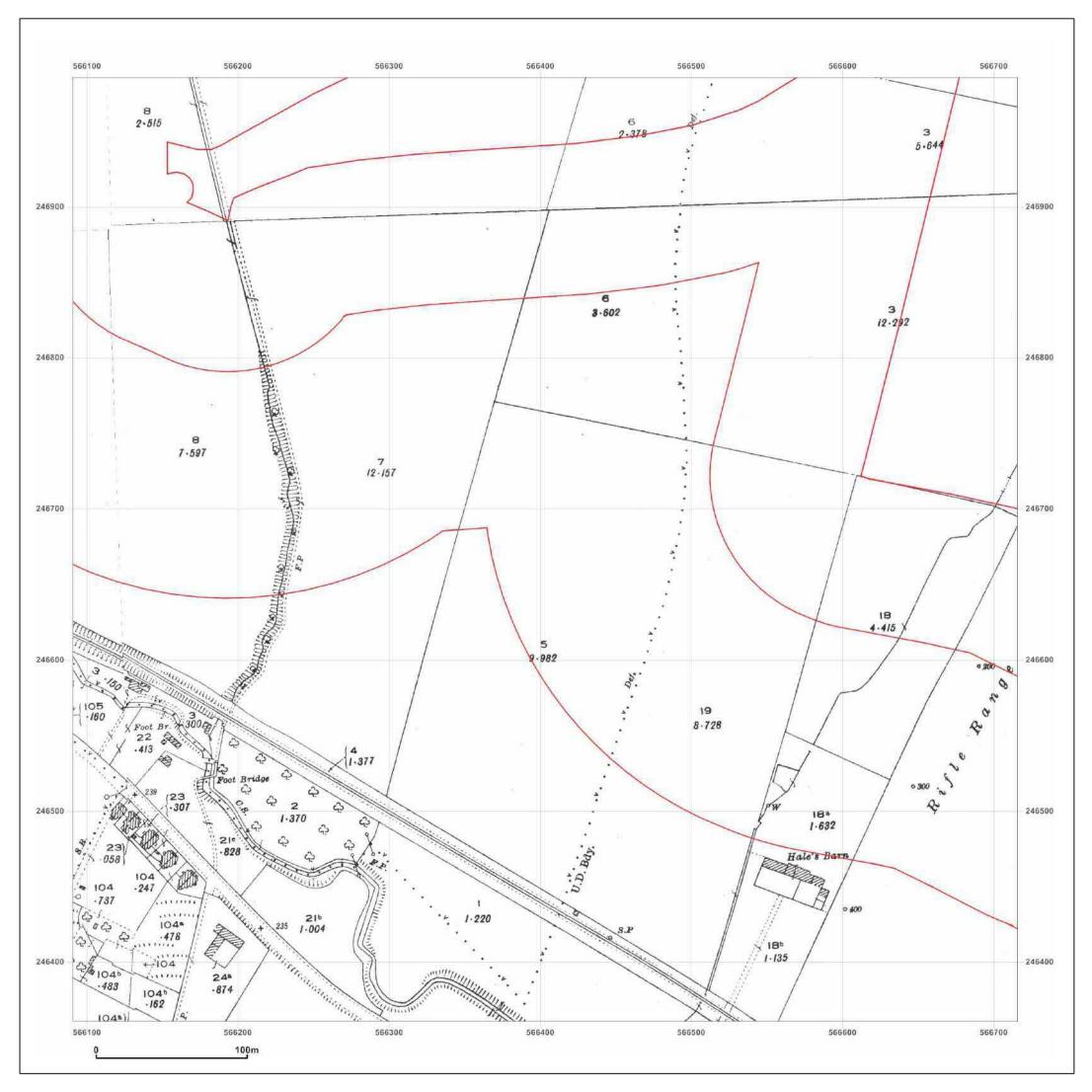


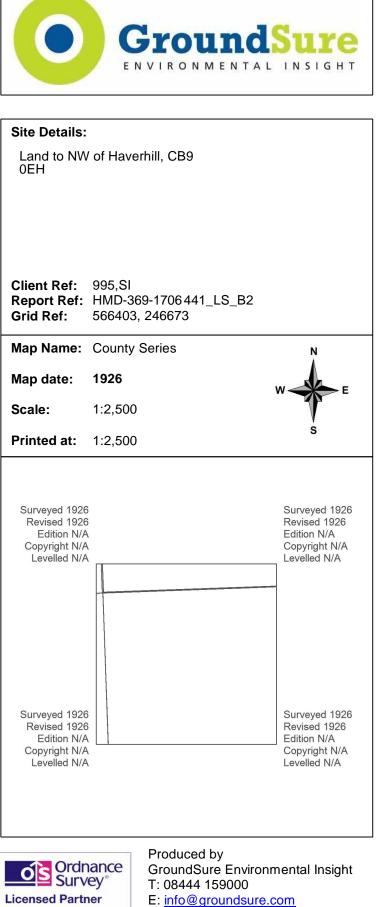


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Production date: 10 October 2014

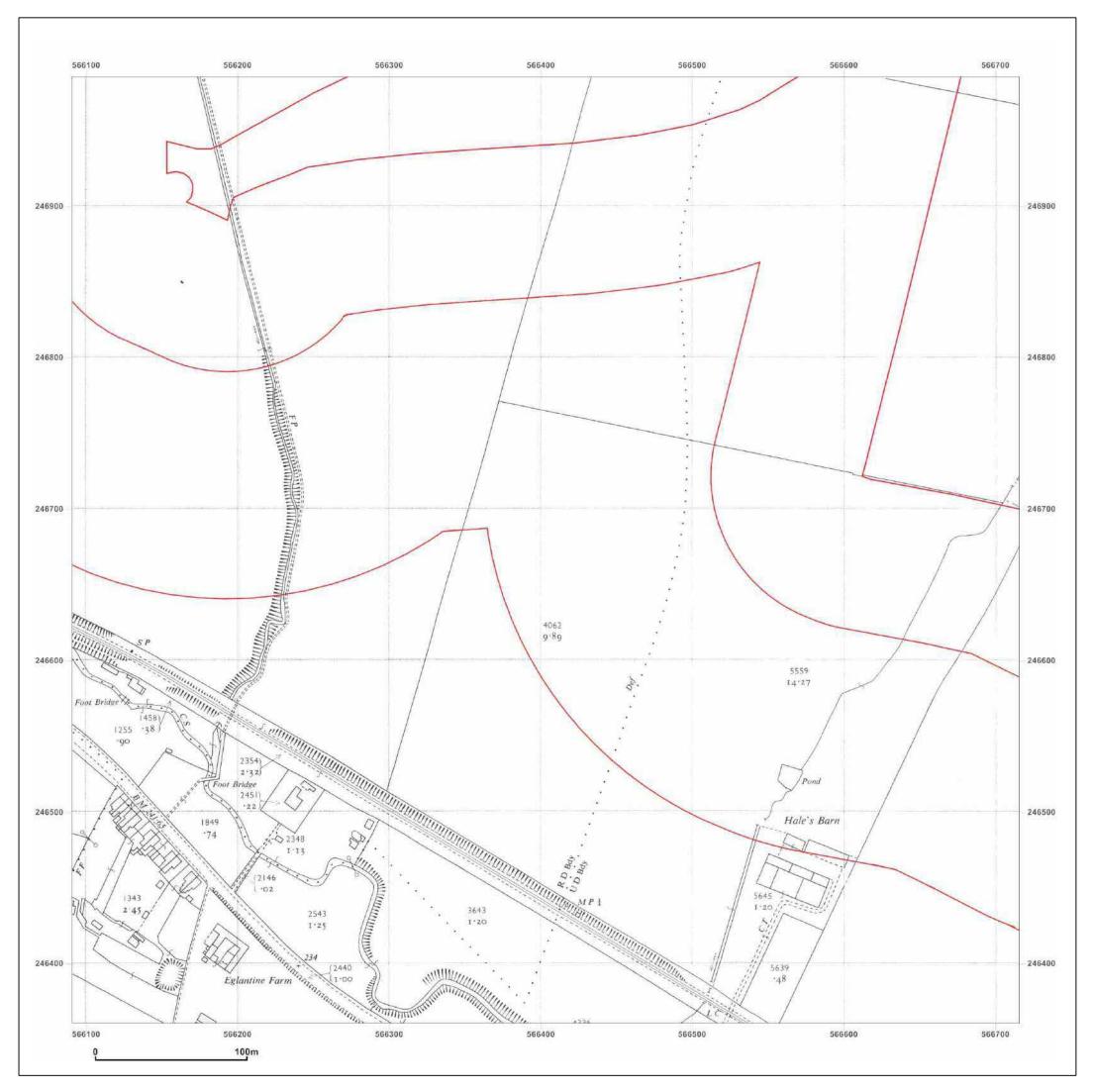




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Production date: 10 October 2014





Site Details:

Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_B2 566403, 246673 Grid Ref:

Map Name: National Grid

Map date: 1959

1:2,500 Scale:

**Printed at:** 1:2,500



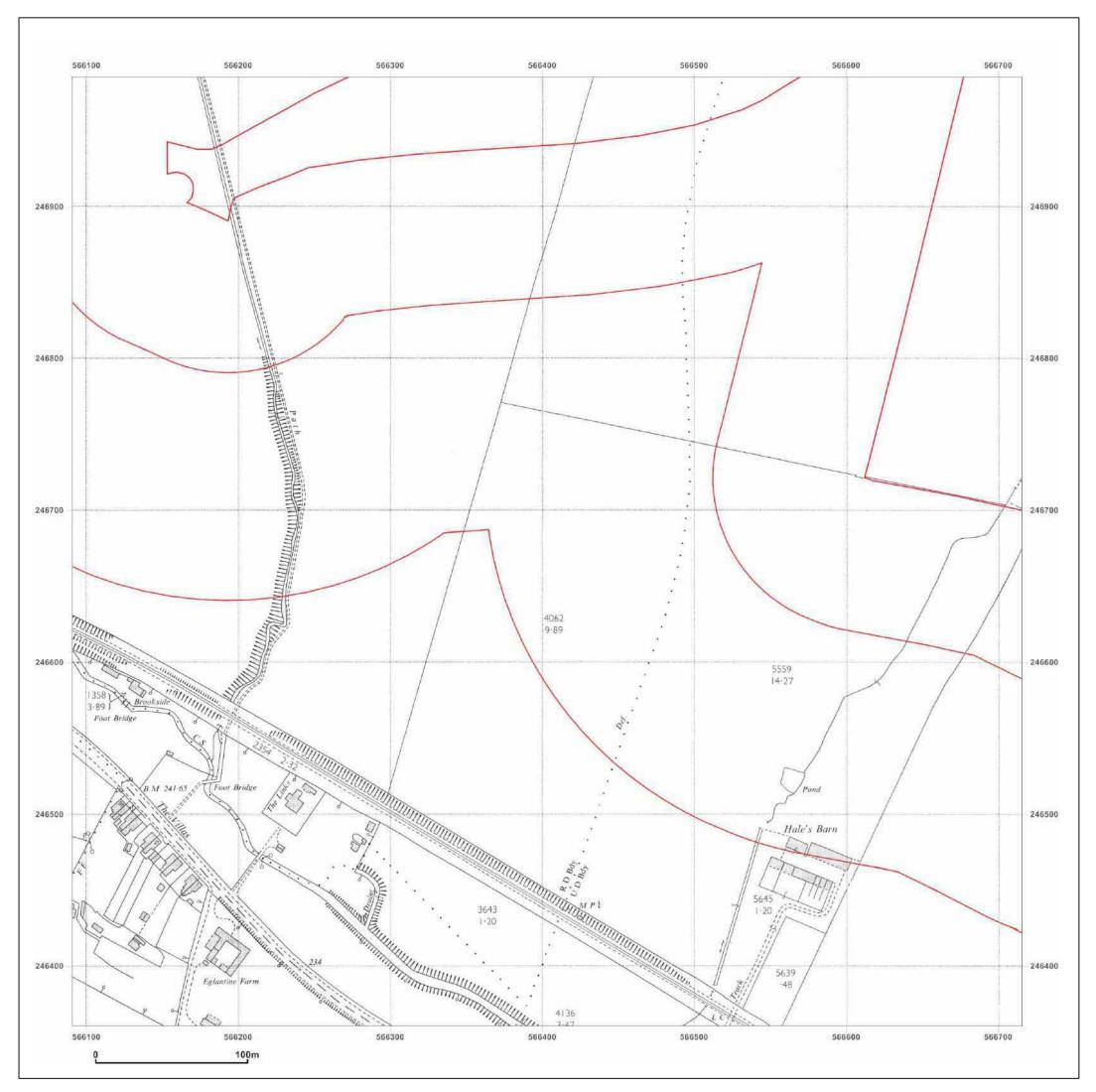
Surveyed 1959 Revised 1959 Edition N/A Copyright 1960 Levelled 1956



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Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_B2 566403, 246673 Grid Ref:

Map Name: National Grid

Map date: 1968

1:2,500 Scale:

**Printed at:** 1:2,500



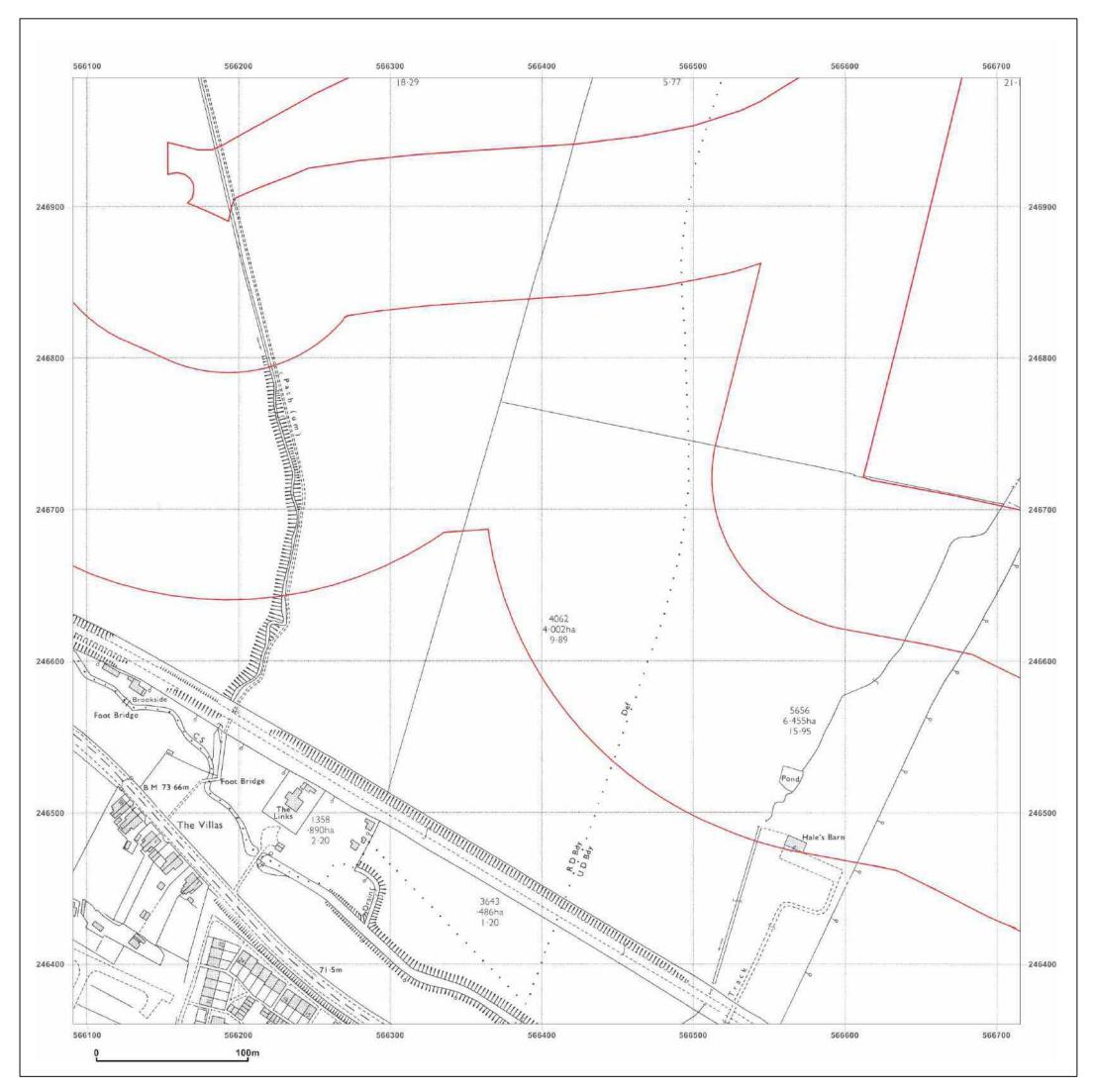
Surveyed 1968 Revised 1968 Edition N/A Copyright 1968 Levelled 1956



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Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_B2 566403, 246673 Grid Ref:

Map Name: National Grid

Map date: 1973

1:2,500 Scale:

**Printed at:** 1:2,500



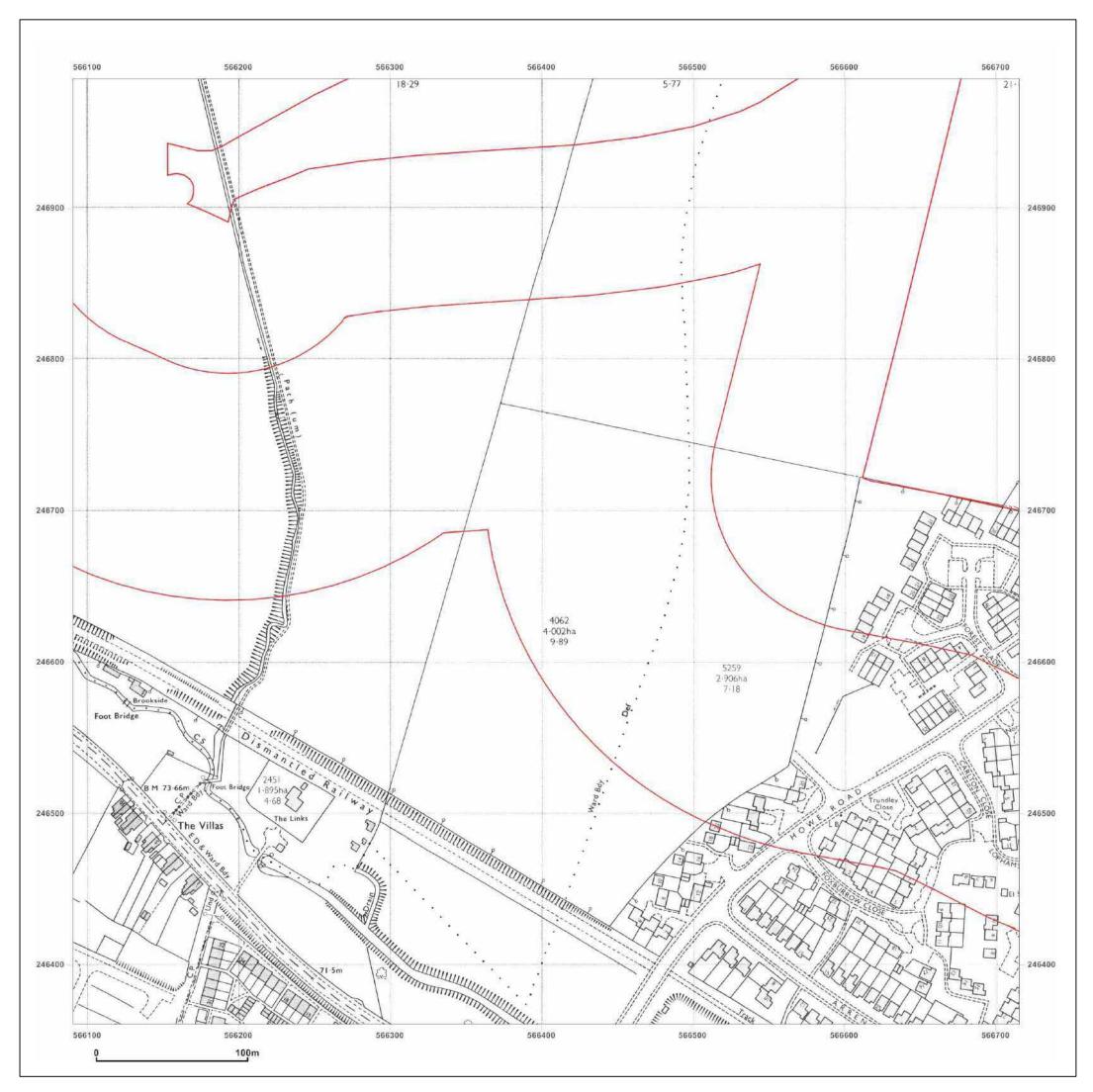
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Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_B2 566403, 246673 Grid Ref:

Map Name: National Grid

Map date: 1980

1:2,500 Scale:

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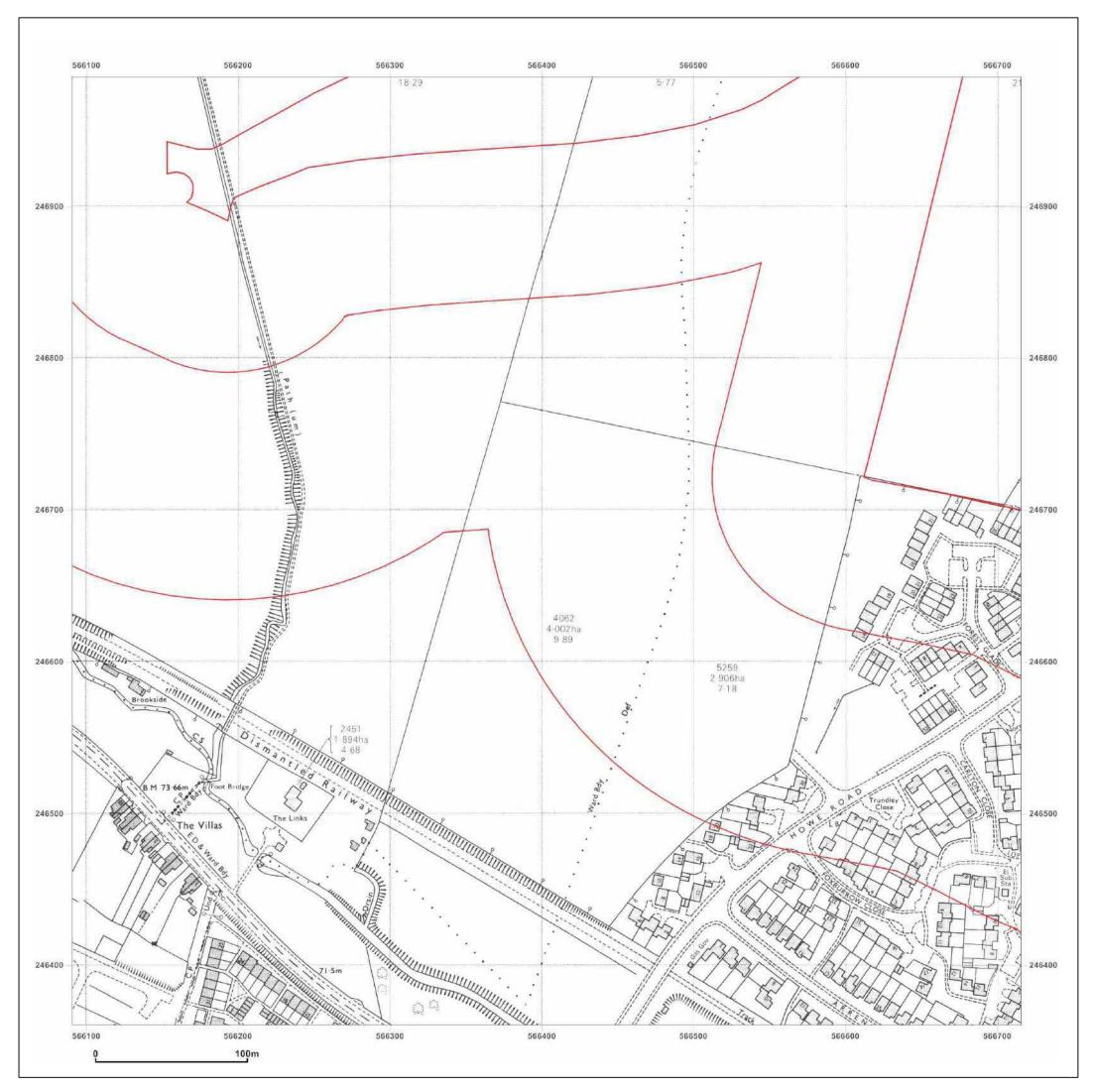
Surveyed 1980 Revised 1980 Edition N/A Copyright 1981 Levelled 1972



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Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_B2 Grid Ref: 566403, 246673

Map Name: National Grid

Map date: 1982

1:2,500 Scale:

**Printed at:** 1:2,500



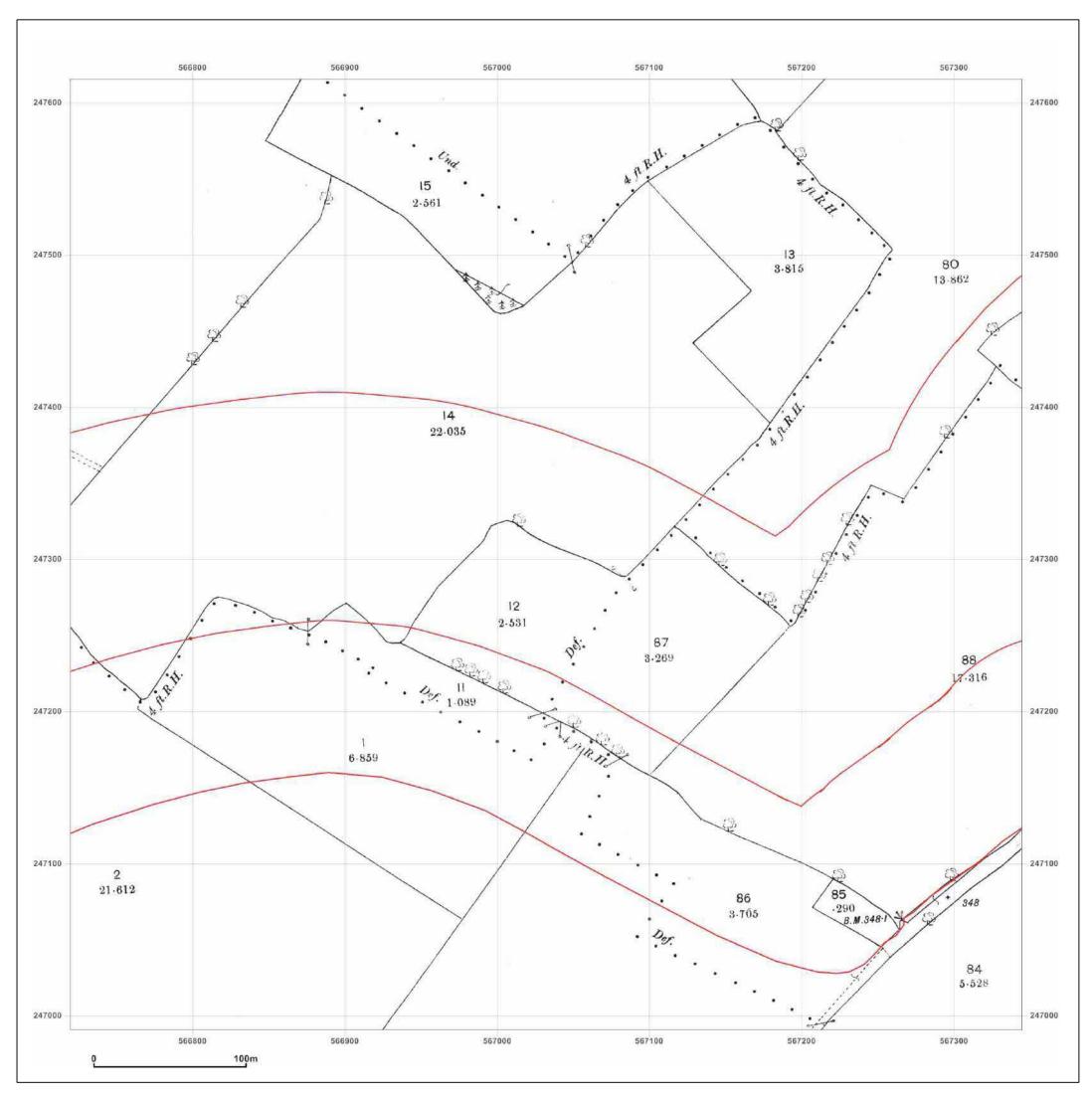
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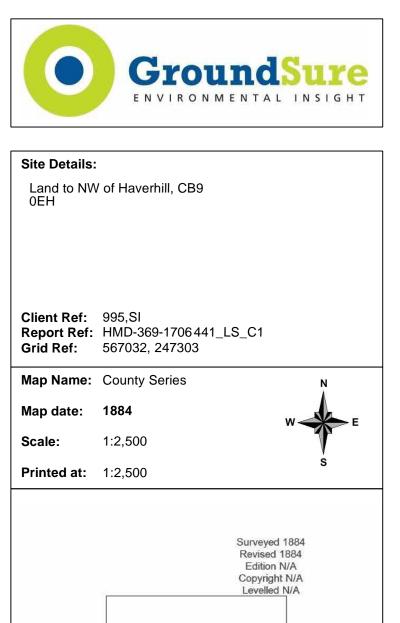


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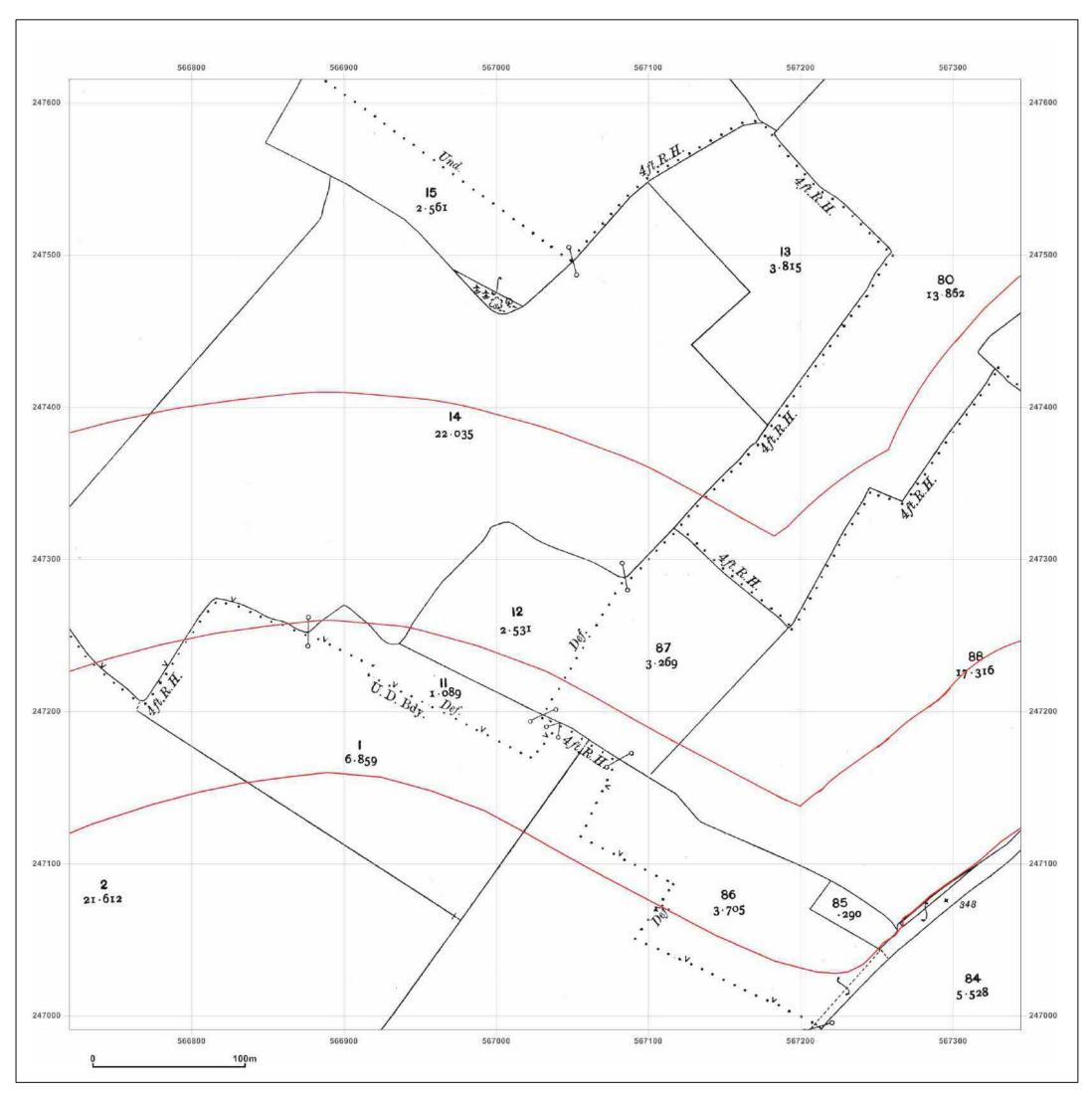


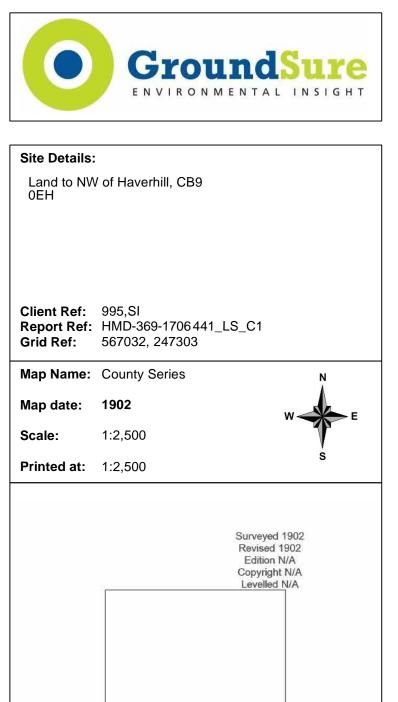




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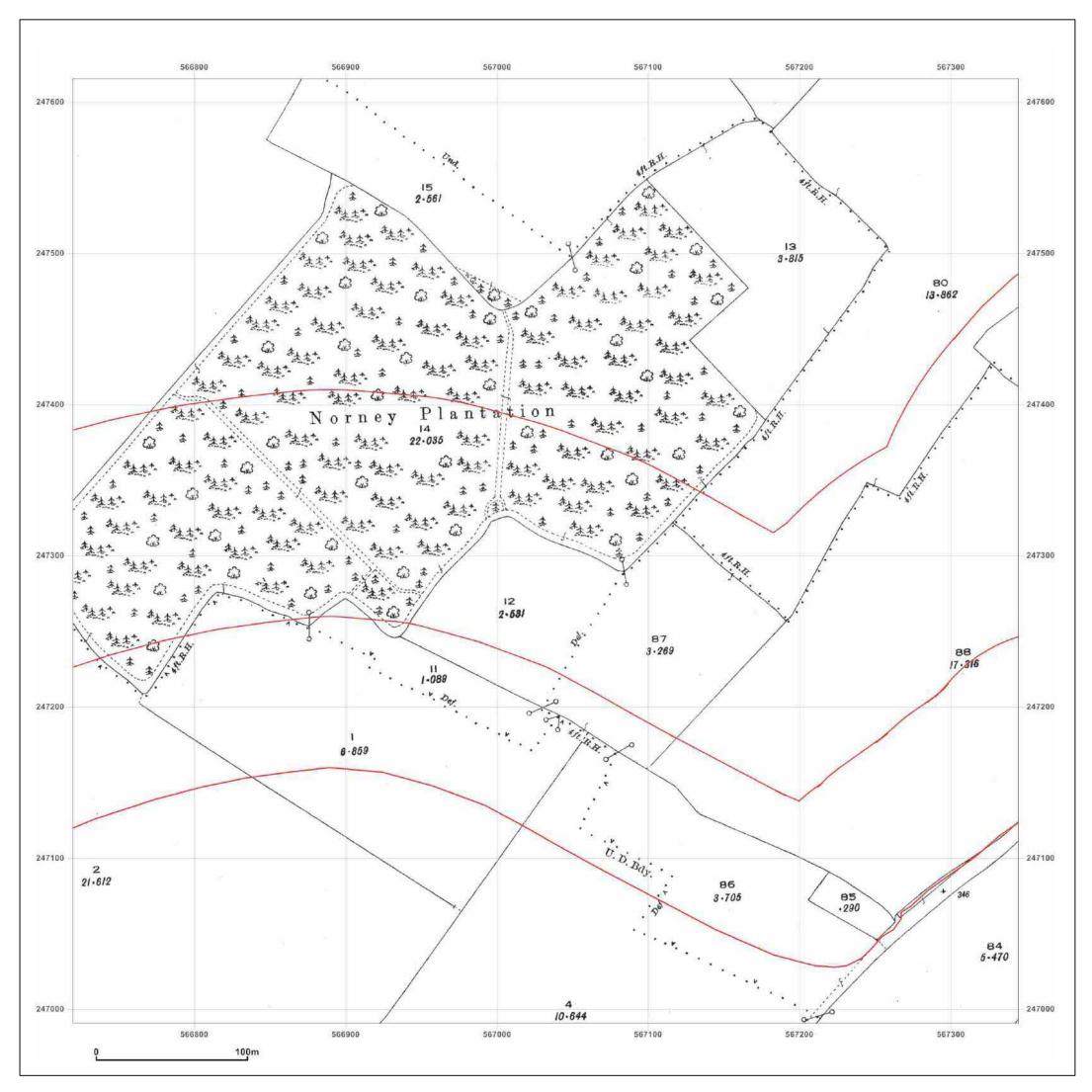


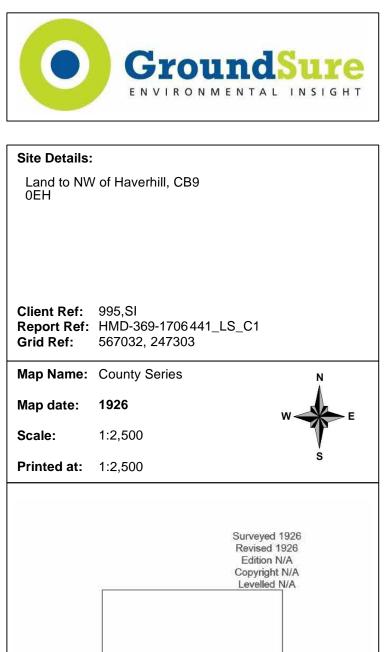




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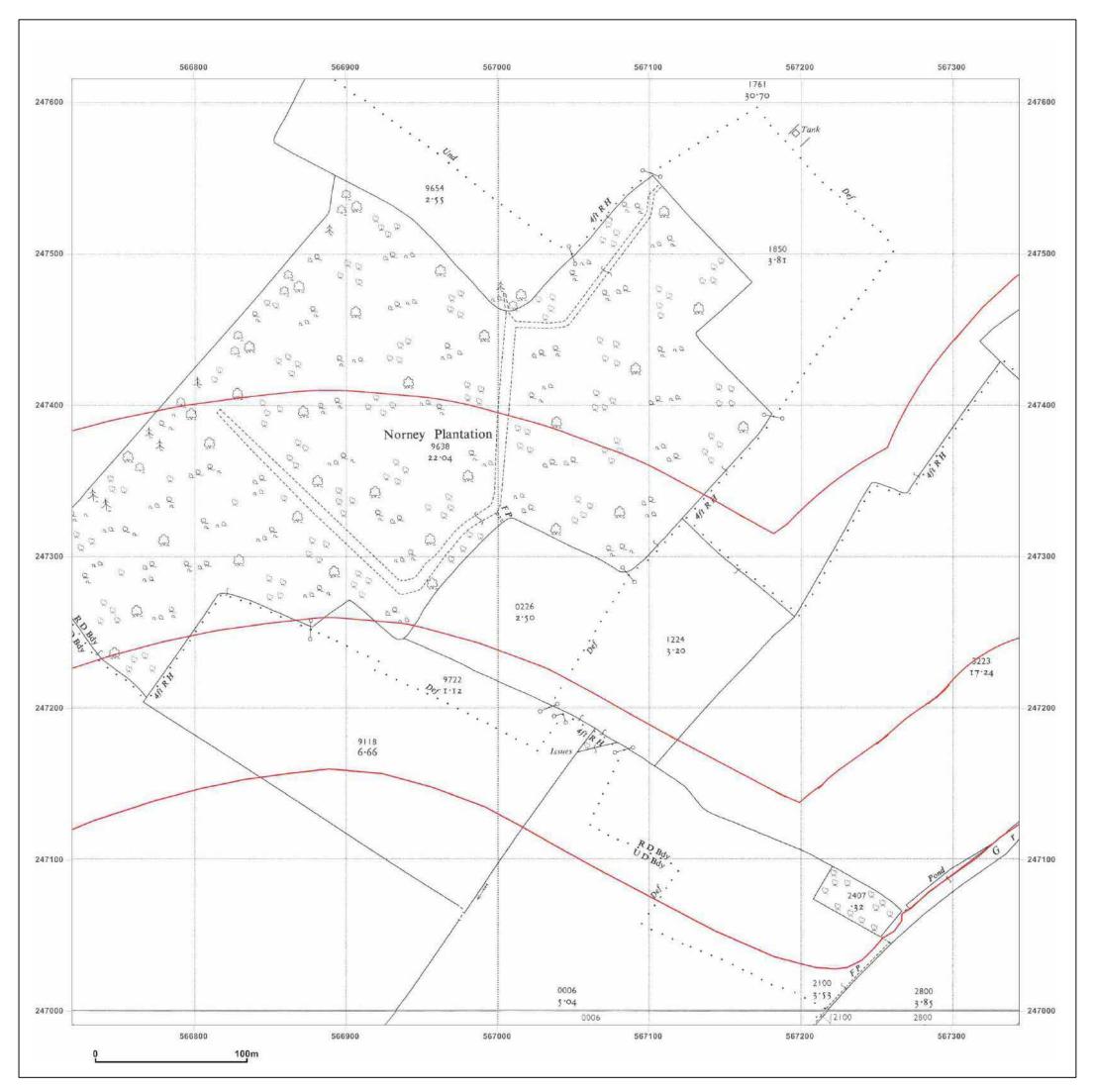






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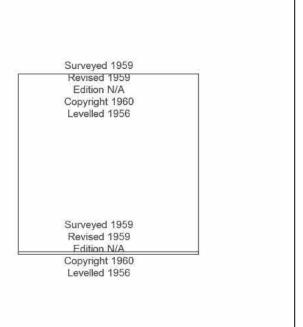
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- Map Name: National Grid
- 1959 Map date:

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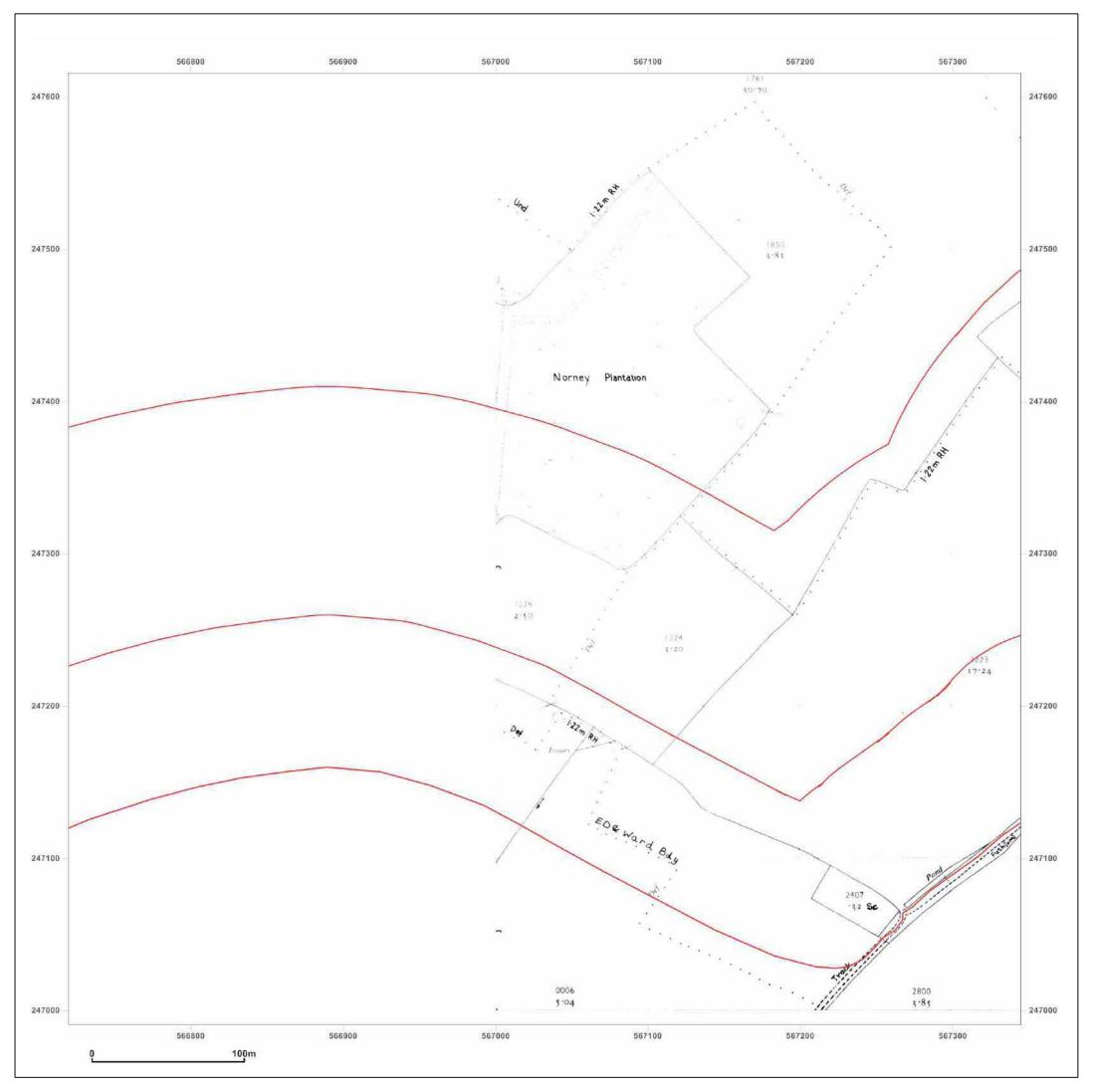




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Production date: 10 October 2014



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•	995,SI HMD-369-1706441_LS_C1 567032, 247303
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 Map date:
 1988

 Scale:
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**Printed at:** 1:2,500



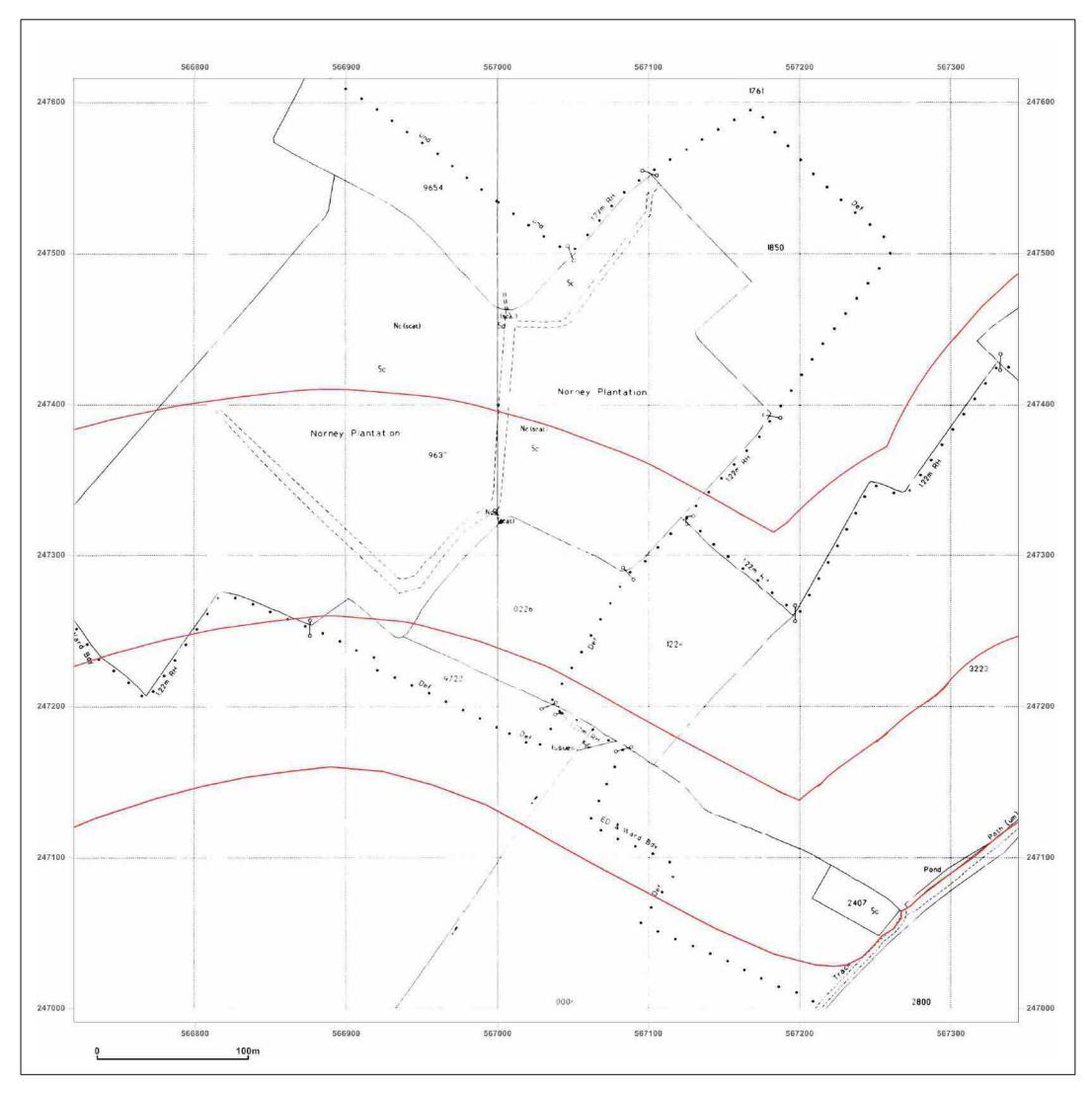
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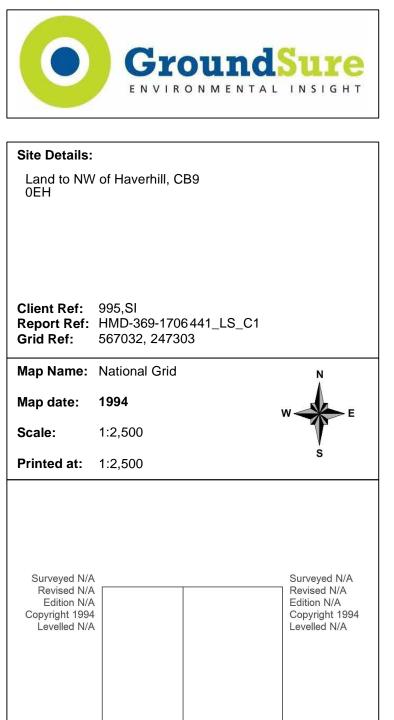


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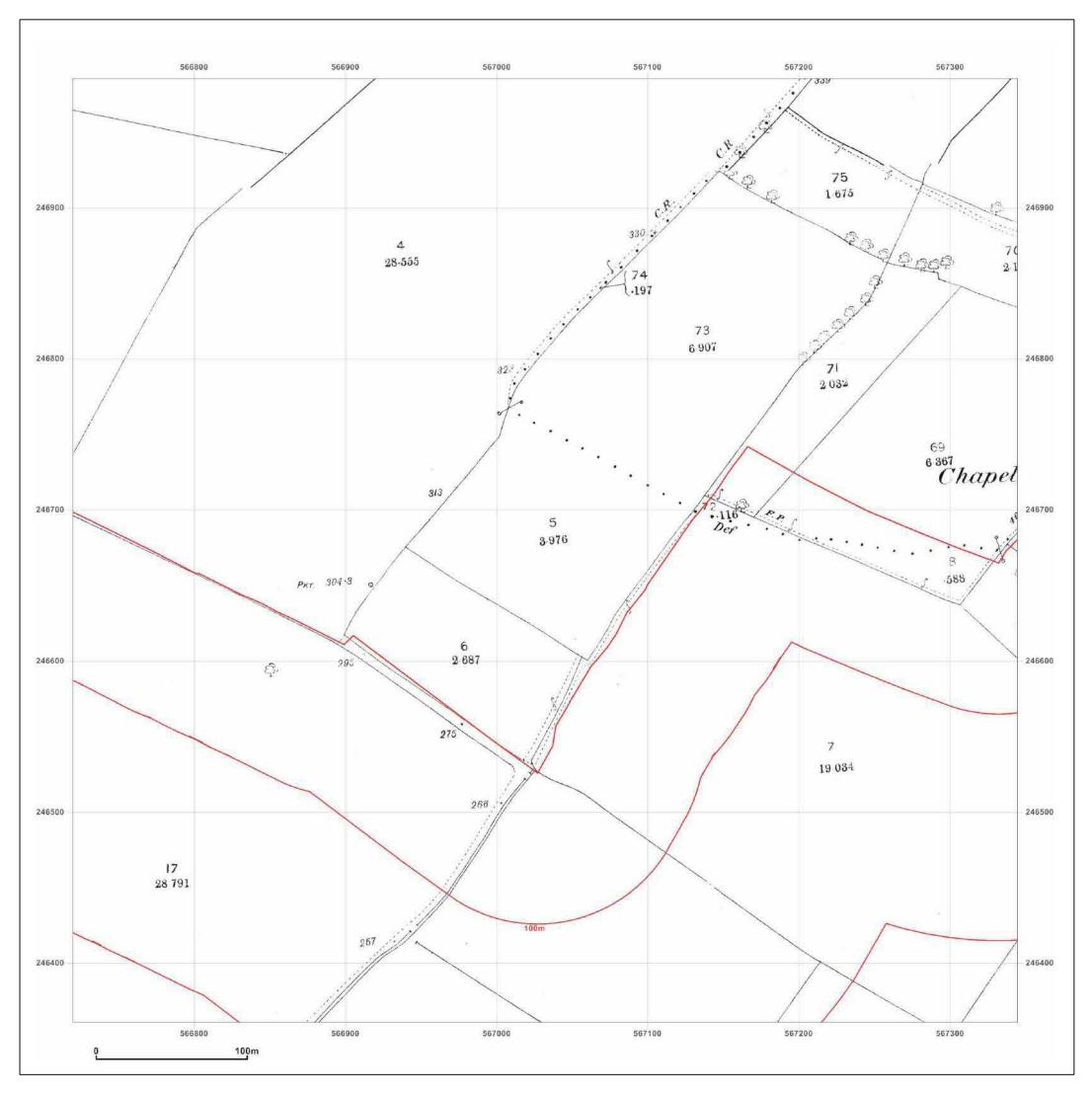


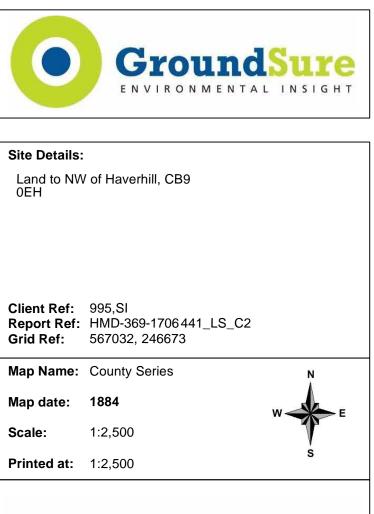


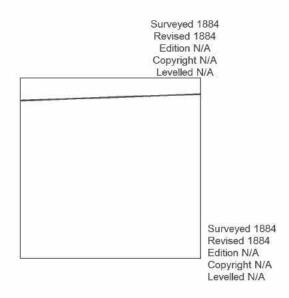


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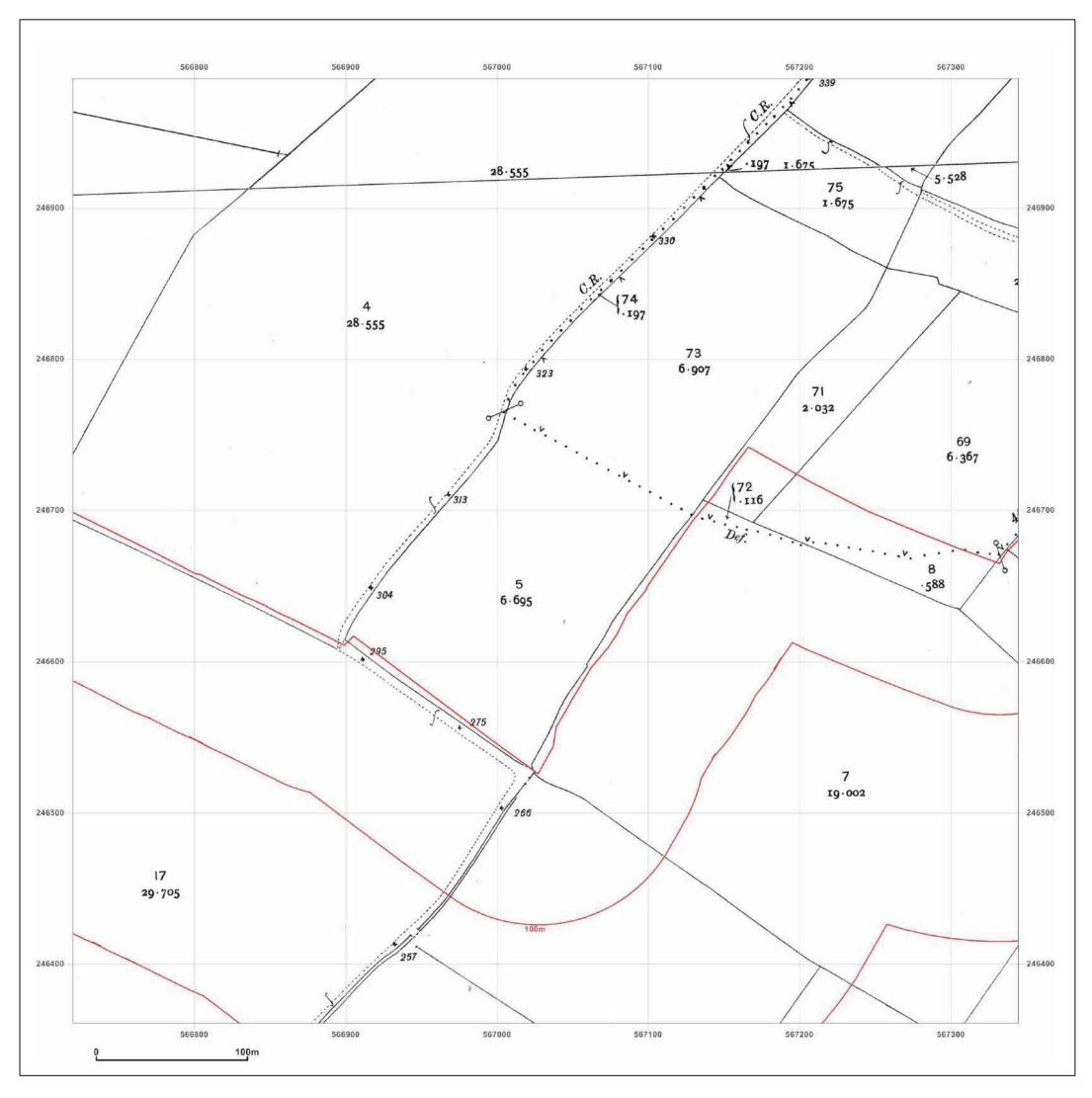


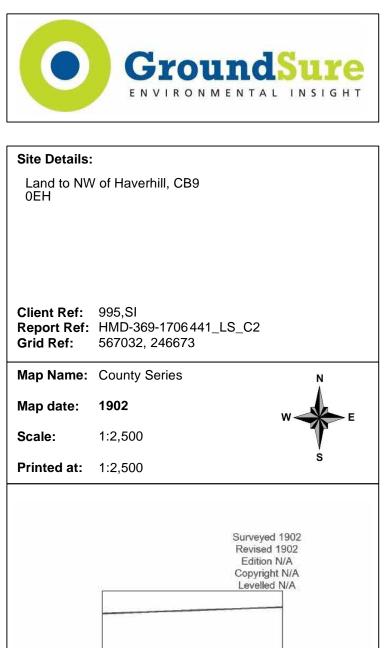




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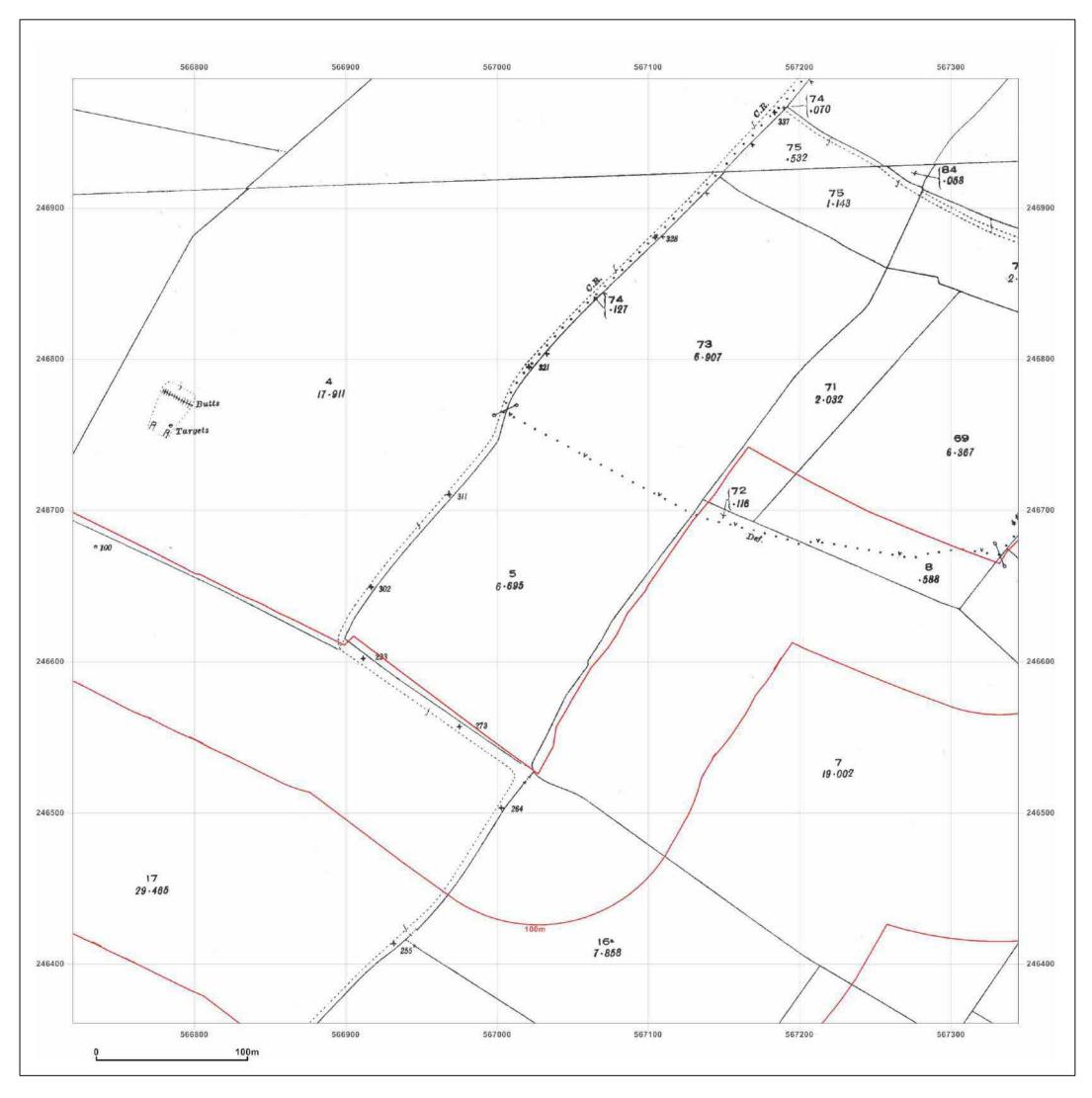


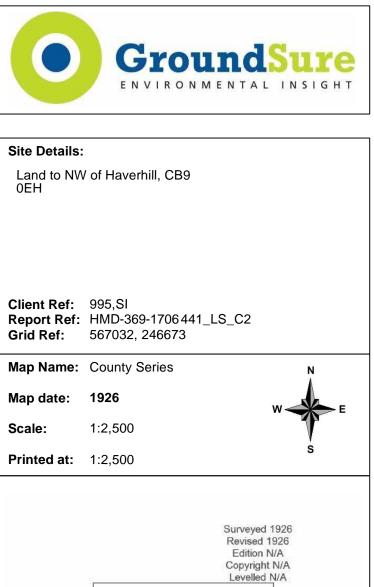


Surveyed 1902 Revised 1902 Edition N/A Copyright N/A Levelled N/A

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Production date: 10 October 2014





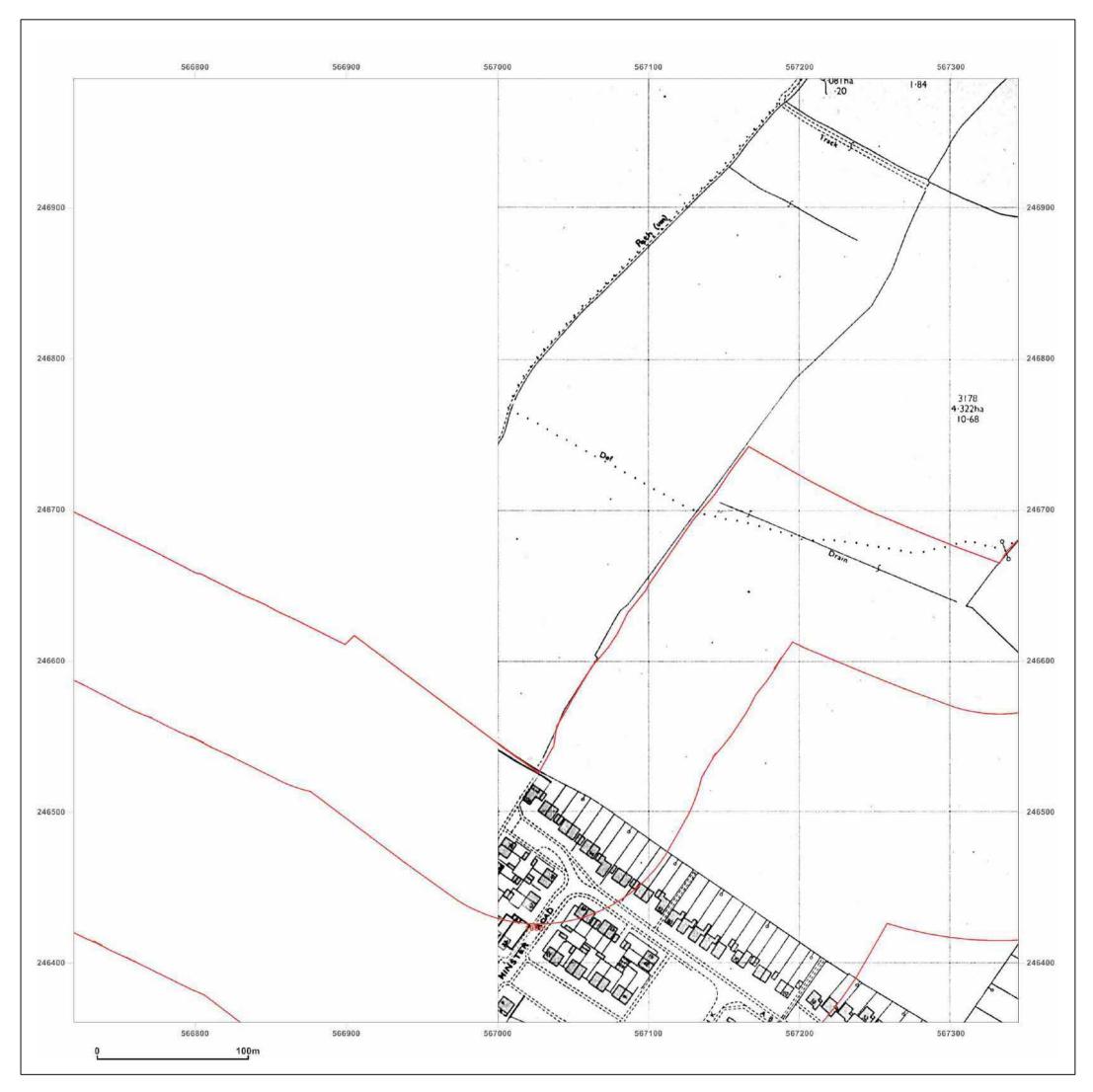
Surveyed 1926 Revised 1926 Edition N/A Copyright N/A Levelled N/A



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Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_C2 Grid Ref: 567032, 246673

- Map Name: National Grid
- Map date: 1956

Scale: 1:2,500

**Printed at:** 1:2,500



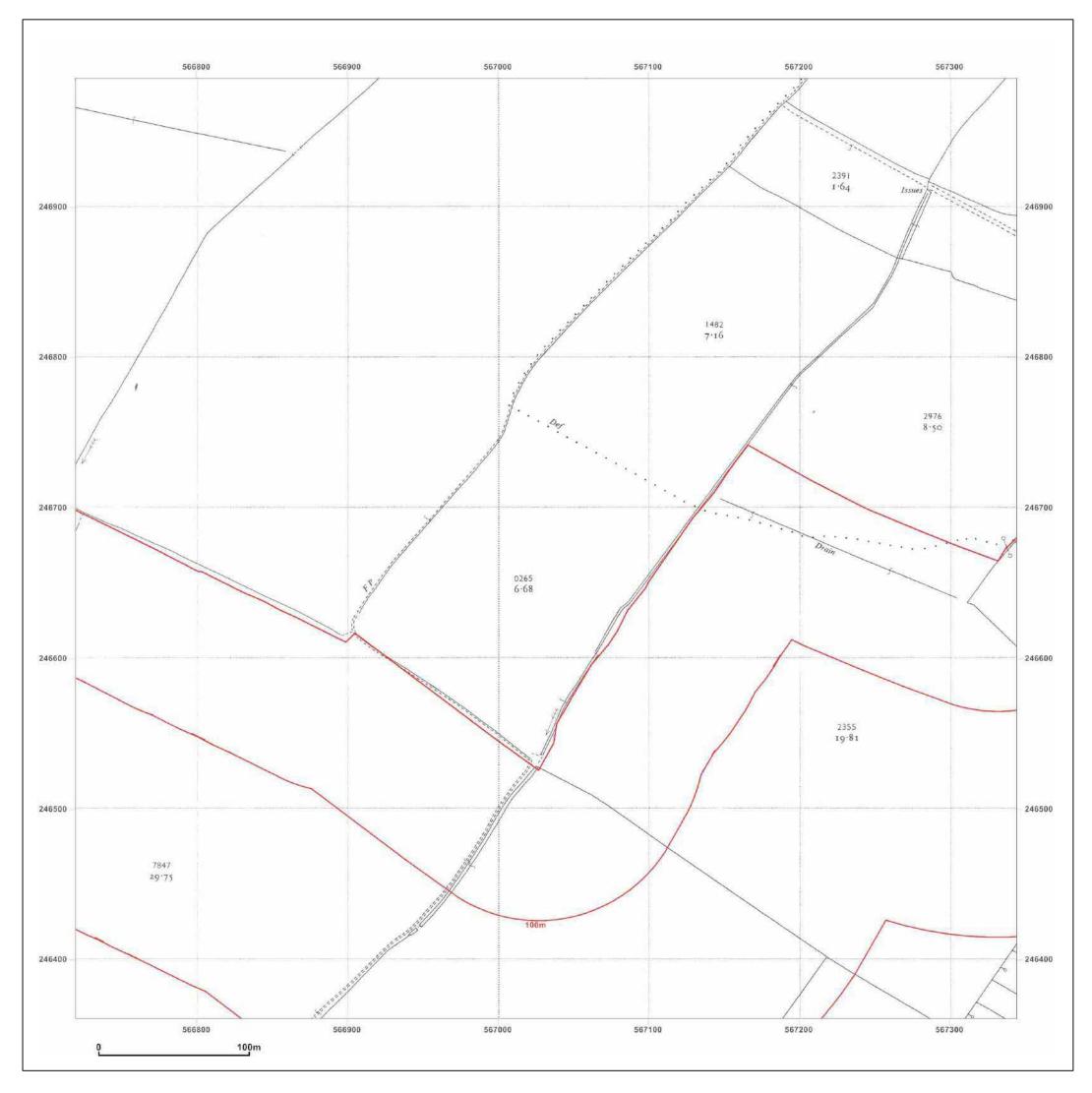
Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled 1956



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Land to NW of Haverhill, CB9 0EH

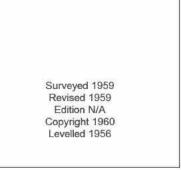
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Map Name: National Grid

Map date: 1959

Scale: 1:2,500

Printed at: 1:2,500

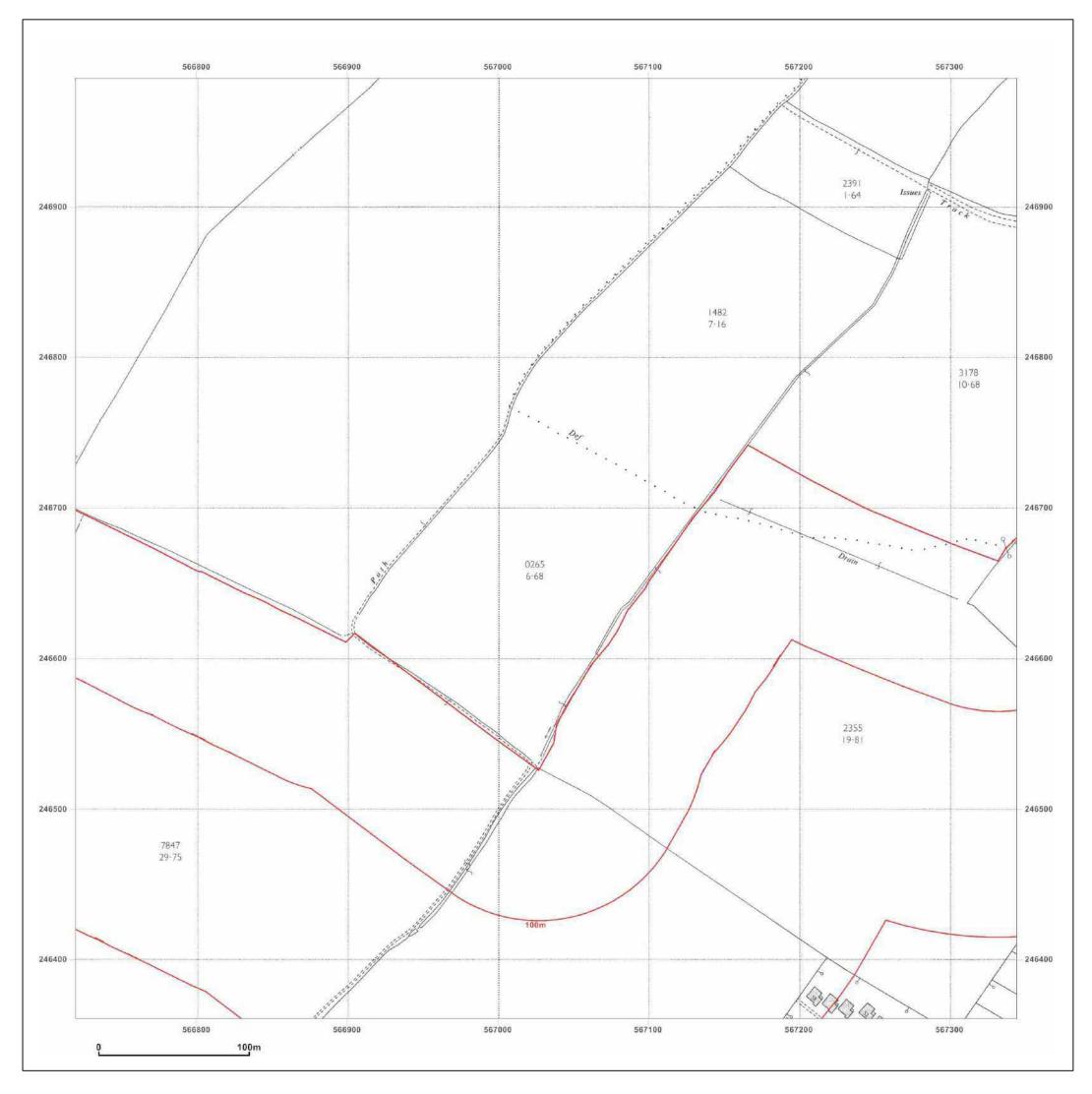




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Land to NW of Haverhill, CB9 0EH

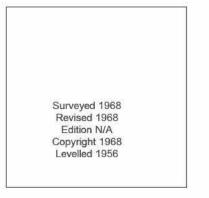
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Map Name: National Grid

Map date: 1968

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Printed at: 1:2,500

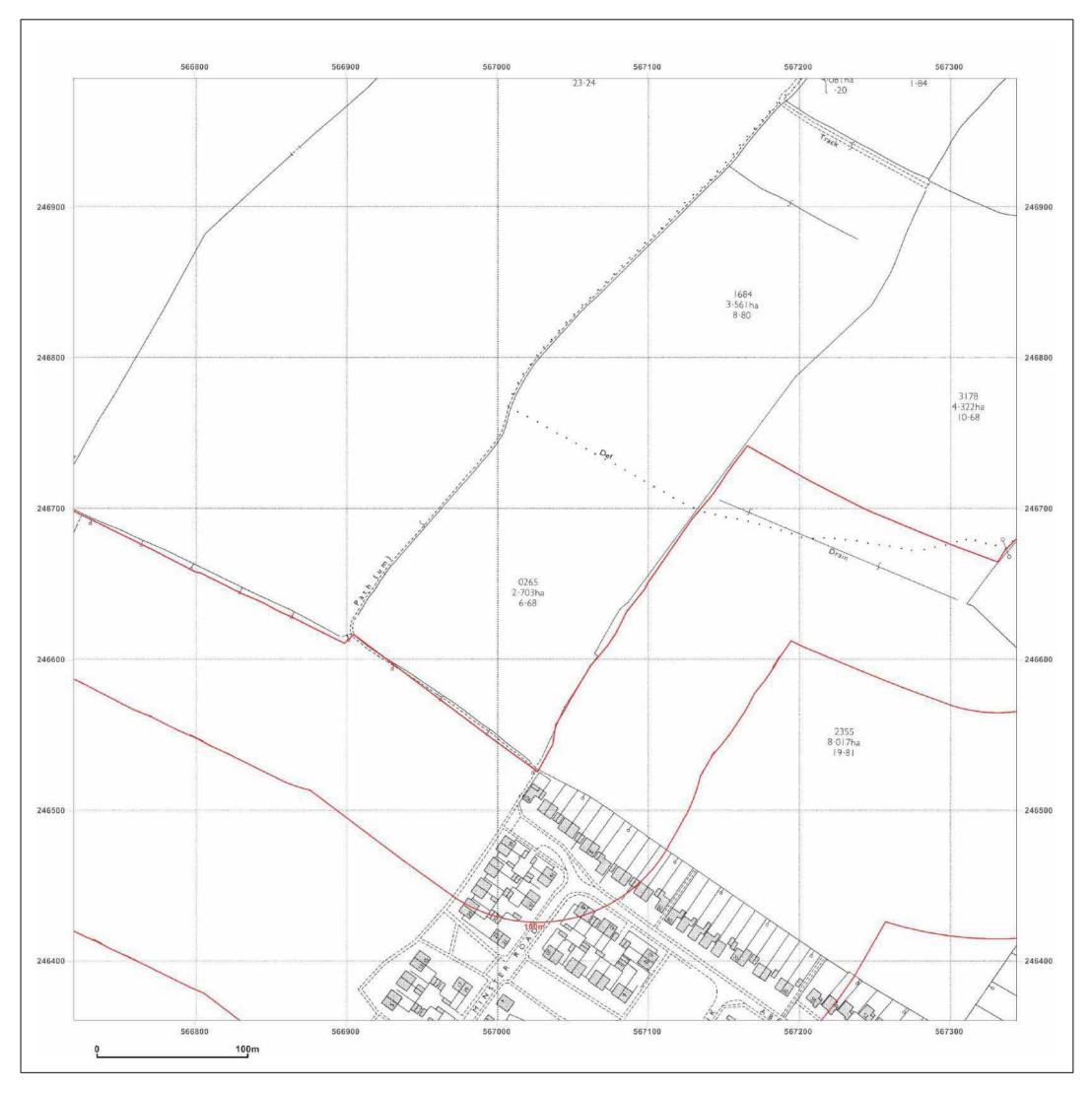




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Land to NW of Haverhill, CB9 0EH

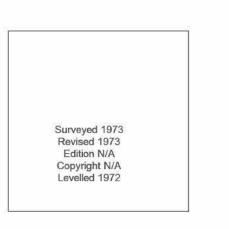
Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_C2 Grid Ref: 567032, 246673

Map Name: National Grid

Map date: 1973

Scale: 1:2,500

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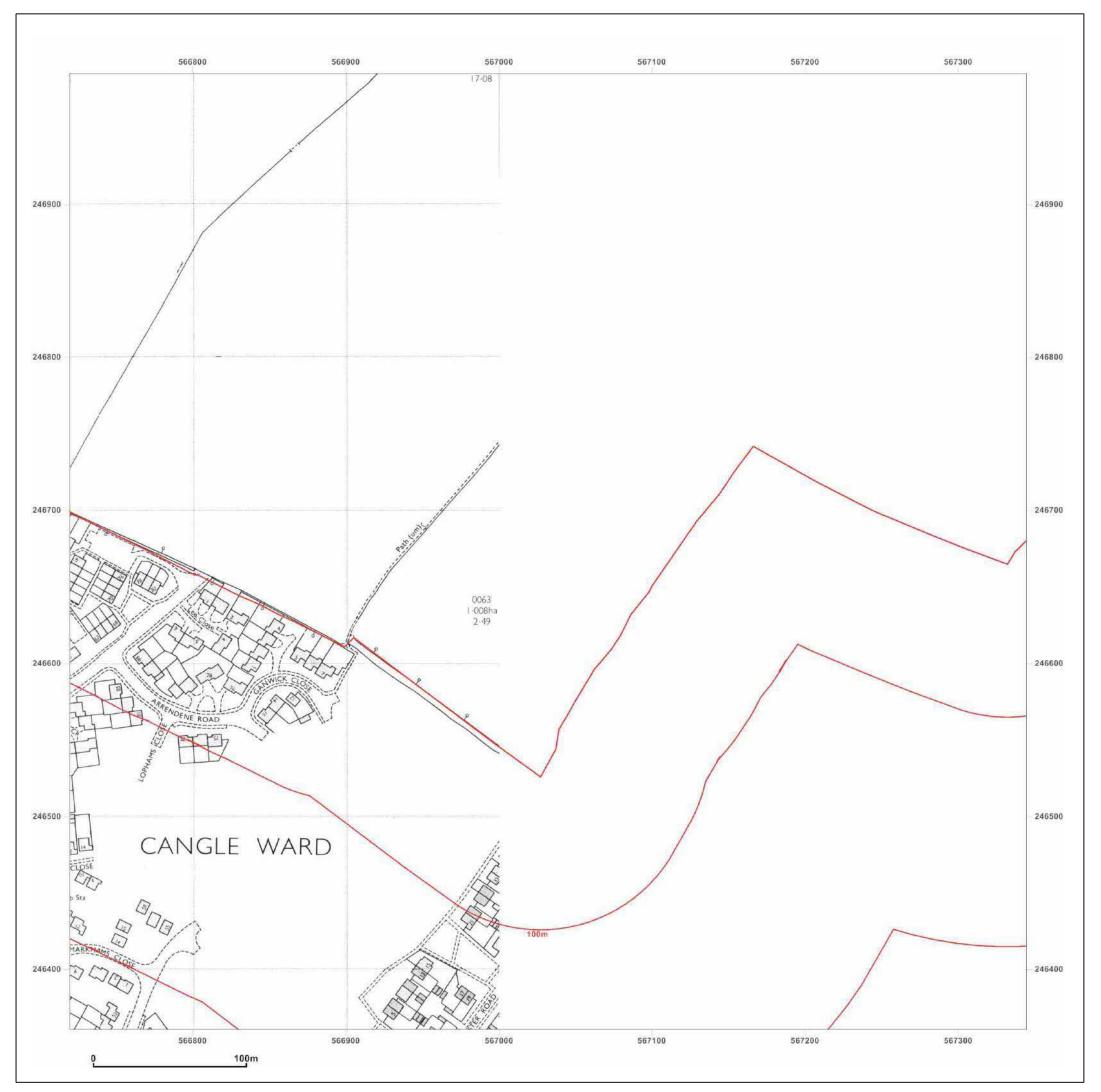




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Land to NW of Haverhill, CB9 0EH

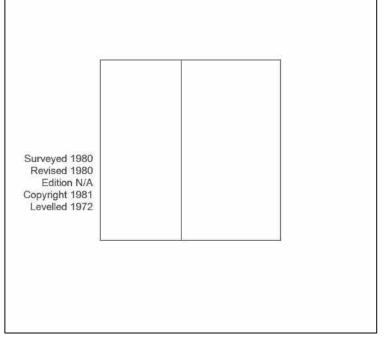
Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_C2 Grid Ref: 567032, 246673

Map Name: National Grid

Map date: 1980

Scale: 1:2,500

**Printed at:** 1:2,500

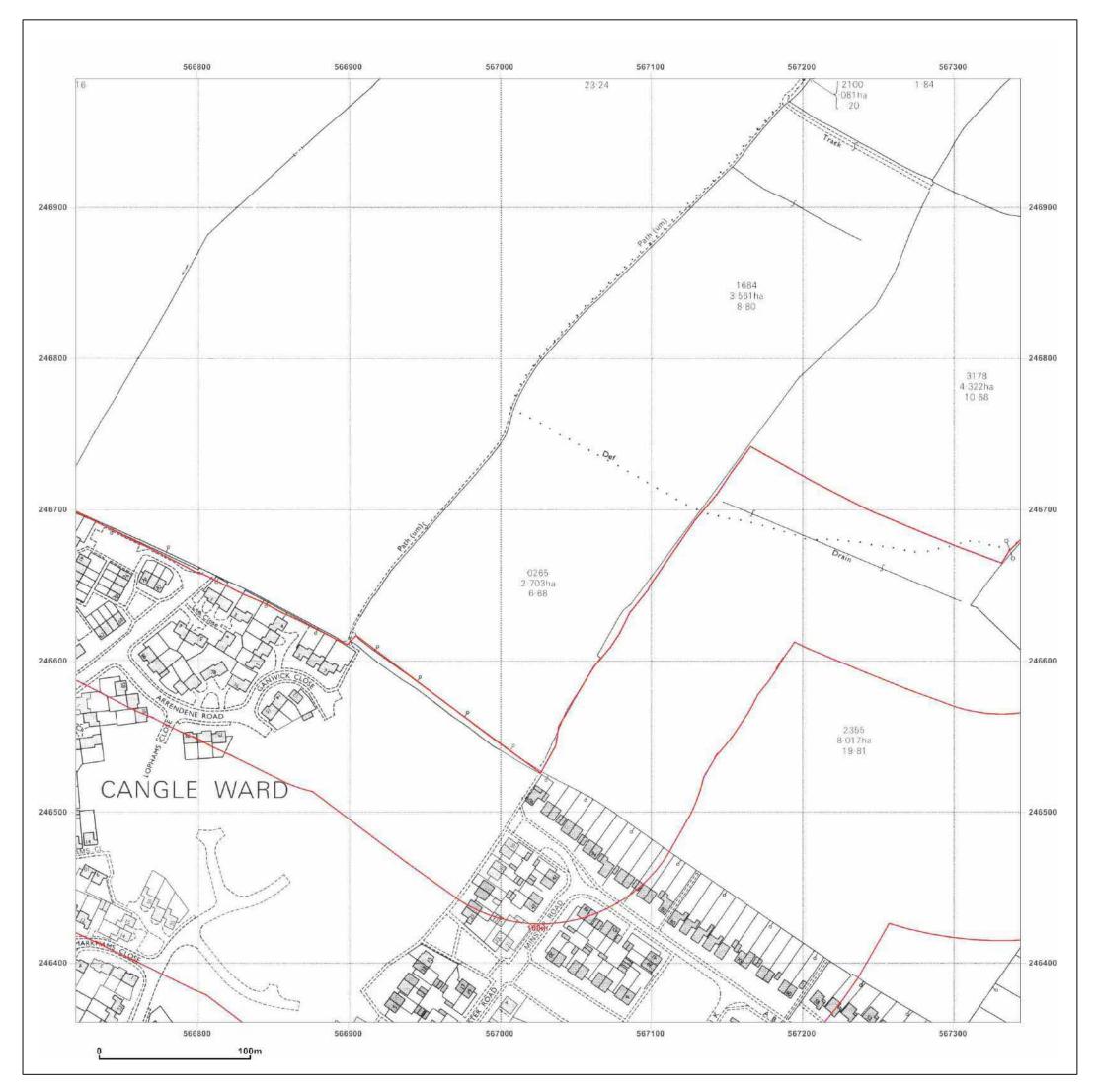




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Land to NW of Haverhill, CB9 0EH

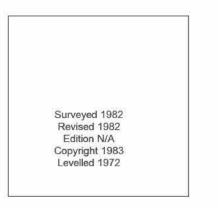
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Map Name: National Grid

Map date: 1982

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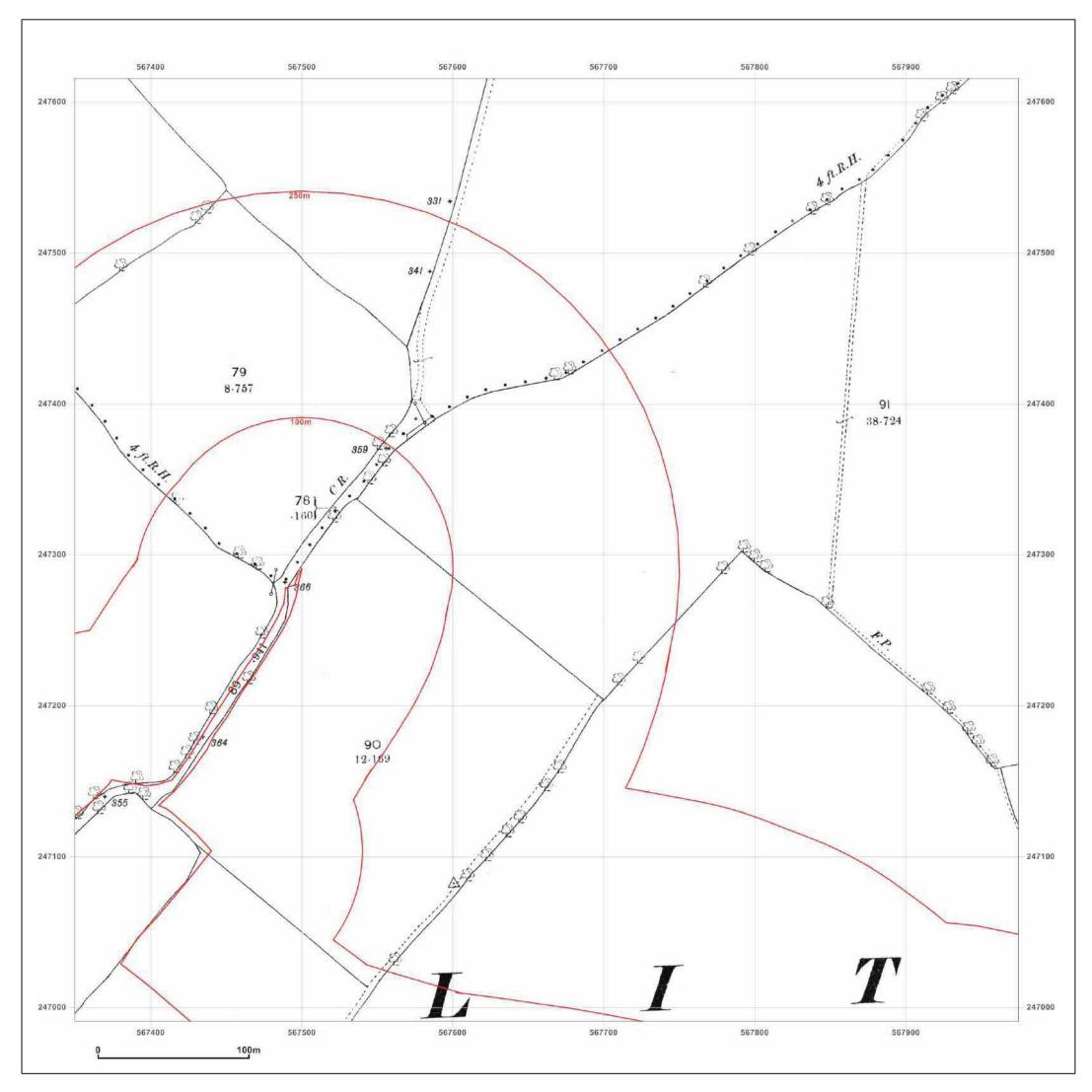




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Land to NW of Haverhill, CB9 0EH

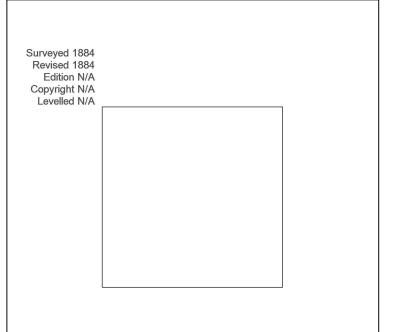
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Map Name: County Series

Map date: 1884

Scale: 1:2,500

**Printed at:** 1:2,500

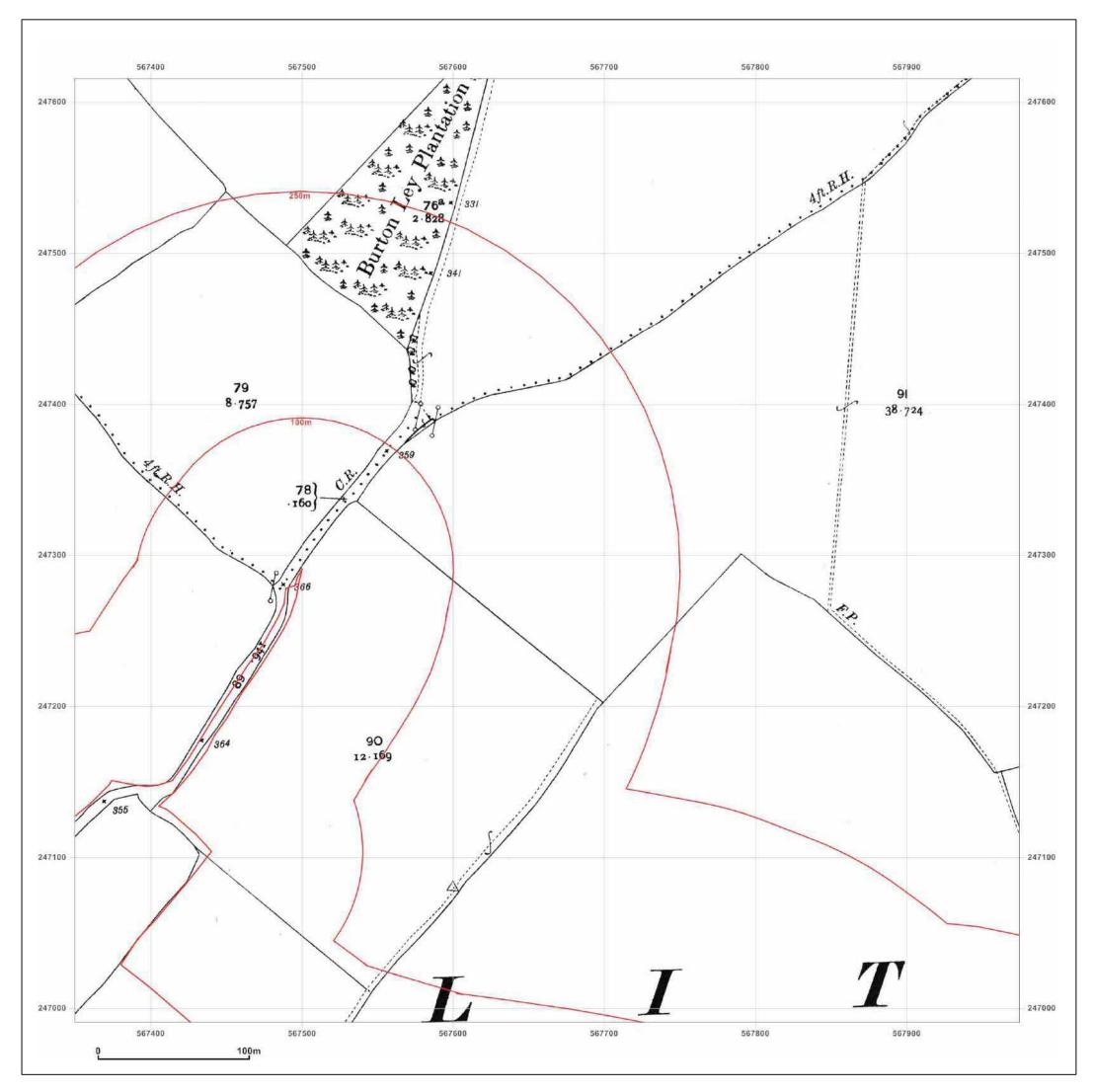




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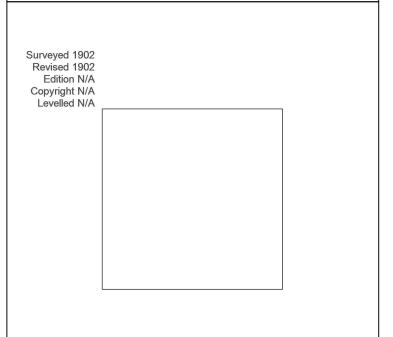
Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_D1 Grid Ref: 567662, 247303

Map Name: County Series

Map date: 1902

Scale: 1:2,500

**Printed at:** 1:2,500

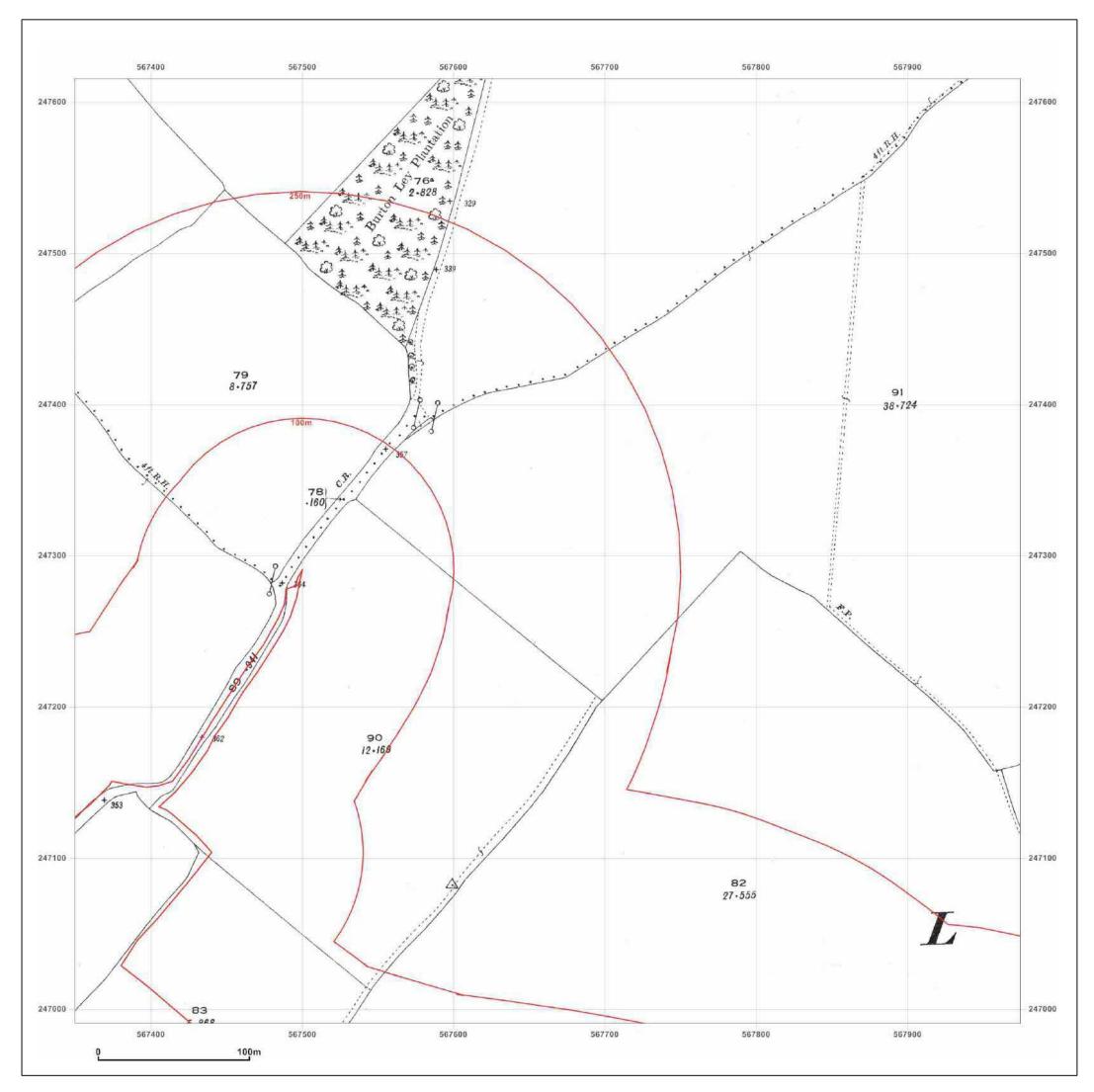




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Land to NW of Haverhill, CB9 0EH

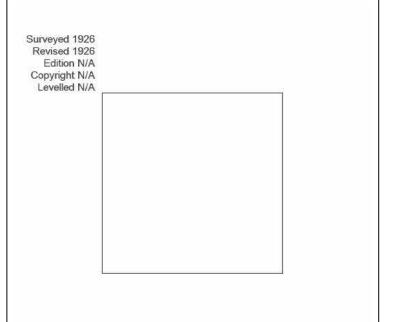
Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_D1 **Grid Ref:** 567662, 247303

Map Name: County Series

Map date: 1926

Scale: 1:2,500

**Printed at:** 1:2,500

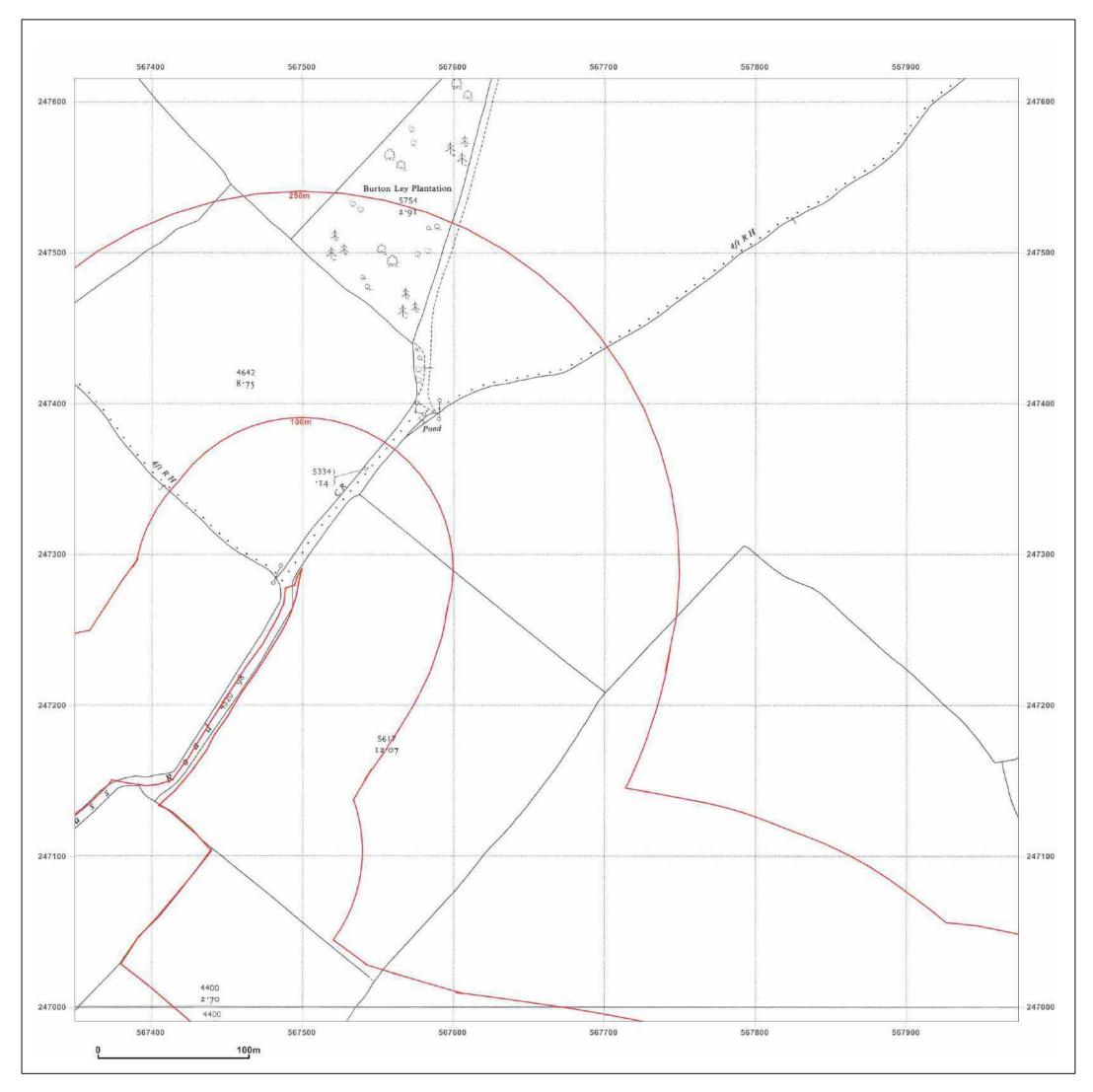




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Land to NW of Haverhill, CB9 0EH

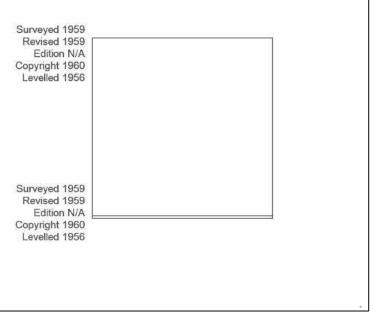
Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_D1 Grid Ref: 567662, 247303

Map Name: National Grid

Map date: 1959

Scale: 1:2,500

**Printed at:** 1:2,500

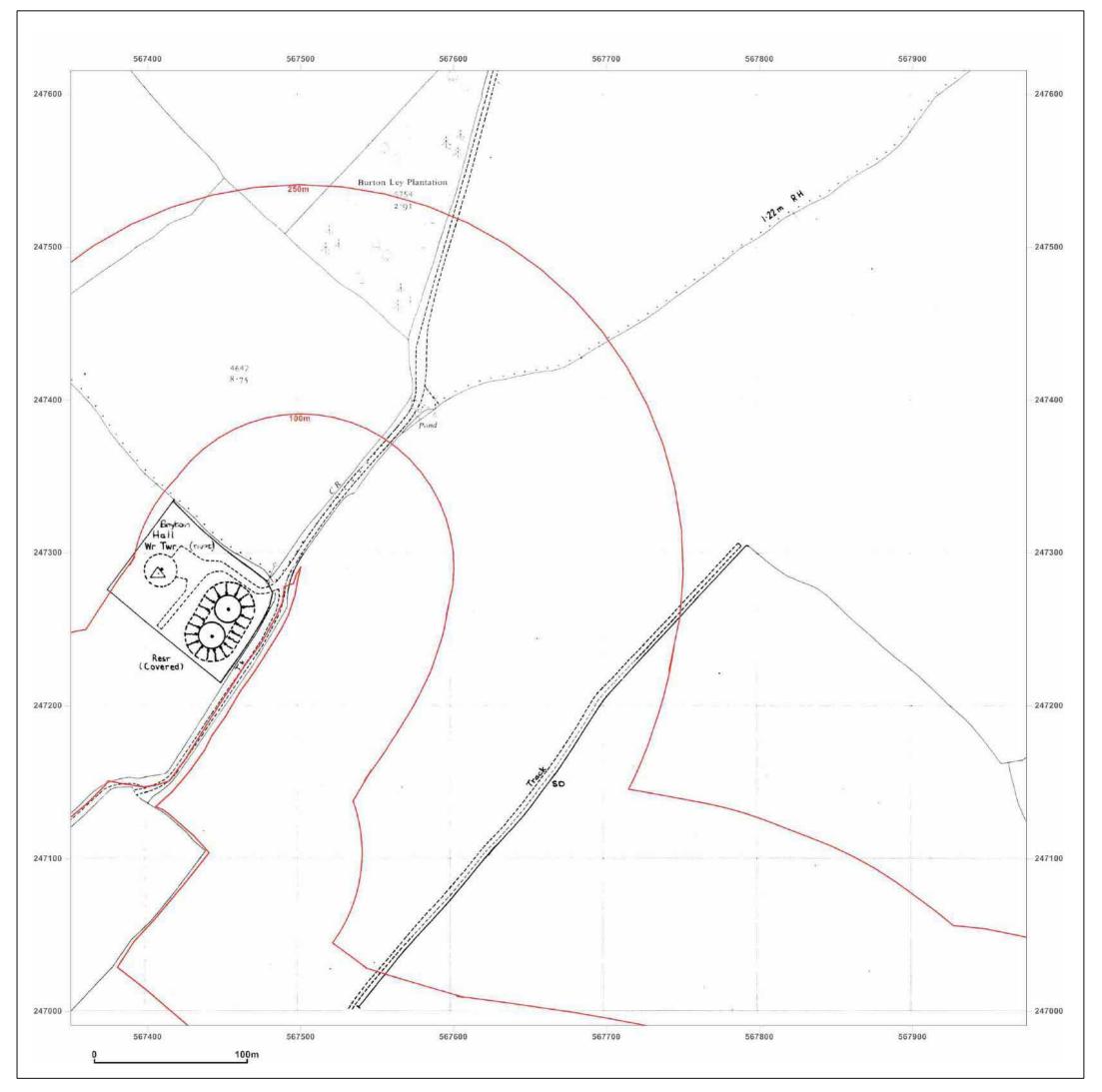




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Site Details:

Land to NW of Haverhill, CB9 0EH

 Client Ref:
 995,SI

 Report Ref:
 HMD-369-1706441\_LS\_D1

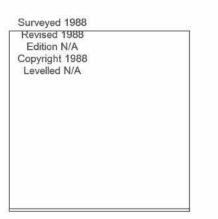
 Grid Ref:
 567662, 247303

Map Name: National Grid

Map date: 1988

**Scale:** 1:2,500

**Printed at:** 1:2,500

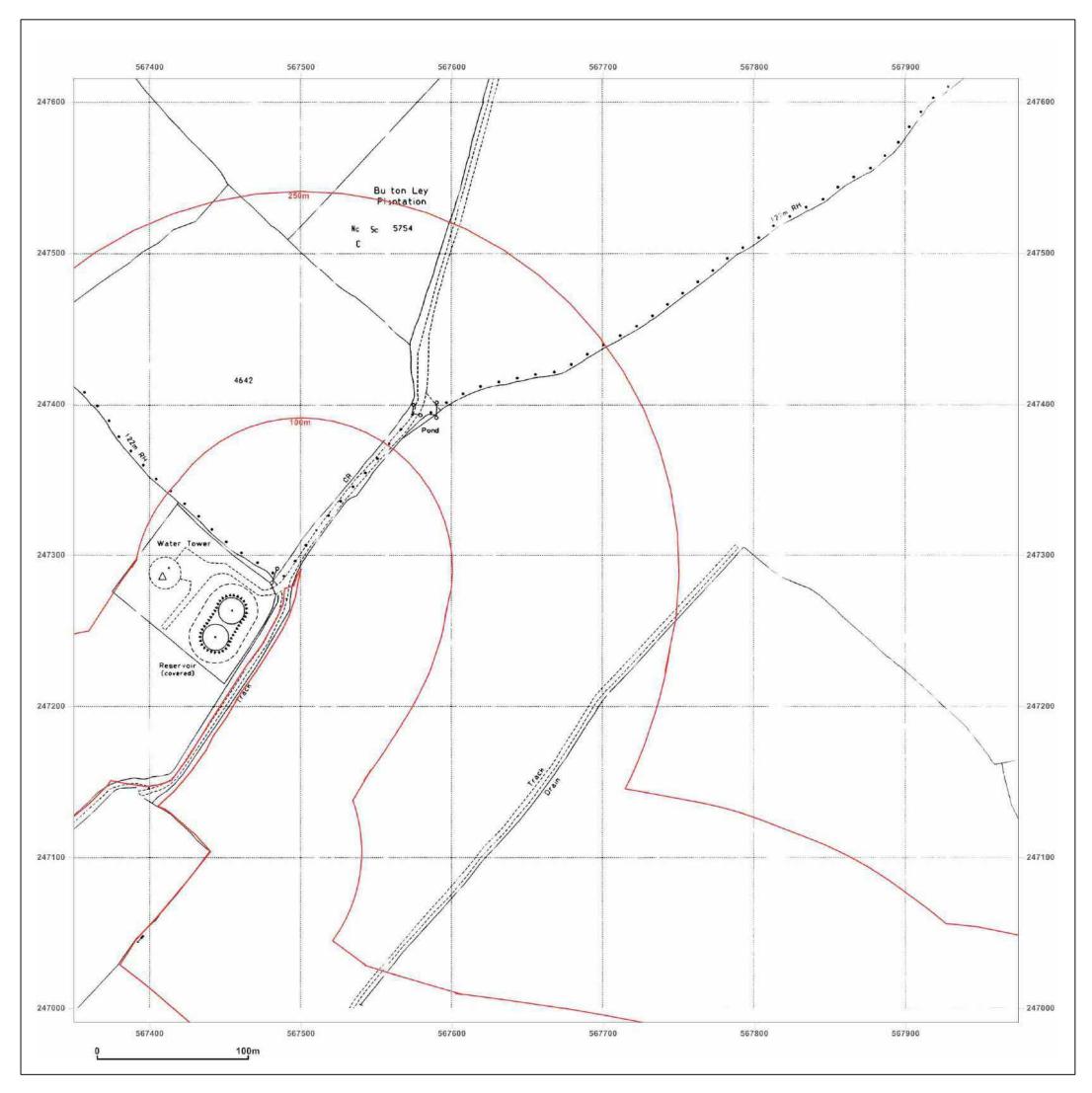




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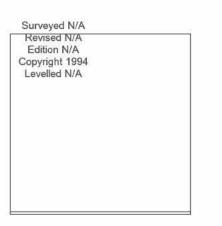
Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_D1 Grid Ref: 567662, 247303

- Map Name: National Grid
- Map date: 1994

Scale: 1:2,500

**Printed at:** 1:2,500

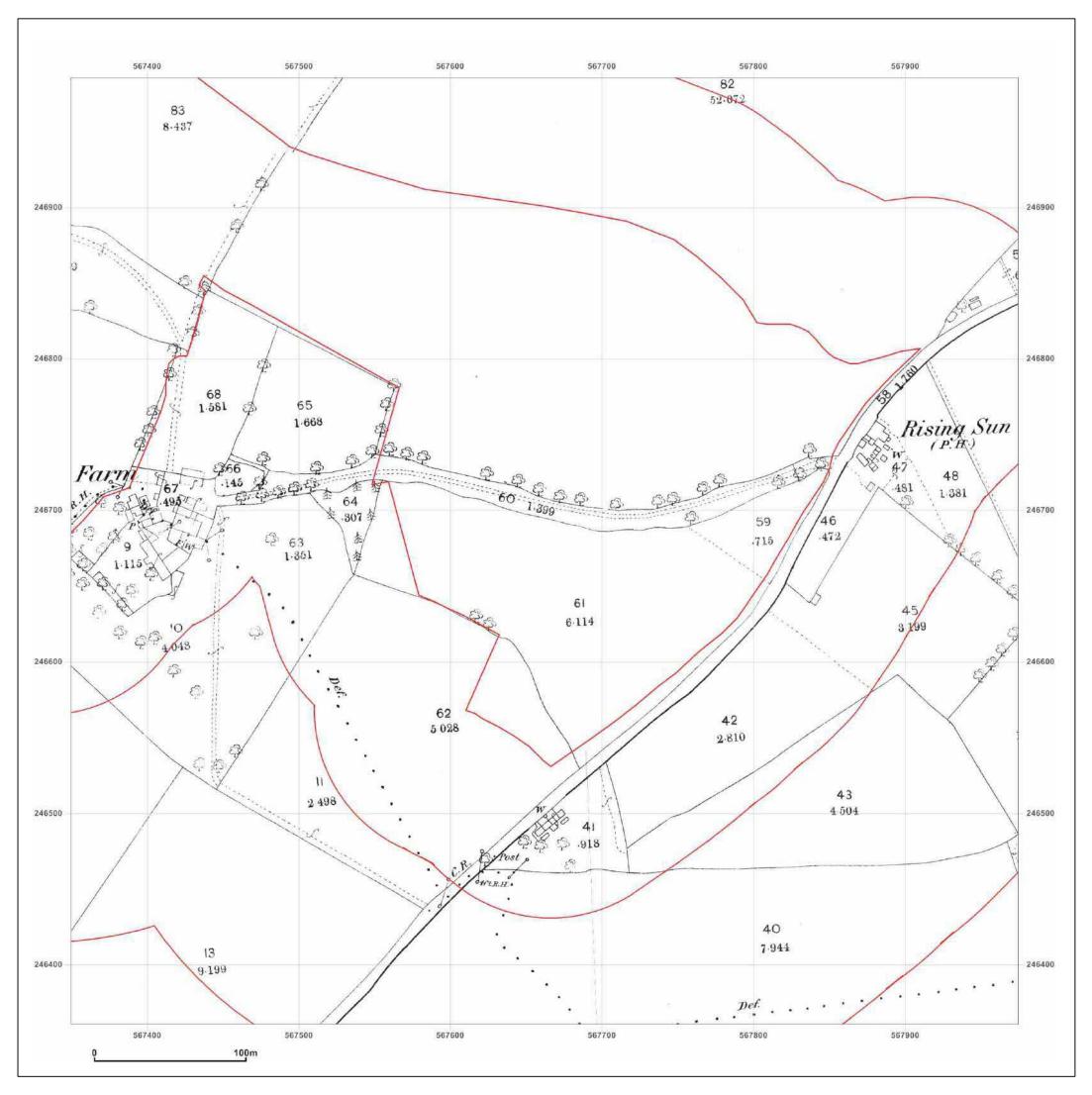


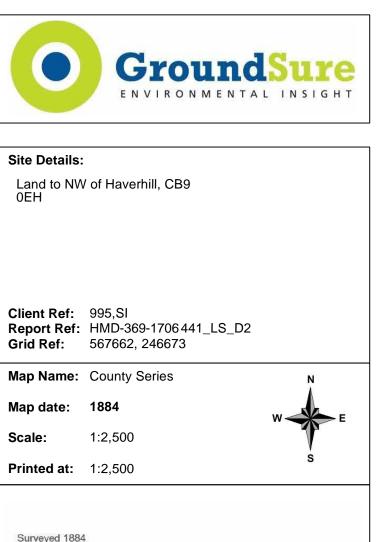


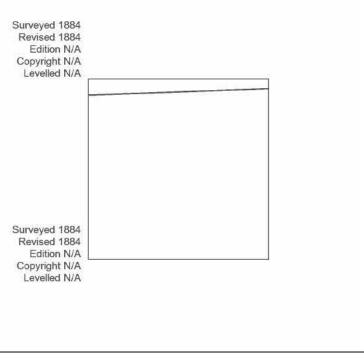
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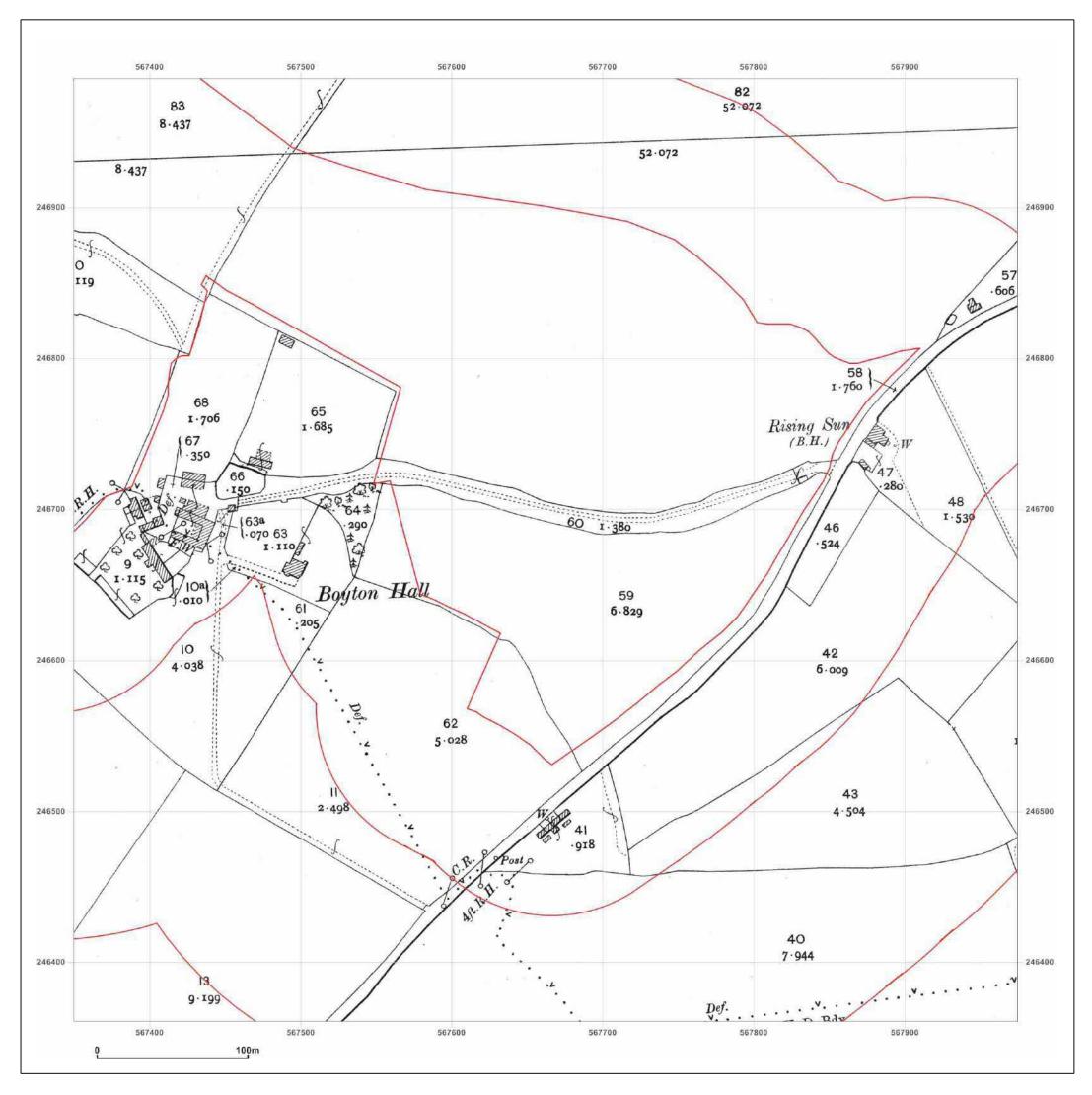


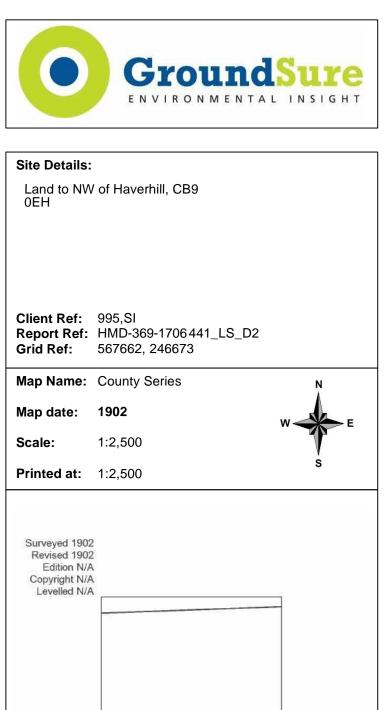




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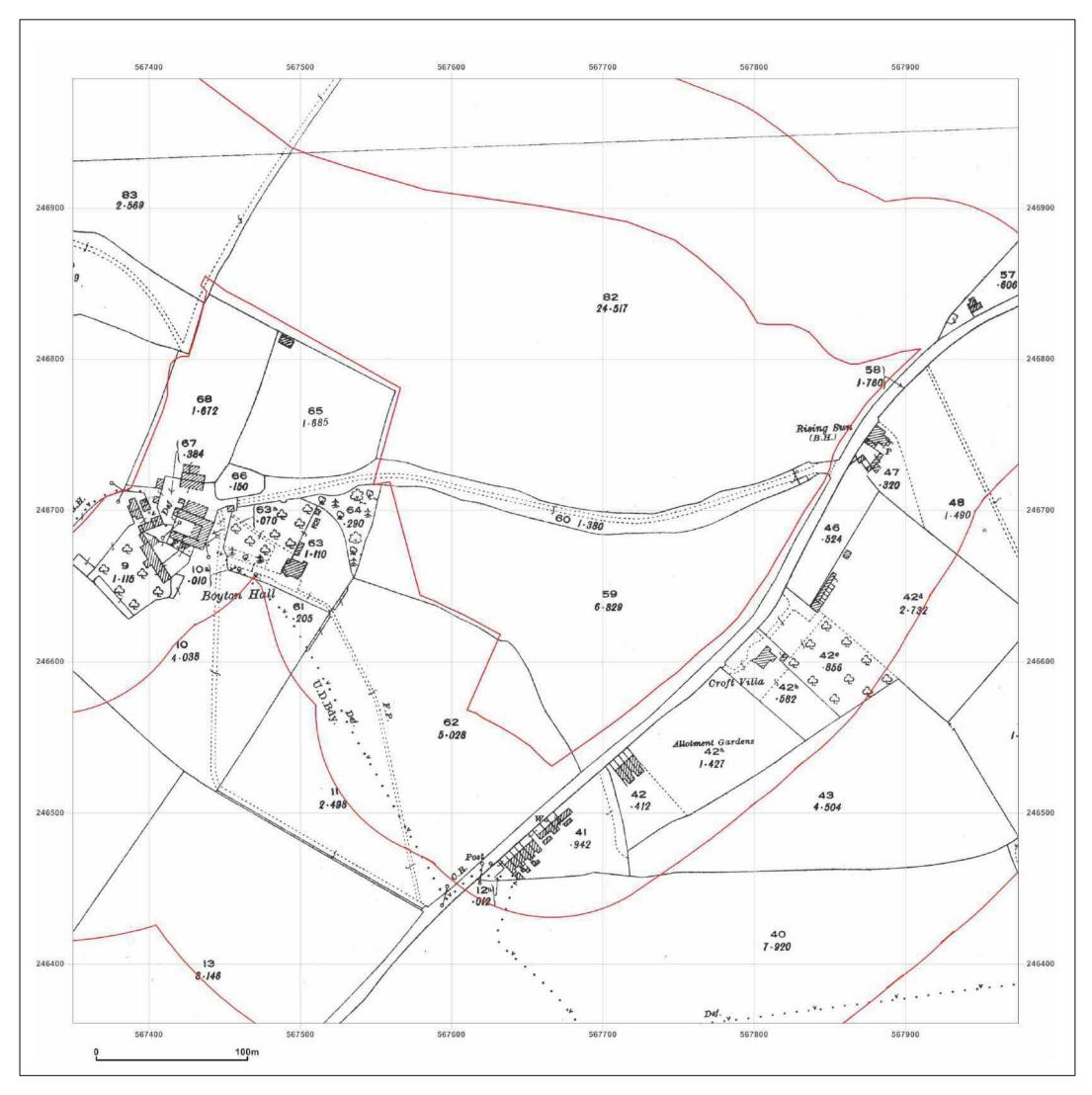
Surveyed 1902



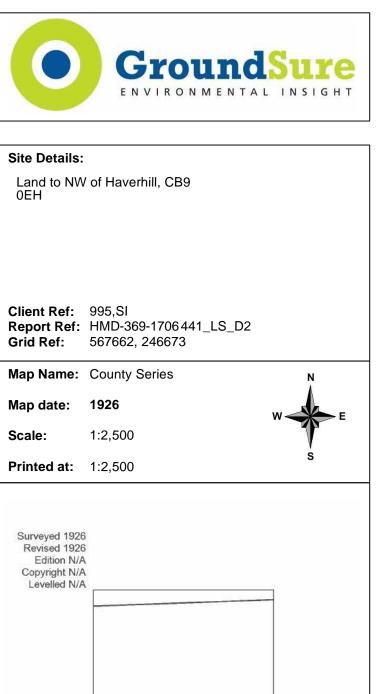
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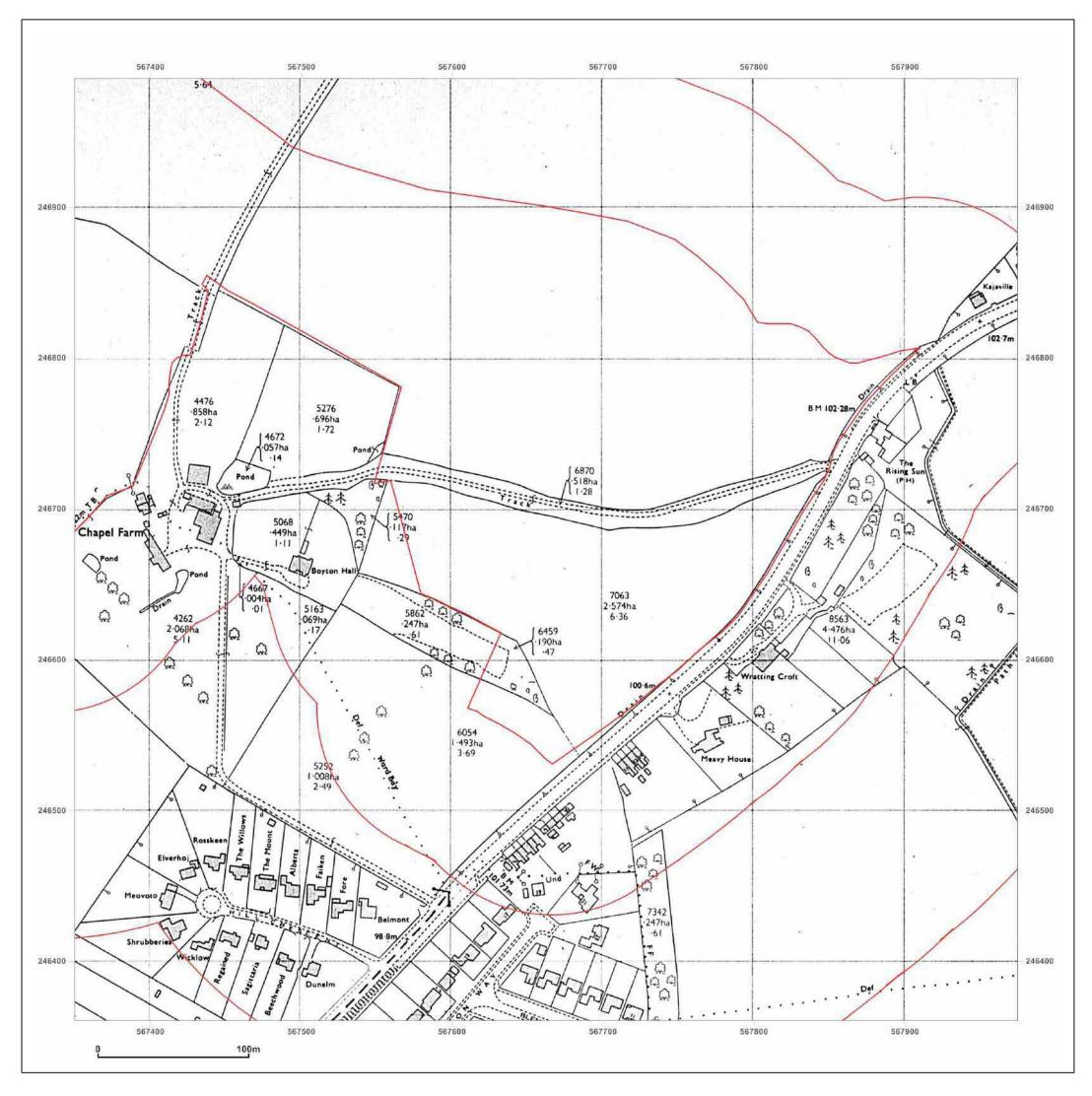
Surveyed 1926 Revised 1926 Edition N/A Copyright N/A Levelled N/A Produced by os Ordnance Survey® GroundSure Environmental Insight T: 08444 159000

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Land to NW of Haverhill, CB9 0EH

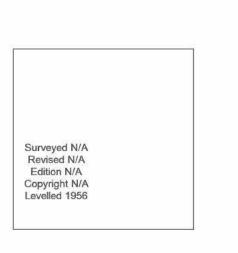
Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_D2 Grid Ref: 567662, 246673

Map Name: National Grid

Map date: 1956

1:2,500 Scale:

**Printed at:** 1:2,500

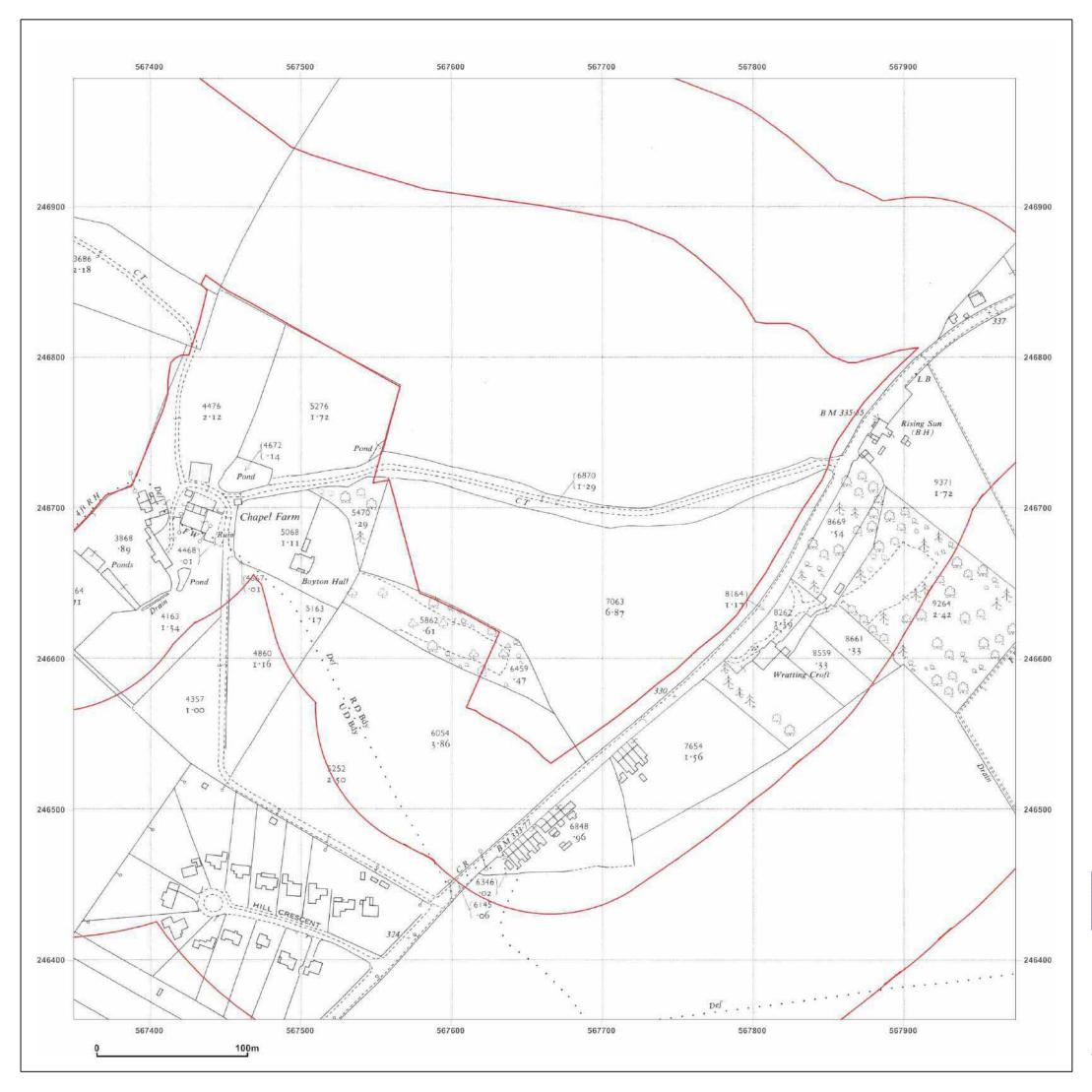




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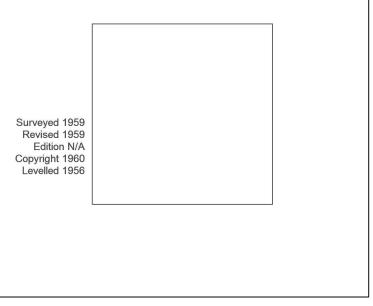
Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_D2 Grid Ref: 567662, 246673

Map Name: National Grid

Map date: 1959

1:2,500 Scale:

**Printed at:** 1:2,500

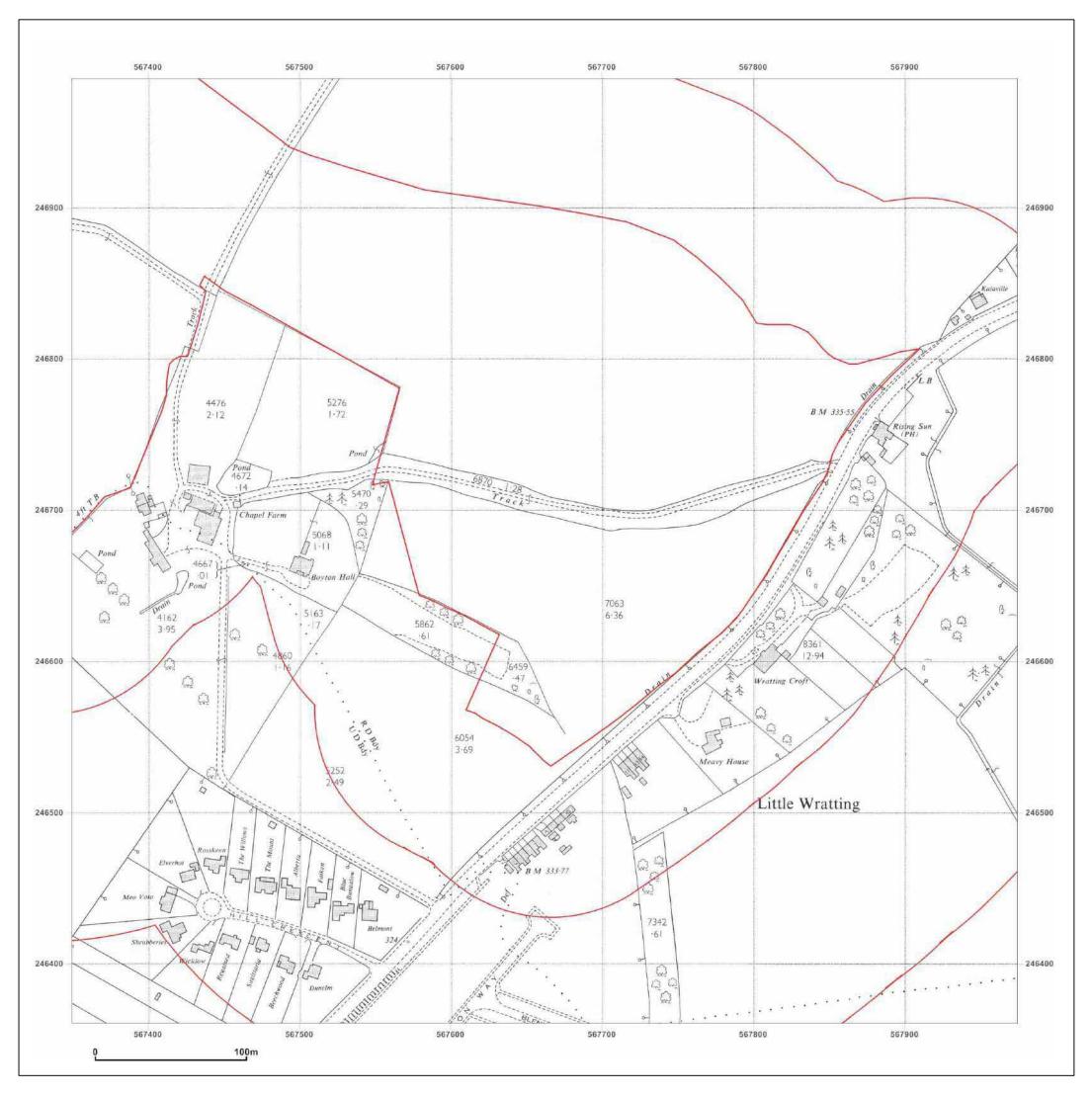




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Land to NW of Haverhill, CB9 0EH

 Client Ref:
 995,SI

 Report Ref:
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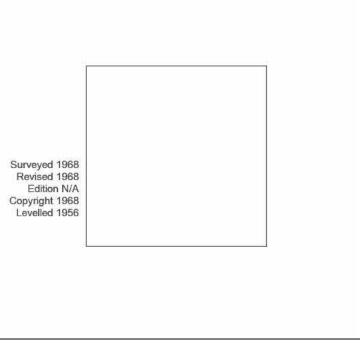
 Grid Ref:
 567662, 246673

Map Name: National Grid

Map date: 1968

**Scale:** 1:2,500

**Printed at:** 1:2,500

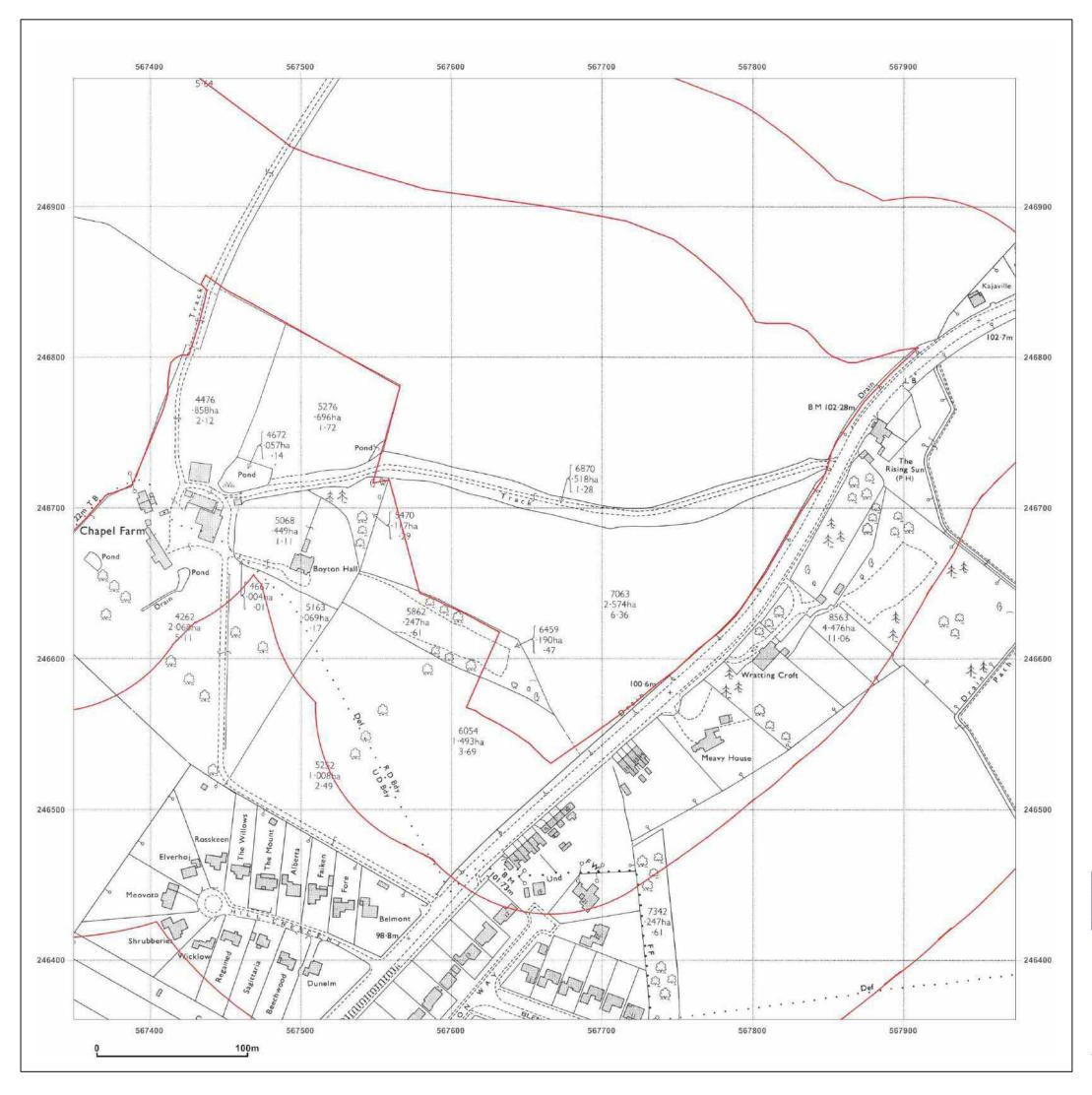




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Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_D2 Grid Ref: 567662, 246673

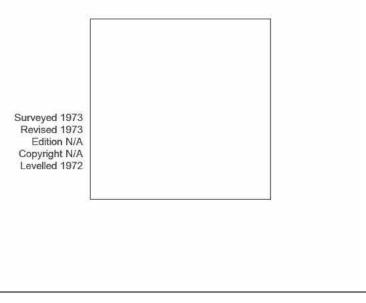
Map Name: National Grid

Map date: 1973

1:2,500 Scale:

**Printed at:** 1:2,500



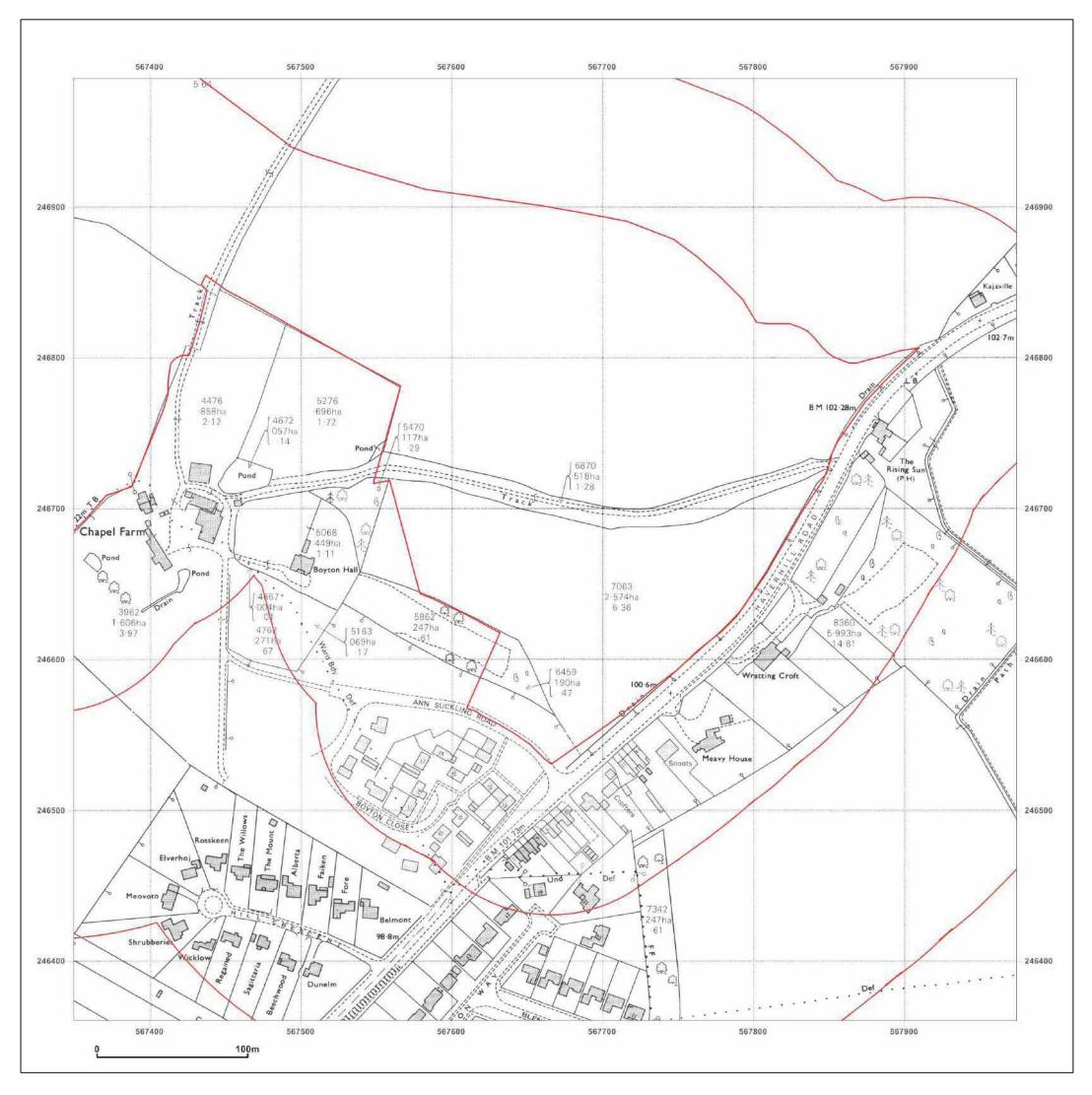




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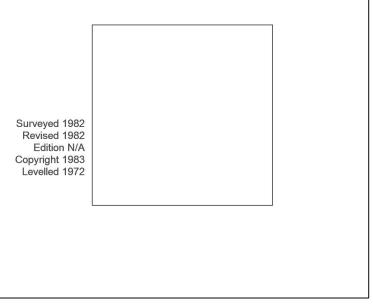
Client Ref: 995,SI **Report Ref:** HMD-369-1706441\_LS\_D2 Grid Ref: 567662, 246673

Map Name: National Grid

Map date: 1982

1:2,500 Scale:

**Printed at:** 1:2,500

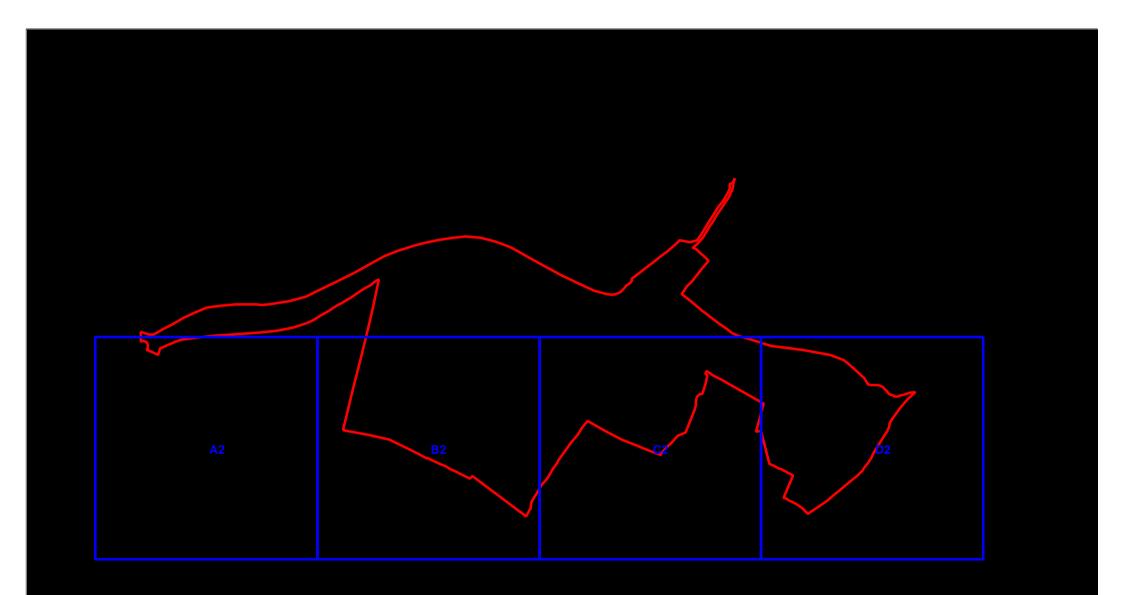


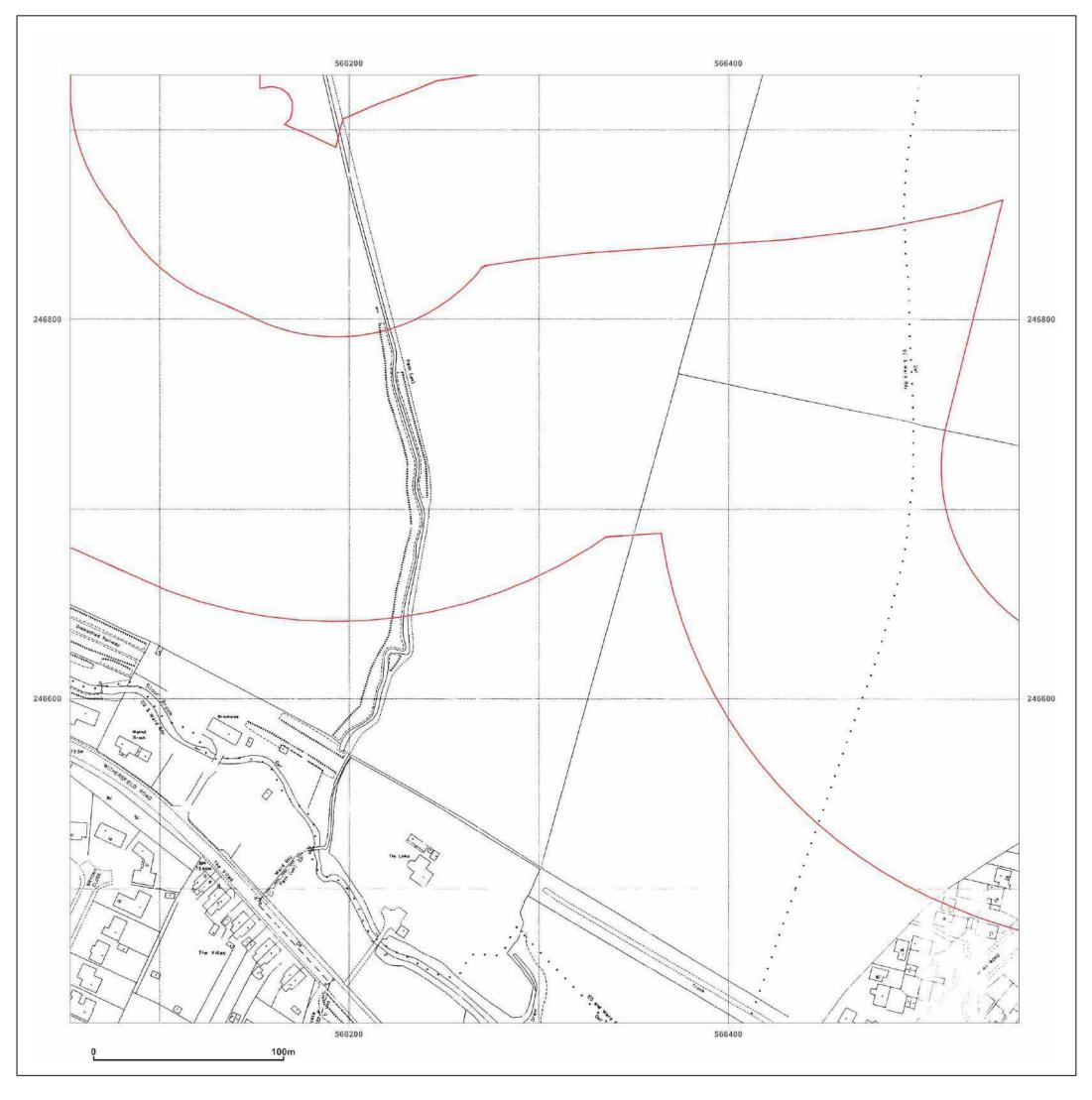


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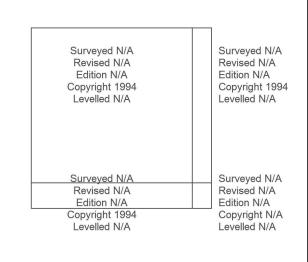






Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_1250Scale\_A2 Grid Ref: 566303, 246679 Map Name: National Grid Map date: 1991-1994 Scale: 1:1,250 **Printed at:** 1:2,000





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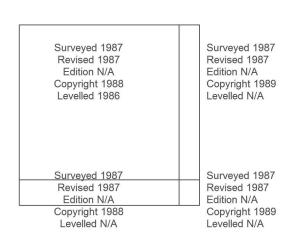
Production date: 10 October 2014





Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_1250Scale\_B2 Grid Ref: 566806, 246679 Map Name: National Grid Map date: 1988-1989 Scale: 1:1,250 **Printed at:** 1:2,000

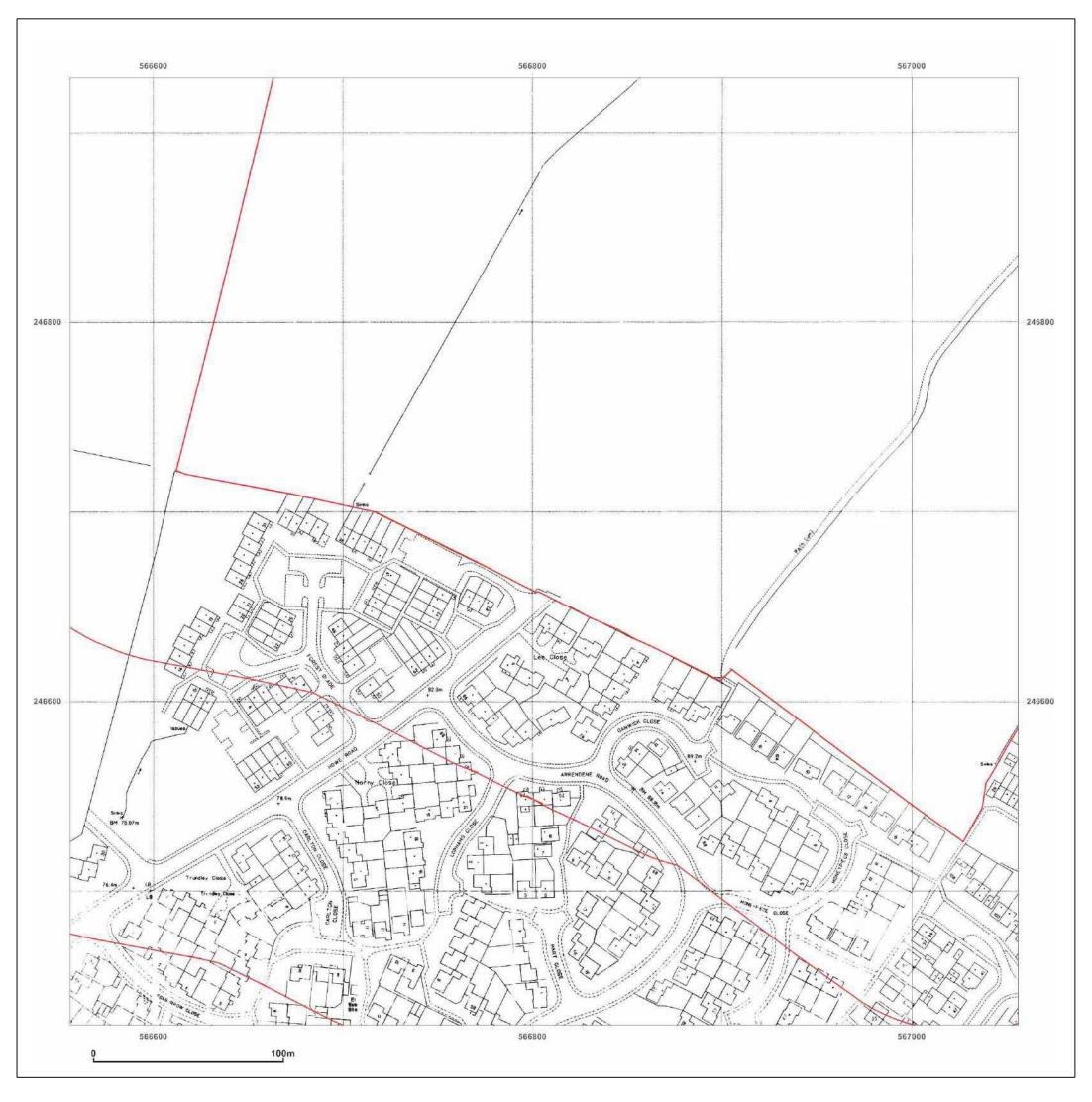




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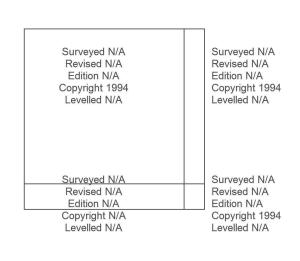
To view map legend click here <u>Legend</u>



Site Details:

Land to NW of Haverhill, CB9 0EH

Client Ref:<br/>Beport Ref:995,SI<br/>HMD-369-1706441\_LS\_1250Scale\_B2<br/>566806,246679Map Name:National GridMap date:1991-1994Scale:1:1,250Printed at:1:2,000





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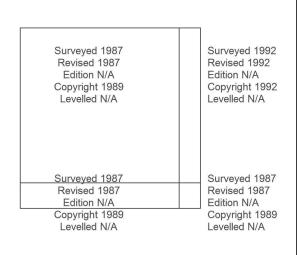
Production date: 10 October 2014





Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_1250Scale\_C2 Grid Ref: 567309, 246679 Map Name: National Grid Map date: 1989-1992 Scale: 1:1,250 **Printed at:** 1:2,000





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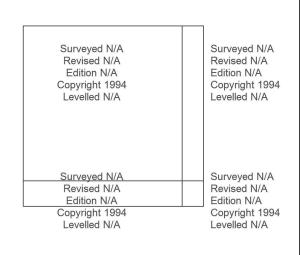
Production date: 10 October 2014





Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_1250Scale\_C2 Grid Ref: 567309, 246679 Map Name: National Grid Map date: 1994 1:1,250 Scale: **Printed at:** 1:2,000

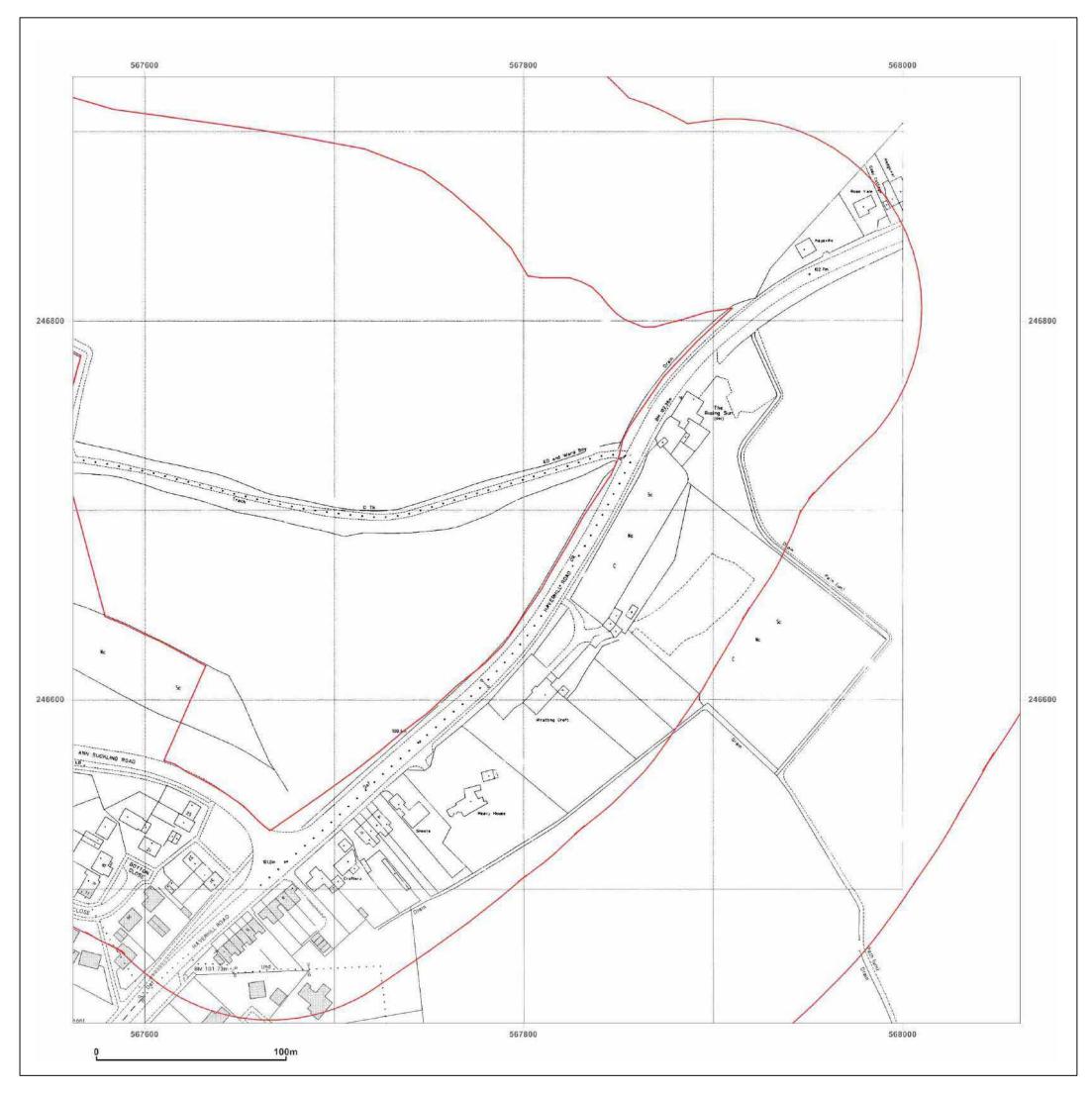




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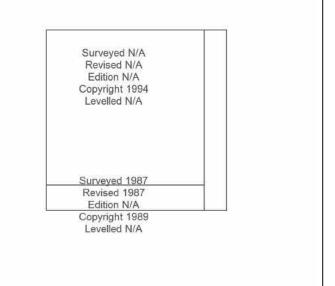
Production date: 10 October 2014





Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441\_LS\_1250Scale\_D2 **Grid Ref:** 567812, 246679 Map Name: National Grid Map date: 1989-1994 Scale: 1:1,250 **Printed at:** 1:2,000

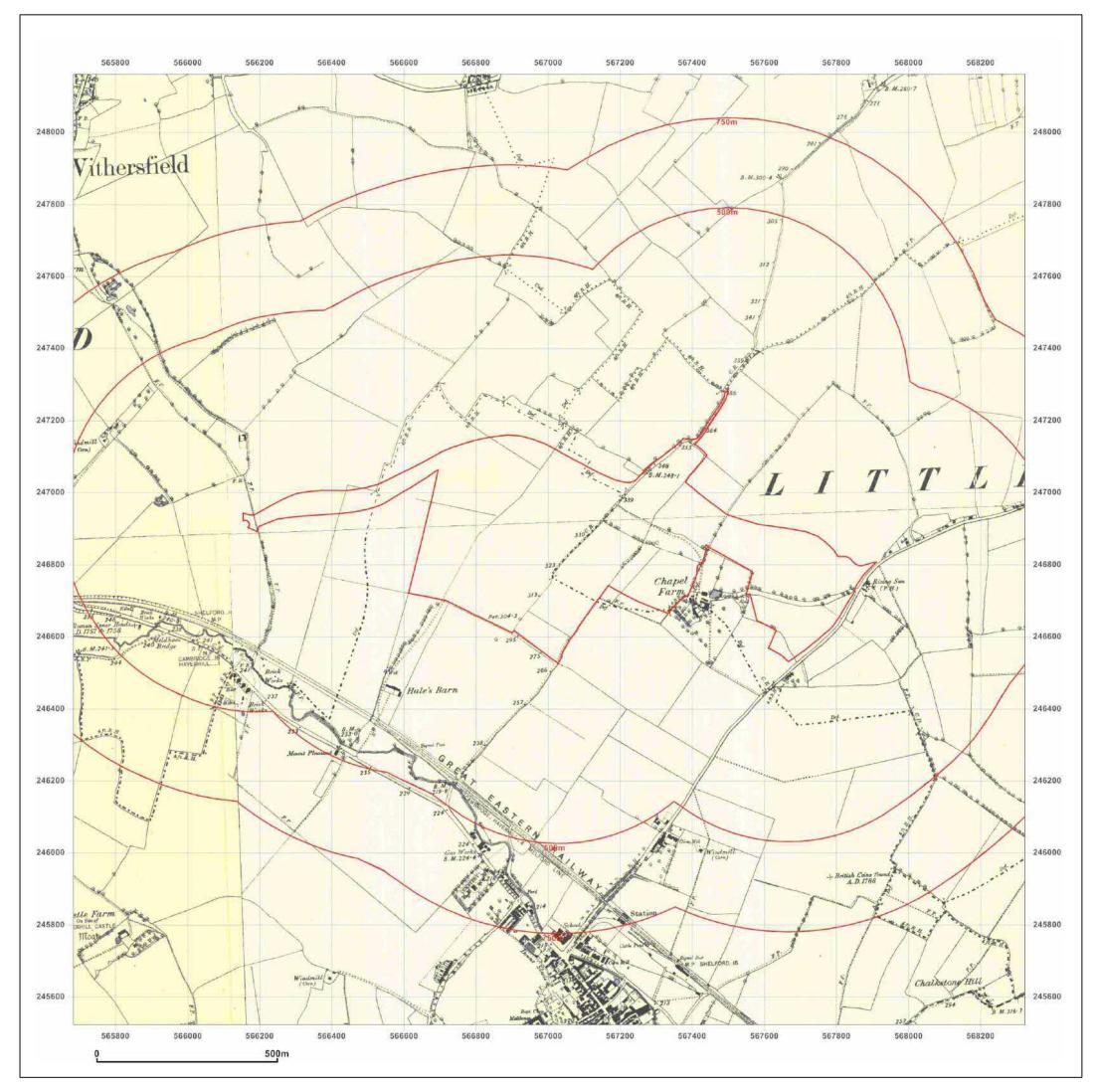


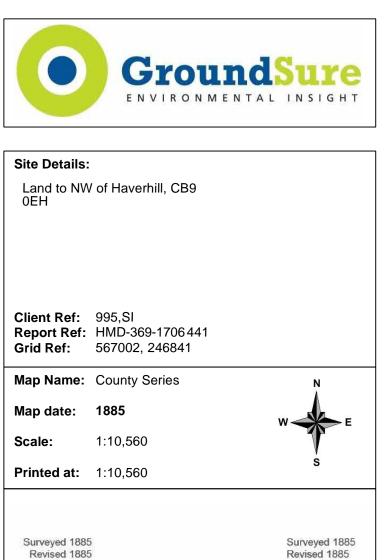


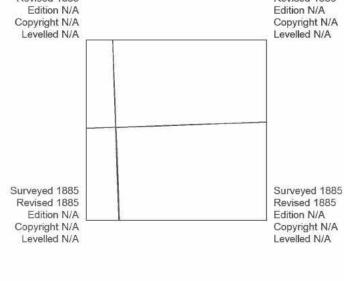
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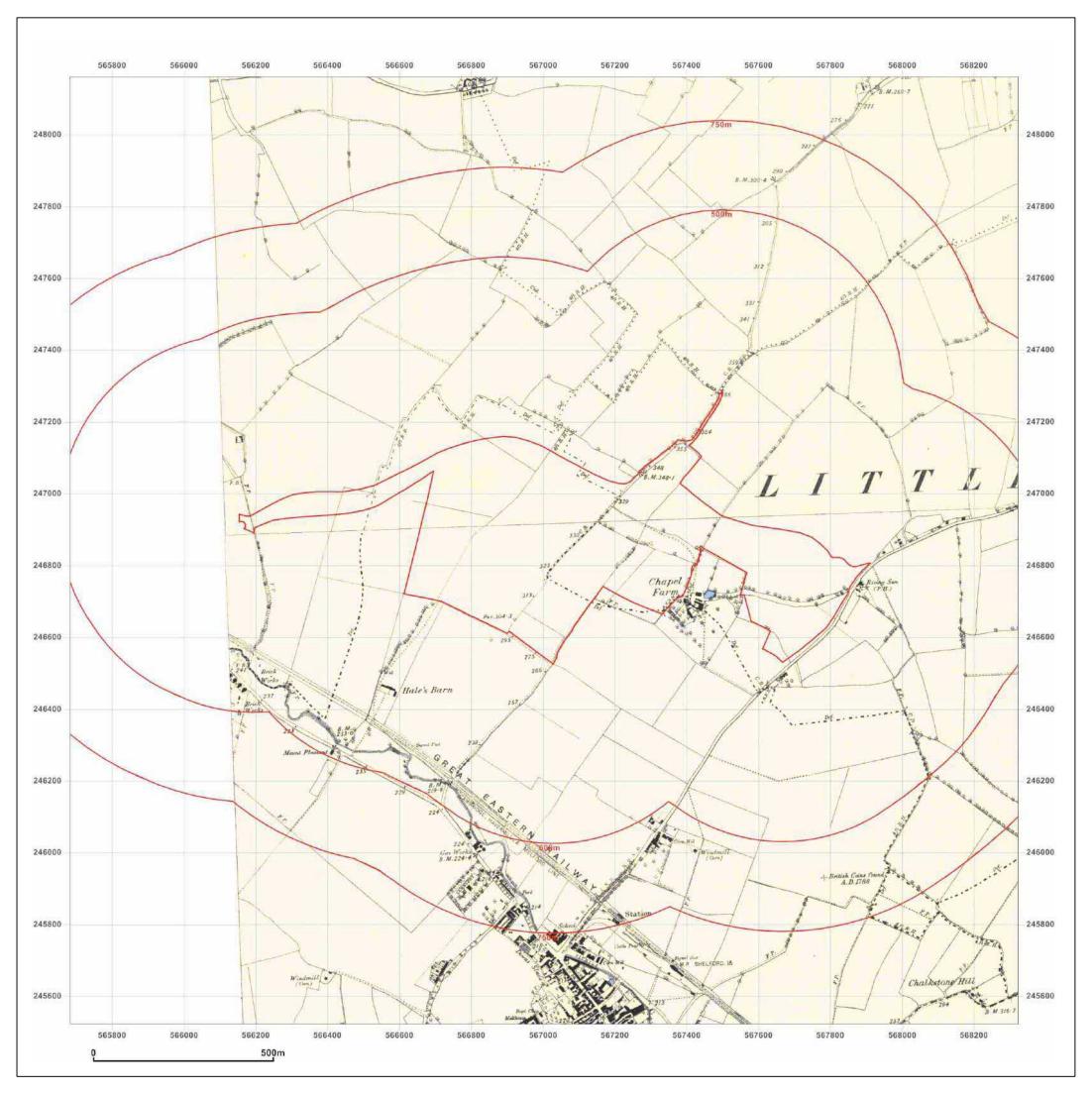




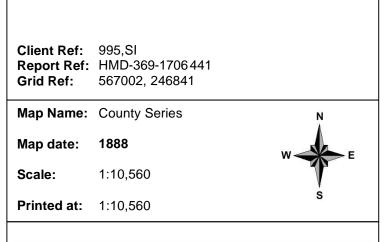
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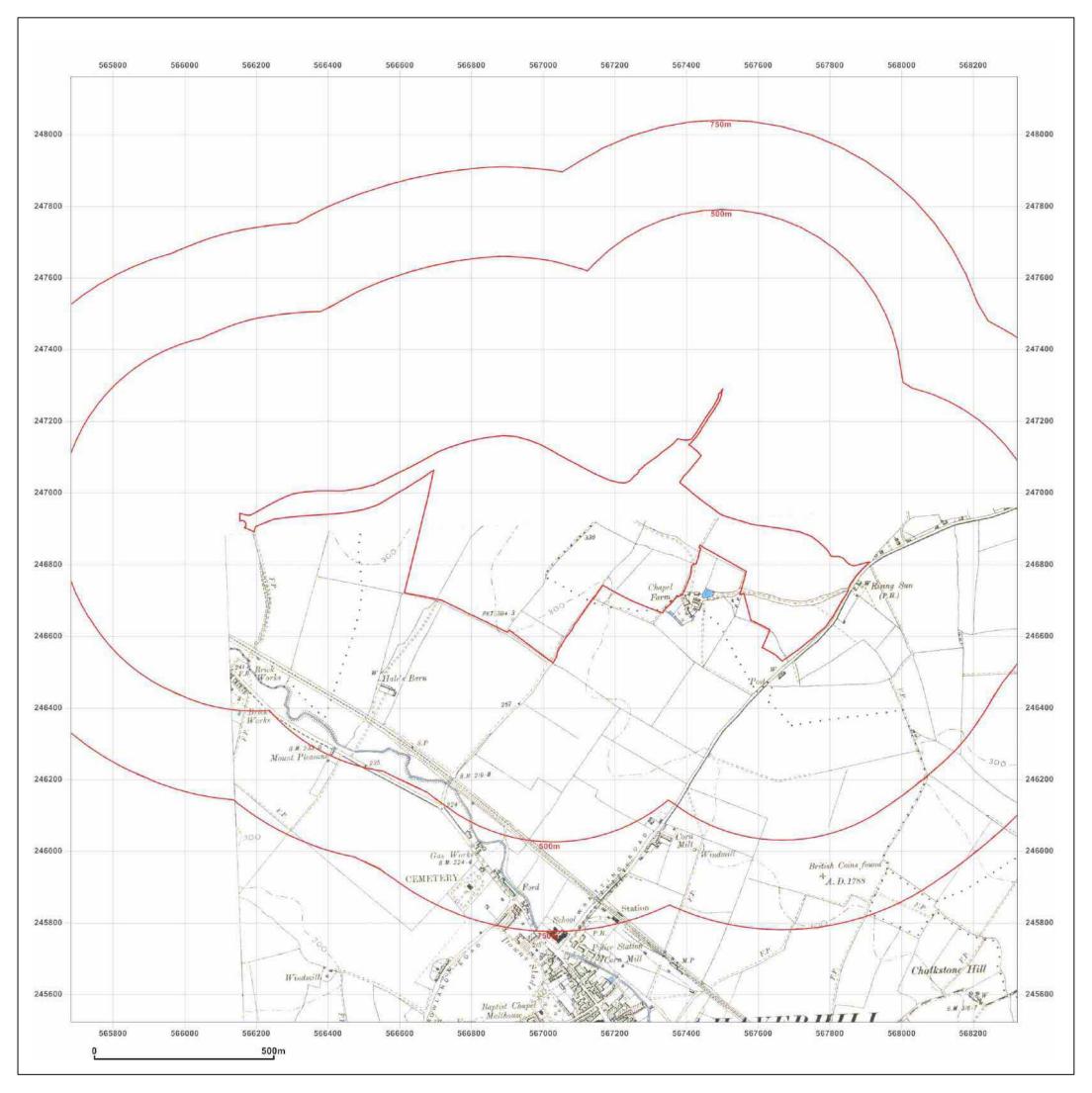
Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A



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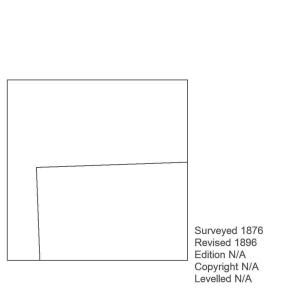




Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706 441 567002, 246841 Grid Ref: Map Name: County Series Map date: 1896 1:10,560 Scale:

Printed at: 1:10,560

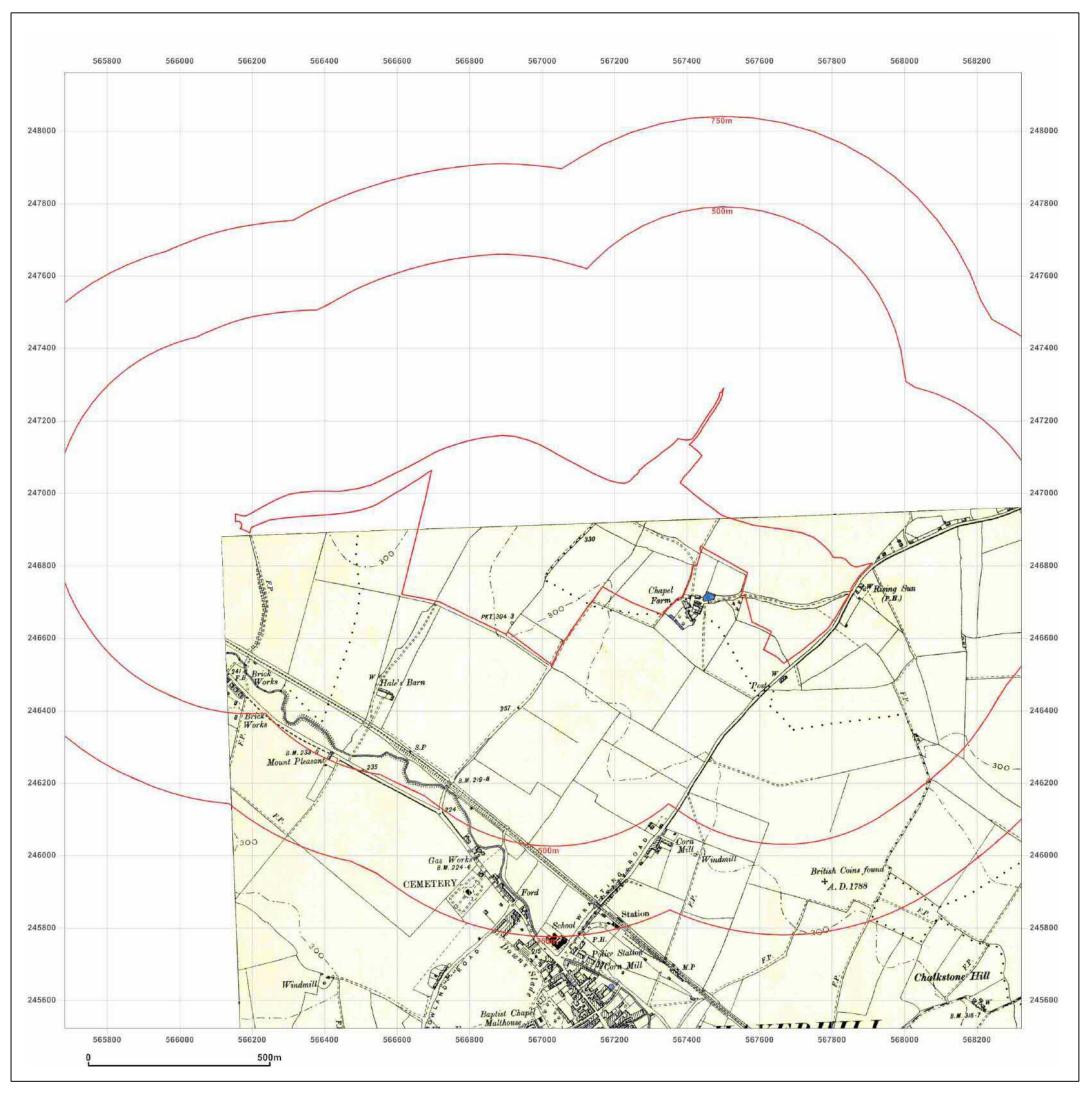




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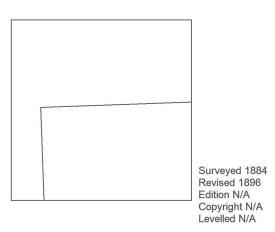
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Client Ref: 995,SI Report Ref: HMD-369-1706441 567002, 246841 Grid Ref: Map Name: County Series Map date: 1899

1:10,560 Scale:

Printed at: 1:10,560



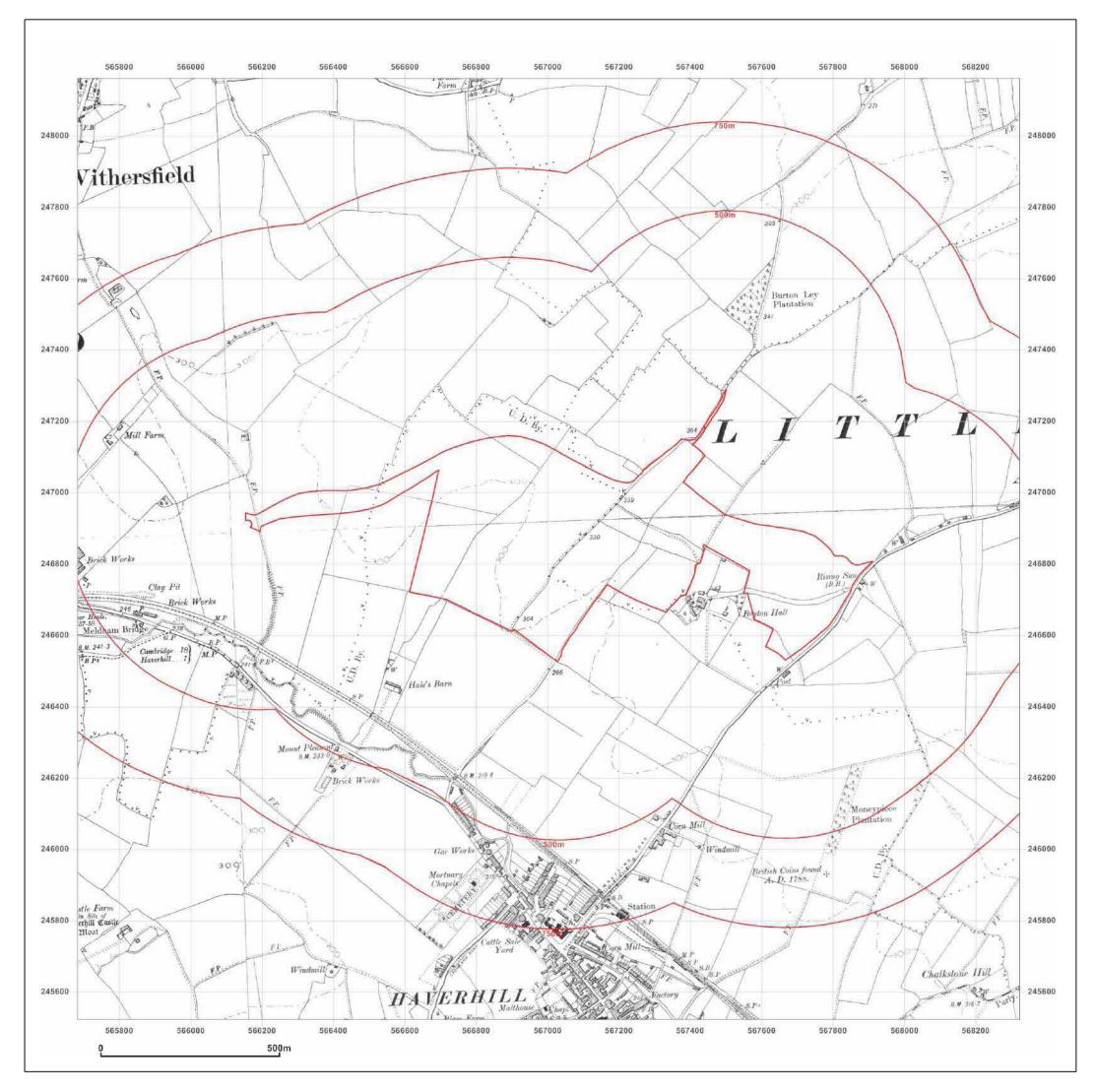


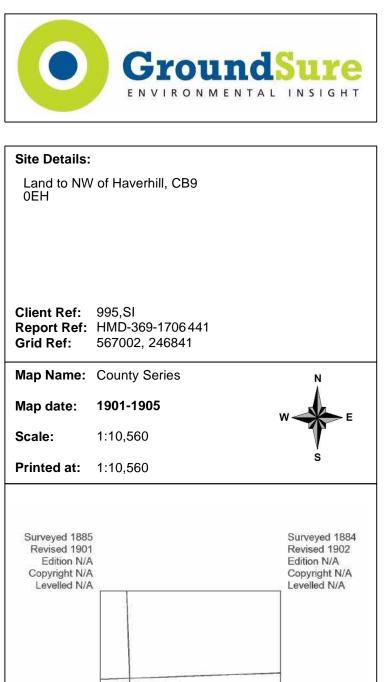


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Surveyed 1876

Revised 1905

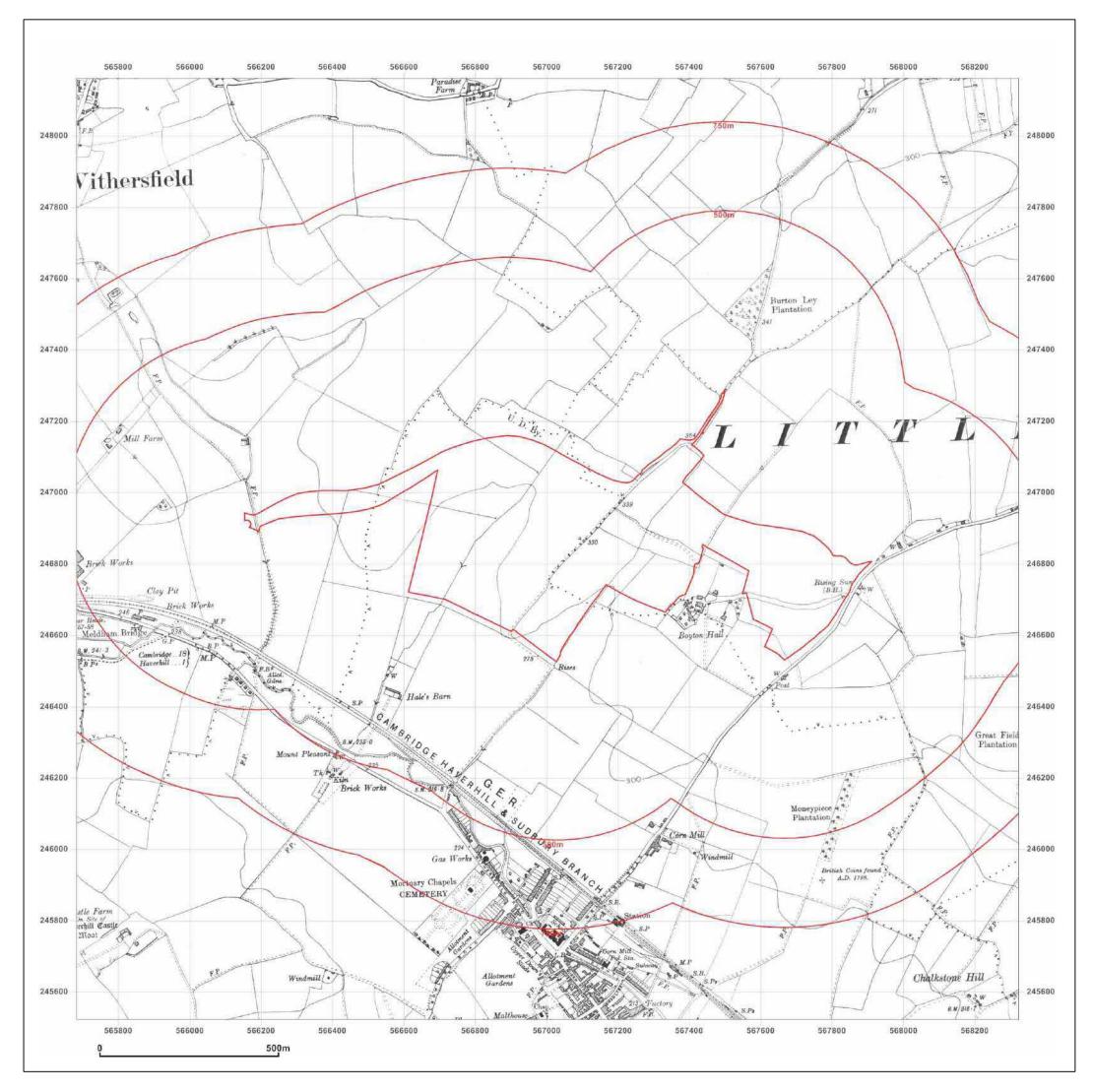
Copyright N/A

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09 October 2014 Production date:





Land to NW of Haverhill, CB9 0EH

Client Ref: Report Ref: Grid Ref:	995,SI HMD-369-1706441 567002, 246841
Map Name:	County Series
Map date:	1924
Scale:	1:10,560
Printed at:	1:10,560



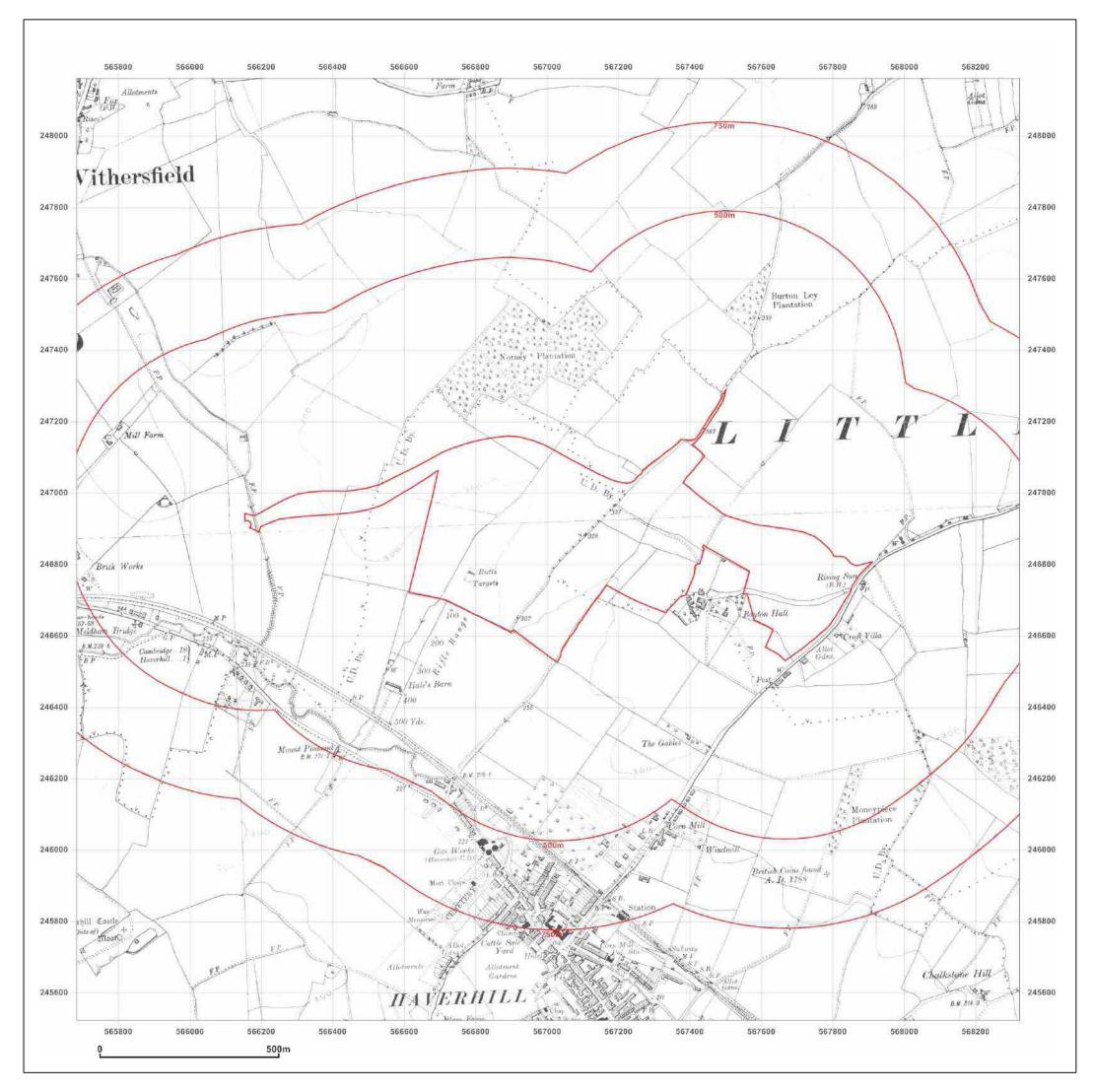
Surveyed 1876 Revised 1924 Edition N/A Copyright N/A Levelled N/A



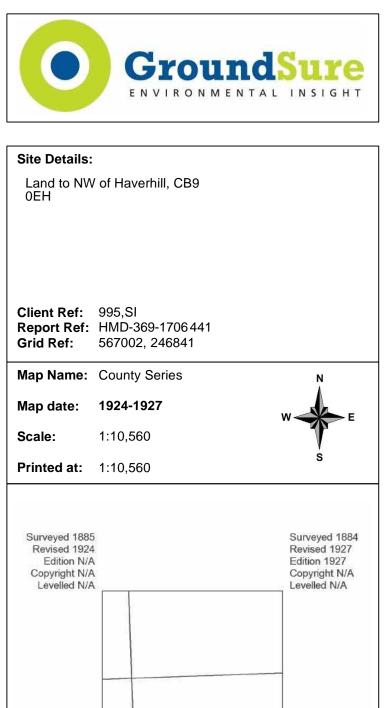
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Surveyed 1884

Revised 1924

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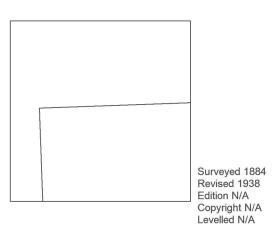
Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441 567002, 246841 Grid Ref: Map Name: County Series Map date: 1938

1:10,560 Scale:

Printed at: 1:10,560



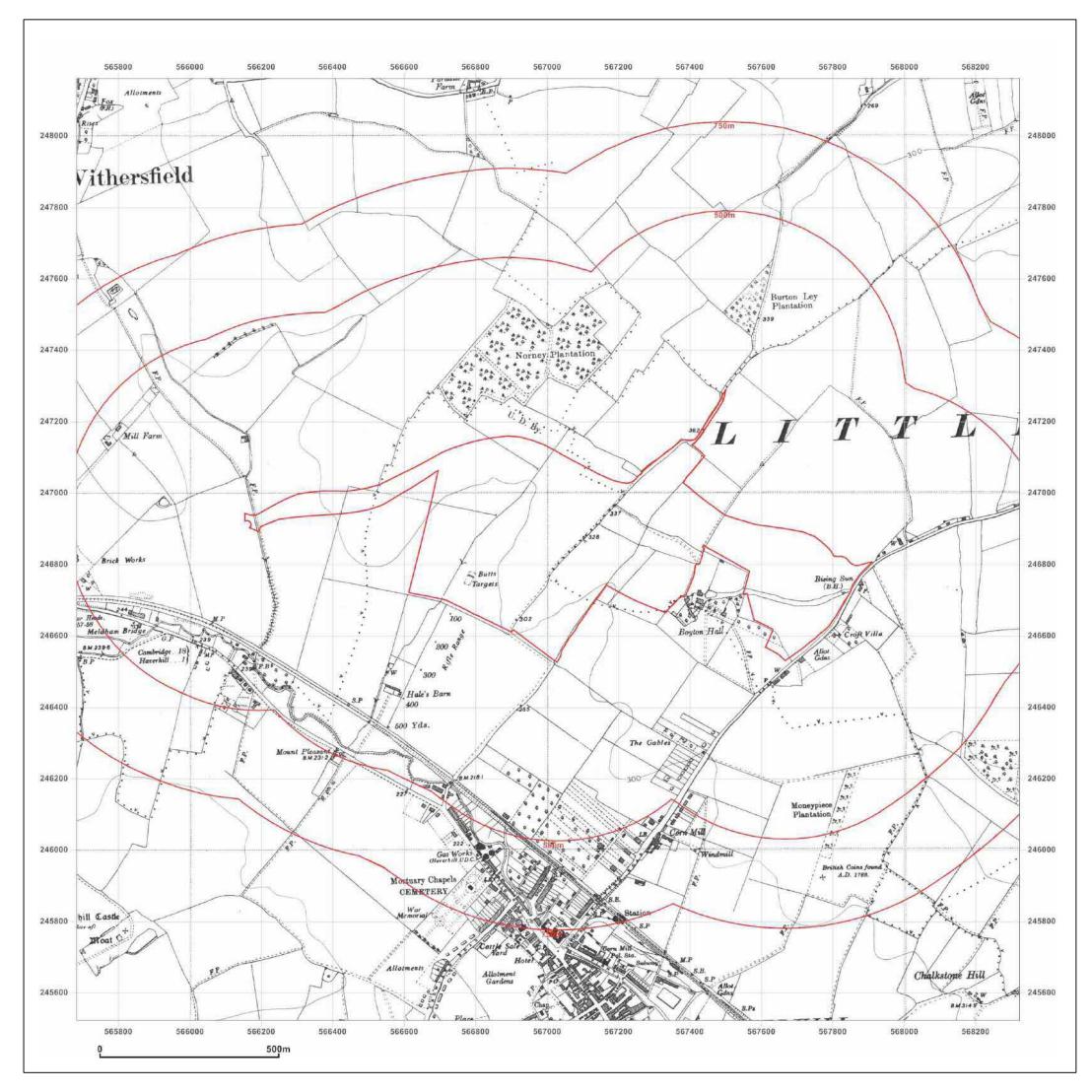




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Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441 Grid Ref: 567002, 246841 Map Name: County Series Map date: 1946 1:10,560 Scale:

Printed at: 1:10,560



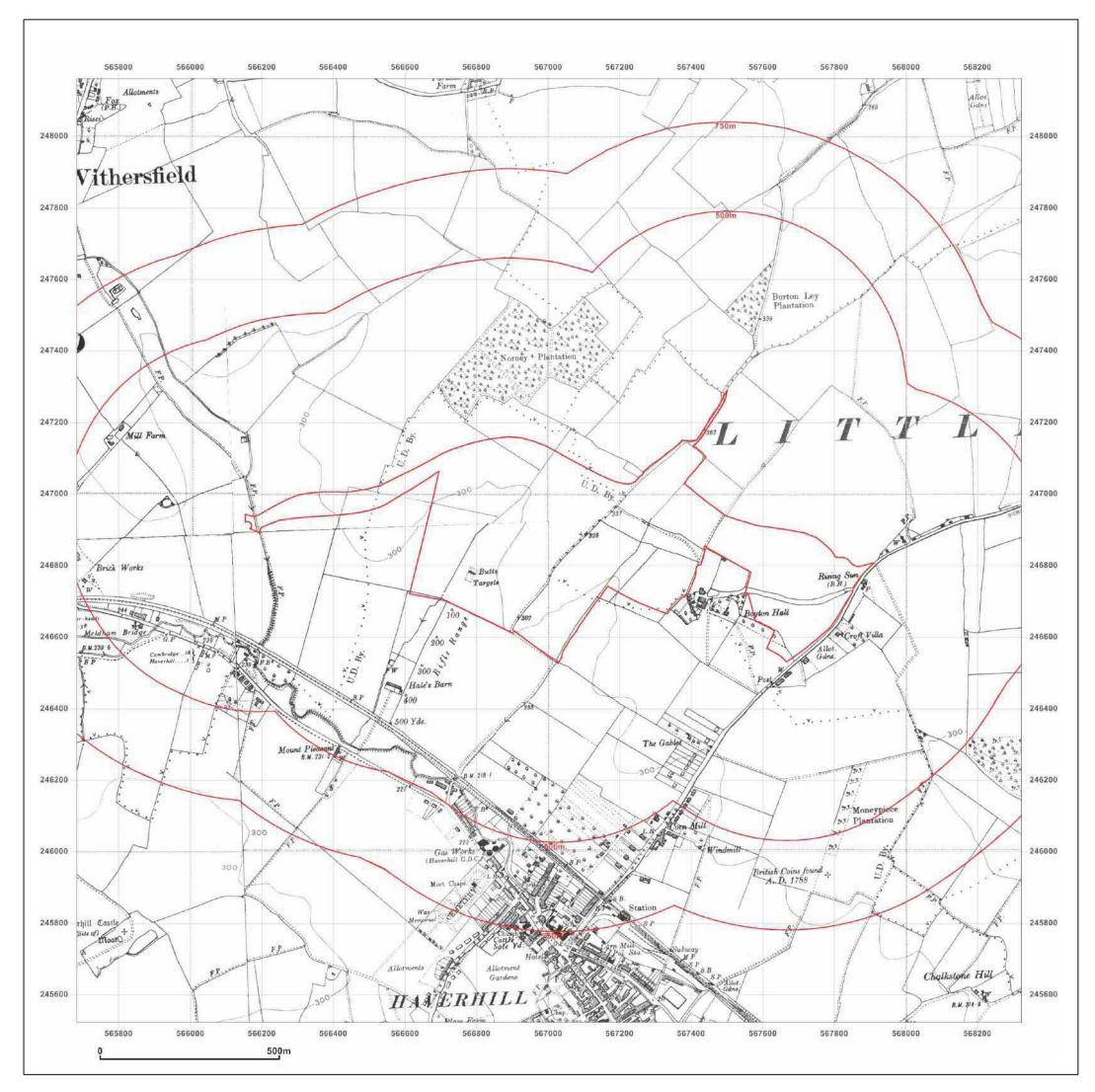
Surveyed 1876 Revised 1876 Edition N/A Copyright N/A Levelled N/A



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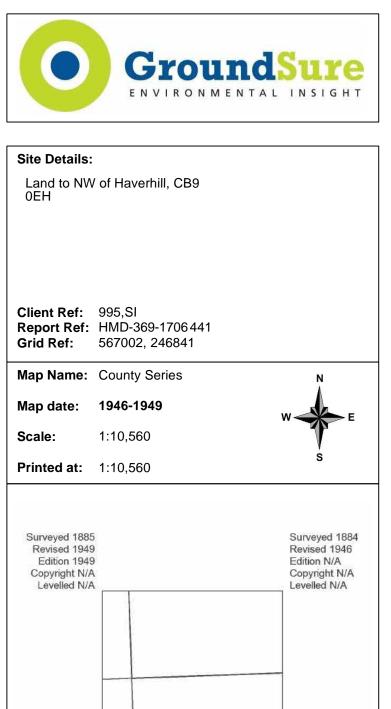
Surveyed 1885

Revised 1949

Copyright N/A

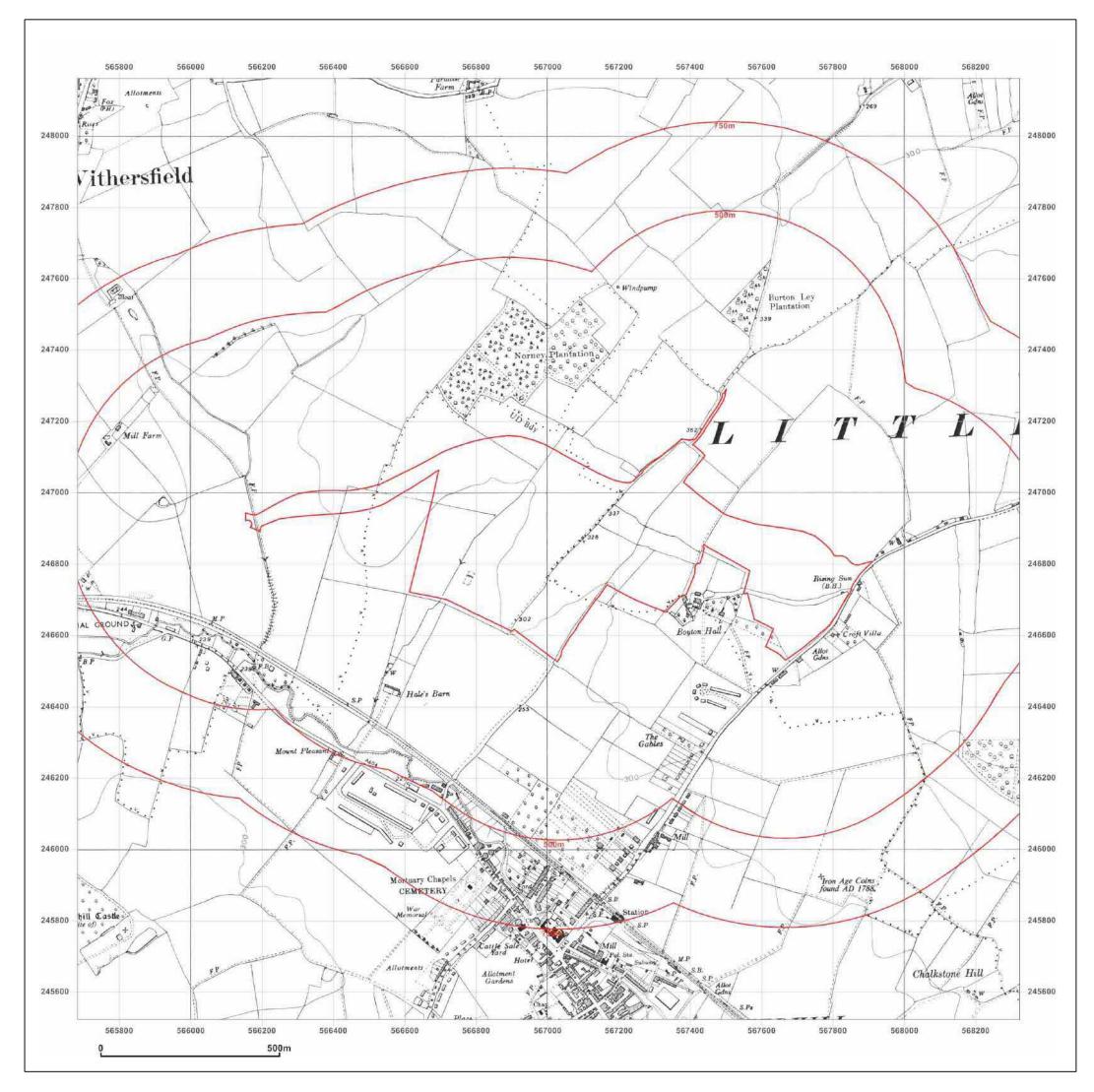
Levelled N/A

Edition N/A



Surveyed 1884 Revised 1949 Edition 1949 Copyright N/A Levelled N/A

09 October 2014 Production date:



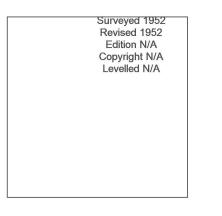


Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441 567002, 246841 Grid Ref: Map Name: Provisional Map date: 1959 1:10,560 Scale:

Printed at: 1:10,560



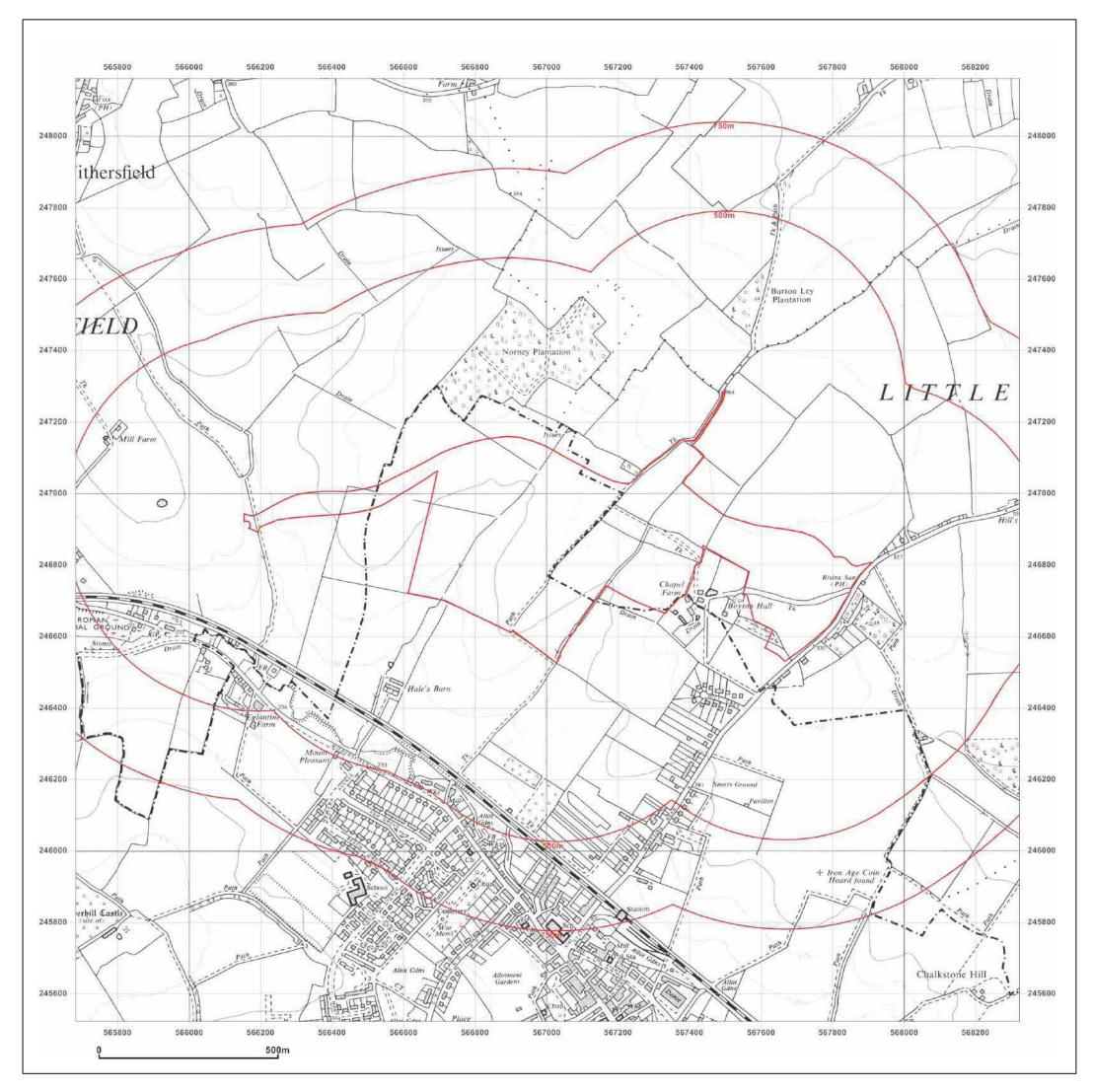




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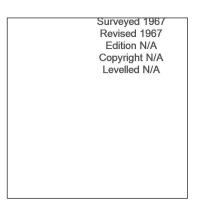


Land to NW of Haverhill, CB9 0EH

Client Ref: Report Ref: Grid Ref:	995,SI HMD-369-1706441 567002, 246841
Map Name:	Provisional
Map date:	1967
Scale:	1:10,560

Printed at: 1:10,560



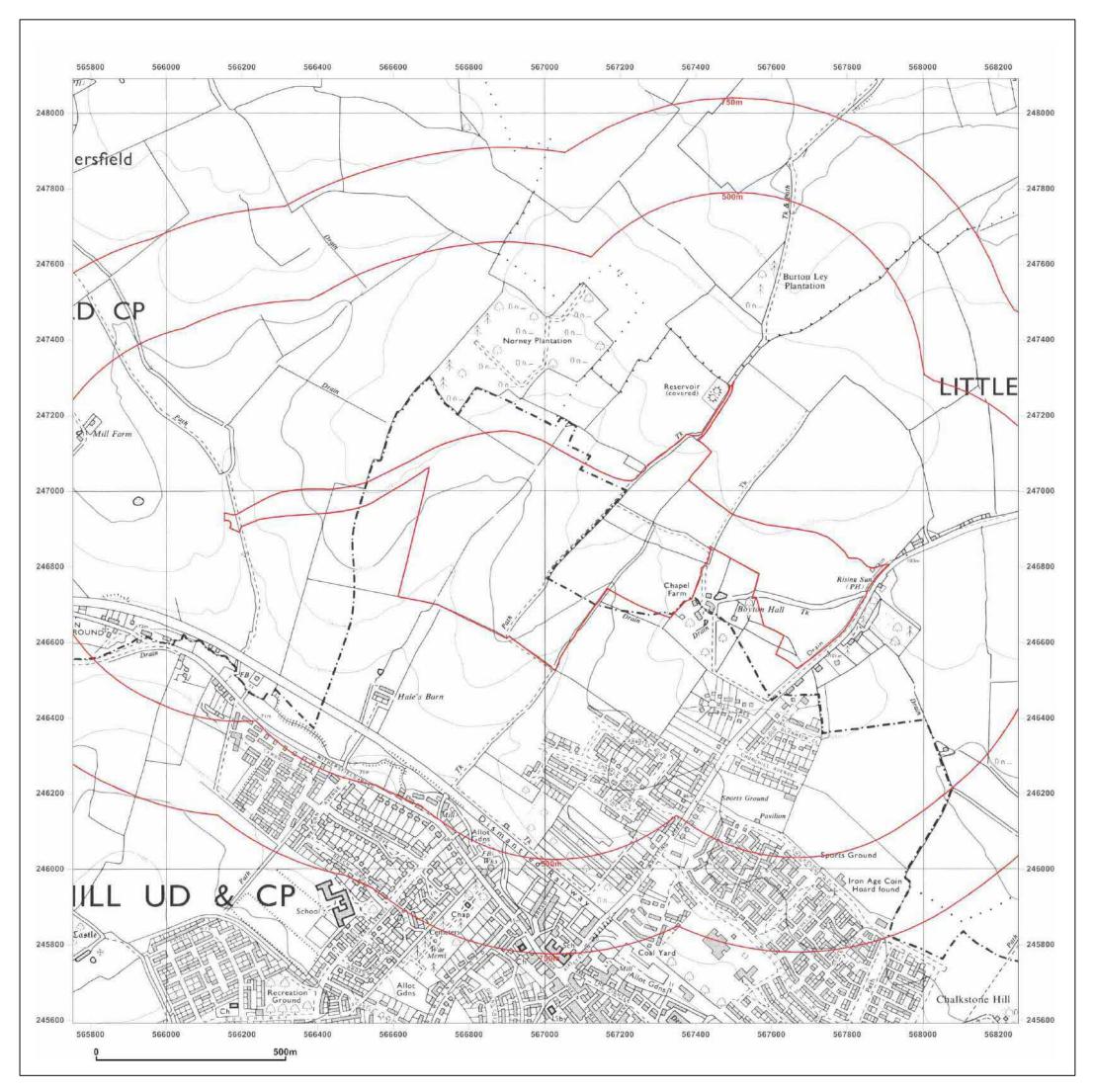




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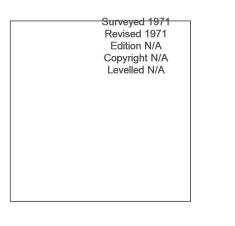
Client Ref: 995,SI Report Ref: HMD-369-1706 441 567002, 246841 Grid Ref: Map Name: National Grid

Map date: 1971

1:10,000 Scale:

Printed at: 1:10,000



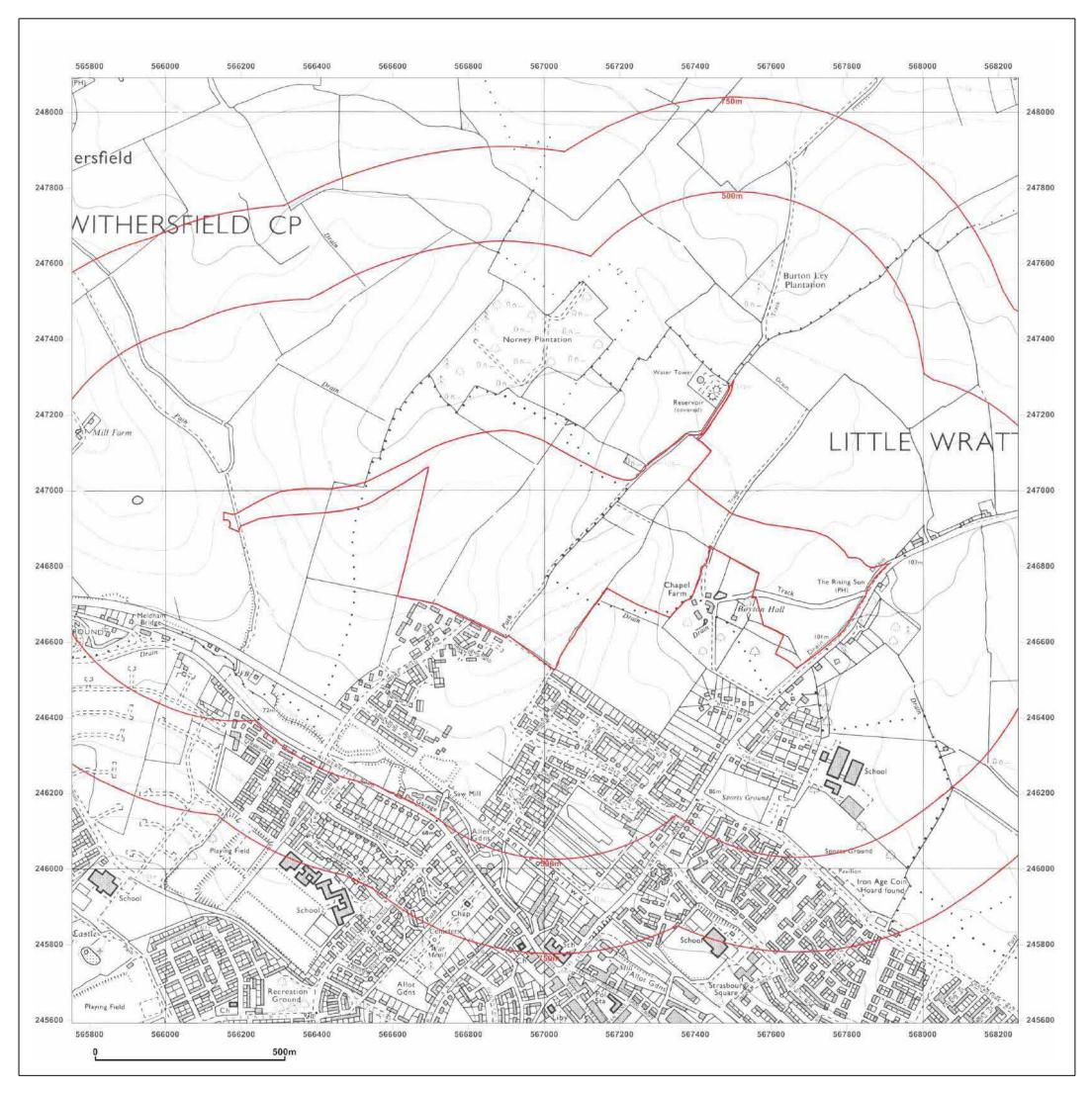




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Land to NW of Haverhill, CB9 0EH

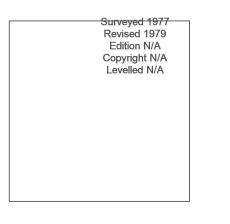
Client Ref: 995,SI **Report Ref:** HMD-369-1706441 Grid Ref: 567002, 246841 Map Name: National Grid

Map date: 1979

Scale: 1:10,000

Printed at: 1:10,000



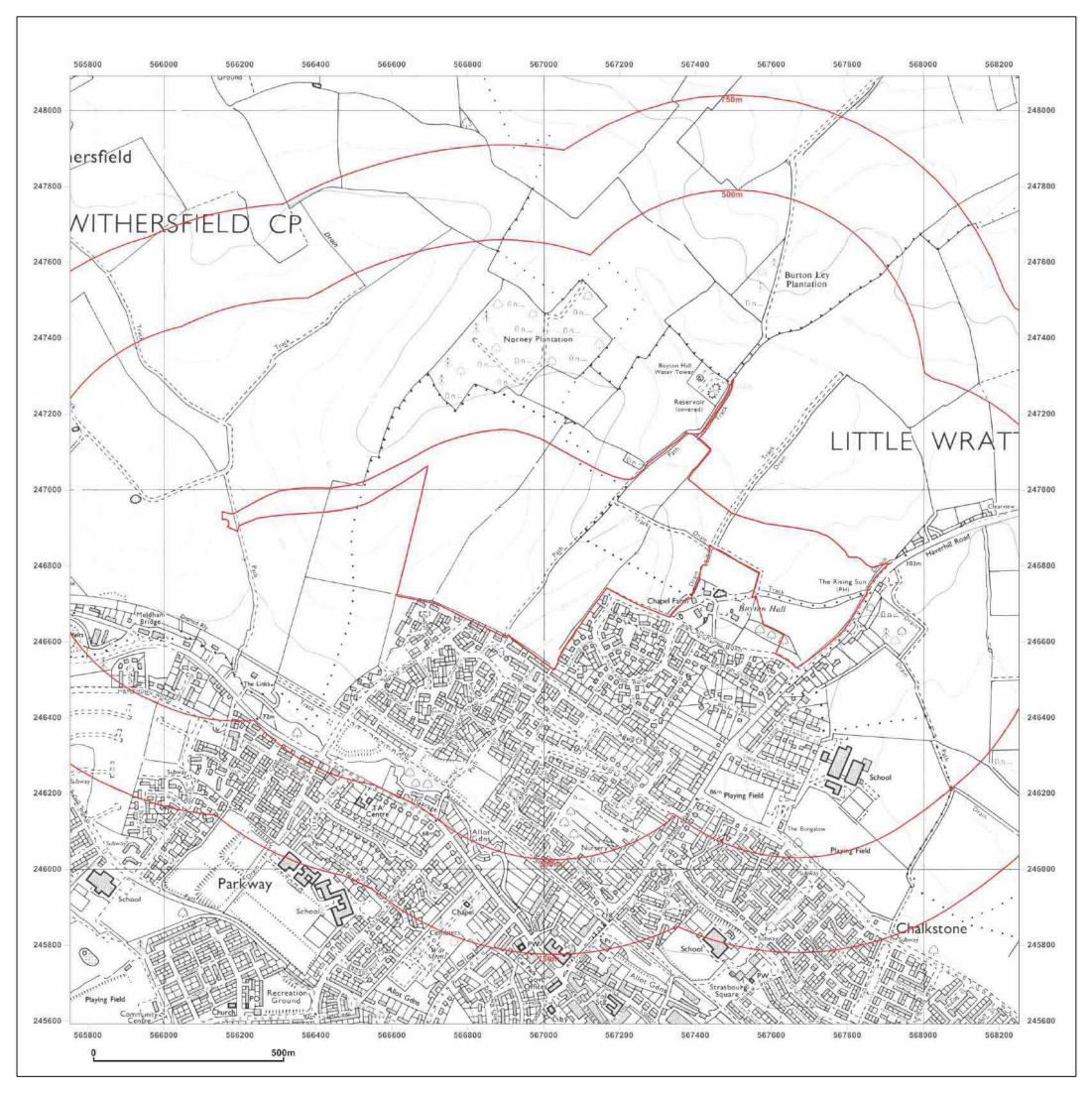




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Production date: 09 October 2014





Land to NW of Haverhill, CB9 0EH

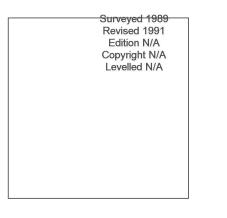
Client Ref: 995,SI **Report Ref:** HMD-369-1706441 Grid Ref: 567002, 246841 Map Name: National Grid

Map date: 1991

Scale: 1:10,000

Printed at: 1:10,000



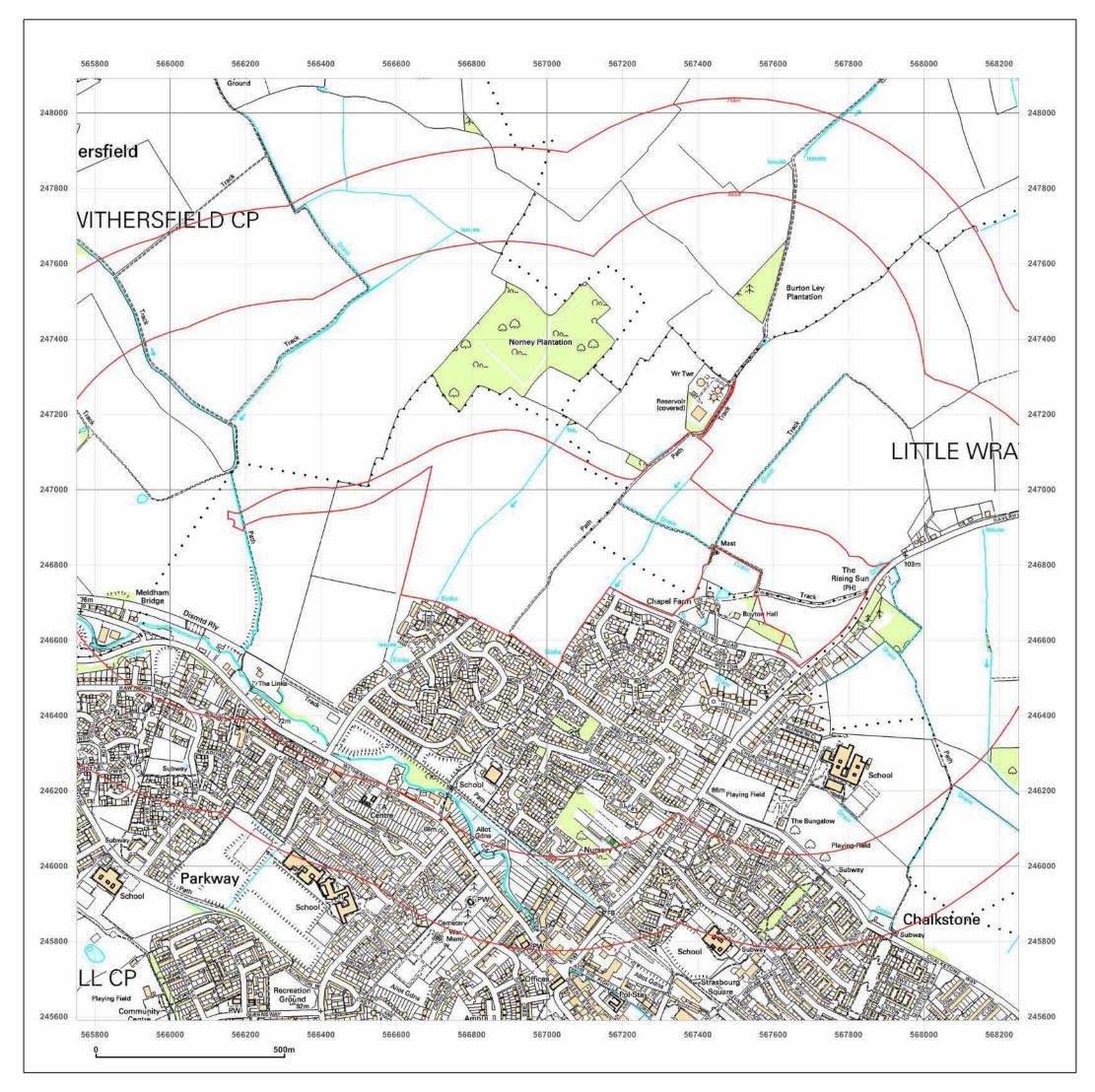




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Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441 Grid Ref: 567002, 246841

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



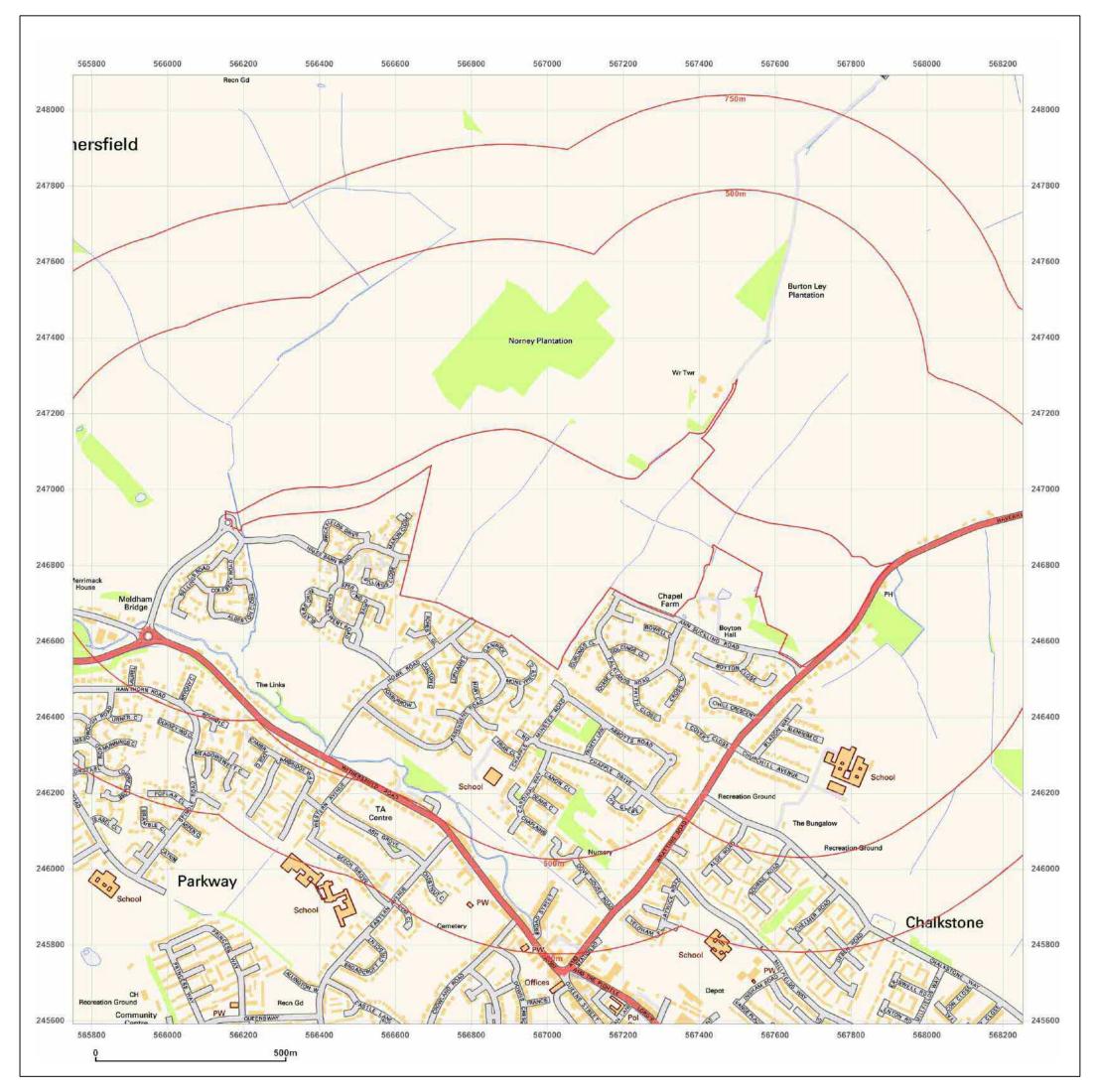
2002



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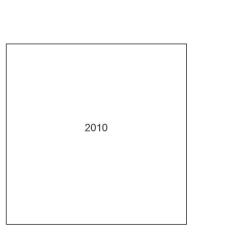


Land to NW of Haverhill, CB9 0EH

Client Ref: 995,SI Report Ref: HMD-369-1706441 Grid Ref: 567002, 246841 Map Name: National Grid Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000

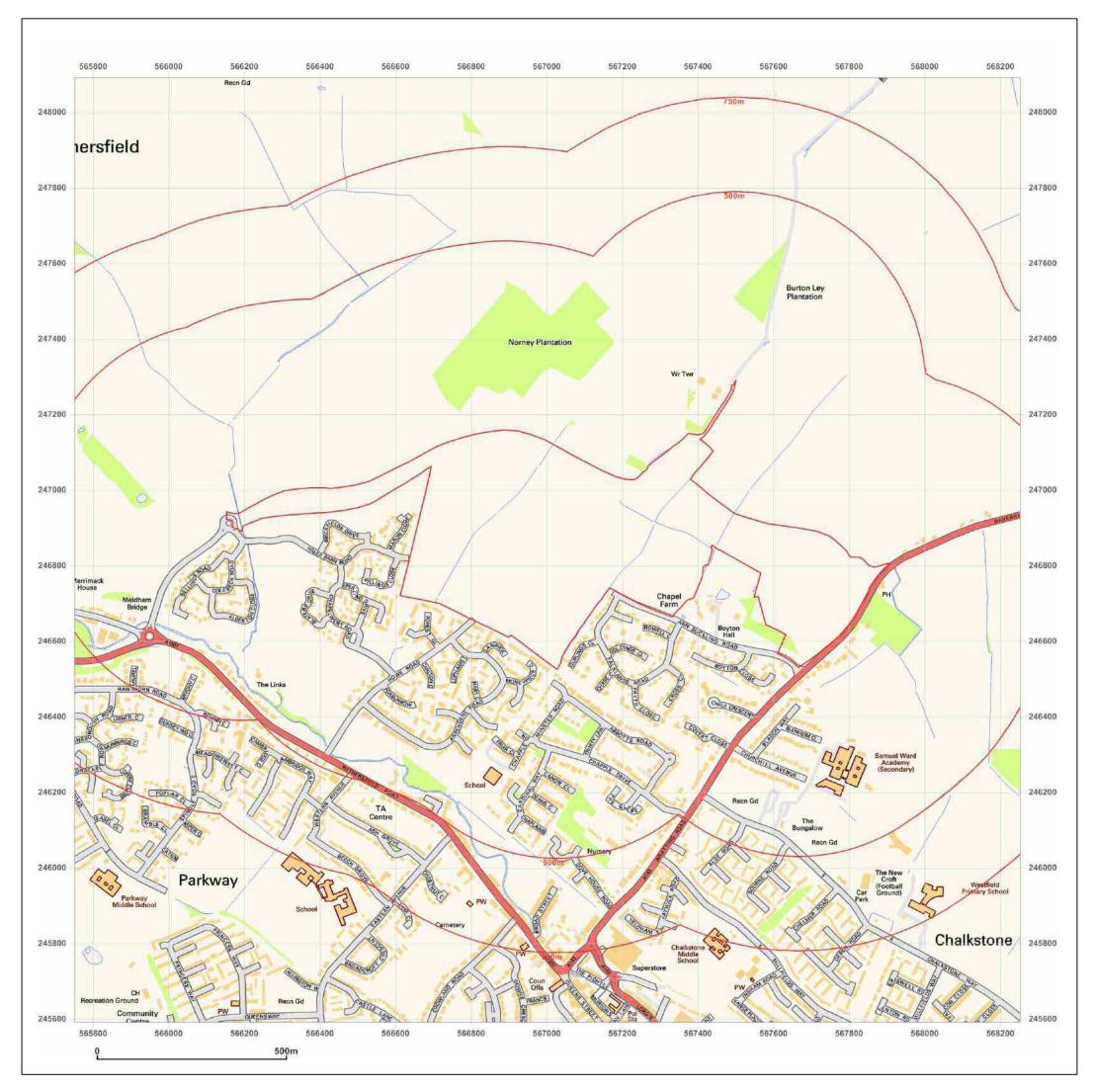




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Production date: 09 October 2014



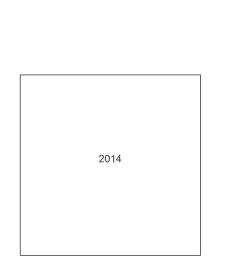


Land to NW of Haverhill, CB9 0EH

Client Ref: Report Ref: Grid Ref:	995,SI HMD-369-1706441 567002, 246841
Map Name:	National Grid
Map date:	2014

Scale: 1:10,000

Printed at: 1:10,000





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Production date: 09 October 2014

## APPENDIX 6 - EXPLORATORY HOLE LOG S

Borehole Logs (BH1 to BH8)

Windowless Sample Hole Logs (WS1 to WS19 and WSA to WSI)

> Trial Pit Logs (TP1 to TP\*)

CLIENT	: c/o Sa	avills		PROJECT: Land to	o the	North	Nest of	Haverhill		GROL	JND L	EVEL.							HOLE No. BH1
LOGGED E		B	CHECKED BY: DATE:	EXCAVATION METHOD	):	1.50mm	cased	from 0.0 to 10.0m		COOR	DINA	TES E	N						SHEET 1 OF 1
		L AGS BH BET			_					DATES	S 20/ <sup>-</sup>	10/20	)14 -	20/	10/2	2014			PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing	Depth* of Water	Description o	f Strata	Leg	Strata Reduced Level	Depth	Graphical Representation Sam SPT 'N' Value Depths	e	/In-Situ No. B	Testing Blows	SPT N	<425 %	Li WC %	abora PL %		esting Mg/m	³ Cu 3 kN/m	Additional Tests and Notes
0/10 09:00	0.00	Dry -	TOPSOIL (Dark brown clay with	rootlets).	·		0.00	0 - 0 - 0 -											Hand pit from GL to 1.2m
_	_		Firm to stiff orange brown grey gravelly CLAY. Gravel of round (LOWESTOFT FORMATION)	mottled slightly ed fine to coarse chalk.		C	0.30	0.80	В	1									_
			1.50 Becoming pale in colour w	ith depth		- -			D S		1 2 3 4 4 4	15	78	20	18	37			Moisture content, Atterberg Limit
-	-						-	2.00 2	D S		1 2 3 3 4 4	14							
-	-					-	-	3.00- 3.45	U D	U 3	(45)		89	21	17	35			- Moisture content, Atterberg Limit
20/10	1.00	7 4.00				c	-		D S	4	12 35 56	19							Seepage inflow of water at 4m
-	-		Stiff grey gravelly CLAY. Gravel coarse chalk. (LOWESTOFT FORMATION)	of rounded fine to		- - -	4.80	4.00 4	D S	5	24 67 810	31							_
-	-					7 	-	6.50	D D S		24 66 67	25							pH and Sulphate
									D	8									
-	-						-	8.00- 8.45 8.45 8.45	U D	2 9	(70)		90	18	17	33	2.14	272.4	<sup>4</sup> Moisture content, Atterberg Limit, Triaxial t
+	-					0	-	9.00 9	D D	10 11	35	33							-
0/10 16:30 0/10 16:45	1.50 0.00	Damp					- 10.00	9.50	S		35 78 99	55							Borehole completed at 10.0m
'WATER		iding water lev er strikes	rel PIEZOMETER Respon Lower s	se zone AND B eal TEST U KEY P	Bulk o Undis Pistor	disturbed disturbed s sturbed sar n sample rbed jar sa	ample nple	K Permeability test SPT N N = S N*12	Jndis PT N 0 = To	turbed s	ample l lows aft	blow co ter seat	bunt ting)		D	D	Bright Birght	well Ba well, S	Environmental Ltd arns, Ipswich Road Suffolk, IP10 0BJ 01603 298 076
			DEPTH All depths, level and	ES	S Enviro	onmental s		<425 Samp	ole % j	passing 4	425 mic	ron sie	ve	2	1		l eleph Fax: (	none: )1603	01603 298 076 . 298 075 .

OGGED BY: AC IELDWORK BY: AGB <u>'EMPLATE REF: GEL AGS</u> te/Time Depth Dep and of casing Wa <u>'10 08:30 0.00 Dry</u>	pth* ziec	CHECKED BY: DATE:	EXCAVATION METHOD	): 2		ราธนออาบ												
TEMPLATE REF: GEL AGS te/Time Depth Dep and of of	pth* ziec				4.50mm	cased	Haverhill on (shell and auger) from 0.0 to 10.0m		C00	RDINA	ATES E	Ν						SHEET 1 OF 1
and of o	ofi∺						1			ES 21/		14 - 2						PROJECT NO. 995,SI
/10 08:30 0.00 Dry		Description o	f Strata	Leg	Strata Reduced Level	Depth	Graphical Representation SPT 'N' Value 0 10 20 30 40	Samplin Depths		u Testino Blows	SPT N	<425 %			ry Testi LL % Mg	ng J/m <sup>3</sup> kl	Cu N/m²	Additional Tests and Notes
+		TOPSOIL Firm to stiff brown slightly sand (HEAD DEPOSITS)			•	- 0.00 0.30 -		0 - 0.40- B 0.80 1 -	1									- Hand pit from GL to 1.2m
+		Firm brown slightly gravelly CLA fine to coarse chalk. (LOWESTOFT FORMATION)	Y. Gravel of rounded		- - -	_ 1.80		2.00- 2.45	1	1 1 2 2 2 3 (45)	9	01	10	1				-
-					d - -	_	• •	3.00 <sup>3</sup> D S	2 3	2 2 3 3 3 3	12	91	19	16	30			Moisture content, Atterberg Limit, pH and sulphate -
21/10 1.50 4.00 15 mins 1.60	60	Firm to stiff grey gravelly CLAY. to coarse rounded chalk. (LOWESTOFT FORMATION)	Gravel of rounded fine			4.40	•	4.00 <sup>4</sup> D S	4	11 12 23	8							Inflow of water at 4m Water sealed out at 4.5m.
					- - - -	_		5.45 D	2 5 6	(35)			20		2	.07 8	80.5	pH and sulphate, Triaxial test
-					- - - -	_		7 - 7 -	7	1 2 3 4 5 8	20							-
					- - - -	_		8.00 <sup>8</sup> D S	9	23 66 77	26							_
/10 13:00 4.50 Dry 10 13:15 0.00	ry			 	- - -	- 10.00	,	9.00 9 D 9.50 D S 10	10 11	34 66 89	29							PH and sulphate Borehole completed at 10.0m
WATER ▼ Standing v ▼ Water stri	water leve rikes	PIEZOMETER Uppers Respons Lowers	se zone AND B eal TEST U KEY P J	Bulk d Undis Piston Distur	disturbed s listurbed sat turbed san sample bed jar sar onmental s	ample nple nple	S Standard penetration test BI C Cone penetration test K Permeability test Sf	lows SPT blow (35) Und PT N N = SPT N N*120 = including 425 Sample 9	isturbed V value ( Total blo J seating	l sample (blows af ows/pen	blow co ter seati etràtion	unt ng)	IOI		Brig	ghtwel ghtwel	II Bar II, Su	nvironmental Ltd rns, Ipswich Road uffolk, IP10 0BJ 01603 298 076

CLIENT:	c/o Sa	avills			PROJECT: Land to	o the	North \	Nest of	Haverhill		GRO	DUND	LEVEL							HOLE No. BH3
LOGGED B		B		CHECKED BY: DATE:	EXCAVATION METHOD	):	1.50mm	cased	Haverhill n (shell and auger) from 0.0 to 10.0m		COC	DRDIN	ATES E	Ν						SHEET 1 OF 1
TEMPLATE			BH BET						1			ES 21/		14 -						PROJECT NO. 995,SI
and	Depth of Casing	Depth of Wate	ie	Description o	f Strata	Leg	Strata Reduced Level	Depth	Graphical Representation SPT 'N' Value	Samplin Depths	ig/In-Si No.	tu Testin Blows	g SPT N	<425 %		PL %	Ory Te	esting Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>	Additional Tests and Notes
1/10 14:00	0.00	Dry		TOPSOIL				0.00		0 -										Hand pit from GL to 1.2m
				Stiff dark brown slightly silty gra rounded fine to coarse chalk (LOWESTOFT FORMATION)	avelly CLAY. Gravel of		-	0.30		0.40- B 0.80	1									
Ī									•••••	1.20 D	1	2 2 4 4 4 6	18							-
-						×_ ×_ ×_ ×_		_		2.00 <sup>2</sup> D S	2	12	15							-
						*_* 	-			3-00-3-0		3 4 4 4								_
Ī								0.55		3.00 <sup>3</sup> D S	3	12 33 55	16							
_				Stiff to very stiff dark grey grave rounded fine to coarse chalk. (LOWESTOFT FORMATION)	elly CLAY. Gravel of			3.70		4.00- U 4.45	1	(60)		90	18	19	48			Moisture content, Atterberg Limit
_						_~ 	2		\	4.45 D	4									_
						 			•	. ]	5	3 5 7 9 10 10	36							
-						 	ł	-		6 I D	6									_
						 		_		6.50- U 6.95 - D	2 7	(80)								-
						 (				7.00 D	8									
-								_		8.00 8 D S	9	57 88 910	35							pH and sulphate
_						 		-		9.00 <sup>9</sup> D	10									_
10 17:00 10 17:15	1.50 0.00	Dry				 		- 10.00		9.50 D S 10	11	48 910 1213	44							Borehole completed at 10.0m
WATER	¥ Stan ¥ Wat	ding wa er strike	ter lev	el PIEZOMETER Upper s Respons Lower s	se zone AND B eal TEST U KEY P	Bulk d Undis Piston	listurbed s turbed sar sample	ample nple	S Standard penetration test B C Cone penetration test	(35) Und PT N N = SPT N N*120 =	isturbe V value Total b	d sample (blows a lows/per	blow co	unt ing)	000		RE	Brightw	vell Ba	L invironmental Ltd Irrns, Ipswich Road uffolk, IP10 0BJ D1603 298 076
				DEPTH All depths, level and t	ES	S Enviro	bed jar sa onmental s Sample		<	including 425 Sample %			icron sie	ve	2	R	T	elepho	one: (	uffolk, IP10 0BJ 01603 298 076 298 075

CLIENT	: c/o S	avills			PROJECT: Land to	o the	North V	Nest of	Haverhill	(	ROUND	LEVEI							HOLE No. BH4
LOGGED E FIELDWOF		`D		CHECKED BY: DATE:	EXCAVATION METHOD	):	1.50mm	cased	from 0.0 to 10.0m	С	OORDIN	ATES	ΕN						SHEET 1 OF 1
TEMPLATE			BH BET.							D	ATES 23	/10/2	014 -	23/	10/2	2014			PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing	Depth of Wate	÷	Description	of Strata	Leg	Strata Reduced Level	Depth	SPT 'N' Value Depths		o. Blows	g SPT N	<425 %	1			esting Ma/m	<sup>3</sup> Cu kN/m <sup>2</sup>	Additional Tests and Notes
-	- 0.00 	ury -		TOPSOIL Stiff orange brown grey mott of rounded fine to coarse cha (LOWESTOFT FORMATION)	ghtly gravelly CLAY.			- 0.00 0.20 	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		1       6 10         10 12       8 8         2       3 5         6 7       7 7         1       (80)         3	38 27 47 40 42 60*		18					Triaxial test
3/10 13:00 3/10 13:15	1.50 0.00	Dry	_			 		- 10.00	9.50- 9.95 9.95 10 [		2 (90)			16			2.14	349.4	pH and sulphate, Triaxial test -
WATER	¥ Star ¥ Wat			vel PIEZOMETER	nse zone AND B seal TEST U KEY P	Bulk o Undis Pistor	disturbed s disturbed s sturbed san n sample rbed jar sar	ample nple	K Permeability test SPT N N = SP	ndistu T N va = Tot	rbed sample lue (blows a al blows/pei	blow c fter sea	ount ting)		D	D	Bright Birght	well Ba well, Si	Environmental Ltd arns, Ipswich Road uffolk, IP10 0BJ 01603 298 076
				DEPTH All depths, level an	ES	S Envir	onmental s					icron sie	eve	3	1	Ð	Fax: (	01603	298 075

CLIENT	: c/o S	avills			PROJECT: Land to	o the	North V	Nest of	Haverhill	GR	OUND	LEVEL	-						HOLE No. BH5
LOGGED E FIELDWOF		R		CHECKED BY: DATE:	EXCAVATION METHOD	:	1.50mm	cased	Haverhill on (shell and auger) from 0.0 to 10.0m	co	ORDIN	ATES E	ΞN						SHEET 1 OF 1
TEMPLAT			3H BET								TES 22/		)14 -						PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing	Depth of Wate	ie.	Description o	f Strata	Leg	Strata Reduced Level		Graphical Representation Samplin SPT 'N' Value 0 10 20 30 40		Blows	SPT N	<425 %				esting Mg/m	Cu kN/m <sup>2</sup>	Additional Tests and Notes
-	- 0.00	Ury		TOPSOIL Stiff orange brown grey mottle Gravel of rounded fine to medi (LOWESTOFT FORMATION)	tly gravelly CLAY.			- 0.00 0.10 - - - - - - - - - - - - - -	0.40- 0.40- 0.80 1 1.20- 1.65 2 2.20 3.00 3.00 4.00 4.00 4.00 5.00 5 0 5.00 5 5 0 5 0 5 0 5 5 0 5 5 0 5 5 0 5 5 0 5 5 0 5 5 0 5 5 0 5 5 0 5 5 0 5 5 0 5 5 0 5 7 0 7 0 7 9 9 0 9 9 0 9 7 7 7 7 10 7 7 7 10 7 7 7 10 7 7 7 7 7 7 7 7 7 7 7 7 7	1 1 2 3 4 5 6 2 7 8 9 9	(55) 2 2 4 5 5 6 2 4 5 8 11 8 3 5 6 8 9 12 3 5 6 8 9 12 3 5 6 8 9 9 (80) (80) 2 4 7 8 10 10	20 32 35 31	93	18	17		2.11	148.3	<ul> <li>Hand pit from GL to 1.2m</li> <li>Triaxial test</li> <li>Moisture content, Atterberg Limit, Triaxial t</li> <li>Moisture content, Atterberg Limit, Triaxial t</li> </ul>
2/10 16:00 2/10 16:15	1.50 0.00	Dry	_			_ <u>~</u>		- 10.00	9.50 D S		5 19 38 12	74*							Borehole completed at 10.0m
WATER	¥ Star ¥ Wat	iding wa	ater lev es	rel PIEZOMETER Upper s Respon Lower s	se zone AND B eal TEST U KEY P J	Bulk d Undis Piston Distur	listurbed san turbed san sample bed jar sar	ample nple mple	K Permeability test SPT N N = SPT N*120 = including	listurbe N value Total b	d sample (blows at lows/per	blow co ter seat	ount ting)	100	D		Bright\ Birght\	vell Ba vell, Si	Linvironmental Ltd arns, Ipswich Road uffolk, IP10 0BJ 01603 298 076 298 075
				DEPTH All depths, level and	ES	5 Enviro	onmental s	oil sample	<425 Sample			cron sie	eve	5	5	D	Fax: C	1603	298 075

CLIENT: c/o	'o Sa	vills			PROJECT: Land to	o the	North V	<u>Nest of</u>	Haverhill	GR	OUNDI	LEVEL							HOLE No. BH6
LOGGED BY: AC FIELDWORK BY:		2		CHECKED BY: DATE:	EXCAVATION METHOD:		1.50mm	cased	from 0.0 to 8.3m	CO(	ORDINA	ATES E	Ν						SHEET 1 OF 1
TEMPLATE REF:			BETA							DA	TES 24/	10/20	14 -	24/1	0/2	014			PROJECT NO. 995,SI
ate/Time Dept and of Depth Casin	f	Depth* of Water	Piez.	Description o	Strata	Leg	Strata Reduced Level		SPT 'N' Value Depths	ng/In-Si No.	itu Testino Blows		<425 %		PL %	Dry Te		Cu kN/m²	Additional Tests and Notes
4/10 08:30 0.00		Dry		TOPSOIL Firm to stiff orange brown grey Gravel of rounded fine to medi (LOWESTOFT FORMATION)				- 4.00 	0 10 20 30 40 0 0.40- 0.80 1 1 1.20 D 2.00- 2.45 D 2.45 D 3.00 3 D 5.45 D 7 U 5.45 D 7 U 7 U 7 U 7 U 7 U 7 U 7 U 7 U	1 1 1 2 3 4 2 5 6 7	55567 88 (50) 24 5568 23 5567 (70) (70) 24 56810	N 29 24 23 29	94		19	48			Hand pit from GL to 1.2m Hand pit from GL to 1.2m Moisture content, Atterberg Limit, Triaxial te
	Stand	Dry ing water		el PIEZOMETER	e zone AND B eal TEST U KEY P J	Bulk o Undis Pistor Distu	disturbed si disturbed si sturbed sa n sample rbed jar sar onmental s	ample nple mple	S Standard penetration test C Cone penetration test K Permeability test	isturbe V value Total b seatin	ed sample (blows af lows/pen	blow co ter seat etràtion	unt ing)			DE	Brightv Birghtv	vell Ba vell, Su	nvironmental Ltd rns, Ipswich Road iffolk, IP10 0BJ infolx, 298 076

Index of W //	CLIENT	: c/o S	avil	ls			PROJECT: Land to	o the	North \	Nest of	f Ha∖	/erhi	ill amala				GRO	DUND	LEVEL	-						HOLE No. BH7
Comparing logs       Comparing logs <th< td=""><td></td><td></td><td>CB</td><td></td><td></td><td></td><td>EXCAVATION METHOD:</td><td>: (</td><td>1.50mm</td><td>cased</td><td>from</td><td>1 0.0</td><td>to 8.</td><td>luger) 2m</td><td></td><td></td><td>00</td><td>ORDIN</td><td>ATES I</td><td>ΕN</td><td></td><td></td><td></td><td></td><td></td><td>SHEET 1 OF 1</td></th<>			CB				EXCAVATION METHOD:	: (	1.50mm	cased	from	1 0.0	to 8.	luger) 2m			00	ORDIN	ATES I	ΕN						SHEET 1 OF 1
Alternation         Security of an antipart of strate         Image in the state of the state				S BH BE	TA	DATE:									_		DAT	TES 24/	/10/20	014 -	24/	10/2	014			PROJECT NO. 995,SI
Parton         Provide         Provide <th< td=""><td>and</td><td>of</td><td>l i</td><td>of 🚟</td><td></td><td>Description of</td><td>f Strata</td><td>1.07</td><td>Reduced</td><td></td><td></td><td></td><td></td><td></td><td>Don</td><td></td><td></td><td></td><td>SPT</td><td>&lt;425</td><td></td><td></td><td></td><td></td><td>Cu</td><td>7</td></th<>	and	of	l i	of 🚟		Description of	f Strata	1.07	Reduced						Don				SPT	<425					Cu	7
10000         100 </td <td></td> <td>0.00</td> <td></td> <td>y</td> <td>+ 7</td> <td></td> <td></td> <td>Leg</td> <td>Level</td> <td>-</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>NO.</td> <td>DIOWS</td> <td>N</td> <td>%</td> <td>%</td> <td>%</td> <td>%</td> <td>Mg/m</td> <td>³ kN/m²</td> <td>_</td>		0.00		y	+ 7			Leg	Level	-	0						NO.	DIOWS	N	%	%	%	%	Mg/m	³ kN/m²	_
*WATER & Standing water level PIEZOMETER Water strikes Water strikes Wate	-		D	у	F g c (I	irm to stiff orange brown grey ravelly CLAY. Gravel of rounde halk. LOWESTOFT FORMATION) /ery stiff dark grey gravelly CLA ing to corse chalk				0.40					0.40- 0.80 1.20- 1.65 2.00 4.40- 4.45 5.00 6.50 7.50	U D D S 3 D S 4 U D D S 4 U D D S 6 D D S 7 D D S 7 D D S 8 7 0 D	1 1 2 3 2 4 5 6 7	1 2 3 4 4 6 1 3 3 5 5 5 6 (55) 2 4 6 6 7 8 2 4 6 6 7 8 2 4 5 6 8 9	19 27	92	20	19	42	2.12	205.6	Moisture content, Atterberg Limit, pH and sulphate, Triaxial test
NET     P Piston sample     N*120 = Total blows/penetration     Birghtwell, Suffolk, IP10 0BJ       J     Disturbed jar sample     including seating	-	-								-						9		23								-
ES Environmental soil sample <425 Sample % passing 425 micron sieve Fax: 01603 298 070 Fax: 01603 298 075	WATER				evel	PIEZOMETER Upper s Respons Lower s	se zone AND B eal TEST U KEY P J	Bulk d Undis Piston Distur	listurbed s turbed sar sample bed jar sai	ample nple mple	C Co K Pe	ne pe	netrati	on test st	SPT N	(35) Und N = SPT N N*120 = including	isturbe V value Total b g seatin	d sample (blows a lows/per g	e blow co ifter sea netràtio	ount ting) n				Bright Birght Feleph	well Ba well, S ione:	

CLIENT:		avills			PROJECT: Land to	b the	North V	Nest of	Have	rhill				GRC	DUND	LEVEL							HOLE No. BH8
OGGED E		GB		CHECKED BY: DATE:	EXCAVATION METHOD:	i d	Cable Pe 6.00mm	cased	from (	0.0 to	10.0m			COC	DRDIN	ATES E	Ν						SHEET 1 OF 1
FEMPLATE			Н ВЕТА			1									ES 23/		14 -						PROJECT NO. 995,SI
and	Depth of Casing	Depth* of Water	Piez.	Description of	f Strata	Leg	Strata Reduced Level		Gra		epresentation l'Value 30 40	Dep	e		tu Testin Blows	g SPT N	<425 %			Dry Te LL % M		Cu kN/m²	Additional Tests and Notes
3/10 14:00	0.00	Dry	┾┾	TOPSOIL			-	- 0.00				-	0-										Hand pit from GL to 1.2m
				Firm brown slightly silty CLAY (HEAD DEPOSITS)				0.40				0.40-	В	1									
-	-									<b>,</b>		1.20	1 - D S	1	12 23 45	14	100	24	20	51			– Moisture content, Atterberg Limit
23/10	7	2.00		Soft brown very sandy CLAY. (HEAD DEPOSITS) Soft to firm brown slightly grave	elly sandy CLAY. Gravel		•	1.80		· · · · · · · · · · · · · · · · · · ·		1.80	2 - D D S	2 3	4 3 1 1 1 2 2 3	8							Seepage inflow of water at 2m
	-			of rounded fine to coarse chalk (HEAD DEPOSITS)			•	_				-	3										_
							•		1::::			::	S	4	1 2 2 2 2 3	9							
23/10	- 7	7 4.50					5 •	-				4.00	4   D S	5	1 2 2 3 3 3	11							-
_							* •	-						6	12	10							Seepage inflow of water at 4.5m
				Stiff grey gravelly CLAY. Gravel coarse chalk. (LOWESTOFT FORMATION)	of rounded fine to		C	5.20		1		1	Š	0	12 34								
+						_~ 	7	-				6.00	6 D	7									Water sealed out at 6.0m.
+	-						ō	_				6.50	7 - D	8	13 45 55	19							-
				7.50 Becoming very stiff with de	epth.		ō					7.50	D	9									
+	-						- 7					8.00-	8 U	1 10	(45)			18			2.16	217.2	- Triaxial test
+							c	_					9   D	11									-
10 17:00 10 17:15	6.00	Dry			·		C	- 10.00				9.50	D S 10	12	2 3 4 5 6 8	23							Borehole completed at 10.0m
						<u> </u>	-					-											
		nding wat er strike:		el PIEZOMETER S Upper s Respons Lower s	eal TEST U KEY P	Bulk d Undis Piston	disturbed disturbed s turbed sar sample rbed jar sar	ample nple	C Cone		netration test ation test test	SPT N	SPT blow (35) Und N = SPT I N*120 = including	isturbe V value Total bl	d sample (blows a lows/per	e blow co ifter seat	unt ing)	DI	X	DB	rightv irahtv	vell Ba vell. Si	invironmental Ltd Irns, Ipswich Road uffolk, IP10 0BJ 01603 298 076
				DEPTH All depths, level and t	ES	Enviro	onmental s		9			<425	Sample	% passir	ng 425 m	icron sie	ve	Q	K	)F	ax: 0	1603 2	298 075

OGGED I IELDWO	3Y · I F						Window	less sai	Haverhill		00110	LEVEL	-				HOLE No. WS1
		FI		CHECKED BY: DATE:	EXCAVATION METHOD	11	Uncased		•	CO	ORDIN	ATES I	ΕN				SHEET 1 OF 1
	E REF: GI		BH BETA								TES 28/		014 -				PROJECT NO. 995,SI
te/Time and Depth	Depth of Casing	Depti of Wate	ie	Description	of Strata	Leg	Strata Reduced Level	Depth	SPT 'N' Value Depths	10	Itu Testin Blows	g SPT N	<425 %	PL %	esting p Mg/m <sup>3</sup> kl	Cu N/m <sup>2</sup>	Additional Tests and Notes
	-			TOPSOIL (Dark brown slightly s clay with rootlets. Gravel of a fine to medium flint and infree				- 0.00	0 10 20 30 40 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1						-	Groundwater not encountered during drilli Metals, PAH, TPH, Moisture content, pH an Sulphate
-	-			Firm becoming stiff brown slig Gravel of subrounded to roun subrounded fine to coarse flin (LOWESTOFT FORMATION) 1.20 Becomes brown grey mo	t.			0.45	0.70 J 0.80 D 0.80 L 0.80 L 0.80 L 0.80 L 0.80 L 0.80 L 0.80 L 0.80 L 0.70 L 0.		1 1 2 2 3 4	11					Metals, PAH, TPH, Moisture content, pH an Sulphate Shear vane test = 48kN/m <sup>2</sup> Shear vane test = 50kN/m <sup>2</sup>
-	-							-	2.00 <sup>2</sup> D	3	11 5 5 5 5 7	22					¯ Shear vane test = 87kN/m²
-	-							_	3.00 <sup>3</sup> <sub>C</sub>	4	4 4 4 6 7 9	26					Collapse of sidewalls at 3.0m depth Shear vane test = 112kN/m²
-	-							- 4.00	4.00 <sup>4</sup> <sub>D</sub>	5	57 810 1214	44					50mm diameter monitoring well installed t 4.0m Windowless sample hole completed at 4.0 depth
WATER	¥ Star ¥ Wa			el PIEZOMETER Upper H Respon Lower	seal AND B Seal TEST U KEY P J	Bulk c Undis Pistor Distur	disturbed disturbed s sturbed sar sample bed jar san onmental s	ample nple mple	K Permeability test SPT N N = SPT N*120 = includin	listurbe N value Total b g seatin	ed sample (blows a blows/per ig	blow co fter sea netratio	ount ting) n		Brightwe Bightwell	ell Bar I, Suf ne: 0	nvironmental Ltd rns, Ipswich Road, ffolk, IP10 0BJ 01603 298 076 298 075

CLIENT	: c/o S	avills			PROJECT: Land to		North V	Vest of	Haverhill		GRO	DUND	LEVEL							HOLE No. WS2
OGGED E		1		CHECKED BY: DATE:	EXCAVATION METHOD:	DE Windowless sampler Uncased to 4.0 m						ORDINA	ATES E	ΕN			SHEET 1 OF 1			
EMPLAT			BH BET				JIICased	10 4.0				TES 28/		)14 - 2	28/10	/20	14			PROJECT NO. 995,SI
	Depth of	Deptl of	Piez.				Strata		Graphical Representation		ng/In-Situ Testing						y Testi	ing		Additional Tests and Notes
and Depth	Casing	Wate	r	Description of		Leg	Reduced Level	Depth	SPT 'N' Value 0 10 20 30 40	Depths Depths	No.	Blows	SPT N	<425 %	WC F	PL I %	LL % Mg	g∕m ³ I	Cu kN/m <sup>2</sup>	
1	-		88	TOPSOIL (Dark brown slightly sa clay with rootlets. Gravel of any fine to coarse flint and infreque and charcoal fragments)	andy slightly gravelly			- 0.00		0-										Groundwater not encountered during drilling
				fine to coarse flint and infreque and charcoal fragments)	ent fine to medium brick					0.10 J	1									No collapse of sidewalls during drilling
										0.30 J	2									
				Firm becoming stiff brown sligh Gravel of subrounded to round subrounded fine to coarse flint. (LOWESTOFT FORMATION)	tly sandy gravelly CLAY.	<u>••</u> •		0.47												
				subrounded fine to coarse flint. (LOWESTOFT FORMATION)		* 				0.70 J	3									
				0.80 Becomes brown grey mott		<u>••</u> ••				0.80 D										Shear vane test = 70kN/m <sup>2</sup>
+	-							-		1.00 <sup>1</sup> D	2									Shear vane test = 76kN/m <sup>2</sup>
						- <u>°</u>														
			- E			$\frac{-}{2}$				-										
						- <u>,</u>				-										
						$\overline{\cdot}$														
			Ë							-										
4	-		: <u>]</u> :]			<u>.</u>		_		2.00 <sup>2</sup> D										Shear vane test = 82kN/m <sup>2</sup>
						÷`				2.00	3									
						<u>••</u> •														
						<u>,                                     </u>														
						• <u>•</u> ••				-										
			₩.																	
	_		: []:			- <u>°</u>				2										
T	-					<u> </u>				3.00 <sup>3</sup> D	4									Shear vane test = 91kN/m <sup>2</sup>
						- <u>·</u> -														
						· <u>·</u> ·				-										
						- <u>-</u> -			·····											
						<u>.</u>				-										
+	-					• •		- 4.00		4.00 <sup>4</sup> D	5									50mm diameter monitoring well installed t
										-										4.0m Shear vane test = 96kN/m <sup>2</sup> Windowless sample hole completed at 4.0r
										-										depth
	▼ Stor	ding w		rel PIEZOMETER ∏ Upper si	eal SAMPLE D		disturbed	amplo	S Standard penetration test BI		l for or	ach 75mn	incrom							
VVAIER	¥ Star ¥ Wat	er strik	es	rel PIEZOMETER N Upper so Respons Lower so	seizone AND B eal TEST II	Bulk d	isturbed san	ample	C Cone penetration test	(35) Und 7 N N = SPT N	listurbe	d sample	blow co	ount		1	Ge	osph	ere E	invironmental Ltd Irns, Ipswich Road, Iffolk, IP10 0BJ 01603 298 076
					KEY P	Piston	sample bed jar sar		ST ST ST ST	N*120 = including	Total b	lows/pen				U	Big	htwe	II, Su	rns, Ipswich Road, ffolk, IP10 0BJ 01603 298 076
				DEPTH All depths, level and t	ES	Enviro	onmental s		2	125 Sample %			cron sie	ve		1	S Tel	epho	ne: ( 603 (	D1603 298 076 O

CLIENT	: c/o	Savi	lls			PROJECT: Land to	o the	North \	Nest of	of Ha	Haverhill		GROUN	) LEVE	L					HOLE No. WS3
LOGGED BY: LF CHECKED BY: EXCAVATION ME FIELDWORK BY: GEL DATE:						EXCAVATION METHOD		Uncased		COORDIN	NATES	ΕN			SHEET 1 OF 1					
TEMPLATI			GS BH	BETA			l	Uncased	110 1.8	8 111			DATES 29	9/10/2	014	- 29/	/10/2	2014		PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		epth* of /ater	Piez.	Description of	f Strata	Leg	Strata Reduced Level			SPT 'N' Value Depths	1ype Type	No. Blow	SDT	<42! %				esting Cu Mg/m³ kN/m	Additional Tests and Notes
	-				TOPSOIL (Dark brown slightly sandy Gravel of angular to subrounds and rare fine brick and charcoa Firm becoming stiff brown sligf Gravel of subrounded to round subrounded fine to coarse film (LOWESTOFT FORMATION)	slightly gravelly clay. ed fine to medium flint I fragments)					0 10 20 30 40 0 - 0.10 0.10 0.20 - 0.20 0.60 0.80 - 1.00 1 - 1.00 1 -	D D 1 1	1 2 3 1 2 3	S N		%		%	Mg/m <sup>°</sup> kN/n	<ul> <li>Groundwater not encountered during drillin No collapse of sidewalls during drilling</li> <li>Shear vane test = 74kN/m<sup>2</sup></li> <li>Shear vane test = 84kN/m<sup>2</sup></li> <li>Infiltration test undertaken at 1.48m depth Shear vane test = 96kN/m<sup>2</sup></li> <li>Windowless sample hole completed at 1.8m depth</li> </ul>
*WATER	¥ Sta ⊽ Wa	andin ater s	g wate trikes	r leve	el PIEZOMETER Upper s Respon	se zone AND B seal TEST U	Bulk d Undis	disturbed s listurbed san turbed san sample	ample	s s c c	Permeability test SPT N N = S	Jndis PT N	turbed samp	le blow c after sea	ount: ting)				Briahtwell B	Environmental Ltd arns, Ipswich Road, uffolk, IP10 0BJ 01603 298 076
					DEPTH All depths, level and	FS	Enviro	bed jar sar onmental s Sample	nple oil sample	ole	incluc <425 Samp	ding de %	seating passing 425	micron si	eve	and the second sec	1	-	Telephone: Fax: 01603	uffolk, IP10 0BJ 01603 298 076 298 075

CLIEN	T: c/	/o Sa	vills			PROJECT: Land t	to the	North \	Nest of	fHaverhill	(	GROUND	LEVE	L					HOLE No. WS4
LOGGED BY: LF CHECKED BY: FIELDWORK BY: GEL DATE:						EXCAVATION METHO	υ.	Uncased	•		COORDIN	ATES	ΕN		SHEET 1 OF 1				
TEMPLA				H BET				Uncased	110 2.0	) [1]	1	DATES 29	/10/2	014 -	29/	10/2	014		PROJECT NO. 995,SI
ate/Time		epth	Depth	* Piez.				Strata	1	Graphical Representation San		n-Situ Testir	ľ					esting	Additional Tests and Notes
and Depth		of ising	of Water	. ić	Descriptio	n of Strata	Leg	Reduced Level	Depth	SPT 'N' Value Depths	Type	lo. Blows	SPT N	<425 %	WC %	PL %	LL %	Mg/m <sup>3</sup> kN/m <sup>2</sup>	2
-	Ť				TOPSOIL (Dark brown slight rootlets. Gravel of angular	y gravelly sandy clay with		-	- 0.00 0.05	0 -		-							Groundwater not encountered during drillin
					\medium flint)		/	•	0.05	0.10	1	1							No collapse of sidewalls during drilling
					TOPSOIL (Dark brown slight clay. Gravel of angular to su flint and rare fine brick and	charcoal fragments)	/ <u>·</u> ·												
					Stiff becoming very stiff pale slightly sandy gravelly CLAY, rounded fine to coarse chal	brown grey mottled Gravel of subrounded to	·			0.50	J	2							
					subrounded fine to coarse that (LOWESTOFT FORMATION)	int.	÷	t		0.80	D	1							Shear vane test = 68kN/m <sup>2</sup>
	1				( · · · · · · ,		- <u>-</u>	*	_	1									
							 	•		1.00 '	D	2							Shear vane test = 82kN/m <sup>2</sup>
								ĉ											
							·•_	•											
							• 	t l											
								*											
	+								- 2.00	2.00 2	D	3							Shear vane test = 87kN/m <sup>2</sup>
												-							Windowless sample hole completed at 2.0m depth
-	t								-	3 -									_
-	Ť								F	4 -									
										····· · · · · · · · · · · · · · · · ·									
*WATEF	R ¥ ¥	Stanc Wate	ing wa r strike	iter lev		onseizone AND B	Bulk	disturbed s	ample		Jndistu	irbed sample	e blow c	ount				Geosphere E	Environmental Ltd
					Low	erseal TEST L KEY P	J Undis Pistor	sturbed sar n sample	nplė	K Permeability test SPT N N = S N*12	PT N va 0 = Tot	alue (blows a al blows/pe	after sea	iting)	6	D	D	Brightwell Ba Bightwell, Su	JITOIK, IP10 UBJ
						J E nd thicknesses in metres V	S Envir	rbed jar sa onmental s	mpie oil sample	e <425 Sam	ding se ble % p	ating assing 425 m	nicron si	eve	7	T	-	Felephone: Fax: 01603	01603 298 076   🖸

CLIENT	: c/o S	Savil	S		PROJECT: Land to	o the	North \	Nest of	Haverhill		GRC	OUND	LEVEL							HOLE No. WS5
LOGGED BY: LF CHECKED BY: FIELDWORK BY: GEL DATE:					EXCAVATION METHOD	D: Windowless sampler Uncased to 4.0 m						RDIN	ATES E	ΞN				SHEET 1 OF 1		
TEMPLAT			S BH BE									ES 29/	10/20	)14 -	29/	10/2	PROJECT NO. 995,SI			
ate/Time and Depth	Depth of Casing	Dep O Wa	fl∺≞	Description	of Strata	Leg	Strata Reduced Level		Graphical Representation SPT 'N' Value De 0 10 20 30 40	Samplin pths	ig/In-Sit No.	u Testin Blows	SPT N	<425 %	La WC %	aborat PL %		esting p Mg/m <sup>3</sup>	Cu kN/m²	Additional Tests and Notes
-	-			TOPSOIL (Dark brown slightly rootlets. Gravel of angular to medium flint) TOPSOIL (Dark brown slightly clay. Gravel of angular to sub	/			- 0.00 0.05	0.10	1 C	1									Groundwater not encountered during drillir Metals, PAH, TPH, Moisture content, pH and Sulphate No collapse of sidewalls during drilling
				clay. Gravel of angular to sub flint and rare fine brick and cl Firm becoming stiff pale brov sandy gravelly CLAY. Gravel o rounded fine to coarse chalk subrounded fine to coarse fli (LOWESTOFT FORMATION)	narcoal fragments) m grey mottled slightly f subrounded to and angular to		č č	0.40	0.70	- - - - - - -	1									
-	-			1.00 Becoming dark yellow bi depth	own grey mottled with			-		1 - C		2 3 3 4 5 5	17							
-	-			2.00 Becoming dark brown gr	ey mottled with depth			_		D D 2 - C	2	33 44 56	19							-
_	-			3.50 Occasional iron oxide sta	ining below 3.5m depth			-	2.60	3 - c	3	4 4 5 5 7 6	23							-
-	-							- 4.00		4 - C		55 57 79	28							Windowless sample hole completed at 4.0m depth
*WATER	¥ Star ¥ Wa			vel PIEZOMETER T Upper Respo Lower	nse zone AND B seal TEST U KEY P J	Bulk d Undis Piston Distur	listurbed s turbed san 1 sample 1 bed jar sar	ample nple mple		(35) Und N = SPT I N*120 = including	isturbeo V value Total bl vseating	d sample (blows a ows/per J	blow co fter sea netràtion	ount ting) า	1000	D	D	Brightv Bightw	vell Ba ell, Su	nvironmental Ltd arns, Ipswich Road, uffolk, IP10 0BJ 01603 298 076
				DEPTH All depths, level an	ES d thicknesses in metres W	b Enviro V Water	onmental s Sample	oil sample	<425	Sample 9	6 passin	g 425 mi	cron sie	eve	5		JF	ax: 0	1603	298 075

CLIENT	: c/o	Savi	ls		1		PROJ	ECT: Land	l to the	North \	Nest of	f Hav	verhill				GRC	DUND	LEVEL	-					HOLE No. WS6
LOGGED E FIELDWOI		<u>с Г</u>			CHECKED BY: DATE:		EXCAV	ATION METH	UD:	Window Jncased		•	er				coc	DRDINA	ATES I	ΞN					SHEET 1 OF 1
TEMPLAT			GS BH BE	TA	DATE:					Jurgan	110 1.9	, 111					DAT	ES 29/	10/20	014 -	29/1	0/20	)14		PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		pth* of ater		Descrip	tion of	Strata		Leg	Strata Reduced Level			Graphical Repr SPT 'N' V	alue	Depth	e	- <sup>2</sup>	tu Testino Blows	SPT N	<425 %		borato PL %		p Cu /g/m³ kN/	Additional Tests and Notes
-	-		-	T ro	OPSOIL (Dark brown slig ootlets. Gravel of angula	htly gra ar to su	avelly sau brounde	ndy clay with ed fine to	7		0.00		10 20	<u>30 40</u>		- (	1							<u> </u>	Groundwater not encountered during drilling
				T cl	nedium flint) OPSOIL (Dark brown slig lay. Gravel of angular to int and rare fine brick an	htly sai	ndy sligh unded fii	ntly gravelly ne to medium			0.25		••••••••	· · · · · · · · · · · · · · · · · · ·	••••	-									No collapse of sidewalls during drilling
				Si sl ro si	tiff becoming very stiff p lightly sandy gravelly CLA ounded fine to coarse ch ubrounded fine to coarse OWESTOFT FORMATION	ale bro VY. Gra alk and e flint.	own grey avel of su d angulai	/ mottled ubrounded to r to							0.60	D	2								
-					.00 Becoming yellow bro elow 1.0m	own gre	ey mottle	ed with depth			-				·····	1 -									-
													· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	-									Infiltration test undertaken at 1.41m depth
-	_										1.89		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	<sup>1.80</sup>	2 - 2 -	2								Windowless sample hole completed at 1.89n depth
													· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · ·	•									
													· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · ·	-									
-	-										-			· · · · · · · · · · · · · · · · · · ·		3 -									-
													· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	····	-									
-	-										-		· · · · · · · · · · · · · · · · · · ·		····	1 4 - -									-
				<u> </u>								· · · · ·			· · · · · · · · · · · · · · · · · · ·										
*WATER	¥ Sta ¥ Wa	anding ater si	j water le rikes	evel	Re	oper se esponse ower se	e zone	AND TEST KEY	B Bulk o U Undis P Pistor J Distur	listurbed s turbed sar sample bed jar sai	ample nple mple	C Co K Pe	andard penet one penetratio ermeability tes	n test	(3 SPT N N N in	5) Und = SPT *120 = cluding	listurbe N value Total bl 1 seating	d sample (blows af lows/pen a	blow co ter sea etràtio	ount ting) n	JOI		Br	rightwell I ightwell, S	Environmental Ltd Barns, Ipswich Road, Suffolk, IP10 0BJ 01603 298 076
					DEPTH All depths, leve	and th	hickness	es in metres	ES Enviro W Water	onmental s Sample	ioil sample	е			<425 Sa	ample	% passir	ng 425 mi	cron sie	eve	6	K	Fa	ax: 0160	3 298 075

CLIENT		Sav	ills			PROJECT: Land to		North Window	<u>Nest of</u> /less sar	Haverhill	GR	OUND L	evel	-						HOLE No. WS7
LOGGED I FIELDWO		GFI			CHECKED BY: DATE:	EXCAVATION METHOD			d to 4.0	•	CO	ORDINA	TES E	ΞN						SHEET 1 OF 1
			GS BH BE	TA	brite:					· · · · · · · · · · · · · · · · · · ·		TES 29/1	0/20	)14 -						PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		epth* of Vater		Description of	<sup>-</sup> Strata	Leg	Strata Reduced Level		Graphical Representation Samplin SPT 'N' Value Depths	- <u> </u>	Blows	SPT N	<425 %	1		LL %	esting p Mg/m <sup>3</sup>	Cu kN/m <sup>2</sup>	Additional Tests and Notes
				T a	OPSOIL (Dark brown slightly gr ingular to subrounded fine to r ind charcoal fragments)	avelly clay. Gravel of nedium flint, rare brick	·		- 0.00	0.10	1									Groundwater not encountered during drilli Metals, PAH, TPH, Moisture content, pH an Sulphate
				F g	irm becoming stiff brown grey ravelly CLAY. Gravel of subrou o coarse chalk and angular to s oarse flint.	mottled slightly sandy inded to rounded fine ubrounded fine to		• o	0.30	0.40 J	2									No'collapse of sidewalls during drilling Metals, PAH, TPH, Moisture content, pH an Sulphate
_	-			(	.00 Occasional iron oxide stain	ing below 1.0m depth			-	0.80 D	1									- Shear vane test = 56kN/m²
-	-			d	2.00 Becoming dark yellow brow lepth	vn grey mottled with			-	D 1.80 2  2  2.60 D	2									- Shear vane test = 82kN/m²
-	-			3	1.50 Becoming dark grey with b lepth	rown mottling with			-	3 3 3 3 0 0 0 0 0	4									- Shear vane test = 94kN/m²
-									- 4.00	4 -										Shear vane test = 88kN/m <sup>2</sup> Windowless sample hole completed at 4.0r depth 50mm diameter monitoring well installated 4.0m
*WATER	I I Sta I I W	andir ater s	g water le strikes	evel	PIEZOMETER Upper s Respons Lower so	e zone AND B eal TEST U KEY P J	Bulk o Undis Pistor Distur	disturbed s sturbed sar n sample rbed jar sa	ample nple mple	K Permeability test SPT N N = SPT N*120 = including	listurbe N value Total I g seatir	ed sample b e (blows afte plows/pene ng	olow co er sea tràtion	ount ting) n		Ŭ	D	Brightv Bightw Teleph	vell Ba vell, Su one: (	invironmental Ltd Invironmental Ltd Irns, Ipswich Road, Ifolk, IP10 0BJ 01603 298 076
					DEPTH All depths, level and t	J ES	Distur Enviro	bed jar sa conmental s	mple soil sample	including	g seatir	ng .				1	-	Teleph	one: (	01603 298 076 . 298 075

CLIENT:	c/o Sa	avills			PROJECT: Land to		North \ Window	Nest of	of Ha			GRO	DUND	EVEL	-					HOLE No. WS8
LOGGED B FIELDWOR		.1		CHECKED BY: DATE:	EXCAVATION METHOD	•	Uncased		•	•		<u> </u>	DRDINA	TES E	ΞN					SHEET 1 OF 1
TEMPLATE			BH BET										ES 29/		)14 -					PROJECT NO. 995,SI
and	Depth of Casing	Dept of Wate	÷	Description	of Strata	Leg	Strata Reduced Level			Graphical Representation SPT 'N' Value De 10 20 20 40	Sampli pths	10	tu Testino Blows	SPT N	<425 %			esting p Mg/m <sup>3</sup>	Cu kN/m²	Additional Tests and Notes
-				TOPSOIL (Dark brown slightly:         clay. Gravel of angular to subflint and rare fine brick and ch         Firm becoming stiff yellow brown sandy gravelly CLAY. Gravel o rounded fine to coarse chalk a subrounded fine to coarse (Interpreted fine to coarse fine (LOWESTOFT FORMATION)         0.80 - Becoming yellow brown         1.00 - Becoming brown/grey r	wn grey mottled slightly 'subrounded to nd angular to t. grey mottled with depth			- 0.00 0.30 -		0 10 20 30 40 0.10		1 2 1		, i i i i i i i i i i i i i i i i i i i						Groundwater not encountered during drillin Metals, PAH, TPH, Moisture content, pH and Sulphate No collapse of sidewalls during drilling
_								- 2.00		1.70	2 -	2								Infiltration test undertaken at 1.58m depth Shear vane test = 102kN/m <sup>2</sup> Windowless sample hole completed at 2.0m depth
+								-			3 -									
*WATER	¥ Stan ¥ Wat	ding w er strik	vater lev kes	vel PIEZOMETER	ise zone AND B seal TEST U KEY P	Bulk o Undis Pistor	disturbed s disturbed s iturbed sam sample bed jar sar	ample nple	C C	Standard penetration test Cone penetration test Permeability test SPT N	(35) Uno N = SPT	disturbe N value Total b	d sample (blows af lows/pen	blow co ter sea	ount ting)	D	D	Brightw Bightwe	vell Ba ell, Su	Environmental Ltd arns, Ipswich Road, iffolk, IP10 0BJ 01603 298 076 298 075

CLIENT	: c/o S	Savil	lls			PROJECT: Land to	o the	North \	Nest of	of Ha	laverhill		GRO	DUND	LEVEI							HOLE No. WS9
LOGGED E FIELDWOF		EI			CHECKED BY: DATE:	EXCAVATION METHOD:		vindow Jncasec					coc	DRDIN	ATES	ΕN						SHEET 1 OF 1
TEMPLATI			GS BH BE	TA	DATE:		l	Jucased	110 2.0	υm	1		DAT	ES 29/	10/20	014 -	29/	/10/2	2014			PROJECT NO. 995,SI
ate/Time	Depth	De	pth* of					Strata			Graphical Representation		10	tu Testin					1	esting		Additional Tests and Notes
and Depth	of Casing	w	of ater		Description of	Strata	Leg	Reduced Level	Depth	٦	SPT 'N' Value De	pths	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	Mg/m <sup>3</sup> k	Cu N/m <sup>2</sup>	2
1	_		2	Ţ	TOPSOIL (Dark brown slightly sa clay. Gravel of angular to subro 'lint and rare fine brick and char	ndy slightly gravelly			- 0.00	) [		0 -										Groundwater not encountered during drillin
				f	lint and rare fine brick and cha	coal fragments)				··			1									No collapse of sidewalls during drilling
					Stiff becoming very stiff yellow slightly sandy gravelly CLAY. Grounded fine to coarse chalk an	brown grey mottled avel of subrounded to	<u>.</u>		0.30	)		1										
				r s	ounded finé to coarse chalk an subrounded fine to coarse flint. LOWESTOFT FORMATION)	d angular to	<u> </u>			<u> </u>	0.5	r c	2									
			ĮĘ	(	LOWESTOFT FORMATION)		<u> </u>					-										
			Ë				<u> </u>			1	0.8	o [D	1									
+	-		Į	1	I.00 - Becoming brown/grey mo	ottled with depth	<u>,</u>		-			1 - c		3 5	23							-
			ļ.									-		35 35 78								
			ĮĘ				<u> </u>					1										
			it	-			<u> </u>					-										
											1.6	D C	2									
							<u>.                                    </u>	-		···												
+	-			_			<u>⊢</u> _		2.00	,		2 -										Windowless sample hole completed at 2.0m
												1										depth
												1										50mm diameter monitoring well installed to 2.0m
										ļ		]										
										···		1										
												-										
+	_								-	ļ		3 -										-
										··		1										
												-										
										ļ		1										
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												-										
	_											4										
										··												
										ļ		1										
											·····	1										
WATER	¥ Sta ¥ Wa	nding Iter st	g water I trikes	evel	PIEZOMETER Upper so H Respons Lower so	ezone AND B	Bulk d	listurbed s	ample	C (	Standard penetration test Blow Cone penetration test	(35) Un	disturbe	d sample	blow c	ount				Geosphe	ere E	Environmental Ltd
					Lower se	KEY P J	Piston Distur	turbed san i sample bed jar sar onmental s	mple		2	N = SPT N*120 = includin Sample	Total b	lows/per a	netràtio	n	Contraction of the local distribution of the			Telepho	n, 3u	
					DEPTH All depths, level and t	hicknesses in metres W	Water	Sample	on sample	iie	<425	Sample	vo hazzit	iy 420 i M		eve				Fax: 01	603	298 075

CLIENT		Savi	lls			PROJECT: Land to	o the	North V	Vest of	f Haverhill	GR	OUND	LEVEL	-					HOLE No. WS10
LOGGED E		<b>FI</b>			CHECKED BY: DATE:	EXCAVATION METHOD:		Uncased			CO	ORDIN	ATES I	ΞN					SHEET 1 OF 1
TEMPLAT			GS BH E	ETA								TES 30/		)14 -					PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		pth* of ater	Piez.	Description c	f Strata	Leg	Strata Reduced Level	Depth	SPT 'N' Value Depths	T	Blows	SPT N	<425 %		Abora PL %		esting ρ Cu Mg/m³ kN/m²	Additional Tests and Notes
-	- -				TOPSOIL (Dark brown slightly s clay. Gravel of subangular to s medium flint and rare chalk.) Stiff pale brown gravelly CLAY. rounded fine to coarse chalk. (LOWESTOFT FORMATION) Stiff dark grey brown mottled ( angular to subrounded fine to (LOWESTOFT FORMATION)	Gravel of subangular to			- 0.00 0.15 - 1.10 - 2.00	0 10 20 30 40 0 0 J	1	2 5 3 4 4 5	16						Groundwater not encountered during drillin Metals, PAH, TPH, Moisture content, pH and Sulphate No collapse of sidewalls during drilling Shear vane test = 108kN/m <sup>2</sup> Shear vane test = 116kN/m <sup>2</sup> Shear vane test = 132kN/m <sup>2</sup> Windowless sample hole completed at 2.0m depth
*WATER	¥ Sta ∓ Wa	anding ater st	g water trikes	leve	PIEZOMETER Upper s Respon	se zone AND B eal TEST U	Bulk Undi	l disturbed s disturbed sa sturbed sam n sample	ample (	K Permeability test SPT N N = SPT	disturb N value	ed sample	blow co	ount tina)			BE	Brightwell Ba	Environmental Ltd arns, Ipswich Road, uffolk, IP10 0BJ 01603 298 076
					DEPTH All depths, level and	j FS	Distu Envir	irbed jar san		includir	g seatir	ng			2	1		Signiwell, Su	Iffolk, IP10 0BJ 01603 298 076 298 075

	: c/o S	avil	S		PROJECT: Land t		North Window	Nest of	Haverhill		GROU	IND L	EVEL							HOLE No. WS11
OGGED E		FI		CHECKED BY: DATE:	EXCAVATION METHOD	):	Uncased		•		COOR	DINA	TES E	Ν						SHEET 1 OF 1
EMPLAT			S BH BE						1		DATES		0/20	14 - 3						PROJECT NO. 995,SI
ite/Time and Depth	Depth of Casing	Dep C Wa	f ¦ë	Descriptio	n of Strata	Leg	Strata Reduced Level	Depth	Graphical Representation SPT 'N' Value	Samplin Depths	g/In-Situ T No. B	lows	SPT N	<425 %			ry Tes LL % N	sting Лg/m <sup>±</sup>	Cu kN/m <sup>2</sup>	Additional Tests and Notes
	_			TOPSOIL (Desiccated dark be clay with rootlets. Gravel of flint and chalk with very rare	own sandy slightly gravelly subangular fine to coarse brick fragments)			0.00		0 - - 0.20 J	1									Groundwater not encounterd during drilling
				Stiff pale brown grey mottle desiccated CLAY. Gravel of a to coarse chalk. (LOWESTOFT FORMATION)	d gravelly slightly cobbly ingular to subangular fine	 	-	0.30												No compactor sincewards during drining
-	_			1.10 Becoming brown dark of to hard with depth 1.30 Orange brown sandy p	, , , , , , , , , , , , , , , , , , ,		- - - - - -	_	•	0.75 D		3 2 4 4 4 6	18							- Shear vane test = 104kN/m <sup>2</sup>
				- - - -			-			1.50 D	2									Shear vane test = 136kN/m <sup>2</sup>
-	_							_		2 - <sub>C</sub>		34 45 66	21							Shear vane test = 136kN/m <sup>2</sup>
				2.80 Becoming dark brown o depth	lark grey mottled with					2.50 D	3									Shear vane test = 120kN/m <sup>2</sup> Shear vane test = 128kN/m <sup>2</sup>
	_											4 4 5 6 7	26							Shear vane test = 128kN/m <sup>2</sup>
	_							- 4 00		4 -										Shear vane test = 140kN/m <sup>2</sup>
								- 4.00				57 78 012	37							Windowless sample hole completed 4.0m d 50mm diameter monitorng well installed to
WATER	¥ Star ¥ Wa	nding ter str	water le ikes	Resp	onse zone AND B er seal TEST U KEY P J	Bulk o Undis Pistor Distur	disturbed disturbed s sturbed sar sample bed jar sa onmental s	ample nple mple	-	(35) Und PTN N = SPTN	sturbed sa I value (blo Total blow seating	ample b ows aft /s/pene	olow cou er seati etràtion	unt ing)	J	1	Bi	rightv ightw eleph	vell Ba vell, Su ione: (	Environmental Ltd arns, Ipswich Road, uffolk, IP10 0BJ 01603 298 076 298 075

CLIENT	: c/o	Savi	lls			PROJECT: Land to	o the	North \	Nest of	Haverhill				GRO	UNDL	EVEL							HOLE No. WS12
LOGGED FIELDWO		GEL			CHECKED BY: DATE:	EXCAVATION METHOD		Uncased					Ļ	COO	RDINA	TES E	Ν						SHEET 1 OF 1
TEMPLAT			GS BH E	BETA											ES 30/		14 - 3						PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		epth* of /ater	Piez.	Description o	f Strata	Leg	Strata Reduced Level		Graphical Rep	/alue	Sa Depths	Type Type		u Testing Blows		<425 %	Labo WC P % %		<u>y Testii</u> L % Mg	<u> </u>	Cu kN/m²	Additional Tests and Notes
-	-				TOPSOIL (Dark brown slightly g subangular to subrounded fine fragments of brick) Firm brown slightly gravelly CL/ subangular fine chalk. (LOWESTOFT FORMATION)	/		-	- 0.00 0.10 - 1.68 			0.10		1									Groundwater not encontered during drillin Metals, PAH, TPH, Moisture content, pH an Sulphate Infiltration test undertaken at 0.15m depth No collapse of sidewalls during drilling Shear vane test = 72kN/m <sup>2</sup> Shear vane test = 60kN/m <sup>2</sup> Shear vane test = 52kN/m <sup>2</sup> Shear vane test = 52kN/m <sup>2</sup> Windowless sample hole completed at 1.66 depth
*WATER	¥ Sta ¥ W	andin ater s	g water trikes	- + leve	I PIEZOMETER Upper s Respon Lower s	se zone AND B eal TEST U KEY P	Bulk ( Undis Pistor	- disturbed s disturbed san sturbed san n sample rbed jar sar	ample nple	S Standard pene C Cone penetrati K Permeability te	on test	(35 PTNN= N*	) Undis SPT N I 20 = T	sturbed value (ł	sample blows aff ws/pene	blow cou ter seati	unt na)	ğ	C	Brig	ghtwe htwe	ell Ba ell, Sut	nvironmental Ltd rrns, Ipswich Road, ffolk, IP10 0BJ 11603 298 076 298 075
					DEPTH All depths, level and	F.S	5 Fnvir	onmental s			•	425 Sar				ron siev	/e			Fax	epho c 01	ne: 0 603 2	01603 298 076 0 298 075 0

CLIENT	: c/o S	avills			PROJECT: Land to	o the	North V	Nest of	Haverhil			GR	OUND	LEVEL						HOLE No. WS13
LOGGED E FIELDWOI		-1		CHECKED BY: DATE:	EXCAVATION METHOD		Window Jncased		•			co	ORDIN/	ATES E	ΕN					SHEET 1 OF 1
TEMPLAT			BH BETA			,	JIICaseu	110 4.0	111			DA	TES 30/	/10/20	)14 - 3	0/10/	2014	ļ		PROJECT NO. 995,SI
ate/Time and	Depth of	Depth of	Piez.				Strata			al Representation		T	itu Testin					Festing		Additional Tests and Notes
Depth	Casing	Wate	r 🗖	Description of	Strata	Leg	Reduced Level	Depth		PT 'N' Value 20 30 40	Depths Depths	No.	Blows	SPT N	<425 \ %	NC PL % %	%	Mg/m <sup>3</sup>	Cu kN/m²	
-	-			TOPSOIL (Dark brown slightly sil gravelly clay with rootlets. Grav subrounded fine to medium flin	ty slightly sandy slightly rel of subangular to	·		- 0.00		······	0-									Groundwater not encountered during drillir
				subrounded fine to medium flin	it)					•••••••••••••••••••••••••••••••••••••••	0.20 J	1								No collapse of sidewalls with depth
				Stiff to very stiff gravelly CLAY. fine to coarse chalk and flint.	Gravel of subangular			0.40												
				fine to coarse chalk and flint. (LOWESTOFT FORMATION)	5					······										
									···· ···	•	0.75 D	1								
											0.75	'								
-	-			Soft to firm brown and orange a sandy slightly gravelly CLAY. Gra	prown mottled slightly	<u>· • ·</u>		- 1.00		· · · · · · · · · · · · · · · · · · ·	1-									-
				coarse flint. (LOWESTOFT FORMATION)		÷														
						<u>· • · ·</u>														Shear vane test = 52kN/m <sup>2</sup>
				Very stiff to hard pale brown group CLAY. Gravel of subangular to s	ey mottled gravelly			1.50		· · · · · · · · · · · · · · · · · · ·	1.50 D	2								
				coarse chalk. (LOWESTOFT FORMATION)		<u> </u>				•••••••••••••••••••••••••••••••••••••••										
				. , , ,																Shear vane test = 52kN/m <sup>2</sup>
-	-							-		· · · · · · · · · · · · · · · · · · ·	2 -									-
																				Shear vane test = 68kN/m <sup>2</sup>
									·····	· · · · · · · · · · · · · · · · · · ·										
																				Shear vane test = 128kN/m <sup>2</sup>
-	_							-	·····	· · · · · · · · · · · · · · · · · · ·	3 -									-
										· · · · · · · · · · · · · · · · · · ·	3.50 D	3								
										· · · · · · · · · · · · · · · · · · ·										
-	-		<u>i H</u>			_		- 4.00	<u> </u>	·	4 -									Windowless sample hole completed at 4.0r
																				depth 50mm diameter monitorng well installed to
*\\\/\_TFD	ret? 🗴	ding w		el PIEZOMETER N Depersion	eal SAMPLE D		disturbed	sample	S Standard	penetration test B		l vs for o	ach 75mr	n increm	nent					
WAILK	¥ Wa	er strike	es	el PIEZOMETER SS Upper se Respons Lower se	e zone AND B	Bulk d	isturbed san	ample		netration test		listurbe	d sample	blow co	ount	X	X	Geosp Brighty	here E vell Ba	nvironmental Ltd rrns, Ipswich Road, ffolk, IP10 0BJ 01603 298 076
						Piston	sample bed jar sar					Total b	lows/per			P		DIGITU	un, Uu	arns, Ipswich Road, iffolk, IP10 0BJ 01603 298 076
				DEPTH All depths, level and t	ES	5 Enviro	onmental s	oil sample		<	425 Sample	% passi	ng 425 mi	icron sie	eve		O	Teleph Fax: 0	one: ( 1603 :	01603 298 076 Ō O

CLIENT	: c/o S	Savil	ls			PROJECT: Land to		North V	Nest of	f Ha	laverhill			GRC	DUND	LEVEL	-						HOLE No. WS14
LOGGED E		<b>FI</b>			CHECKED BY: DATE:	EXCAVATION METHOD		Window Uncased		•				<u> </u>	DRDIN	ATES I	EN						SHEET 1 OF 1
TEMPLAT			GS BH I	BETA											ES 30/		014 -						PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		pth* of ater	Piez.	Description of	<sup>-</sup> Strata	Leg	Strata Reduced Level			Graphical Representation SPT 'N' Value 10 20 30 40	n S Depth	e		tu Testin Blows	SPT N	<425 %			LL %		Cu kN/m²	Additional Tests and Notes
-	_				TOPSOIL (Dark brown slightly si gravelly CLAY with rootlets. Gra to medium flint and chalk) Stiff pale brown slightly gravelly subangular to subrounded fine (LOWESTOFT FORMATION)		_o_		- 0.00 0.30			0.15	) - - J - -	1									Groundwater not encountered during drillin Metals, PAH, TPH, Moisture content, pH and Sulphate No collapse of sidewalls during drilling
-	_				(LOWESTOFT FORMATION) Stiff dark brown and dark grey I Gravel of subangular to subroun chalk. (LOWESTOFT FORMATION)	mottled gravelly CLAY		d - - -	0.60			·····	-										Shear vane test = 88kN/m <sup>2</sup> Infiltration test undertaken at 0.70m depth Shear vane test = 132kN/m <sup>2</sup>
					1.10 Becoming hard with depth							1.50	D	1									Shear vane test = 140kN/m <sup>2</sup>
_	-				1.70 Orange brown sandy clay p	oocket present	 	2	- 1.97			·····	-										Shear vane test = 100kN/m <sup>2</sup> - Windowless sample hole completed at 1.97 depth
												· · · · · · · · · · · · · · · · · · ·											
-	_								_														-
-	-								-			·····	- - - -										-
*WATER	¥ Sta ¥ Wa	anding ater st	y water rikes		el PIEZOMETER Respons Lower su	e zone AND B eal TEST U	Bulk c Undis	disturbed sa listurbed sa turbed sample	ample	СC	Standard penetration test Permeability test	(3 SPTNN	5) Und = SPT I	listurbe N value	d sample	blow co ter sea	ount ting)			BB	Brightv	vell Ba	nvironmental Ltd trns, Ipswich Road, tfolk, IP10 0BJ 01603 298 076 298 075
					DEPTH All depths, level and t	J ES	Distur Enviro	bed jar sar onmental s		le			cluding	g seating	g '			C	R	Ē	eleph	one: (	01603 298 076 0 298 075 0 298 075

CLIENT	: c/o	Savi	lls			PROJECT: Land to	o the	North \	Nest of	f Hav	verhill				GRO	DUND	LEVEL	-					HOLE No. WS15
LOGGED I FIELDWO		251			CHECKED BY: DATE:	EXCAVATION METHOD		Vindow Jncased			;1				000	DRDIN	ATES E	ΕN					SHEET 1 OF 1
TEMPLAT			GS BH E	BETA			L L	Jucased	110 2.0	111					DAT	ES 30/	10/20	014 -	30/10	/201	4		PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		epth* of 'ater	Piez.	Description of	of Strata	Leg	Strata Reduced	Depth	G	raphical Repre SPT 'N' Va		Sar Depths	e	g/In-Sit No.	tu Testin Blows	SPT	<425 %			Testing P Mg/m	Cu	Additional Tests and Notes
-	-	+		-+	TOPSOIL (Desiccated dark brow	vn slightly silty slightly		Level	- 0.00	0	10 20 3	0 40	0 -			5.0110	N	%	% %	6 %	ivig/m	KIN/m	Groundwater not encountered during dri
					TOPSOIL (Desiccated dark brow gravelly desiccated CLAY with r subangular to subrounded fine Stiff to desiccated pale brown	e to coarse flint) and grey mottled			0.20				0.10	- J	1								No collapse of sidewalls during drilling
					Stiff to desiccated pale brown a gravelly slightly cobbly desicca subangular to rounded fine to (LOWESTOFT FORMATION)	ted CLAY. Gravel of coarse chalk	 				· · · · · · · · · · · · · · · · · · ·												
											· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·											
							_~ 					•••••	0.75	D	1								_ Infiltration test undertaken at 0.9m depth
					1.00 Becoming hard and dark g	rey with depth	 																
							` 																
							 				· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	1.50	D	2								
							_~ 				· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • • •											
-	-			-					- 2.00				2 -										Windowless sample hole completed at 2.0
																							depth
											· · · · · · · · · · · · · · · · · · ·												
											• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •											
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-									F				4 -										-
					<u>-</u>		<u> </u>				· · · · · · · · · · · · · · · · · · ·												
WATER	¥ St. ¥ W	andin ater s	g water trikes	leve	I PIEZOMETER Upper Respon	se zone AND B seal TEST U KEY P	Bulk d Undist Piston	isturbed saturbed saturbed san sample	ample nple	C Co	andard penetration ne penetration rmeability test	n test	(35) PTNN= N*1	Undi SPT N 20 =	isturbe I value Total bl	d sample (blows a lows/per	blow co fter seat	ount ting)	ă	C	Bright Biahty	well Ba vell. Su	Environmental Ltd arns, Ipswich Road, ffolk, IP10 0BJ
					DEPTH All depths, level and	FS	5 Enviro	bed jar sar nmental s	nple oil sample	9		<	inclı 425 Sam	uding ple %	seating passir	g ng 425 mi	cron sie	eve		0	Telepl	none: (	1110 (K, 1P10 (BJ) 01603 298 076 298 075

CLIENT:	: c/o S	avill	S		PROJECT: Land to	o the	North V	Vest of	f Ha	verhi	ill				GR	OUND	LEVE	L					HOLE No. WS16	
LOGGED B		FI		CHECKED BY: DATE:	EXCAVATION METHOD	•	Incased			ei					00	ORDIN	ATES	ΕN					SHEET 1 OF 1	
TEMPLATE			S BH BET				measeu	10 4.0					-		DAT	TES 31.	/10/2	014 -	31/	10/2	014		PROJECT NO. 995,	
ate/Time and	Depth of	Dep					Strata		(			sentation			T	itu Testin	ľ			aborat			Additional Tests and Note	es
Depth	Casing	Wa	ter 🖻	Description of	f Strata	Leg	Reduced Level	Depth	0		PT 'N' Va 20 3		Dep	ths df	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	p Ci Mg/m³ kN/	u m <sup>2</sup>	
-	-			TOPSOIL (Dark grey brown sligh of fine to medium flint with occ	tly gravelly clay. Gravel			- 0.00	- <u>-</u>				-	0-									Groundwater not encour	ntered during drill
				of the to medium find with occ	asional drick).								0.10	- 1	1								No collapse of sidewalls of	lurina drillina
				Firm becoming stiff dark yellow desiccated CLAY. Gravel of fine	brown slightly gravelly			0.30	···		•••••••			1										anng anning
				occasional medium chalk.	to medium flint with									-										
				(LOWESTOFT FORMATION) 0.50 Rootlets present							•••••••		•••	1										
														1										
												•••••		-										
1	-							-						1									-	
														-										
									1					1										
				1.50 No desiccation below 1.5m	and becoming slightly									-										
				sandy and firm with depth	rand becoming signify						•••••••		•••	1										
														]										
											•••••••		••											
T	-							-						2 -									-	
				2 20 Becoming gravelly and pale	e grev orange brown									-										
				2.20 Becoming gravelly and pale mottled below 2.2m. Gravel is f flint	ine to coarse chalk and				1					1										
														-										
											•••••••		•••	1										
														1										
											••••••••	•••••		-										
1	-							-						3 -									-	
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						$\_$					••••••••	••••												
														]										
											••••••••		•••											
														1										
														-										
+	-							- 4.00	<u> </u>				-	4 -									Windowless sample hole	completed at 4.0
														-										
											••••••••	•••••	•••	1										
						<u>L _ </u>				<u> </u>	<u> </u>			1										
WATER	¥ Star ¥ Wat	nding ter str	water lev ikes	Vel PIEZOMETER Upper so Response Lower so	eal TEST U KEY P	Bulk di Undist Piston	listurbed s sturbed sa urbed sam sample	ample ple	C C	one pe	d penetra netration pility test	n test	SPT N	(35) Unc N = SPT N*120 =	listurbe N value Total b	d sample (blows a lows/pe	e blow o ofter sea	ount:		D	RE	Briahtwell	Environmental Ltd Barns, Ipswich Road, Suffolk, IP10 0BJ	SHEET 1 OF 1 HOLE N WS16
					FS	Fnviro	oed jar san nmental so		е					includin Sample		ig ng 425 m	icron si	eve	7	67	T	elephone	01603 298 076	
				DEPTH All depths, level and t	hicknesses in metres W	Water	Sample		-					- ampio							- F	-ax: 0160	3 298 075	

CLIENT:	c/oS	avills			PROJECT: Land to	o the	North V	Vest of	f Haverhill	GR	OUND LE	EVEL						HOLE No. WS17
OGGED E		1		CHECKED BY: DATE:	EXCAVATION METHOD		Incased			CO	ORDINAT	TES E	Ν					SHEET 1 OF 1
EMPLATE			BH BETA				nicascu	10 2.0		DA	TES 31/1	0/20	14 - 3					PROJECT NO. 995,SI
and	Depth of Casing	Depti of Wate	je	Description o	f Strata	Leg	Strata Reduced Level	Depth	SDT IN! Volue		Blows	SPT N	<425 %		Orator PL L %	<u> </u>	p Cu g/m <sup>3</sup> kN/m <sup>2</sup>	Additional Tests and Notes
-	-		-+	TOPSOIL (Dark brown slightly g fine to medium flint with occas	ravelly clay. Gravel is			0.00		-								Groundwater not encountered with depth
									0.10	1								No collapse of sidewalls during drilling
				Firm dark brown slightly gravel to coarse flint and chalk. (HEAD DEPOSITS)	y CLAY. Gravel of fine			0.35										
+				Firm becoming stiff dark yellow Gravel of fine to coarse flint an (LOWESTOFT FORMATION)	brown gravelly CLAY. d chalk.			0.80	1-									-
				1.30 Becoming dark grey and d mottled with depth	ark orange brown													
				1.65 Cobbles of chalk present														
-	-							- 2.00	2 -									Windowless sample hole completed at 2.0r
+	-							-	3									-
+	-							-	4 -									-
				<u> </u>														
VATER	¥ Star ¥ Wat	ding w er strik	ater lev æs	el PIEZOMETER S Upper s Respon Lower s	se zone AND B eal TEST U KEY P	Bulk di Undist Piston	disturbed s isturbed sa urbed sam sample ped jar san	imple ( iple I	K Permeability test SPT N N = SP N*120	ndisturbe FN value	ed sample bl e (blows afte plows/penet	low co er seati	unt ng)	D		Bri	ightwell Ba ghtwell, Su	invironmental Ltd Irrns, Ipswich Road, ffolk, IP10 0BJ 01603 298 076
				DEPTH All depths, level and	FS	Fnviro	nmental so		e <425 Sample	% pass	ing 425 micr	on siev	/e	C	10	Fa	lephone: ( x: 01603)	01603 298 076 වි 298 075 වි

CLIENT	: c/o S	avil	S		PROJECT: Land to	o the	North \	Nest of	Haverhill	$\rightarrow$	GROUND	LEVEI	_						HOLE No. WS18
OGGED E		FI		CHECKED BY: DATE:	EXCAVATION METHOD		Uncased			Ļ	COORDIN	ATES	ΕN						SHEET 1 OF 1
FEMPLAT			S BH BE				Uncased	110 4.0	111		DATES 31/	/10/20	014 -	31/	10/2	2014			PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing	De	oth* id of iter	Description	of Strata	Leg	Strata Reduced Level	Depth	SPT 'N' Value Depths	npling ad (	No. Blows	g SPT N	<425 %		PL %	tory T	esting Ma/m	<sup>3</sup> Cu kN/m	Additional Tests and Notes
-				TOPSOIL (Dark brown slightly rootlets. Gravel of angular to medium flint and infrequent	gravelly clay with subrounded fine to charcoal fragments).		-	- 0.00	0 10 20 30 40 0	<u> </u>			70	70	70	70	ivig, in		No collapse of sidewalls during drilling
				Firm becoming stiff dark brow Gravel of angular to subroun (HEAD DEPOSITS)	<i>u</i> n slightly gravelly CLAY. Jed fine to medium flint.	- <u>0</u>		0.30											
31/10	7	<u> </u>	10					-	0.80	D	2								Seepage inflow of water at 1m
				Firm becoming stiff orange b Gravel of subrounded to rou and angular to subrounded fi (LOWESTOFT FORMATION)	own gravelly CLAY. Ided fine to coarse chalk ne to coarse flint.			1.50											
-	-			2.20 Becoming brown grey m	ottled with depth			_	2 -										-
	_							_											_
									3.00 3	D	3								
_	_						- -	- 4.00	4-										
								ч.00											Windowless sample hole completed at 4.0n
WATER	¥ Star ¥ Wa	nding ter st	water le ikes	vel PIEZOMETER S Uppe Respo Lower	nse zone AND B seal TEST U KEY P J	Bulk Undis Pisto Distu	disturbed s sturbed san n sample rbed jar sar	ample nple mple	K Permeability test SPT N N = N*1 inclu	Undis SPT N 20 = T Iding s	sturbed sample value (blows a fotal blows/per seating	blow c fter sea netràtio	ount ting) n			D	Bright Bightv	well Ba vell, Su	Environmental Ltd arns, Ipswich Road, uffolk, IP10 0BJ 01603 298 076 298 075
				DEPTH All depths, level an	ES Hithicknesses in matrice W	Envir	onmental s er Sample	oil sample	<425 Sam	ple %	passing 425 m	icron sie	eve	5			Fax:	01603	298 075

CLIENT	:c/o	Sav	lls			PROJECT: Land to	<u>o the</u>	North \	Nest of	f Haverhill		GRC	UNDL	EVEL						HOLE No. WS19
LOGGED I FIELDWO		GEL			CHECKED BY: DATE:	EXCAVATION METHOD	<i>.</i>	Jncasec				C00	RDINA	TES E	ΕN					SHEET 1 OF 1
TEMPLAT			GS BH B	TA	DATE.								ES 31/		)14 -					PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		epth* of /ater	LIC2.	Description o	f Strata	Leg	Strata Reduced Level		Graphical Representation SPT 'N' Value Dep Dep	e	g/In-Sit No.	u Testing Blows	SPT N	<425 %	La WC %	PL %		p ρCu /lg/m³ kN/m	Additional Tests and Notes
	-				TOPSOIL (Dark brown gravelly v Gravel of frequent fine to coars Dark brown pale grey mottled o desiccated CLAY. Gravel of fine chalk with frequent cobbles of (LOWESTOFT FORMATION)	pravelly cobbly very to coarse flint and chalk.			- 0.00 0.40 					N		N				Groundwater not encountered during drillin No collapse of sidewalls during drilling
*WATER	¥ Sta ¥ Wa	andin ater s	g water strikes	level	I PIEZOMETER Upper s Respon Lower s	se zone AND B eal TEST U	Bulk d Undis	disturbed s listurbed s turbed san sample	ample	K Permeability test SPT N	SPT blow (35) Undi N = SPT N N*120 =	isturbed V value (	l sample l blows afi	blow co ter seat	ount ting)		be	B	riahtwell Ba	Environmental Ltd arns, Ipswich Road, uffolk, IP10 0BJ 01603 298 076 298 075
					DEPTH All depths, level and	J FS	Distur S Enviro	bed jar sar prmental s			including Sample %	seating				2	R	Te Te	elephone: ax: 01603	01603 298 076

CLIENT:	: c/o S	avill	6	1	PROJECT: Land to	o the	North \	Nest of	f Hav	erhill				GRC	OUND	LEVEI	_					HOLE No. WSA	
OGGED B		= 1		CHECKED BY: DATE:	EXCAVATION METHOD		Window Uncased		•					COC	RDIN	ATES	ΕN					SHEET 1 OF 1	
FEMPLATE			BH BET			L L	Uncased	110 4.0	, , , ,					DAT	ES 18/	/11/2	014 -	18/1	1/20	14		PROJECT NO. 995,SI	
	Depth	Dep	h* zi				Strata	1	Gr	aphical Repr	esentation	Sar		g/In-Sit	u Testin	g I			orato	y Testi	ing	Additional Tests and Notes	
and Depth	of Casing	Wa	er biez	Description o	f Strata	Leg	Reduced Level	Deptil	0	SPT 'N' V	alue 80 40	Depths	Type	No.	Blows	SPT N	<425 %	WC %	PL %	LL % Mç	p Cu g/m³ kN/r	n²	
Ī	-			TOPSOIL (Dark brown gravelly s with occasional rootlets. Grave subrounded fine to medium fli	lightly silty clayey sand is angular to nt)			- 0.00				0 - 0.10	J	1								Groundwater not encountered durin	5
				Firm becoming very stiff yellow Gravel of angular to subrounde and subrounded to rounded fir	brown gravelly CLAY. d fine to coarse flint to coarse chalk		- -	0.25				0.30	1	2								No collapse of sidewalls during drilling Metals, PAH, TPH, Moisture content, Sulphate	
				(LOWESTOFT FORMATION) 0.50 - Becoming desiccated wit 0.60 - 1.00 - Becoming dark gre	n depth																		
						 	-																
Ī	-			1.00 - 4.00 - Becoming grey bro	wn mottled with depth		-	_				1-	С		11 12 9 8 8 9	34							
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	-					 	-					3 -	С		68 99 1012	40							
						 	6																
							a a																
						 	đ					4 -											
	-							- 4.00				4-	С		89 1012 1314	49						Windowless sample hole completed a	it 4.0i
						<u> </u>																	
VATER	¥ Sta ¥ Wa	nding v ter stri	vater le kes	vel PIEZOMETER S Upper s Respon Lower s	se zone AND B eal TEST U	Bulk d Undis	disturbed listurbed s turbed san sample	ample	C Cor	ndard peneti e penetratic meability tes		(35) PTNN=	Undis SPT N	sturbec value	i sample	blow c fter sea	ount ting)	0	R	Ge Brig	osphere ghtwell E	Environmental Ltd	SHEET
				DEPTH All depths, level and	J ES	Distur Enviro	bed jar sar onmental s	mple oil sample	e		<		uding	seating	· ·			C	R	Tel	ephone:	01603 298 076 3 298 075	-

CLIENT	: c/o S	avil	S		1	PROJECT: Land to	<u>o the</u>	North \	Nest of	of Ha	Haverhill		GRO	UNDL	EVEL	-						HOLE No. WSB
LOGGED E FIELDWOF		FI			CHECKED BY: DATE:	EXCAVATION METHOD		Window Uncasec		•	•		COO	RDINA	TES I	ΕN						SHEET 1 OF 1
TEMPLATI			S BH BE	TA	DATE.			Uncased	110 2.0	0 111			DATI	ES 18/	11/20	)14 -	18/	'11/2	2014			PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing	Dep C Wa	f∣∺		Description of	of Strata	Leg	Strata Reduced Level		h	SPT 'N' Value Depths	Type Type		u Testing Blows	SPT N	<425 %		PL		esting p Mg/m	Cu 3 kN/m <sup>2</sup>	Additional Tests and Notes
Depth		Wa		Fi Gi ar (L	Description of OPSOIL (Dark brown slightly of sedium flint) irm becoming stiff light orang ravel of angular to subround a subrounded fine to coarse .OWESTOFT FORMATION) .80 - Becoming brown grey m	ravelly <u>clay with</u> ubrounded fine to e brown gravelly CLAY. ed fine to coarse flint chalk		Reduced Level	Depth - 0.00 0.30 		SPT 'N Value         Depths           0         10         20         30         40         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0         0           0	Typ	No.	Blows	SPT N	<425 %	% WC %			Mg <sup>2</sup> m	3 CU KN/m <sup>3</sup>	<ul> <li>Groundwater not encountered during drillin No collapse of sidewalls during drilling Metals, PAH, TPH, Moisture content, pH and Sulphate</li> <li>Infiltration test undertaken at 0.69m depth</li> <li>Windowless sample hole completed at 2.00r depth</li> </ul>
*WATER	¥ Star ¥ Wa	nding ter str	water le ikes	evel	PIEZOMETER Upper Respon Lowers	se zone AND B seal TEST U	Bulk c Undis	listurbed s turbed san	ample	s : C	Permeability test SPT N N =	Undi SPT N	sturbed I value (	sample blows af	blow co ter sea	ount ting)				Bright	well Ba	Environmental Ltd
					DEPTH All depths, level and	J	Distur Enviro	n sample bed jar sar onmental s r Sample	nple oil sample	ole		iding	seating					1		Teleph	ione: (	Environmental Ltd arns, Ipswich Road, iffolk, IP10 0BJ 01603 298 076 298 075

LIENT		Savil	ls			PROJECT: Land to		North \ Window	Nest of	Haverh	ill			GRO	DUND	LEVEL	-						HOLE No. WSC
OGGED E IELDWOF		FI			CHECKED BY: DATE:	EXCAVATION METHOD:		Uncased		•				00	DRDIN	ATES	ΕN						SHEET 1 OF 1
EMPLATE			S BH B	TA	DATE.			Uncased	110 4.0						ES 18/		014 -						PROJECT NO. 995,SI
te/Time and	Depth of		pth*					Strata				esentation	· · · · ·	10	tu Testin		405			ory Te			Additional Tests and Notes
Depth	Casing		ater		Description of		Leg	Reduced Level	Depth	0 10	SPT 'N' Va 20 3	alue 80 40	Depths	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	Mg/m <sup>3</sup>	Cu kN/m²	2
	-			Nt	OPSOIL (Dark brown slightly gr occasional rootlets. Gravel of ar ine to medium flint and occasic ragments)				0.00				0 - 0.20 J	1									No collapse of sidewalls during drilling
				// ⊦ //////////////////////////////////	irm brown slightly gravelly CLA ubrounded fine to medium flin HEAD DEPOSITS)	Y. Gravel of angular to t		- -	0.00	 			0.40 J	2									
					0.60 - Becoming slightly sandy v	vith depth		- 7															
-	-			1	.00 - 1.50 - Becoming soft with	depth		5 - - -	-	••••	· · · · · · · · · · · · · · · · · · ·		1 - C		11 11 22	6							-
				ri t	irm becoming stiff yellow brow ravelly CLAY. Gravel of angular coarse flint and frequent subrou o coarse chalk LOWESTOFT FORMATION)	n/grey mottled to subrounded fine to unded to rounded fine		- - -	1.50														
-	-							d - - -	-		•		2- <sub>C</sub>		4 3 4 3 5 5	17							-
								a - -			·····												
+	-			Ŀ				-	-				3-c		3 3 4 4 5 6	19							50mm diameter monitoring well installed 3.0m
18/11		<u> </u>	50					d - - -			· · · · · · · · · · · ·												Inflow of water at 3.5m
-	-								- 4.00				4 - C		4 4 6 6 6 8	26							Windowless sample hole completed at 4.0 depth
VATER	¥ Sta ¥ Wa	nding Iter st	water rikes	+ - evel	PIEZOMETER S Upper se Respons Lower se	e zone AND B eal TEST U KEY P J	Bulk d Undis Piston Distur	listurbed s turbed sar sample bed jar sai	ample nple mple	C Cone pe K Permea	enetratio	n test t S	PT N N = SPT N*120 = includin	listurbe N value Total b g seatin	d sample (blows a lows/per g	blow c fter sea netratio	ount ting) n	100		DB	Brightv Bightw	vell Ba ell, Su	L Environmental Ltd arns, Ipswich Road, fffolk, IP10 0BJ 01603 298 076
					DEPTH All depths, level and t	FS	Fnviro	onmental s	oil sample	1		<	425 Sample	% passir	ng 425 m	icron sie	eve	6	K	DF	Fax: 0	1603	298 075

CLIENT	c/o Sa	avill	6				PRO	JECT: La	nd to	the	North \	Nest of	f Hav	erhill					GRC	DUND	LEVEL	-						HOLE No. WSD
LOGGED E		1		CHECKEE DATE:	BY:		EXCA	VATION ME	THOD:		Window Jncased		•	1					COC	RDIN	ATES I	ΕN						SHEET 1 OF 1
TEMPLATE			BH BE							Ľ	JIICaset	110 2.0	, , , , ,						DAT	ES 18/	11/20	014 -	18/	11/2	014			PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing	Dep of Wa	:		Des	cription	of Strata			Leg	Strata Reduced Level		G	aphical F SPT '	Represe N' Valu		Sa Depths	nplin I Abe	g/In-Sit No.	Blows	g SPT N	<425 %			LL		Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Bro	wn sligh avel of f	tly sandy lint)	clay with	n occasional	fine		Level	0.00	0	1020	30	40	0				IN	%	%	%	%	ivig/111	KIN/III	Groundwater not encountered during drill No collapse of sidewalls during drilling
				Firm becomin fine to coarse (LOWESTOFT	ng stiff ye e gravel o FORMA	ellow bro of flint an TION)	wn CLAY Id chalk	with occasi	onal			0.30	 	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	····	0.20 0.40	- J	1 2									Metals, PAH, TPH, Moisture content, pH ar Sulphate
				0.70 - 2.00 - E mottled.	Becoming	g pale gre	ey/orange	e brown						• • • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·												Infiltration test undertaken at 0.55m depth
-	-											_			· · · · · · · · · ·	 	- 1	-										_
														· · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	·····												
														• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · ·	·····												
	-											- 2.00			· · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	2	-										Windowless sample hole completed at 2.0 depth
														• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	·····	-											
-	-											-	 	• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	····	3	-										-
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														· · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·												
WATER	¥ Stan ¥ Wat	ding v er stri	vater le kes	evel piezomete	R	Upper Respor Lower	nse zone	SAMPLE AND TEST KEY	B U P	Bulk d Undist Piston	isturbed s turbed sar sample	ample nple	C Co	ndard pe ne penet meability	ration t	test	PTN N = N*1	Undi SPT N 20 =	sturbeo I value Total bl	d sample (blows at ows/per	blow co fter sea	ount ting)	000		D	Brightv Biahtw	vell Ba ell. Su	Environmental Ltd Invironmental Ltd Invironmental Ltd Invironmental Ltd HOLE SDEE SD
				DEPTH All					ES	Enviro	bed jar sai	npie oil sample	Э				425 San	uding iple %	seating passin	) ig 425 mi	cron sie	eve	7	T		eleph	one: (	01603 298 076 5 298 075

*WATER I Standing water level PIEZOMETER WATER I Standing water level PIEZOMETER WATER I Standing water level PIEZOMETER Water strikes WATER I Standing water level PIEZOMETER Water strikes WATER I Standing water level PIEZOMETER Water strikes Water stri	CLIENT	: c/c	o Sa	vills			PROJECT: Land to	o the	North \	Vest of	fHaverhill		GRO	DUND	LEVEI	L						HOLE No. WSE
UNUL 1         Statute of the second part of the second p							EXCAVATION METHOD:						cod	ORDIN	ATES	ΕN						SHEET 1 OF 1
Marting       Case of the set of the					H BET/				JIICaseu	110 4.0	,		DAT	TES 18/	/11/2	014 ·	- 18/	11/2	014			PROJECT NO. 995,SI
WITE       The Section Contract and young using the period       0.00	and	of	f	of	Piez.	Description	of Strata	Leg	Reduced		SPT 'N' Value		T		SPT	<425 %					Cu N/m²	Additional Tests and Notes
*WATER ¥ Standing water level PIEZOMETER Water strikes Wat	18/11		<b>Y</b>	1.80		Firm yellow brown sandy CLAY speckling (HEAD DEPOSITS) Stiff dark brown/pale grey mo Gravel is fine to coarse flint an (HEAD DEPOSITS) Orange brown fine to medium fine to medium flint (HEAD DEPOSITS) Stiff dark brown/pale grey mo Gravel is fine flint and chalk (LOWESTOFT FIORMATION)	with occasional black tled gravelly CLAY. d chalk gravelly SAND. Gravel is		Level	0.40 0.40 1.20		0 - 1 - c		1 1 2 3 2 3 3 4 4 5 5 5	10	%	%	%	%	Mg/m <sup>a</sup> k	<u>N/m²</u>	Rising to 0.8m on completion Moderate inflow of water at 1.8m
	-	-								- 4.00	▲ 	4 - C		3 3 4 5 5 9	23							<ul> <li>Windowless sample hole completed at 4.0m depth</li> </ul>
KEY       P Piston sample       N*120 = Total blows/penetration including seating       Bightwell, Suffolk, IP10 0BJ       Z         J       Disturbed jar sample       including seating       Sample % passing 425 micron sieve       Fax: 01603 298 075       0	*WATER	¥ s ¥ v	Stanc Wate	ing wa r strike	ter lev s	el PIEZOMETER Upper Respor	se zone AND B seal TEST U KEY P J	Bulk d Undist Piston Distur	isturbed sa turbed san sample bed jar sar	ample nple nple	C Cone penetration test K Permeability test SI	(35) Un PT N N = SPT N*120 = includin	disturbe N value Total b q seatin	d sample (blows a lows/per q	blow c fter sea netràtio	count ating) on				Brightwe Bightwell Telephor	ell Ba I, Sui ne: C	rns, Ipswich Road, ffolk, IP10 0BJ

CLIENT	: c/o	Sav	ills					P	ROJE	CT: Lar	nd to	the	North Vindou	Nest o	f Hav	<u>erhi</u>						GRC	DUND	LEVEI	-						HOLE No. WSF
LOGGED E FIELDWOF		GEL			CHECKEI DATE:	D BY:		EΣ	KCAVAT	ION MET	HOD:		Vindow Jncased		•	;1						COC	RDIN	ATES	ΕN						SHEET 1 OF 1
TEMPLAT			AGS E	BH BE								ر د	псазес	110 2.0									ES 18/		014 -	18/	11/2	014			PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		epth of Vate	ie i		De	escriptio	on of Str	ata			Leg	Strata Reduced Level			SF	al Repre PT 'N' Va 20 3	alue		Sar Depths	Type Type	g/In-Sit No.	u Testin Blows	SPT N	<425 %		aborat PL %		esting Mg/m <sup>3</sup>	Cu kN/m²	Additional Tests and Notes
-	-				TOPSOIL (Da fine gravel o Firm becomi occasional fi (HEAD DEPO	ng soft c ne to me	orange	brown s	andy Cl					0.00		· · · · · · · · · · · · · · · · · · ·				0 - 0.20 0.45	- - - - -	1 2									– No collapse of sidewalls during drilling Metals, PAH, TPH, Moisture content, pH an Sulphate
18/11	-	¥	1.30								• • • • • • • • • • • • • • • • • • •			-		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			1 -											- Inflow of water at 1.3m
	_				Stiff dark bro CLAY. Grave (LOWESTOF	own/pale l is fine t T FORM/	e grey r to medi ATION)	mottled um flint	slightly and cha	gravelly alk				1.60			· · · · · · · · · · · · · · · · · · ·			2 -	-										
														2.00			· · · · · · · · · · · · · · · · · · ·	  	  	-	-										Window sample hole completed at 2.00m c
_	_													_		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	3 -	-										-
																	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · ·		-										
-	-													-		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	  	4 -	-										-
*WATER	¥ Sta	andi	ng wa	iter le	vel PIEZOMET		Upp	er seal		<u> </u>			listurbed		S Sta		penetr	ation t	est Bl										Jenen	here F	invironmental Ltd 옷곱 ~ 위
	¥ W	ater	SUTIK	5	DEPTH AI	ER		oonse zo er seal	T K	EST EY	UU PP JD ESE	Jndist Piston Disturk Inviro	sturbed s urbed sar sample bed jar sa nmental s	mple mple	K Pei		netratio ility test			TN N = N*1	SPT N 20 = 1 Jding	value lotal bl seating	ows/per	fter sea ietràtio	ting) n	SIL	D		Brightv Bightw Feleph	vell Ba ell, Su one: (	nvironmental Ltd Irns, Ipswich Road, ffolk, IP10 0BJ 01603 298 076 298 075

CLIENT:		avil	S			PROJECT: Land to	o th	e North V	Vest of	of Hav	verhil					GRO	DUND	LEVE	L				HOLE No. WSG
LOGGED E FIELDWOF		FI			CHECKED BY: DATE:	EXCAVATION METHOD	<i>.</i>	Uncased								00	DRDIN	ATES	ΕN				SHEET 1 OF 1
TEMPLATE			S BH E	BETA													ES 19		014 -				PROJECT NO. 995,SI
and	Depth of Casing	Dep G Wa	oth* of ater	Piez.	Description	of Strata	Leç	Strata Reduced Level	Depth		SF	PT 'N' Val		Deptl	e e	T	tu Testin Blows	CDT	<425 %	Aborat PL %		esting ρ C Mg/m <sup>3</sup> kN	Additional Tests and Notes
Depth	-	Wa			TOPSOIL (Dark brown slightly clay with occasional rootlets. subrounded fine to medium Dark orange brown fine to m (HEAD DEPOSITS) Firm dark orange brown very CLAY. Gravel of angular to su flint (HEAD DEPOSITS) 1.00 - Becoming gravelly with flint 1.10 - 1.70 - Becoming black s Orange brown clayey gravelly (HEAD DEPOSITS)	gravelly slightly sandy Gravel of angular to lint) edium SAND sandy slightly gravelly orounded fine to medium depth. Gravel is coarse .peckled		· · · · · · · · · · · · · · · · · · ·	Depth 0.40 0.70 - 1.70 - 2.00						115 0	No.	Blows	N		%	% //	Mg <sup>/</sup> m <sup>3</sup> kŇ	Groundwater not encountered during drillin Metals, PAH, TPH, Moisture content, pH and Sulphate No collapse of sidewalls during drilling Shear vane test = 70kN/m <sup>2</sup> Infiltration test undertaken at 0.73m depth Shear vane test = 50kN/m <sup>2</sup> Windowless sample hole completed at 2.00r depth
*WATER	▼ Star ⊽ Wa	nding ter sti	water	- leve	SI PIEZOMETER	nse zone AND B	Bulk		ample (	C Co	andard	penetra penetration ility test	test	lows S	35) Und	listurbe	ach 75m d sample (blows a	e blow c	ount			Geosphero	e Environmental Ltd Barns, Ipswich Road, Suffolk, IP10 0BJ
					DEPTH All depths, level an	KEY P J	Pisto Disto S Envi	on sample urbed jar san ronmental se	nple		ti niedu	miy test		N	l*120 = ncluding	Total b g seatin	lows/pe	netràtio	n	R		Felephone	Barns, Ipswich Road, Suffolk, IP10 0BJ e: 01603 298 076 03 298 075

CLIENT	: c/o S	avills			PROJECT: Land to	o the	North \	Nest of	f Haver	hill				GRO	UNDL	EVEL						HOLE No. WSH
LOGGED E		-1		CHECKED BY: DATE:	EXCAVATION METHOD		Uncased							COOF	RDINA	TES E	N					SHEET 1 OF 1
TEMPLATE			BH BET												ES 19/		)14 -					PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing	Dept of Wat	iθ	Description o	fStrata	Leg	Strata Reduced Level			hical Represe SPT 'N' Valu 20 30	e	Sar Depths	e		u Testing Blows	SPT N	<425 %			<u>y Testir</u> LL % Mg	ng Cu ′m <sup>3</sup> kN/m <sup>2</sup>	Additional Tests and Notes
	-			TOPSOIL (Dark brown slightly g angular to subrounded fine to i	avelly clay. Gravel of nedium flint)		1	0.00			 	0 -										Groundwater not encountered during drilli
				Firm orange brown slightly grav occasional sandy pockets. Grav subrounded fine to medium fili (HEAD DEPOSITS) 0.40 - Becoming orange brown.	elly CLAY with el of angular to tt		- -	0.30		·····	· · · · · · · · · · · · · · · · · · ·	0.20 0.40	1	1 2								Borehole collapsed to 1.7m on completion Infiltration test undertaken at 0.24m depth
				depth 0.90 - Becoming slightly sandy v	vith depth	   _©_	ō 															Shear vane test = 61kN/m <sup>2</sup>
	_						5 - - -			· · · · · · · · · · · · · · · · · · ·		1 -										Shear vane test = 40kN/m <sup>2</sup>
				1.70 - 2.00 - With a sandy clay p Soft yellow brown/grey mottle Gravel of angular to rounded fi				1.80			· · · · · · · · · · · · · · · · · · ·	· · · ·										Shear vane test = 36kN/m <sup>2</sup>
-	-			chalk (LOWESTOFT FORMATION)	/	,	đ	- 2.00		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	2 -										Shear vane test = 23kN/m <sup>2</sup> Windowless sample hole completed at 2.0m depth
_	_							_		· · · · · · · · · · · · · · · · · · ·		3 -										
										· · · · · · · · · · · · · · · · · · ·												
	_									· · · · · · · · · · · · · · · · · · ·		4 -										
	-									· · · · · · · · · · · · · · · · · · ·		4 -										
WATER	▼ Star ⊽ Wat	l nding v er stril	vater lev kes	vel PIEZOMETER Upper s Respon	se zone AND B eal TEST U KEY P	Bulk o Undis Pistor	disturbed s listurbed s turbed san sample bed jar sar	ample nple	C Cone	ard penetration to ability test	est	(35) PTNN= N*1	Undist SPT N v	urbed : value (b otal blo	sample l blows aff ws/pene	blow co ter seat	ount ing)	D	d	Brig	htwell Ba htwell, Su	Environmental Ltd arms, Ipswich Road, uffolk, IP10 0BJ 01603 298 076 298 075
				DEPTH All depths, level and	ES	Enviro	onmental s		е		<4	425 Sam				ron sie	ve	0	TO	Fax	phone: 01603	01603 298 076 5 298 075

CLIENT	: c/o S	Savil	ls			PROJECT: Land to	o the	North V	Vest of	Haverhill			GRC	DUND	EVEL	-						HOLE No. WSI
LOGGED E FIELDWOF		FI			CHECKED BY: DATE:	EXCAVATION METHOD:		Uncased					COC	RDINA	ATES E	ΕN						SHEET 1 OF 1
TEMPLAT			GS BH BI	ETA						r				ES 19/		<u>)</u> 14 -						PROJECT NO. 995,SI
ate/Time and Depth	Depth of Casing		pth* of ater	LIG2.	Description o	f Strata	Leg	Strata Reduced Level	Depth	Graphical Representation SPT 'N' Value	Sa Depths	e	<u>g/In-Sit</u> No.	u Testino Blows	SPT N	<425 %		PL %	LL %		Cu <sup>3</sup> kN/m	Additional Tests and Notes
Depth			Ater All and a second s		TOPSOIL (Dark brown slightly g angular to subrounded fine to r Firm brown slightly sandy slight of angular to subrounded fine t (HEAD DEPOSITS) Firm becoming stiff brown/gree Gravel of angular to subrounded and subrounded to rounded ch (LOWESTOFT FORMATION)	ravelly clay. Gravel of medium flint) ly gravelly CLAY. Gravel o medium flint			- 2.00		2 0 0.10 0.30 1 2 3		No. 1 2	2 2 2 2 2 2 2 3 3 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	9		· %	×	<u>%</u>	Mg <sup>r</sup> /m	1 <sup>3</sup> kN/m	<ul> <li><sup>2</sup></li> <li>Groundwater not encountered during drillin Metals, PAH, TPH, Moisture content, pH and Sulphate No collapse of sidewalls during drilling</li> <li>Shear vane test = 62kN/m<sup>2</sup></li> <li>Shear vane test = 78kN/m<sup>2</sup></li> <li>Shear vane test = 80kN/m<sup>2</sup></li> <li>Shear vane test = 76kN/m<sup>2</sup></li> <li>Shear vane test = 76kN/m<sup>2</sup></li> <li>Shear vane test = 76kN/m<sup>2</sup></li> </ul>
*WATER	▼ Sta ⊽ Wa	Inding ater st	g water I trikes	level	I PIEZOMETER	se zone AND B eal TEST U	Bulk ( Undis	I disturbed s disturbed sa sturbed sam n sample	ample	S Standard penetration test E C Cone penetration test K Permeability test S	(35 PTNN=	) Undi SPT N	isturbec V value (	d sample	blow co ter sea	ount ting)			RE	Bright	twell B	Environmental Ltd arns, Ipswich Road, uffolk, IP10 0BJ 01603 298 076 298 075
					DEPTH All depths, level and	j FS	Distu Envir	rbed jar san onmental se		: <		luding	seating	, . ,			C	R		Гејер	hone:	01603 298 076 0 298 075 2



Project	-ax: 016032	298 075		lient	LUG				TRIAL PIT No
-	d to the N	lorth West of Haverh		c/o Sav	lls				
Job No	5,SI	Date 28-10-14 28-10-14	Ground Le		Co-Ordinates	5 ()			– TP1
Fieldwork	-		L	ogged By					Sheet
GEL				SG					1 of 1
Depth 0.00-0.35	TOPSOIL (I - with occas -	E Dark brown slightly grave sional fine to medium bri	ESCRIPTION elly clay. Grav ck fragments	rel is fine to )	medium flint	Legend	Depth	No	Remarks/Tests Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.35-1.50	flint and c (LOWESTC - - 0.80 - 1.50	yellow brown slightly gra halk )FT FORMATION) ) - Becoming gravelly ) - Becoming dark grey w							Trial pit completed at 1.5 depth
J <b>a</b>	1.5				Sho	oring/Su	Jpport: STABLE	NON	E
L		<u>*</u>			310	ionity. 、			



Project			Client	TRIAL PIT No					
Land to the North West of Haverhill				c/o Sav	vills				сат
Job No		Date 28-10-14 28-10-14	d Level (m)	Co-Ordinates	5 ()			- TP2	
99	5,SI	28-10-14							
Fieldwork	Ву	I	1	Logged By	1				Sheet
GEI	_			SG					1 of 1
Depth		Г	DESCRIPT			Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (D	ark brown clay with oc			of flint	Logona	Deptii	NO	Groundwater not
-	_ ``	5		0					encountered during excavation
-	_					-			No collapse of sidewalls during excavation
0.30-1.40	Firm becom	ning stiff dark yellow broken se flint and chalk with o	own sligh	tly gravelly CLA	Y. Gravel of				during excavation
-	fine to coar - (IOWESTOR	se flint and chalk with ( FT FORMATION)	occasiona	al cobble of chal	k and flint				
-	_ (201120101					<u> </u>			
-	0.60 - Beco	ming pale grey/orange	brown m	ottled			0.60-0.80	1B	CBR
-	_								
	_								
	_								
[	1.00 - Beco	ming very gravelly			-				
	_								
_	_								
-	_					_			Trial pit completed at 1.4m depth
-	_					_			
-	_					-			
-	_					-			
-	_					_			
-	_				-	-			
-	_					-			
-	_					-			
-	_					-			
-	-					-			
4	-								
11/11									
GDT									
3_1.0									
AGS									
STD									
2									
20.0									
10-14									
. 31-									
AVEF									
≖ ≩ <b>⊨</b>		<b>⊳</b>							
- 		<b>T</b>							
995,		0.25			Sho	orina/S	upport: I	NON	IE
					Sta	bility:	upport: I STABLE		
GELAGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/ Proceeding									
All dimens	ions in metre	es Method Trial Pit/tr	rench	Plant I	JsedMECHAN EXCAVAT	ICAL			Checked By
ਯ਼ੁੱ Scale 1:20.8	333333333333	33		ÂD					



Project				Client	TRIAL PIT No				
Lar	nd to the No	orth West of Haverh	c/o Sav	ills					
Job No		Date 28-10-14	d Level (m)	Co-Ordinates	5 ()			- TP3	
99	5,SI	Date 28-10-14 28-10-14							
Fieldwork	Ву			Logged By					Sheet
GEI	L			SG					1 of 1
Depth		[	DESCRIPT	ION		Legend	Depth	No	Remarks/Tests
0.00-0.25	TOPSOIL (D	ark brown clay with oc	casional n	nedium gravel o	f flint)		•		Groundwater not
					-				encountered during excavation
0.25-1.50	_ - Firm becom	ning stiff dark vellow br	own CLAY	( with frequent )	fine to coarse				No collapse of sidewalls during excavation
	gravel of fli	ning stiff dark yellow br nt and chalk and occasi T FORMATION)	onal root	s (2mm)					<b>J</b>
-	-								
-	-				-				
-	- 0.65 - Beco	ming gravelly			-				
-	_				-				
-	_ 0.90 - Beco	ming pale grey/orange	brown m	ottled	-				
-					-				
-	-				-				
					-				
	_								
-									
-	-				-				Trial pit completed at 1.5m depth
-	-					-			
-	-				-	-			
-	_				-				
-					-				
-	-				-				
	_				-				
-	_				-				
4									
11/12/									
TOS									
3_1.0									
AGS									
STD									
GINT									
GPJ									
.9°.									
14, L1									
-11-10-									
Ţ,									
VER									
×H× ►	<u> </u>								
z 		<b>_</b> _							
395,3		0.25			Sho	orina/Si	upport.	NON	IF
BETA					Sta	bility:	upport: STABLE		
GELAGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3_1.GDT 11/12/ Proceeding 11/12/ Sroeming 15:50.50 Control of the state of th	ions in metre	es Method Trial Pit/ti	rench	Plant L	JsedMECHAN EXCAVAT	ICAL			Checked By
<u> "Scale 1:20.8</u>	3333333333333	33		ÂD					



	Fax: 01603 2	298 075		I RIAL PIT	LUG				
Project				Client					TRIAL PIT No
Job No		orth West of Haverhi Date 28-10-14 28-10-14		c/o Sav Level (m)	IIIS Co-Ordinate	TP4			
995 Fieldwork	5,SI	28-10-14	 	Logged By					Sheet
GEL	•			SG					1 of 1
	•					Leneral			
Depth 0.00-0.25 0.25-1.50	- Firm becor fine to coa (LOWESTC - 0.55 - Becc -	Di Dark grey brown clay with and occasional coarse gra ning stiff dark yellow bro rse chalk and flint FT FORMATION) oming gravelly	t fine to mediu ick fragments) ly gravelly CLAY	. Gravel is	Legend	Depth 0.60-0.70	No 1B	Remarks/Tests Groundwater not encountered during excavation No collapse of sidewalls during excavation Moisture content, CBR Trial pit completed at 1.5 depth	
<b>F</b>					Sh	oring/Si	upport: 1 STABLE	NON	IE
L	ons in metr 3333333333			Plant U	54	· ··· j· ·			



	Fax: 01603 2	298 075			100				1
Project	al ta tha N			Client					TRIAL PIT No
Lan Job No	u lo the N	orth West of Haverhi		c/o Sav d Level (m)	/IIIS Co-Ordinate	es ()			TP5
	5,SI	Date 28-10-14 28-10-14				00 ()			
Fieldwork				Logged By					Sheet
GEL	-			SG					1 of 1
Depth			ESCRIPT			Legend	Depth	No	Remarks/Tests
0.30-1.50	- Firm becor - medium gr (LOWESTO - 0.60 - Becc	Dark grey brown clay with and occasional coarse gr ning stiff dark yellow bro avel of flint and chalk FT FORMATION) oming gravelly oming pale grey with occa	n freque avel of t wn CLA	nt fine to mediu prick fragments) Y with occasiona	Il fine to		Deptit		Trial pil completed at 1.5
	1.4						innort.		Γ
	ions in motr	es Method Trial Pit/tre	<u>-nch</u>	Plant I	Sr St JsedMECHAI	noring/Su ability: S	STABLE		E Checked By
cale 1:20.8	ions in metro 3333333333333		ench		EXCAVA	TOR			AD



Project

Job No

Fieldwork By

Depth

0.00-0.30

0.30-1.50

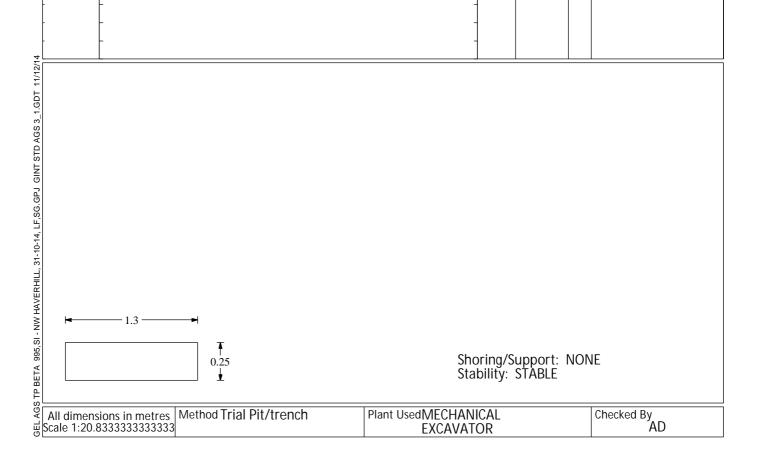
GEL

995,SI

Geosphere Environmental Ltd Brightwell Barns, Ipswich Road Birghtwell, Suffolk, IP10 0BJ Telephone: 01603 298 076 Fax: 01603 298 075

#### TRIAL PIT LOG Client TRIAL PIT No Land to the North West of Haverhill c/o Savills TP6 Date Ground Level (m) Co-Ordinates () 29-10-14 29-10-14 Sheet Logged By SG 1 of 1 DESCRIPTION Legend No Remarks/Tests Depth TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments) No collapse of sidewalls during excavation Firm becoming stiff dark yellow brown very gravelly CLAY. Gravel is fine to coarse flint, chalk and occasionalvcobble of chalk (LOWESTOFT FORMATION) 0 0 0 \_\_\_\_\_ 0.70-1.00 1B \_ و

1.05 - Becoming pale grey 0 \_\_\_\_\_ Very slow inflow of water at 1.5 m Rising to 1.45m after 20 minutes Trial pit completed at 1.5m depth





## TRIAL PIT LOG Client TRIAL PIT No Project Land to the North West of Haverhill c/o Savills TP7 Job No Ground Level (m) Co-Ordinates () Date 30-10-14 30-10-14 995,SI Fieldwork By Logged By Sheet GEL SG 1 of 1 Depth DESCRIPTION Legend Remarks/Tests Depth No TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasionalcoarse gravel of brick fragments 0.00-0.30 No collapse of sidewalls during excavation Firm dark yellow brown very gravelly CLAY. Gravel is fine to coarse flint, chalk and occasional cobble of flint (HEAD DEPOSITS) 0.30-1.20 Moisture content, CBR 0.80 - Becoming pale grey Soft orange brown very gravelly sandy CLAY. Gravel is fine to coarse chalk and flint (HEAD DEPOSITS) 1.20-1.80 Slight seepage inflow of water at 1.8 m Trial pit completed at 1.9m Stiff dark grey CLAY with frequent fine to coarse gravel of chalk and flint (LOWESTOFT FORMATION) 1.80-1.90 depth AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14 - 1.57 -Shoring/Support: NONE Stability: STABLE 0.25 All dimensions in metres Method Trial Pit/trench Scale 1:20.8333333333333 Plant UsedMECHANICAL Checked By ΆD **EXCAVATOR** Ë



Project	-ax: 016032	290 073		Client	100				TRIAL PIT No
	d to the N	lorth West of Haverh		c/o Sav					TP8
Job No <b>99</b> !	5,SI	Date 30-10-14 30-10-14	Ground L	.evel (m)	Co-Ordinate	es ()			
Fieldwork	Ву			Logged By	1				Sheet
GEL				SG					1 of 1
Depth 0.00-0.30 0.30-1.05	TOPSOIL (I flint, chalk Firm becor coarse flin (LOWESTO 0.60 - Becc cobble of (	D Dark grey brown clay with and occasional gravel of ming stiff dark yellow brown t and chalk FT FORMATION) oming dark yellow brown chalk coming pale grey	own gravell	N fine to mediu nents) y CLAY. Grave	No	I       OI       I         Remarks/Tests         Groundwater not encountered during excavation         No collapse of sidewalls during excavation         Trial pit completed at 1.05m depth			
	1.6						upport:		F
		0.25				noring/Su ability: S	STABLE		
All dimensi cale 1:20.8					JsedMECHAN				Checked By



Project Land to the North West of Haverhill ON No 95,SI GEL       Date 30-10-14 33-10-14       Ground Level (m) Co-Ordinates 0       TRIAL PIT No TP9         Image: Comparison of the North West of Haverhill O.00-0.00       Description TopSoll (Derk grey brown clay with frequent fine to medium gravel of finit, chaik and occasional coarse gravel with the fragments)       Logend SG       Depth No       Remark/Tests Corondwater ret: west and/or corondwater ret: west and/or finit, chaik and occasional coarse gravel of finit       I of 1         0.00-0.00       The disk brown CLAY with decasional fine to coarse gravel of finit coarse limit and chaik (LOVESTOFT FORMATION)       I open of fine to coarse limit and chaik (LOVESTOFT FORMATION)       I open of fine to coarse limit and chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely CLAY. Gravel of fine to coarse limit and chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely CLAY. Gravel of fine to coarse limit and chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely CLAY. Gravel of fine to coarse limit and chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely CLAY. Gravel of fine to coarse limit and chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely CLAY. Gravel of fine to coarse limit and chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely CLAY. Gravel of fine to coarse limit and chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely chaik (LOVESTOFT FORMATION)       The disk pellow brown gravely chaik (LOVESTOFT FORMATION)         Image: Logic chaik (LOVESTOFT FORMATION)       I and the din thand the disk pellow brown gravely chaik (LO		Fax: 01603 2	298 075		I RIAL PH	LUG				
Job No       Date 30-10-14       Ground Level (m)       Co-Ordinates ()       IP9         Fieldwork By       Logged By       SG       1 of 1         Depth       DESCRIPTION       Legend       Depth       No       Remarks/Tests         0.00-0.30       TOPSOIL (Dark grey brown clay with Frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)       Groundwater not encountered during excavation         0.30-0.70       Firm dark brown CLAY with occasional fine to coarse gravel of flint       No collapse of sidewalls during excavation       No collapse of sidewalls during excavation         0.70-1.50       Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse fint and chalk (LOWESTOFT FORMATION)       Trial pit completed at 1.57	Project				Client					TRIAL PIT No
Jointol 10       Jointol 2010       Jointol 14       Coordinates ()         Fieldwork By GEL       Logged By SG       Sheet       1 of 1         Depth       DESCRIPTION       Legend       Depth       No       Remarks/Tests         0.00-0.30       TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)       Image: Coordinates ()       Sheet       Coordinates ()         0.30-0.70       Firm dark brown CLAV with occasional fine to coarse gravel of flint (HEAD DEPOSITS)       Image: Coordinates ()       Image: Coordinates ()       No       Remarks/Tests         0.70-1.50       Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse flint and chalk (LOWESTOFT FORMATION)       Image: Coarse flint and chalk (LOWESTOFT FORMATION)       Image: Coarse flint and chalk (LOWESTOFT FORMATION)       Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()         Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()         Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()       Image: Coarse flint and chalk ()         Image: Coarse flint and chalk ()       Image: Coarse flint and chalk () <t< td=""><td></td><td>nd to the N</td><td></td><td></td><td></td><td></td><td></td><td></td><td>ТРО</td></t<>		nd to the N							ТРО	
Fieldwork By GEL     Logged By SG     Sheet       Depth     DESCRIPTION     Legend     Depth     No     Remarks/Tests       0.00-0.30     TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)     Groundwater not encounteed during excavation     Groundwater not encounteed during excavation       0.30-0.70     Firm dark brown CLAY with occasional fine to coarse gravel of flint (HEAD DEPOSITS)     No     Calapse of sidewalls during excavation       0.70-1.50     Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse flint and chalk (LOWESTOFT FORMATION)     Trial pit completed at 1.5r		95,SI	Date 30-10-14 30-10-14	Ground	d Level (m)	Co-Ordinate	es ()			11.7
Depth         DESCRIPTION         Legend         Depth         No         Remarks/Tests           0.00-0.30         TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)         -	Fieldwork	Ву			Logged By					Sheet
0.00-0.30       TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)       Groundwater not encountered during excavation         0.30-0.70       Firm dark brown CLAY with occasional fine to coarse gravel of flint (HEAD DEPOSITS)       Groundwater not encountered during excavation         0.70-1.50       Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse flint and chalk (LOWESTOFT FORMATION)       Total coarse flint and chalk (LOWESTOFT FORMATION)	GE	L			SG					1 of 1
0.30-0.70 Firm dark brown CLAY with occasional fine to coarse gravel of flint (HEAD DEPOSITS) 0.70-1.50 Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse flint and chalk (LOWESTOFT FORMATION) Trial pit completed at 1.5f depth Trial pit completed at 1.5f							Legend	Depth	No	Remarks/Tests
0.30-0.70 Firm dark brown CLAY with occasional fine to coarse gravel of flint (HEAD DEPOSITS) 0.70-1.50 Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse flint and chalk (LOWESTOFT FORMATION) Trial pit completed at 1.5f depth Trial pit completed at 1.5f	0.00-0.30	TOPSOIL (D	Dark grey brown clay with and occasional coarse gra	frequer	nt fine to mediu rick fragments)	m gravel of				Groundwater not encountered during
0.30-0.70 Hirm dark brown CLAY with occasional fine to coarse gravel of flint (HEAD DEPOSITS) 0.70-1.50 Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse flint and chalk (LOWESTOFT FORMATION) Trial pit completed at 1.50 Trial pit completed at 1.50 Completed at	-	-	<u>-</u>				-			
0.70-1.50       Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse filint and chalk (LOWESTOFT FORMATION)	0 30-0 70	Firm dark h	prown CLAY with occasion	al fine t	o coarse gravel	of flint				during excavation
(LOWESTOFT FORMATION)		- (HEAD DEP	POSITS)		e eeu ee graver	0				
(LOWESTOFT FORMATION)	-	-								
(LOWESTOFT FORMATION)	[	_								
(LOWESTOFT FORMATION)	0.70-1.50	Firm becon - coarse flint	ning stiff dark yellow brov t and chalk	wn grave	elly CLAY. Grave	l of fine to				
Trial pit completed at 1.5r depth	-	LOWESTO	FT FORMATION)							
Trial pit completed at 1.5r depth	-	-								
Trial pit completed at 1.5r depth	-	-					- <u> </u>			
Trial pit completed at 1.5r depth	-	-								
Trial pit completed at 1.5r depth										
-     -     -     depth       -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -       -     -     -     -	-									
Image: stability:     Image: stability:     Shoring/Support:     NONE       Image: stability:     Stability:     Stability:     Stability:       Image: stability:     Stability:     Stability:     Stability:	-	-					-			depth
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Image: stability:     Image: stability:     NONE       Image: stability:     Shoring/Support:     NONE       Image: stability:     Shoring:     NONE       Image: stability:     Stability:     Stability:       Image: stability:     Stability:     Stability:	-	-					-			
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Image: stability:       Image: stability:       NONE         Image: stability:       Image: stability:       Shoring/Support:       NONE         Image: stability:       Image: stability:       Stability:       Stability:       Stability:         Image: stability:       Image: stability:       Image: stability:       Sta	[									
Image: stability:       Image: stability:       Shoring/Support:       NONE         Image: stability:       Stability:       STABLE         All dimensions in metres       Method Trial Pit/trench       Plant Used/MECHANICAL       Checked By         Scale 1:20.833333333333       Method Trial Pit/trench       Plant Used/MECHANICAL       Checked By										
Image: scale 1:20.833333333333       Method Trial Pit/trench       Plant Used MECHANICAL EXCAVATOR       Checked By AD										
Image: All dimensions in metres       Method Trial Pit/trench       Plant UsedMECHANICAL EXCAVATOR       Checked By AD										
All dimensions in metres Method Trial Pit/trench Plant Used MECHANICAL Checked By AD										
All dimensions in metres All dimensions in metres Method Trial Pit/trench Plant UsedMECHANICAL EXCAVATOR Checked By AD										
All dimensions in metres All dimensions in metres Scale 1:20.833333333333 Method Trial Pit/trench Plant Used MECHANICAL EXCAVATOR Checked By AD										
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All dimensions in metres Scale 1:20.833333333333 Method Trial Pit/trench Plant UsedMECHANICAL EXCAVATOR Checked By AD										
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Image: Scale 1:20.833333333333       Method Trial Pit/trench       Plant UsedMECHANICAL EXCAVATOR       Checked By AD										
Image: None of the stability:     Image: None of the stability:     Shoring/Support:     NONE of the stability:       All dimensions in metres scale 1:20.83333333333     Method Trial Pit/trench     Plant Used MECHANICAL EXCAVATOR     Checked By AD										
All dimensions in metres Scale 1:20.833333333333	<b>—</b>	17	<b>&gt;</b>							
All dimensions in metres       Method Trial Pit/trench       Plant UsedMECHANICAL       Checked By         Scale 1:20.83333333333       AD			·							
All dimensions in metres     Method Trial Pit/trench     Plant UsedMECHANICAL     Checked By       Scale 1:20.83333333333     AD			0.25			Sh	norina/Sı	upport:	NON	E
All dimensions in metres Method Trial Pit/trench EXCAVATOR Checked By AD			<b>1</b>			St	ability:	STABLE	2	
All dimensions in metres Method Trial Pit/trench Plant UsedMECHANICAL Checked By EXCAVATOR AD										
	All dimens	sions in metre	es Method Trial Pit/tre	ench	Plant L					
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Project	Project Client								
Lar	nd to the No	c/o \$	Savills						
Job No		Date 30-10-14	d Level (m)	Co-Ordinat	tes ()			- TP10	
99	5,SI	Date 30-10-14 30-10-14							
Fieldwork	Ву	1		Logged B	/				Sheet
GEI	_			SG					1 of 1
Depth		Γ	DESCRIPT	ION		Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (D	ark grey brown clay wit and occasional coarse g			dium gravel of		Doptii		Groundwater not
-	- flint, chalk :	and occasional coarse g	ravel of b	orick)		-			encountered during excavation
	-					-			No collapse of sidewalls during excavation
0.30-0.70	Firm dark b - (HEAD DEP	rown CLAY with occasic	onal fine	to coarse gra	vel of flint				during excavation
		03113)				]			
-	_						-		
							-		
0.70-1.40	Firm becom - coarse flint	ning stiff dark yellow bro and chalk	own grav	elly CLAY. Gr	avel is fine to		-		
-	(LOWESTO	FT FORMATION)					-		
-	_0.95 - Beco	ming pale grey/dark yel	llow brow	vn mottled					
-	-						-		
-	_								
-	-					<u> </u>	-		
-									Trial pit completed at 1.4m
-	_					-			depth
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2, SI -		<b>A</b>							
26 A	All dimensions in metres All dimensions in metres Scale 1:20.833333333333 Method Trial Pit/trench Plant UsedMECHANIC EXCAVATO								IE
		<u>+</u>			S	horing/S tability:	STARLE		
Service Servic									
≷ All dimens ש Scale 1:20.8	ions in metre 3333333333333	es Method Trial Pit/tr	rench	Plar	nt UsedMECHA EXCAVA	ANICAL ATOR			Checked By AD
					LNORW				



# Client TRIAL PIT No Project Land to the North West of Haverhill c/o Savills **TP11** Job No Date Ground Level (m) Co-Ordinates () 30-10-14 995,SI 30-10-14 Fieldwork By Sheet Logged By GEL SG 1 of 1 Depth DESCRIPTION Legend No Depth Remarks/Tests TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments) 0.00-0.30 Groundwater not encountered during excavation No collapse of sidewalls during excavation Firm becoming stiff dark yellow brown CLAY with frequent fine to coarse - gravel of flint and chalk (LOWESTOFT FORMATION) 0.30-1.30 Trial pit completed at 1.3m depth AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14 - 1.9 Shoring/Support: NONE Stability: STABLE 0.25 Checked By AD All dimensions in metres Method Trial Pit/trench Scale 1:20.8333333333333 Plant UsedMECHANICAL ЭËГ **EXCAVATOR**



#### TRIAL PIT LOG Client TRIAL PIT No Project Land to the North West of Haverhill c/o Savills **TP12** Job No Date Ground Level (m) Co-Ordinates () 30-10-14 995,SI 30-10-14 Fieldwork By Sheet Logged By SG GEL 1 of 1 Depth DESCRIPTION Legend Depth No Remarks/Tests TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments) 0.00-0.35 Groundwater not encountered during excavation No collapse of sidewalls during excavation Firm becoming stiff dark yellow brown gravelly CLAY. Gravel is fine to coarse flint and chalk (LOWESTOFT FORMATION) 0.35-1.40 0\_\_\_\_ 0 0 0 0.80 - Becoming dark yellow brown/pale grey mottled Q 0 0 0 Trial pit completed at 1.4m depth AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14 - 1.4 -Shoring/Support: NONE Stability: STABLE 0.25 Checked By AD All dimensions in metres Method Trial Pit/trench Scale 1:20.8333333333333 Plant UsedMECHANICAL ЭËГ **EXCAVATOR**



## Client TRIAL PIT No Project Land to the North West of Haverhill c/o Savills **TP13** Job No Date Ground Level (m) Co-Ordinates () 30-10-14 995,SI 30-10-14 Fieldwork By Sheet Logged By GEL SG 1 of 1 Depth DESCRIPTION Legend Depth No Remarks/Tests TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments) 0.00-0.25 Groundwater not encountered during excavation No collapse of sidewalls during excavation - Firm becoming stiff dark yellow brown CLAY with frequent fine to coarse gravel of chalk and flint (LOWESTOFT FORMATION) 0.25-1.40 0.70-0.80 1B Moisture content, CBR 0.80 - Becoming dark grey/dark yellow brown mottled 0.90 - With occasional cobble of flint and chalk Trial pit completed at 1.4m depth AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14 2.0 -Shoring/Support: NONE Stability: STABLE 0.25 Checked By AD All dimensions in metres Method Trial Pit/trench Scale 1:20.8333333333333 Plant UsedMECHANICAL ЭËГ **EXCAVATOR**



AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14

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Geosphere Environmental Ltd Brightwell Barns, Ipswich Road Birghtwell, Suffolk, IP10 0BJ Telephone: 01603 298 076 Fax: 01603 298 075

#### Client TRIAL PIT No Project Land to the North West of Haverhill c/o Savills **TP14** Job No Date Ground Level (m) Co-Ordinates () 31-10-14 995,SI 31-10-14 Fieldwork By Sheet Logged By LF GEL 1 of 1 Depth DESCRIPTION Legend Depth No Remarks/Tests TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of angular to subrounded fine to coarse flint and occasional fine brick and charcoal fragments) 0.00-0.30 Groundwater not encountered during excavation No collapse of sidewalls during excavation Firm becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to 0.30-1.40 0 \_0 coarse flint (LOWESTOFT FORMATION) 0 0 1.00 - Becoming pale brown C Trial pit completed at 1.4m depth - 1.8 -Shoring/Support: NONE Stability: STABLE 0.25 Checked By AD All dimensions in metres Method Trial Pit/trench Scale 1:20.83333333333333 Plant UsedMECHANICAL **EXCAVATOR**





Land to the North West of Haverhill     c/o Savills     TP16       10b No     Date 31-10-14     Ground Level (m)     Co-Ordinates 0     TP16       999,53     107501     Depth     LF     Sheet     1 of 1       0.00.030     Corposition of angular to subformed time to coassional rootlets.     Lagend     Depth     No     Remarks/Tests       0.00.030     Corposition of angular to subformed time to coassional rootlets.     Lagend     Depth     No     Remarks/Tests       0.00.030     Corposition of angular to subformed time to coassional rootlets.     Lagend     Depth     No     Remarks/Tests       0.00.030     Corposition of angular to subformed time to complete the complete t	Project	Fax: 01603	230 013		Client	100				TRIAL PIT No
Job No       Date 31-10-14 31-10-14       Ground Level (m) Logged By LF       Co-Ordinates ()       IP16         BeltWork By GEL       Logged By LF       Sheet       1 of 1         0.00-30       TOPSOIL (Dark brown slightly gravel) casalonal rootlets. Gravel of angular to subrounded fine to coarse finit and occasional troo to rounding the to coarse chaik and angular to subrounded fine to to rounding.       I of 1         0.30-140       Tim becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounding.       I of 0         0.30-140       Tim becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounding.       I of 0         0.30-140       Tim becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounding.       I of 0         0.30-140       Tim becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounding.       I of 0         0.30-140       Tim becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounding.       I of 0         0.30-140       Tim becoming stiff orange brown gravelly CLAY. Gravel of subrounded fine to to rounding.       I of 0         0.30-140       Tim becoming stiff orange brown gravelly CLAY. Gravel of subrounded fine to to rounding.       I of 0         0.30-140       I of 0       I of 0       I of 0         0.30-140       Tim plateophic material       I of 0         0.30-140       I of 0       I of 0       I of 0<	•	d to the N	North West of Hav	verhill		ills				
Fieldwork By     Logged By     Pheet       GEL     LF     1 of 1       Dopth     DSCRPTION     Legend     Depth     No     Generation Statistical Statis	Job No						s ()			– IP16
Depth       DFSCRIPTION       Lagend       Depth       No       Remarks/Tests         0.000.30       TOPSOIL (Dark brown slightly gravelly clay with accasional rootlets. Gravel of angular to subtrounded line to coarse finit and occasional ince- brick and charcoal tragments       No       Remarks/Tests         0.30-1.40       Firm becoming stiff orange brown gravelly CLAY. Gravel of subrounded coarse finit.       Image: Clay Subrounded fine to coarse finit and occasional ince- coarse finit.       Image: Clay Subrounded fine to coarse finit and occasional ince- coarse finit.       Image: Clay Subrounded fine to coarse finit.       Image: Clay Subrounded fine to coarse finit.       Image: Cl					Logged By					Sheet
1.000.00       TOPSOIL Chark brown slightly gravelly clay with accasional rotlets. brick and charcoal fragments       Image: Chark brown slightly gravelly clay with accasional fine	GEL	-			LF					1 of 1
0.30-1.40 Firm becoming stiff orange brown gravely CLW. Gravel of subrounded to rounded the to coarse chaik and angular to subrounded fine to coarse finit curves of the subrounded fine to coarse finit curve	Depth						Legend	Depth	No	Remarks/Tests
0.25 	0.00-0.30	Firm beco to rounde coarse flir (LOWEST( 0.70 - Wit	ming stiff orange bro d fine to coarse chal nt DFT FORMATION) h a cobble of metam oming brown/grey n	ravelly clay v ed fine to co own gravelly k and angula orphic mater	with occasional r arse flint and occ CLAY. Gravel of s r to subrounded		-	Depth	No	Groundwater not encountered during excavation No collapse of sidewalls during excavation
	•	1.4	0.25			Sh	oring/Sy	upport:	NON	Ε
All dimensions in metres Cale 1:20.8333333333333333333333333333333333333	All dimensi	ions in met	¥	it/trench	Plant U			STABLE		Checked By



Project				Client	TRIAL PIT No				
Lar	nd to the No	orth West of Haverhi	ill	c/o Sav	ills				
Job No		Date 31-10-14	Ground	d Level (m)	Co-Ordinates	0			– TP17
99	5,SI	31-10-14							
Fieldwork	Ву	1		Logged By					Sheet
GEI	_			LF					1 of 1
Depth			ESCRIPT			Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (D	ark brown slightly grave	elly clay w	vith occasional r	ootlets.	Legenu	Deptii	NU	Groundwater not
-	- Gravel of fi	Dark brown slightly grave ne to coarse angular to s agments)	súbroúno	ded flint and occ	asional fine				encountered during excavation
-		ignents			-				No collapse of sidewalls during excavation
0.30-1.40	Firm becom	ning stiff yellow brown g ne to coarse chalk and ar	ravelly C	LAY. Gravel of s	ubrounded to				during excavation
-	l flint		ngular to	subrounded fin	e to coarse -				
-	CLOWESTO	FT FORMATION)			-	<u> </u>			
	-				-				
[									
-	0.80 - Beco	ming yellow brown/grey	y mottled	1	-				
-					_				
	-				-				
-	-				-				
-	-				-	 			
-									Trial pit completed at 1.4m
-	_				-	-			depth
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N - 19	1.0	- 1							
895,S		T O 25			She	orina/Si	upport: STABLE		IF
ETA	0.25				Sta	IL			
		<b>±</b>			- 10	- <b>j</b> -			
<u>رە</u>		Mathed Trial Dit /tr	Dianti	Plant UsedMECHANICAL				Checked By	
All dimens	1.8     1.8     0.25     1.20.83333333333 Method Trial Pit/trench				EXCAVAT	AD			



Project				Client	TRIAL PIT No				
Lar		orth West of Haverh	nill	c/o Sav	/ills				TD10
Job No		Date 31-10-14 31-10-14	Groun	d Level (m)	Co-Ordinate:	s ()			- TP18
99	5,SI	31-10-14							
Fieldwork	Ву			Logged By	-				Sheet
GE	_			LF					1 of 1
Depth			DESCRIPT	ION		Legend	Depth	No	Remarks/Tests
0.00-0.30		ark brown slightly grave ne to coarse angular to agments	elly clay v subround	vith occasional ded flint and oc		-	Dopin		Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.50	l flint	hing stiff yellow brown d to rounded chalk and T FORMATION)	gravely c angular t						Trial pit completed at 1.5m depth
GELAGS IP BELA 995,SI - NW HAVERHILL, 31-10-14, LF. 56:GPJ GINI SID AGS 3-1:GDI 11/12/ Branch Participation Statement of the		0.25 0.25	rench	Plant	Sh Sta UsedMECHAN		upport: STABLE	NON	IE Checked By
Scale 1:20.8	ions in metre 33333333333333			Fidill	OR		AD		



Project

Job No

Fieldwork By

Depth

0.00-0.25

0.25-1.50

TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14

- 1.8 -

**T** 0.25

GEL

995,SI

Geosphere Environmental Ltd Brightwell Barns, Ipswich Road Birghtwell, Suffolk, IP10 0BJ Telephone: 01603 298 076 Fax: 01603 298 075

#### TRIAL PIT LOG Client TRIAL PIT No Land to the North West of Haverhill c/o Savills **TP19** Date Ground Level (m) Co-Ordinates () 31-10-14 31-10-14 Sheet Logged By LF 1 of 1 DESCRIPTION Legend Depth No Remarks/Tests TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of fine to coarse angular to subrounded flint and occasional fine Groundwater not encountered during excavation charcoal fragments) No collapse of sidewalls during excavation Firm becoming stiff yellow brown gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint 0 \_\_\_\_ (LOWESTOFT FORMATION) 0 0.90 - Becoming grey/brown mottled ..... 0 Trial completed at 1.5m depth



GEL AG	All dimensions in metres	Plant UsedMECHANICAL EXCAVATOR	Checked By AD



Project	-ax: 01603	298 075		Client	100				TRIAL PIT No
-	d to the N	Jorth West of Have	rhill	c/o Sav					
Job No 99	5,SI	Date 18-11-14 18-11-14	Grour	id Level (m)	Co-Ordinate	es ()			– TP20
Fieldwork				Logged By					Sheet
GEL				LF					1 of 1
Depth			DESCRIPT	ION		Legend	Depth	No	Remarks/Tests
0.30-1.45 	- Firm yello coarse flin (LOWESTC 0.60 - Bec	Dark grey brown slight gular to sub rounded fl w brown grey CLAY. Gr it and subrounded fine DFT FORMATION) oming brown/grey mo	ly gravelly int) avel of and to coarse ttled	silty clay. Gravel					No collapse of sidewalls during excavation Seepage inflow of water - 1.45 m Trial completed at 1.45m depth
	1.3				01				Γ
		0.25			Sh Sta	ioring/Su ability: S	upport: STABLE		
All dimensi scale 1:20.8			/tranah	Diant	sedMECHAN			1	Checked By



	Fax: 01603	298 075			LUG				1
Project	-1 + - +1 N			Client	911 -				TRIAL PIT No
Lan Job No	a to the N	lorth West of Haverh		c/o Sav d Level (m)	IIIS Co-Ordinate	<u>-s ()</u>			– TP21
	5,SI	Date 18-11-14 18-11-14							
Fieldwork				Logged By					Sheet
GEL	-			LF					1 of 1
Depth		C	ESCRIPT	ION		Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (	Dark grey brown slightly gular to sub rounded flin	gravelly	silty clay. Gravel	of fine to				Groundwater not encountered during excavation
	-		-)			-			
0.30-1.35	Firm boco	ming stiff brown gravolly		ravel of angular	to				No collapse of sidewalls during excavation
5.50-1.55	- subrounde	ming stiff brown gravelly ed fine to coarse flint and	subrou	nded to rounded	fine to				
·	(LOWESTC	alk DFT FORMATION)				- <u> </u>			
	-								
	_								
	-								
		oming light brown							
	-	5 5							
	_								
									Trial completed at 1.35r
	-					-			depth
	-					-			
	-					-			
	-								
	-					-			
·	-					-			
	-					-			
	-					-			
								<u> </u>	
-	— 1.3 —	₽							
		<b>T</b>			C٢	orina/s	innort.		F
		0.25			Sr St	noring/Su ability: S	STABLE	NON	L
						5			
All dimens	ions in metr 33333333333	res Method Trial Pit/tr	ench	Plant L	JsedMECHAI	NICAL			Checked By
cale 1:20.8	333333333333	333			EXCAVA	IUR			ÂD



Project				Client	TRIAL PIT No				
Lar	nd to the N	orth West of Haverl	hill	c/o Sa	троо				
Job No				d Level (m)	Co-Ordinates	s ()			- TP22
99	5,SI	Date 18-11-14 18-11-14							
Fieldwork	Ву	1	I	Logged By	1				Sheet
GE	L			LF					1 of 1
Depth			DESCRIPT			Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (I	Dark grev brown slightly	aravelly s	silty clay. Grave	l of fine to	Legena	Deptil	NU	Groundwater not
-	- coarse ang	Dark grey brown slightly Jular to sub rounded flir	nt)			-			encountered during excavation
-	_					-			No collapse of sidewalls during excavation
0.30-1.45	Firm orang	je brown Clay POSITS)							during excavation
-	- (HEAD DEĔ	POSITS)							
-	_								
-	-								
-	_								
-	-								
-	_								
F					-				
ĺ									
	1.30 - Beco	oming sandy							
	 -								Trial completed at 1.45m
-	_								depth
-	-								
-	-								
-	_					-			
-	_				_	-			
-	-					-			
-	-					-			
-	-					-			
-	_					-			
4									
AGS									
STD									
- L									
5.52									
5									
10-14									
-12									
AVE									
≰ ⊨	— 1.3 —								
		——————— <b>—</b> —							
		0.25			Sho	oring/Si	upport:	NON	IE
3ETA					Sta	bility:	upport: STABLE		
GELAGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/ Proceeding and the second se	ions in metr 3333333333333	es Method Trial Pit/t	rench	Plant	UsedMECHAN	ICAL			Checked By
<u> "</u> Scale 1:20.8	333333333333	333			EXCAVAT	OR			ÂD



#### Client TRIAL PIT No Project Land to the North West of Haverhill c/o Savills **TP23** Job No Date Ground Level (m) Co-Ordinates () 18-11-14 995,SI 18-11-14 Fieldwork By Sheet Logged By GEL LF 1 of 1 Depth DESCRIPTION Legend No Remarks/Tests Depth TOPSOIL (Dark brown slightly gravelly clay with rootlets. Gravel of angular to subrounded fine to medium flint) 0.00-0.30 No collapse of sidewalls during excavation Firm orange brown slightly gravelly CLAY. Gravel of angular to subrounded fine to medium flint and chalk (LOWESTOFT FORMATION) 0.30-1.50 0 0 0 Q 0 -1.00 - Becoming slightly sandy with frequent gravel $\nabla$ 0 Seepage inflow of water at 1.2 m 0 \_0\_ \_\_\_\_ Trial completed at 1.5m depth AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14 - 1.3 -Shoring/Support: NONE Stability: STABLE 0.25 Checked By AD All dimensions in metres Method Trial Pit/trench Scale 1:20.83333333333333 Plant UsedMECHANICAL ЭËГ **EXCAVATOR**



	-ax: 01603 2	290 075		IRIAL PIT	100							
Project				Client					TRIAL PIT No			
Land Job No	a to the N	orth West of Haverh		c/o Sav I Level (m)	Ills Co-Ordinates	s ()			– TP24			
ол аоц 9 <b>9</b> 9	5 51	<sup>Date</sup> 18-11-14 18-11-14		i Levei (III)		s ()						
Fieldwork I		10-11-14		Logged By					Sheet			
GEL	5			LF					1 of 1			
Depth		C	ESCRIPTI	ON		Legend	Depth	No	Remarks/Tests			
0.00-0.28	TOPSOIL (	Dark brown slightly grave subrounded fine to med			avel of				Groundwater not encountered during excavation			
	- angular to											
0.28-1.20	Firm becor	ning stiff brown gravelly d fine to coarse flint wit	CLAY. Gra	avel of angular	to				No collapse of sidewalls during excavation			
ŀ	chalk		h frequen	it subrounded f	ine to coarse							
ŀ	· (LOWESTO	FT FORMATION)										
	-											
-												
ŀ	-											
-		oming grey/brown mottle	ed		-							
ŀ												
						-			Trial completed at 1.2m depth			
ŀ						-						
ŀ	-					-						
F	-					-						
F	-					-						
	-											
ŀ	_				-	-						
ŀ						-						
ŀ	-					-						
-	-					-						
4	<u> </u>	<b>&gt;</b>										
	1.5	·										
		0.25			Sh	oring/Si	upport:	NON	IE			
	0.25Shoring/Support: NONE111111											
				1								
All dimensi	ons in metr	es Method Trial Pit/tr	ench	Plant L					Checked By			
All dimensi Scale 1:20.8	ons in metr 3333333333		ench	Plant U	IsedMECHAN EXCAVAT	IICAL			Checked By AD			



Project				Client		TRIAL PIT No			
	d to the No	orth West of Haverh		c/o S					TP25
Job No		Date 18-11-14 18-11-14	Ground	Level (m)	Co-Ordinates	s ()			
	5,SI	18-11-14							
Fieldwork	-			Logged By	,				Sheet
GEI	_			SG					1 of 1
Depth			DESCRIPTIO			Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (B	rown slightly sandy clay int and flint)	y with occa	asional fine t	o medium				
▼ 0.30-1.40	- Firm becon - flint and ch (LOWESTOI - -	int and flint)	ith occasio	onal fine to c					No collapse of sidewalls during excavation Perched inflow of water at 0.3 m
							upport: STABLE		
All dimens	ions in metre	es Method Trial Pit/tr	rench	Plan	t UsedMECHAN EXCAVAT				Checked By AD
	All dimensions in metres Method Trial Pit/trench				EAGAVAI	UK			NU



#### TRIAL PIT LOG Client TRIAL PIT No Project Land to the North West of Haverhill c/o Savills **TP26** Job No Date Ground Level (m) Co-Ordinates () 18-11-14 995,SI 18-11-14 Fieldwork By Logged By Sheet GEL LF 1 of 1 Depth DESCRIPTION Legend No Remarks/Tests Depth TOPSOIL (Brown slightly sandy clay with occasional fine to medium gravel of flint and flint) 0.00-0.20 Firm becoming stiff orange brown gravelly CLAY. Gravel of angular to rounded fine to coarse flint with frequent chalk (LOWESTOFT FORMATION) No collapse of sidewalls during excavation 0.20-1.20 0 \_\_\_\_\_ 0 0.90 - Becoming grey/brown mottled $\nabla$ 0 Perched inflow of water at 1.2 m Trial completed at 1.2m depth AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14 - 1.3 -Shoring/Support: NONE Stability: STABLE 0.25 Checked By AD All dimensions in metres Method Trial Pit/trench Scale 1:20.83333333333333 Plant UsedMECHANICAL ЭËГ **EXCAVATOR**



Project				Client		TRIAL PIT No			
Lar	d to the No	orth West of Haverh	nill	c/o Sav	/ills				тоот
Job No		<sup>Date</sup> 18-11-14 18-11-14	Ground	d Level (m)	Co-Ordinates	s ()			– TP27
99	5,SI	18-11-14							
Fieldwork	Ву	I		Logged By	1				Sheet
GEI	-			LF					1 of 1
Depth			DESCRIPTI	ION		Legend	Depth	No	Remarks/Tests
0.00-0.20	TOPSOIL (B	rown slightly sandy cla nt and flint)			medium		Doptil	110	Groundwater not
-									encountered during excavation
0.20-1.45	-	hing stiff yellow brown fine to coarse flint wi se gravel and cobbles o T FORMATION) ming grey/brown mott		LAY. Gravel of a	angular to to rounded				Trial completed at 1.45m depth
All dimens		0.25 0.25	rench	Plant (	Sho Sta JsedMECHAN EXCAVAT	ICAL	upport: STABLE	NON	E Checked By AD



Project				Client	TRIAL PIT No				
Lar	nd to the No	orth West of Haverh	nill	c/o Sav	vills				трро
Job No		Date 19-11-14	Groun	d Level (m)	Co-Ordinates	s ()			- TP28
	5,SI	Date 19-11-14 19-11-14							
Fieldwork	Ву	•		Logged By					Sheet
GE	L			SG					1 of 1
Depth		[	DESCRIPT	ION		Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (D	ark grey brown slightly	sandy cla	y with occasion	al fine gravel				Groundwater not
	- of flint)					]			encountered during excavation
									No collapse of sidewalls during excavation
0.30-1.50	F chalk	range brown gravelly C	LAY. Grav	el of fine to coa	arse flint and				
-	(HEAD DEP	OSITS)							
-	0.40 haca	ming very gravelly							
-	- 0.00 - Deco	innig very graveny							
	-								
-	-								
-	-				-				
-	1.10 - with	cobble of flint							
-	-								
-									
	-					-			Trial completed at 1.5m depth
-	-					-			
-	-					-			
-	-					-			
-					-	-			
-	_					-			
-	-								
	[								
4									
1/12/									
1 101									
2.1.G									
AGS									
STD									
DINT									
- Las									
0.00									
14, LF									
1-10-									
/ERF									
	<u> </u>								
N - 10	1.5								
995,5		0.25			Sh	orina/Si	upport		IF
ETA		0.25			Sta	ability:	upport: STABLE		IL
GELAGS TP BETA 995,SI-NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/ Proceeding 11/12/ Stratement of the strategy of the strate						2			
All dimens	ions in metre	es Method Trial Pit/t	rench	Plant UsedMECHANICAL				Checked By	
<u>ы</u> Scale 1:20.8	dimensions in metres Method Trial Pit/trench e 1:20.833333333333333				EXCAVAT	OR			ÂD



Project	Fax: 01603	290 075			Client	100				TRIAL PIT No
•	d to the N	orth West of	Haverhill		c/o Sav	vills				
Job No	5,SI	Date 19-11- 19-11-			_evel (m)	Co-Ordinates	s ()			– TP29
Fieldwork	-	., .,	· ·		Logged By					Sheet
GEL	-				SG					1 of 1
Depth				SCRIPTIO			Legend	Depth	No	Remarks/Tests
0.00-0.25	- of flint)	Dark grey brown	0	5 5		Ū	-			Groundwater not encountered during excavation
0.25-0.60	- Firm dark coarse gra - (HEAD DEI -	orange brown sl vel of chalk and POSITS)	ghtly sandy flint	y CLAY w	ith occasiona	l fine to				No collapse of sidewalls during excavation
0.60-1.20	Firm beco - CLAY. Grav - (HEAD DEI - -	ming stiff pale gr vel of fine to coa POSITS)	ey brown/c rse flint an	orange b d chalk	brown mottled	d very gravelly		0.70-0.80	18	CBR
1.20-1.50	<ul> <li>to coarse i</li> </ul>	rey/pale orange chalk FT FORMATION – – – – – – –		ottled gra	avelly CLAY. G	ravel of fine				Trial completed at 1.5m
	-						-			depth
-	-  -					-	-			
	-						-			
							<u> </u>		<u> </u>	
⊨	1.3									_
•	1.3	0.25				Shi Sta	oring/Su ability: S	upport: 1 STABLE	NON	E



AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3\_1.GDT 11/12/14

ЭËГ

Geosphere Environmental Ltd Brightwell Barns, Ipswich Road Birghtwell, Suffolk, IP10 0BJ Telephone: 01603 298 076 Fax: 01603 298 075

#### Client TRIAL PIT No Project Land to the North West of Haverhill c/o Savills **TP30** Job No Date Ground Level (m) Co-Ordinates () 19-11-14 995,SI 19-11-14 Fieldwork By Sheet Logged By SG 1 of 1 GEL Depth DESCRIPTION Legend No Depth Remarks/Tests 0.00-0.20 TOPSOIL (Dark grey brown slightly sandy clay with occasional fine gravel Groundwater not encountered during of flint) excavation Firm dark orange brown slightly sandy CLAY (HEAD DEPOSITS) No collapse of sidewalls during excavation 0.20-0.60 0.20 1J 0.40 2J Stiff pale grey/dark orange brown mottled gravelly CLAY. Gravel of fine to coarse chalk with occasional fine to medium flint (LOWESTOFT FORMATION) 0.60-1.50 Trial completed at 1.5m depth - 1.3 -Shoring/Support: NONE Stability: STABLE 0.25 Checked By AD All dimensions in metres Method Trial Pit/trench Scale 1:20.83333333333333 Plant UsedMECHANICAL **EXCAVATOR**



	Fax: 016032	298 075		Client	LUG				
Project Lan	d to the N	Jorth West of Haverh	hill	c/o Sav	vills				TRIAL PIT No
Job No		Date 19-11-14		Level (m)	Co-Ordinate	es ()			– TP31
	5,SI	19-11-14							
Fieldwork	•			Logged By					Sheet
GEL	-			SG					1 of 1
Depth 0.00-0.30		ا Dark grey brown slightly	DESCRIPTIO		al fine gravel	Legend	Depth	No	Remarks/Tests Groundwater not
5.00 0.30	- of flint)	bark grey brown signity	Sandy cidy		ar fille graver	-			encountered during excavation
	_					-	0.20	1J	No collapse of sidewalls during excavation
0.30-0.65	Firm becor Gravel of f	ming stiff pale grey/yello fine to medium chalk an	ow brown i d flint	mottled gravel	ly CLAY.				during excavation
·	(LOWESTC	OFT FORMATION)					-		
	-						-		
0.65-1.50	LOWESTC	grey gravelly CLAY. Grave DFT FORMATION)	el of fine to	o medium flint			0.70	2J	
	_					<u></u>	-		
	_				-		-		
-	-						-		
	_						-		
	_						-		
							-		Trial completed at 1.5m
	_					-			depth
	-					-			
	-					-			
					-				
	-					-			
-	-					-			
	-					-			
-	_								
	— 1.3 —								
		<b>—</b>							
		0.25			Sh	oring/S	upport: STABLE	NON	E
		<u>+</u>			Sta	ability:	STABLE		
	ions in metr 333333333333	res Method Trial Pit/t	ronolo	Direct I					
All dimonsi			renan	Plant I	JsedMECHAN	JICAI		1	Checked By



Project				Client					TRIAL PIT No
Lar	nd to the Nor	rth West of Haver	hill	c/o Sa	ivills				торо
Job No		Date 19-11-14	Groun	d Level (m)	Co-Ordinate	s ()			- TP32
99	5,SI	19-11-14							
Fieldwork	Ву		•	Logged By	ŀ				Sheet
GE	_			SG					1 of 1
Depth			DESCRIPT	ION		Legend	Depth	No	Remarks/Tests
0.00-0.35	- of flint) - - Firm becomi Gravel is fine	rk grey brown slightly	y sandy cla	y with occasic	-	Legend	Depth	No	Remarks/Tests Groundwater not encountered during excavation No collapse of sidewalls during excavation
GELAGS IP BELA 995,SI - NW HAVERHILL, 31-10-14, LF. 56:GPJ GINI SID AGS 3-1:GDI 11/12/ Branch Participation Statement of the	1.3		trench	Diant			upport: STABLE	NON	
≷  All dimens چ Scale 1:20.8	ions in metres 333333333333333	Method Trial Pit/1	rench	Plant	UsedMECHAN EXCAVA	IICAL FOR			Checked By AD
		1				~			l



Fieldwork By GEL Depth	19-11-14 19-11-14 DE		c/o Sav I Level (m) Logged By	ills Co-Ordinates	; ()			- TP33
Fieldwork By GEL Depth	DE	Ground		Co-Ordinates	; ()			- IP33
Fieldwork By GEL Depth	DE		Logged By					
Fieldwork By GEL Depth	DE		Logged By					
Depth			00 5					Sheet
			SG					1 of 1
		SCRIPTI	ON		Legend	Depth	No	Remarks/Tests
0.00-0.25 TOPSOIL (Dark gre - of flint)	y biown slightly se			al fine gravel	-			Groundwater not encountered during excavation
0.25-1.50 - Firm becoming sti to medium chalk v - (LOWESTOFT FOR 	ff pale grey/yellow vith occasional fine MATION)	v brown e to med	gravelly CLAY. ( Jium flint	Gravel is fine				excavation No collapse of sidewalls during excavation
All dimensions in metres Me Scale 1:20.83333333333	thod Trial Pit/tre	ench	Plant L	Sho Sta IsedMECHAN		ipport: 1 TABLE		E Checked By
식 All dimensions in metres Me 및 Scale 1:20.83333333333333		encn		EXCAVAT	OR			AD

geosphere environmental Itd

# geosphere environmental ltd

Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]

100 110 120

DATE

05 December 2014

Time	Depth to	Boreho	le Dimensi	ions [m]	
	Water	Doronic		iono [m]	
[min]	[mbgl]	Diam	eter	Depth	
0	1.48	0.1	01	1.80	
1	1.48				
2	1.48	Infiltration R			Borehole WS3
3	1.48	Parameter	Unit	Result	
4	1.48	height			Run 1 of 1
5	1.48	h <sub>25</sub>	[m]	1.5600	
10	1.48	h <sub>75</sub>	[m]	1.7200	Test Date 29/10/2014
15	1.48	h <sub>75</sub> -h <sub>25</sub>	[m]	0.160	
20	1.48				Groundwater Encountered at: n/a
30	1.48	time			
45	1.48	t <sub>75</sub>	[s]	N/A	Soakage Rate
60	1.48	t <sub>25</sub>	[s]	N/A	
90	1.48	t <sub>75</sub> - t <sub>25</sub>	[s]	N/A	0 10 20 30 40 50 60 70 80 90
120	1.48	effective volu			1.00
			[m <sup>3</sup> ]	1.28E-03	1.10
		V <sub>75-25</sub>	[111]	1.28E-03	
		effective area			1.20
		ap <sub>50</sub>	7 [m <sup>2</sup> ]	5.88E-02	1.30
		ap <sub>50</sub>	[]	5.002-02	
		infiltration rat	e		<u>E</u> 1.40 - · · · · · · · · · · · · · · · · · ·
		f	[m/s]	N/A	1.50
					1.60
					1.70
					1.80
					mbgl - metres below ground level
					5 5
SITE		CLIENT		REPORT NO	SITE SUPERVISION CALCULATIONS CHECKED BY
NW Haverhill		Savills		995,GI	LF SG AD
				İ	

Page 1 of 1

# geosphere environmental Itd

Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

80

90

100

DATE

05 December 2014

T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]

110 120

Time	Depth to Water	Boreho	le Dimens	ions [m]									
[min]	[mbgl]	Diam		Depth									
0	1.41	0.1	01	1.89									
1	1.41				-								
2	1.41	Infiltration R					Boreh	nole	WS6				
3	1.41	Parameter	Unit	Result									
4	1.41	height					Run		1 of 1				
5	1.41	h <sub>25</sub>	[m]	1.5300									
10	1.41	h <sub>75</sub>	[m]	1.7700			Test I	Date	29/10	)/2014	1		
15	1.41	h <sub>75</sub> -h <sub>25</sub>	[m]	0.240									
20	1.41						Grour	ndwa	ter En	coun	tered	at:	n/a
30	1.41	time											
45	1.41	t <sub>75</sub>	[s]	N/A						So	akage	e Rat	е
60	1.41	t <sub>25</sub>	[s]	N/A									
90	1.41	t <sub>75</sub> - t <sub>25</sub>	[s]	N/A		0	10	20	30	40	50	60	70
120	1.41		I			1.00 +							
		effective volu	me										
		V <sub>75-25</sub>	[m <sup>3</sup> ]	1.93E-03		1.10 -					1111		
						1.20 -							
		effective area	1			1.30 -							
		ap <sub>50</sub>	[m <sup>2</sup> ]	8.41E-02		1.30							
					bgl	1.40		• • • •			<b>,</b>	•••	
		infiltration rat	e		<u> </u>	1.50 -							
		f	[m/s]	N/A	Depth [mbgl]	1.50 T							
					De	1.60 -							
						1.70 -							
						1.70 T							
						1.80 -							
						1.90							
						1.30							
					mb	gl - me	troc ho	low ar		ovol			
					UTT	iyi - me	u es pel	iow gi		evei			
SITE		CLIENT	[	REPORT NO	SIT	E SUPE		N	CALCI	<u>ΙΙ ΑΤΙ</u>	ONS		CHEC
NW Haverhill		Savills		995,GI	LF	2 001 2			SG		5110		AD
		1							1				

Page 1 of 1

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WS6

CHECKED BY

# geosphere environmental ltd

Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

T 01603 298 076 E info@geosphere-environmental.co.uk

Time	Depth to	Boreh	ole Dimens	ions [m]														
	Water																	
[min]	[mbgl]		neter	Depth														
0	1.58	0.	101	2.00														
1	1.58																	
2	1.56 1.56	Infiltration Parameter	Unit	Result			Borel	nole	WS8									
3	1.56	height	Unit	Result			Run		1 of	1								
5	1.56	h <sub>25</sub>	[m]	1.6500			Kuli		1 01	I								
10	1.56	h <sub>25</sub>	[11] [m]	1.8500			Test I	Data	20/1/	1/201 /								
15	1.56	h <sub>75</sub> -h <sub>25</sub>	[11] [m]	0.200			Test	Jale	29/10	J/2014	r							
20	1.56	1175 <sup>-11</sup> 25	[III]	0.200			Grou	adwa		COUNT	torod	l atr	n/o					
30	1.56	time					Grou	iuwa		courr	lereu	al.	n/a					
45	1.56	t <sub>75</sub>	[s]	N/A						Sec		o Dot	-					
60	1.56	t <sub>25</sub>	[0]	N/A						308	akag	e Rat	e				Tim	e [min
90	1.56	t <sub>75</sub> - t <sub>25</sub>	[s]	N/A														
120	1.56	-75 -25	[0]			C + 1.00	) 10	20	30	40	50	60	70	80	90	100	110	120
		effective vol	lume															
		V <sub>75-25</sub>	[m <sup>3</sup> ]	1.61E-03		1.10 -	•••••											
						1.20 -	• • • • • • • •											
		effective are	ea	1		1.30 -	• • • • • • • •											
		ap <sub>50</sub>	[m <sup>2</sup> ]	8.73E-02	_	1.40 -												
					lgdr													
		infiltration ra			Depth [mbgl]	1.50 -		• • • •										
		f	[m/s]	N/A	eptł	1.60												
					Ō	1.70												
						1.80 -												
						1.90 -	• • • • • • • •											
						2.00												
					n	nbgl - m	etres be	low gr	ound l	evel								
					2			NI	0.01.0								A T F	
SITE		CLIENT Savills		REPORT NO 995,GI	S		ervisio	N	CALC SG	ULATIC	JNS		CHEC AD	KED E	3Y		ATE	ember
NW Haverhill		Navinc		1995 [-1		F			N-									

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# geosphere environmental ltd

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Time	Depth to Water	Borehol	e Dimens	sions [m]															
[min]	[mbgl]	Diame	eter	Depth															
0	0.15	0.10	)1	1.68															
1	0.15																		
2	0.15	Infiltration Ra					Bore	ehole	WS1	2									
3	0.15	Parameter	Unit	Result			_												
4	0.15	height		0.5005			Run		1 of	1									
5	0.15	h <sub>25</sub>	[m]	0.5325			_	_											
10	0.15	h <sub>75</sub>	[m]	1.2975			Test	Date	30/1	0/201	4								
15	0.15	h <sub>75</sub> -h <sub>25</sub>	[m]	0.765			-												
20	0.15						Grou	undwa	iter Er	ncoun	itered	l at:	n/a						
30	0.15	time	F . 1																
45	0.15	t <sub>75</sub>	[s]	N/A						So	akag	e Rat	е				<b></b>		
60	0.15	t <sub>25</sub>	[s]	N/A													lime	e <b>[min]</b>	
90	0.15	t <sub>75</sub> - t <sub>25</sub>	[s]	N/A			0 10	20	30	40	50	60	70	80	90	100	110	120	
120	0.15					0.00 0.10	1												
		effective volur				0.20	••••••				• • • • •	• • •							
		V <sub>75-25</sub>	[m <sup>3</sup> ]	6.14E-03		0.30	•												
		effective area				0.40 0.50													
			[m <sup>2</sup> ]	2.51E-01		0.60													
		ap <sub>50</sub>	[]	2.51E-01	[lgu	0.70	<b>-</b>												
		infiltration rate	)		Depth [mbgl]	0.80 0.90													
		f	 [m/s]	N/A	oth	1.00													
			[III/O]		Dep	1.10													
						1.20 1.30	• • • • • •											• • •	
						1.30												111	
						1.50													
						1.60	• · · · · ·												
						1.70													
					r	nbgl - r	netres b	elow g	round	level									
Ē		CLIENT		REPORT NO	k	SITE SU	PERVISI	ON	CALC	ULATI	ONS		CHE	CKED E	37	۱.	DATE		
N Haverhill		Savills		995,GI		.F			SG	5000	0110		AD		~ 1			ember 2	.014
									ĺ.										

Page 1 of 1

# geosphere environmental ltd

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T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]

110 120

DATE

05 December 2014

Time	Depth to Water	Boreho	le Dimens	ions [m]													
[min]	[mbgl]	Diam	eter	Depth													
0	0.70	0.1	01	1.97													
1	0.70																
2	0.70	Infiltration R					Bore	ehole	WS1	4							
3	0.70	Parameter	Unit	Result													
4	0.70	height	1				Run		1 of 1	1							
5	0.70	h <sub>25</sub>	[m]	1.0250													
10	0.70	h <sub>75</sub>	[m]	1.6750			Test	Date	30/10	)/2014	4						
15	0.70	h <sub>75</sub> -h <sub>25</sub>	[m]	0.650													
20	0.70						Grou	undwa	iter En	coun	tered	l at:	n/a				
30	0.70	time	r														
45	0.70	t <sub>75</sub>	[s]	N/A						So	akago	e Rate	e				
60	0.70	t <sub>25</sub>	[s]	N/A													
90	0.70	t <sub>75</sub> - t <sub>25</sub>	[s]	N/A		(	) 10	20	30	40	50	60	70	80	90	100	0
120	0.70					0.00 - 0.10 -											Π
		effective volu				0.20 -											
		V <sub>75-25</sub>	[m <sup>3</sup> ]	5.22E-03		0.30 - 0.40 -											
						0.50 -	• • • • • •										
		effective area				0.60 - 0.70 (											•
		ap <sub>50</sub>	[m <sup>2</sup> ]	2.05E-01	Ξ	0.80 -	• • • • • •										
					Depth [mbgl]	0.90 - 1.00 -	•••••										
		infiltration rate			th	1.10 -	• • • • • •										
		Ť	[m/s]	N/A	.də(	1.20 - 1.30 -											
						1.40 -	• • • • • •										
						1.50 - 1.60 -	•••••										
						1.70 -	• • • • • •										
						1.80 - 1.90 -											
						2.00											
					n	nbgl - m	etres b	elow gi	round l	evel							
SITE		CLIENT	1	REPORT NO		ITE SUP	ERVISI	ON	CALC	ULATI	ONS			KED E	ΒY		D
NW Haverhill		Savills		995,GI	L	F			SG				AD				0

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# geosphere environmental ltd

Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

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90

Time [min]

100 110 120

DATE

05 December 2014

Time	Depth to Water	Boreho	le Dimens	ions [m]												_
[min]	[mbgl]	Diam	eter	Depth												
0	0.900	0.1	01	2.00												
1	0.900															
2	0.900	Infiltration R					Borel	nole	WS1	5						
3	0.900	Parameter	Unit	Result												
4	0.900	height					Run		1 of <i>1</i>	1						
5	0.900	h <sub>25</sub>	[m]	1.1737												
10	0.900	h <sub>75</sub>	[m]	1.7250			Test	Date	30/10	)/201	4					
15	0.900	h <sub>75</sub> -h <sub>25</sub>	[m]	0.551												
20	0.905						Grou	ndwa	iter En	cour	ntere	d at:	n/a			
30	0.905	time	1													
45	0.905	t <sub>75</sub>	[s]	N/A						Sc	baka	ge Ra	te			
60	0.905	t <sub>25</sub>	[s]	N/A												
90	0.905	t <sub>75</sub> - t <sub>25</sub>	[s]	N/A		0	10	20	30	40	50	60	70	80	g	90
120	0.905					0.00										t
		effective volu				0.20 +										
		V <sub>75-25</sub>	[m <sup>3</sup> ]	4.43E-03		0.30 - 0.40 -										ŀ
						0.50 -										
		effective area				0.60 - 0.70 -										
		ap <sub>50</sub>	[m <sup>2</sup> ]	1.83E-01	<u>[]</u>	0.80										
		infiltration rat	۵		Depth [mbgl]	1.00 -										
		f	[m/s]	N/A	oth	1.10 - 1.20 -								 		
		· · · · · · · · · · · · · · · · · · ·	[,0]		Dep	1.30 -										
						1.40 - 1.50 -										
						1.60 +										
						1.70 - 1.80 -								· · · · · ·		
						1.90 -										ŀ
						2.00										
						abal maa	tree be	10.00	round I	aval						
					r r	nbgl - me	erres de	iow gi	rouna l	evei						
SITE		CLIENT	1	REPORT NO	S	SITE SUPE	RVISIO	N	CALC	ULAT	IONS		CHE	CKED	ΒY	
W Haverhill		Savills		995,GI		.F			SG				AD			

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Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

90

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Time [min]

100 110 120

DATE

05 December 2014

Time	Depth to Water	Boreho	le Dimensi	ions [m]											
[min]	[mbgl]	Diam	eter	Depth											
0	0.69	0.10	01	2.00											
1	0.69								-						
2	0.69	Infiltration R					Borel	nole	WSB						
3	0.69	Parameter	Unit	Result			D		4 - 5 4						
4	0.69 0.69	height b	[m]	1.0175			Run		1 of 1						
5 10	0.69	h <sub>25</sub> h <sub>75</sub>	[m]	1.6725			Teet	Data	18/11	1004					
			[m]	0.655			lest	Date	18/11	/2014	-				
15 20	0.69 0.69	h <sub>75</sub> -h <sub>25</sub>	[m]	0.000			Crow	n duya	ter En		ho rod		-		
30	0.69	time					Grou	nawa	ter En	coum	erea	at:	n/a		
45	0.69	t <sub>75</sub>	[s]	N/A						•		Det			
60	0.69	t <sub>25</sub>	[3] [s]	N/A						508	akage	e Rat	е		
90	0.69	t <sub>75</sub> - t <sub>25</sub>	[3] [s]	N/A											
120	0.69	•75 •25	[9]	19/7		0 + 0.00	10	20	30	40	50	60	70	80	90
		effective volu V <sub>75-25</sub> effective area ap <sub>50</sub> infiltration rate f	[m <sup>3</sup> ]	5.26E-03 2.16E-01 N/A	Depth [mbgl]	0.10 0.20 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.20 1.30 1.40 1.30 1.40 1.60 1.70 1.60 1.70 1.80 1.90 2.00 0 0 0 0 0 0 0 0 0 0 0 0	etres be	low gr	ound le	evel					
E / Haverhill		CLIENT Savills		REPORT NO 995,GI	S L	ITE SUPI F	ERVISIO	N	CALCU SG	JLATIC	ONS		CHE( AD	CKED	BY

Page 1 of 1

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90

Time [min]

100 110 120

DATE

05 December 2014

Time	Depth to Water	Borehole	e Dimens	ions [m]											
[min]	[mbgl]	Diame	tor	Depth											
0	0.550	0.10		2.00											
1	0.550	0.10	1	2.00											
2	0.550	Infiltration Ra	te Calcul	ations			Bore	hole	WSD	)					
3	0.560	Parameter	Unit	Result											
4	0.560	height					Run		1 of 1	1					
5	0.560	h <sub>25</sub>	[m]	0.9125											
10	0.560	h <sub>75</sub>	[m]	1.6375			Test	Date	18/11	1/2014	1				
15	0.560	h <sub>75</sub> -h <sub>25</sub>	[m]	0.725											
20	0.570						Grou	ndwa	ter En	coun	tered	l at:	n/a		
30	0.580	time													
45	0.595	t <sub>75</sub>	[s]	N/A						So	akag	e Rat	е		
60	0.600	t <sub>25</sub>	[s]	N/A							-				
90	0.610	t <sub>75</sub> - t <sub>25</sub>	[s]	N/A			0 10	20	30	40	50	60	70	80	90
120	0.620					0.00									
		effective volun				0.10 0.20	• • • • • • • •								
		V <sub>75-25</sub>	[m <sup>3</sup> ]	5.82E-03		0.30	• • • • • • •								
						0.40 0.50									
		effective area				0.60 0.70		• • • • •			•	•			-++
		ap <sub>50</sub>	[m <sup>2</sup> ]	2.38E-01	Ξ	0.80	• • • • • • • •								
					Depth [mbgl]	0.90 1.00	<b>•</b> • • • • • • •								
		infiltration rate			h [r	1.10	• • • • • • •								
		f	[m/s]	N/A	ept	1.20 1.30	<b>.</b>							· · · · · ·	
						1.40	• • • • • • •								
						1.50 1.60	<b>.</b>	· · · · · ·						· · · · · ·	
						1.70	• • • • • • •								
						1.80 1.90	<b>.</b>	· · · · · ·						· · · · · ·	
						2.00									
					n	nbgl - n	netres be	elow gi	round l	evel					
ITE		CLIENT		REPORT NO			PERVISIC	DN		ULATI	ONS			CKED	BY
NW Haverhill		Savills		995,GI	L	F			SG				AD		
													1		

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T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]

05 December 2014

Time	Depth to Water	Borehole Dimensions [m]										
[min]	[mbgl]	Diameter		Depth								
0	0.730	0.0	0.090									
1	0.750											
2	0.760	Infiltration R	ate Calcul	ations		Borehole	WSG					
3	0.765	Parameter	Unit	Result								
4	0.765	height				Run	1 of 1					
5	0.770	h <sub>25</sub>	[m]	1.0475								
10	0.790	h <sub>75</sub>	[m]	1.6825		Test Date	19/11/2014					
15	0.800	h <sub>75</sub> -h <sub>25</sub>	[m]	0.635								
20	0.810			i.		Groundwa	ter Encountered at	n/a				
30	0.830	time										
60	0.870	t <sub>75</sub>	[s]	N/A			Soakage R	ate				
90	0.900	t <sub>25</sub>	[s]	N/A			-		Time [mir			
120	0.930	t <sub>75</sub> - t <sub>25</sub>	[s]	N/A		0 10 20 30	40 50 60 70 80 90	0 100 110 120 130 140	150 160 170 180			
180	0.970		l.		0.	.00 ++ 00.						
		effective volu	effective volume			.10 <b>-</b>						
		V <sub>75-25</sub>	[m <sup>3</sup> ]	4.05E-03	0.	.30 - • • • • • • • • • •						
					0. 0.	.40 - · · · · · · · · · · · · · · · · · ·						
		effective area			0.	.60						
		ap <sub>50</sub>	[m <sup>2</sup> ]	1.86E-01		.70	· · · · · · · · · · · · · · · · · · ·					
					<u>b</u> 0.	.90		• • • • • • • • • • • • • • • • • • • •				
		infiltration rate				.00 - · · · · · · · · · · · · · · · · · ·						
		f	[m/s]	N/A	1. btl	.20 - · · · · · · · · · · · · · · · · · ·						
					1.	.40						
					1.	.50 <b>-</b> · · · · · · · · · · · · · · · · · · ·						
					1.	.70						
					1.	.80 <b>-</b>						
					2.	.00 I						
						mbgl - metres below ground level						
ITE		CLIENT		REPORT NO		SUPERVISION	CALCULATIONS	CHECKED BY	DATE			
NW Haverhill		Savills		995,GI	LF		SG	AD	05 December			

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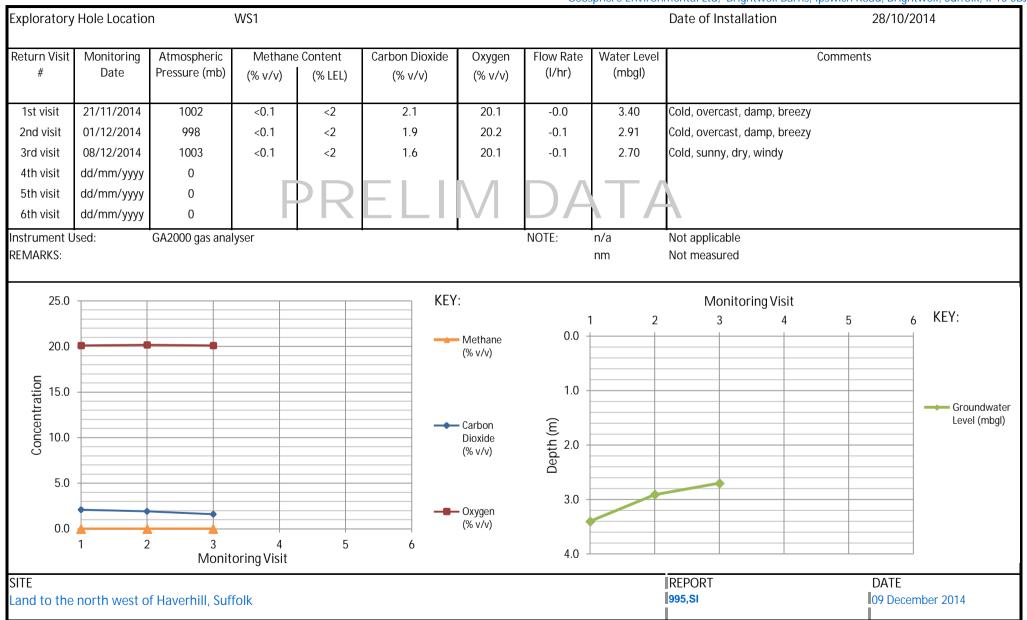
T 01603 298 076 E info@geosphere-environmental.co.uk

Time	Depth to Water	Borehole Dimensions [m]										
[min]	[mbgl]	Diameter		Depth								
0	0.24	0.09	90	2.00								
1	0.26											
2	0.36	Infiltration Rate Calcula				Borehole						
3	0.43	Parameter	Unit	Result			_					
5	0.48	height					Run	1 of	1			
10	0.63	h <sub>25</sub>	[m]	0.6050								
20	0.68	h <sub>75</sub>	[m]	1.3350			Test Date	e 19/1	1/2014			
30	0.69	h <sub>75</sub> -h <sub>25</sub>	[m]	0.730								
60 90	0.68	1/100 0					Groundy	ater Er	ncountered at:	n/a		
90 120	0.68 0.68	time t <sub>75</sub> [s] N/A										
120	0.08		[s]	N/A 540.00				Soakage Rate				Time [min]
		t <sub>25</sub>	[s]									nine [min]
		t <sub>75</sub> - t <sub>25</sub>	[s]	N/A			0 10 2	0 30	40 50 60	70 80	90 10	00 110 120
		effective volume				0.00 · 0.10 ·	•					
		V <sub>75-25</sub>	[m <sup>3</sup> ]	4.65E-03		0.20 0.30						
		▼75-25	[]	4.032-03		0.40						
		effective area	1			0.50 0.60		· · · · · · · ·		· · · · · · · · · · · · · ·	 	
		ap <sub>50</sub>	[m <sup>2</sup> ]	2.97E-01		0.70		•	•		• • • • • • • • •	• • • • • • • • • •
					bgl]	0.80	•					
		infiltration rate	9		Depth [mbgl]	1.00 · 1.10 ·	• · · · · · · · · · · ·					
		f	[m/s]	N/A	pth	1.20	•					
					De	1.30 · 1.40 ·	•				 	
						1.50	•					
						1.60 · 1.70 ·	• · · · · · · · · · ·	 				
						1.80	•					
						1.90 · 2.00 ·	•		• • • • • • • • • • • •			
						mbal - m	netres below	around	level			
						J. 0 0.1.0						
SITE			CLIENT Savills			SITE SUPERVISI			ULATIONS	CHECKED E	3Y	DATE
NW Haverhill	W Haverhill			995,GI		LF		SG		AD		05 December 2014

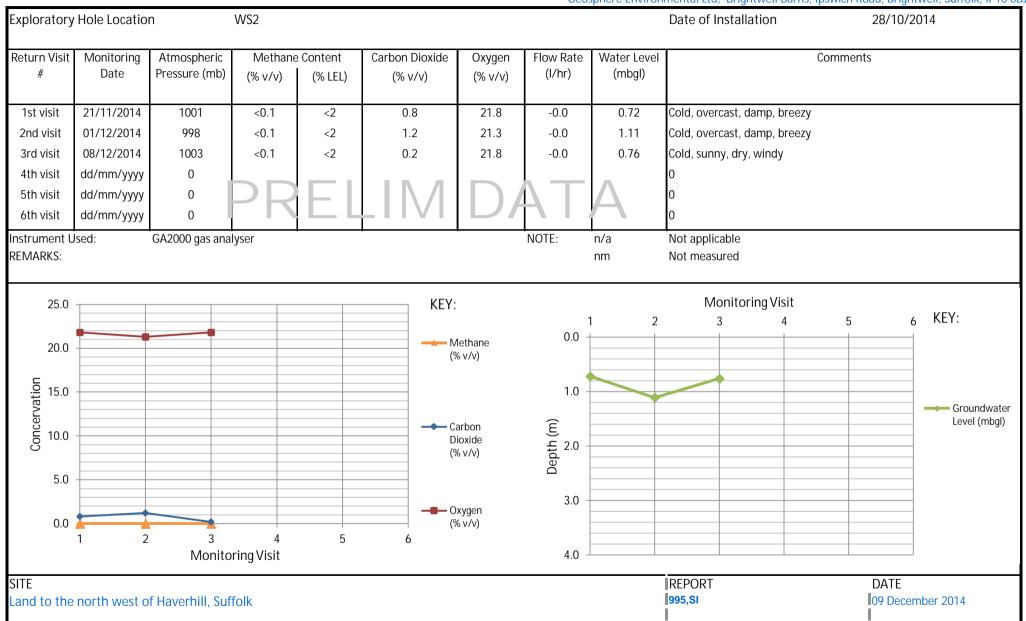
Page 1 of 1

geosphere environmental Itd

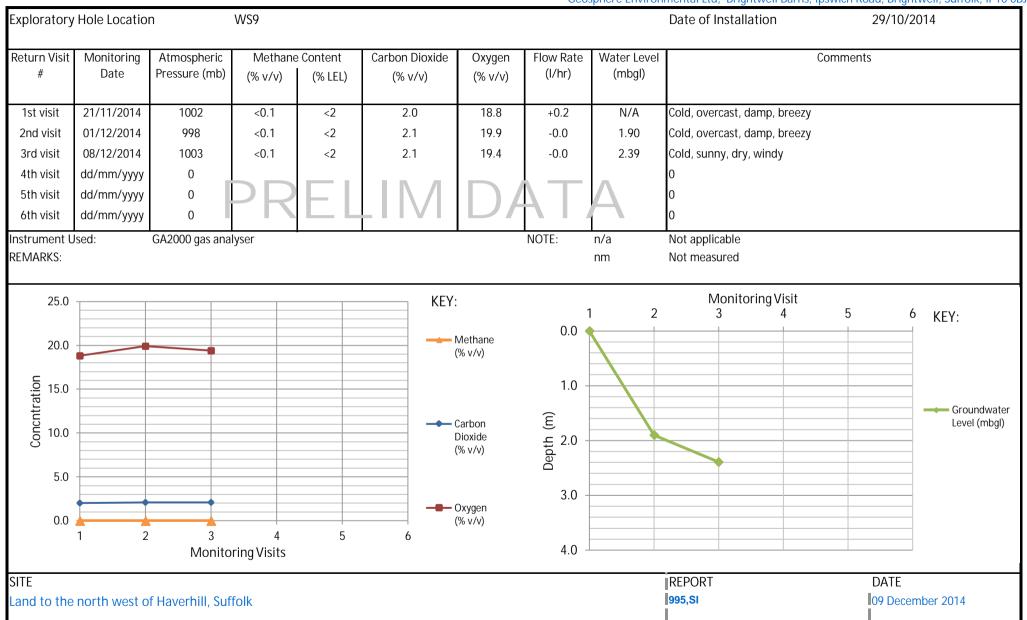
# geosphere environmental Itd



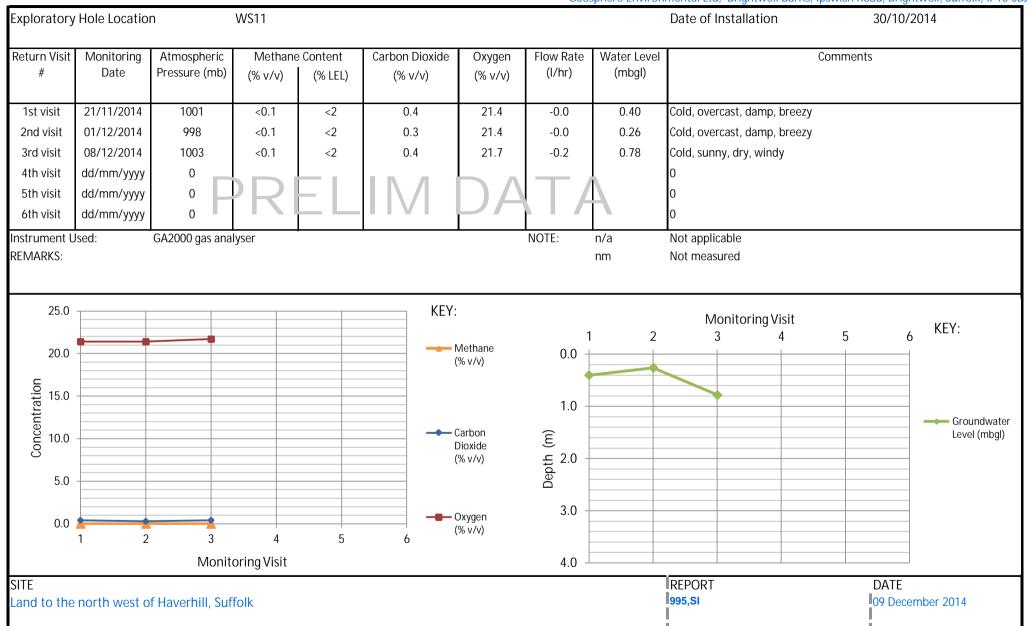
# geosphere environmental Itd



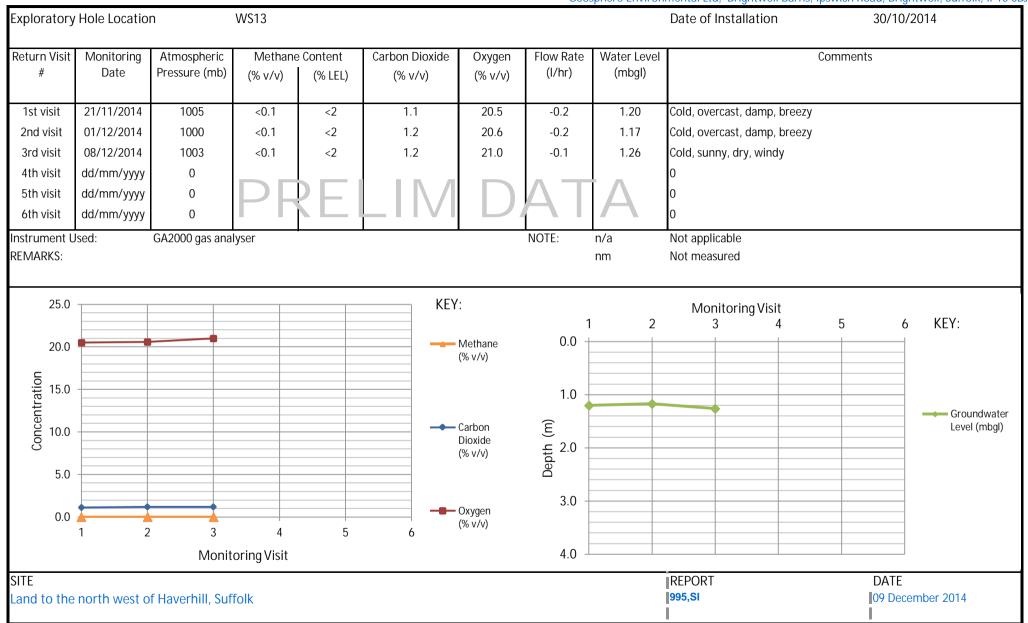
# geosphere environmental Itd



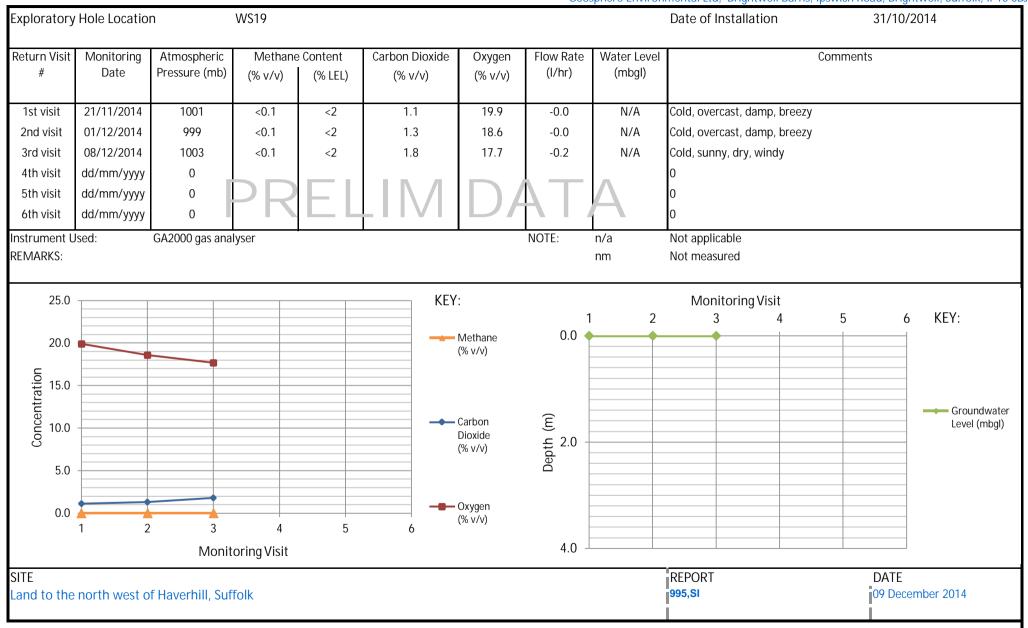
# geosphere environmental Itd



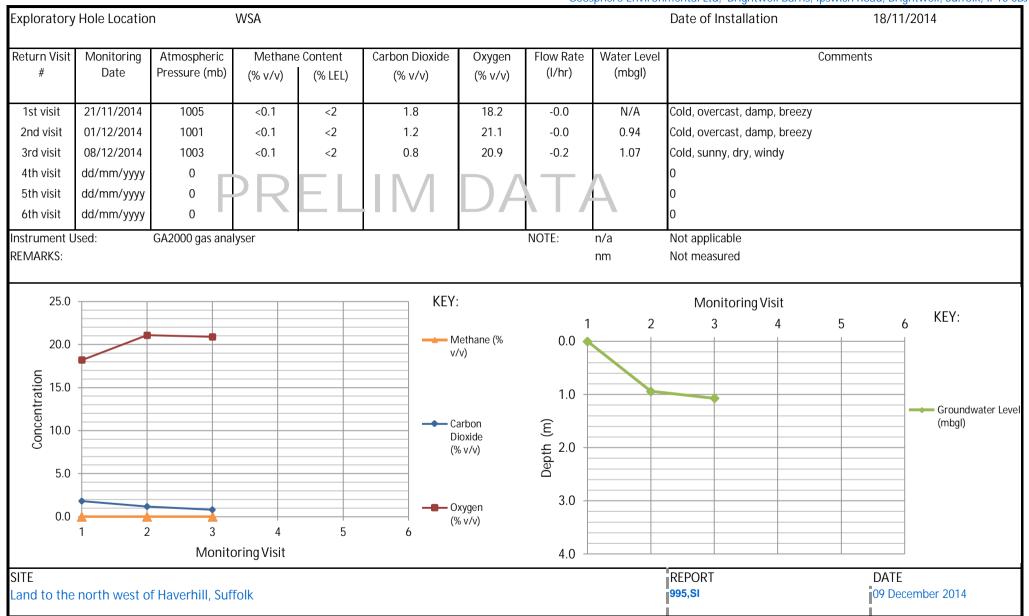
# geosphere environmental Itd



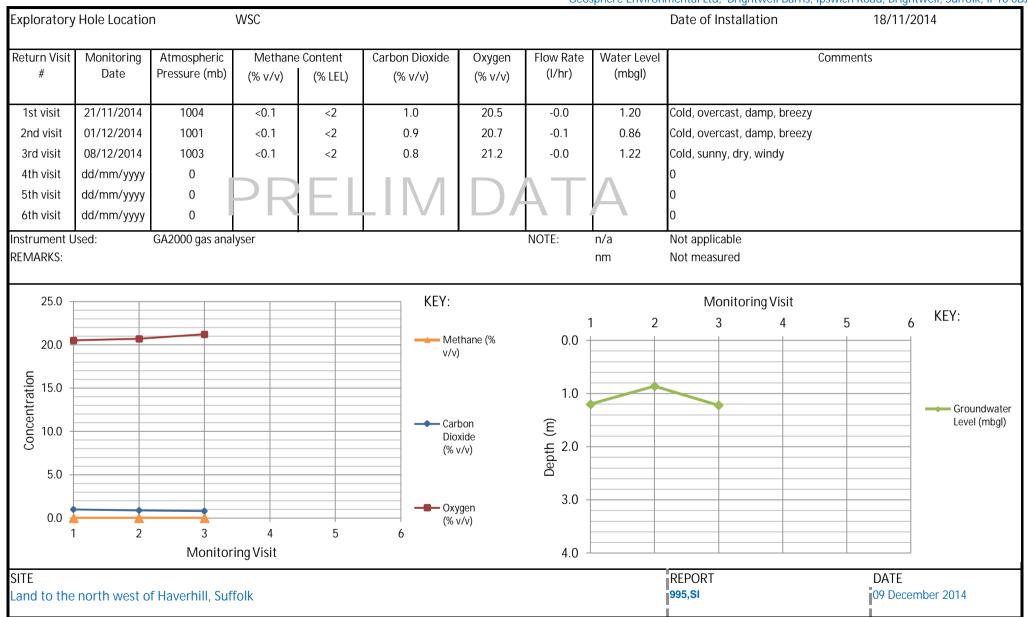
# geosphere environmental Itd



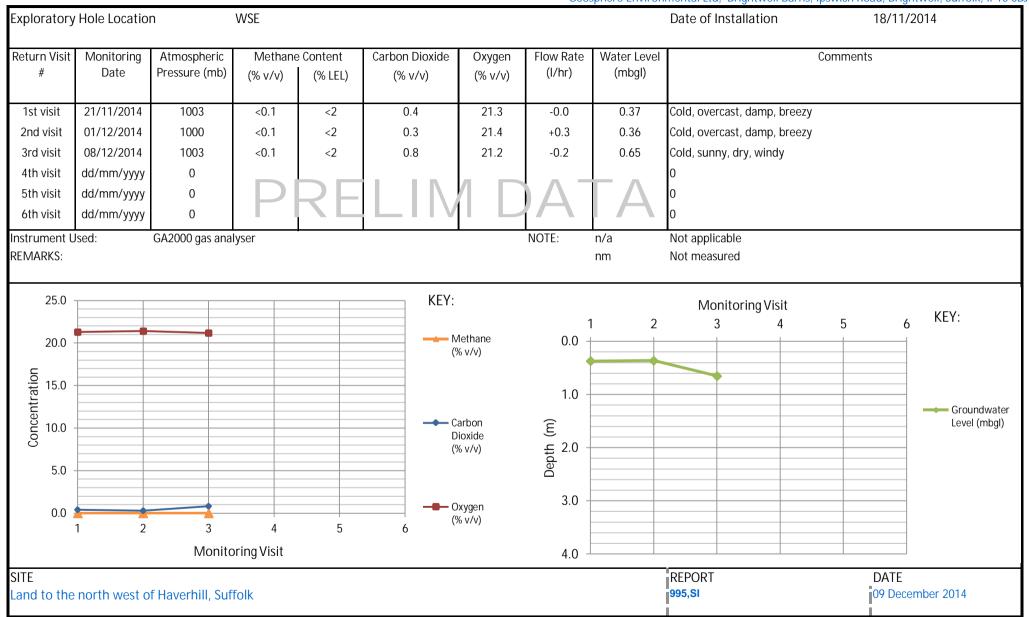
# geosphere environmental Itd



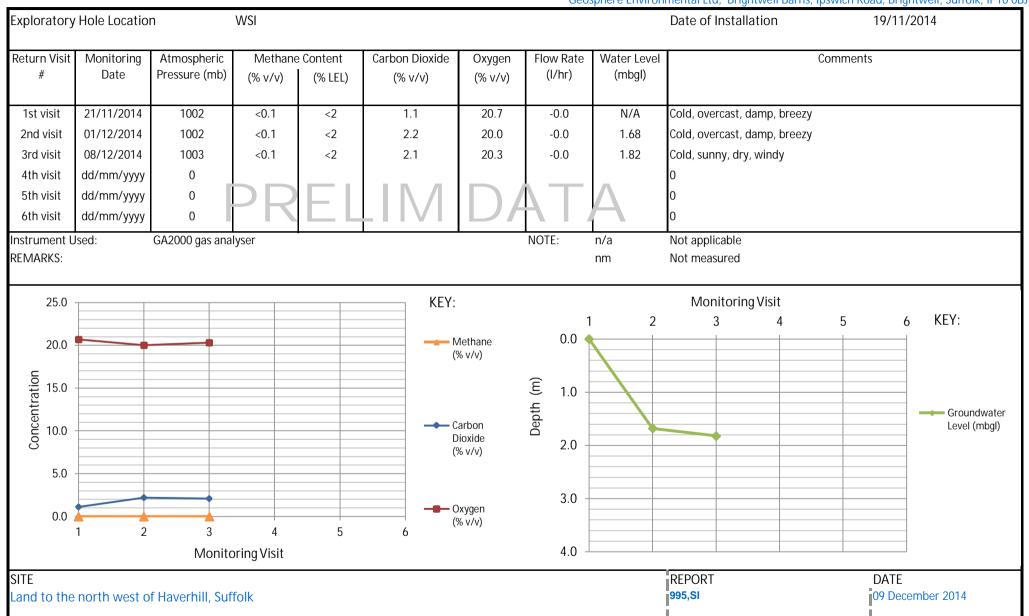
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# geosphere environmental Itd



# geosphere environmental Itd



geosphere environmental Itd



Geosphere Environmental

**Brightwell Barns** 

Ipswich Road

Brightwell Ipswich Suffolk IP10 0BJ

# Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Stephen Gilchrist
Date :	10th November, 2014
Your reference :	995,SI
Our reference :	Test Report 14/13128 Batch 1
Location :	NW Haverhill
Date samples received :	31st October, 2014
Status :	Final report
Issue :	1

Twenty samples were received for analysis on 31st October, 2014 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

ilad D

Phil Sommerton BSc Project Manager

Bob Millward BSc FRSC Principal Chemist

Client Name:	Geosphere Environmental
Reference:	995,SI
Location:	NW Haverhill
Contact:	Stephen Gilchrist
JE Job No.:	14/13128

#### Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

JE Job No.:	14/13128										
J E Sample No.	7-8	9-10	15-16	33-34	35-36	37-38					
Sample ID	J1/WS1	J3/WS1	J2/WS7	J1/WS7	J1/WS8	J1/WS5					
Depth	0.2	0.7	0.4	0.1	0.1	0.1			Please se	otes for all	
COC No / misc										cronyms	
Containers	٧J	٧J	٧J	٧J	٧J	٧J					
Sample Date	28/10/2014	28/10/2014	29/10/2014	29/10/2014	29/10/2014	29/10/2014					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1					
									LOD/LOR	Units	Method No.
Date of Receipt	12.2	9.6	7.2	12.9	12.4	11.6			<0.5	mg/kg	TM30/PM15
Barium #M	78	56	46	75	69	78			<1	mg/kg	TM30/PM15
Beryllium	1.4	1.2	0.8	1.5	1.2	1.4			<0.5	mg/kg	TM30/PM15
Cadmium <sup>#M</sup>	0.3	0.2	0.1	0.2	0.3	0.3			<0.1	mg/kg	TM30/PM15
Chromium <sup>#M</sup>	43.1	34.8	21.0	40.9	37.2	49.9			<0.5	mg/kg	TM30/PM15
Copper <sup>#M</sup>	20	17	14	19	26	19			<1	mg/kg	TM30/PM15
Lead #M	29	14	9	22 <0.1	44	23 <0.1			<5	mg/kg	TM30/PM15 TM30/PM15
Mercury <sup>#M</sup> Nickel <sup>#M</sup>	<0.1 31.1	<0.1 29.5	<0.1 21.8	29.9	<0.1 26.3	30.9			<0.1 <0.7	mg/kg mg/kg	TM30/PM15 TM30/PM15
Selenium #M	<1	<1	<1	<1	<1	<1			<1	mg/kg	TM30/PM15
Vanadium	58	47	28	58	44	58			<1	mg/kg	TM30/PM15
Water Soluble Boron #M	2.2	2.4	0.9	2.3	2.1	2.5			<0.1	mg/kg	TM74/PM32
Zinc #M	88	66	41	82	80	87			<5	mg/kg	TM30/PM15
PAH MS	-0.06	-0.06	-0.06	0.12	-0.06	-0.06			-0.06	ma/ka	TM4/PM8
Benzo(a)anthracene <sup>#</sup> Chrysene <sup>#M</sup>	<0.06 0.04	<0.06 <0.02	<0.06 <0.02	0.12	<0.06 0.04	<0.06 <0.02			<0.06 <0.02	mg/kg mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	<0.07	<0.07	<0.07	0.15	<0.07	<0.07			<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	<0.04	<0.04	<0.04	0.09	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	<0.04	<0.04	<0.04	0.06	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene#	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	0.11	<0.05	<0.05			<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene Benzo(j)fluoranthene	<0.02 <1	<0.02 <1	<0.02 <1	0.04 <1	<0.02 <1	<0.02 <1			<0.02 <1	mg/kg mg/kg	TM4/PM8 TM4/PM8
Total PAH 8	<1.27	<1.27	<1.27	<1.27	<1.27	<1.27			<1.27	mg/kg	TM4/PM8
PAH Surrogate % Recovery	96	98	99	106	95	106			<0	%	TM4/PM8
EPH (C8-C40) <sup>#M</sup>	<30	<30	<30	<30	<30	<30			<30	mg/kg	TM5/PM8
Natural Moisture Content	23.0	21.9	17.3	21.6	23.9	25.9			<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	<0.0015	<0.0015	0.0056	<0.0015	<0.0015	<0.0015			<0.0015	g/l	TM38/PM20
Chromium III	43.1	34.8	21.0	40.9	37.2	49.9			<0.5	mg/kg	NONE/NONE
Organic Matter	2.7	1.5	0.6	2.8	2.8	2.9			<0.2	%	TM21/PM24
pH <sup>#M</sup>	8.18	8.50	8.53	8.33	8.36	8.26			<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay				None	PM13/PM0
Sample Colour	Light Brown	-	-	Light Brown	-	Light Brown				None	PM13/PM0
Other Items	roots	roots	chalk	roots	roots	roots				None	PM13/PM0
						1					

Client Name:Geosphere EnvironmentalReference:995,SILocation:NW HaverhillContact:Stephen Gilchrist

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
					No deviating sample report results for job 14/13128	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/13128

#### SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

#### WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

## Method Code Appendix

### **JE Job No:** 14/13128

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
ТМ30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
ТМ30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes

## Method Code Appendix

### **JE Job No:** 14/13128

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes
ТМ73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes	Yes	AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes



Geosphere Environmental

**Brightwell Barns** 

Ipswich Road

Brightwell Ipswich Suffolk IP10 0BJ

# Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Stephen Gilchrist
Date :	10th November, 2014
Your reference :	995,SI
Our reference :	Test Report 14/13190 Batch 1
Location :	Haverhill
Date samples received :	1st November, 2014
Status :	Final report
Issue :	1

Six samples were received for analysis on 1st November, 2014 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

**Compiled By:** 



Phil Sommerton BSc Project Manager

Bob Millward BSc FRSC Principal Chemist

Client Name: Reference:	995,SI	e Environn	nental		Report :						
Location:	Haverhill	Vilobriat			Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Stephen C	Silchrist									
JE Job No.:	14/13190								1		
J E Sample No.	1	4-5	8-9								
Sample ID	WS10 1J	WS12 1J	WS14 1J								
Depth	0.1	0.1	0.15						Please se	e attached n	otes for all
COC No / misc									abbrevi	ations and a	cronyms
Containers	J	٧J	V								
Sample Date	30/10/2014	30/10/2014	30/10/2014								
Sample Type	Soil	Soil	Soil								1
Batch Number	1	1	1						LOD/LOR	Units	Method No.
Date of Receipt											
Arsenic <sup>#M</sup>	14.7	18.6	14.0						<0.5	mg/kg	TM30/PM15
Barium <sup>#M</sup> Beryllium	71 1.4	72 1.2	67 1.3						<1 <0.5	mg/kg	TM30/PM15 TM30/PM15
Beryllium Cadmium <sup>#M</sup>	0.3	0.4	0.3						<0.5	mg/kg mg/kg	TM30/PM15 TM30/PM15
Chromium #M	43.2	42.3	39.5						<0.5	mg/kg	TM30/PM15
Copper #M	22	21	21						<1	mg/kg	TM30/PM15
Lead #M	29	24	25						<5	mg/kg	TM30/PM15
Mercury #M	<0.1	<0.1	<0.1						<0.1	mg/kg	TM30/PM15
Nickel #M	34.8	37.6	34.7						<0.7	mg/kg	TM30/PM15
Selenium <sup>#M</sup>	<1	<1	<1						<1	mg/kg	TM30/PM15
Vanadium	56	48	58						<1	mg/kg	TM30/PM15
Water Soluble Boron #M	1.2	1.3	1.3						<0.1	mg/kg	TM74/PM32
Zinc #M	90	98	72						<5	mg/kg	TM30/PM15
PAH MS											
Benzo(a)anthracene#	0.12	<0.06	<0.06						<0.06	mg/kg	TM4/PM8
Chrysene #M	0.10	<0.02	<0.02						<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene <sup>#M</sup>	0.16	<0.07	<0.07						<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	0.10	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	0.06	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene <sup>#</sup> Benzo(b)fluoranthene	<0.04 0.12	<0.04 <0.05	<0.04 <0.05						<0.04 <0.05	mg/kg mg/kg	TM4/PM8 TM4/PM8
Benzo(k)fluoranthene	0.12	<0.03	<0.03						<0.03	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1						<1	mg/kg	TM4/PM8
Total PAH 8	<1.27	<1.27	<1.27						<1.27	mg/kg	TM4/PM8
PAH Surrogate % Recovery	93	90	89						<0	%	TM4/PM8
EPH (C8-C40) <sup>#M</sup>	<30	<30	147						<30	mg/kg	TM5/PM8
Natural Moisture Content	20.4	22.7	17.8						<0.1	%	PM4/PM0
Hexavalent Chromium <sup>#</sup>	<0.3	<0.3	<0.3						<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	0.0069	<0.0015	<0.0015						<0.0015	g/l	TM38/PM20
Chromium III	43.2	42.3	39.5						<0.5	mg/kg	NONE/NONE
Organic Matter	3.2	3.6	2.4						<0.2	%	TM21/PM24
рН <sup>#М</sup>	8.11	7.96	8.10						<0.01	pH units	TM73/PM11

Client Name:Geosphere EnvironmentalReference:995,SILocation:HaverhillContact:Stephen Gilchrist

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
					No deviating sample report results for job 14/13190	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/13190

#### SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

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It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

#### WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

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#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

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## ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
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DR	Dilution required.
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NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

## Method Code Appendix

#### **JE Job No:** 14/13190

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
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TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
ТМ30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
ТМ30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes

## Method Code Appendix

### **JE Job No:** 14/13190

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
ТМ73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes	Yes	AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes



Geosphere Environmental

**Brightwell Barns** 

Ipswich Road

Brightwell Ipswich Suffolk IP10 0BJ

# Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Stephen Gilchrist
Date :	1st December, 2014
Your reference :	995, SI
Our reference :	Test Report 14/14102 Batch 1
Location :	Haverhill
Date samples received :	21st November, 2014
Status :	Final report
Issue :	1

Twenty one samples were received for analysis on 21st November, 2014 of which seven were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

**Compiled By:** 



Project Manager



Bob Millward BSc FRSC Principal Chemist

Client Name:	Geosphere Environmental
Reference:	995, SI
Location:	Haverhill
Contact:	Stephen Gilchrist
JE Job No.:	14/14102

#### Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

JE Job No.:	14/14102								_		
J E Sample No.	3-4	5-6	7-8	13-14	19-20	29-30	37-38				
Sample ID	J2 WSA	J1 WSB	J2 WSB	C1 WSD	C1 WSF	J1 WSG	J1 WSI				
Depth	0.3	0.2	0.4	0.2	0.2	0.1	0.1			e attached r	
COC No / misc									abbrevi	ations and a	cronyms
Containers	٧J	٧J	٧J	٧J	٧J	٧J	νJ				
Sample Date	18/11/2014	18/11/2014	18/11/2014	18/11/2014	18/11/2014	19/11/2014	19/11/2014				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1				Method
Date of Receipt	21/11/2014	21/11/2014	21/11/2014	21/11/2014	21/11/2014	21/11/2014	21/11/2014		LOD/LOR	Units	No.
Arsenic <sup>#M</sup>	11.4	15.0	9.4	14.9	13.0	13.1	14.0		<0.5	mg/kg	TM30/PM15
Barium <sup>#M</sup>	70	76	46	79	82	81	79		<1	mg/kg	TM30/PM15
Beryllium	1.1	1.5	1.1	1.6	1.1	1.0	0.9		<0.5	mg/kg	TM30/PM15
Cadmium <sup>#M</sup>	0.2	0.4	0.2	0.3	0.9	0.4	0.3		<0.1	mg/kg	TM30/PM15
Chromium <sup>#M</sup>	46.5	47.8	29.6	48.4	53.9	40.3	52.5		<0.5	mg/kg	TM30/PM15
Copper #M	17	22	15	21	22	17	18		<1	mg/kg	TM30/PM15
Lead #M	16	25	10	23	25	22	23		<5	mg/kg	TM30/PM15
Mercury #M	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM30/PM15
Nickel #M	30.6	39.7	27.6	40.7	25.6	25.1	25.6		<0.7	mg/kg	TM30/PM15
Selenium <sup>#M</sup>	<1	<1	<1	<1	<1	1	1		<1	mg/kg	TM30/PM15
Vanadium Water Soluble Boron <sup>#M</sup>	46 1.9	67 2.9	44 1.4	68 2.6	55 2.9	50 2.3	49 2.2		<1 <0.1	mg/kg mg/kg	TM30/PM15 TM74/PM32
Zinc <sup>#M</sup>	64	89	50	94	79	64	59		<5	mg/kg	TM30/PM15
PAH MS											
Benzo(a)anthracene <sup>#</sup>	<0.06	<0.06	< 0.06	<0.06	<0.06	<0.06	<0.06		<0.06	mg/kg	TM4/PM8
Chrysene <sup>#M</sup>	<0.02	<0.00	<0.00	<0.02	<0.02	<0.00	<0.02		<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07		<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene <sup>#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1		<1	mg/kg	TM4/PM8
Total PAH 8	<1.27	<1.27	<1.27	<1.27	<1.27	<1.27	<1.27		<1.27	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	90	91	124	105	81	89		<0	%	TM4/PM8
EPH (C8-C40) <sup>#M</sup>	51	<30	<30	<30	<30	<30	<30		<30	mg/kg	TM5/PM8
Natural Moisture Content	14.8	29.1	20.1	23.3	24.3	19.5	22.1		<0.1	%	PM4/PM0
Hexavalent Chromium <sup>#</sup>	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	0.0025	0.0020	0.0099	<0.0015	0.0101	<0.0015	0.0030		<0.0015	g/l	TM38/PM20
Chromium III	46.5	47.8	29.6	48.4	53.9	40.3	52.5		<0.5	mg/kg	NONE/NONE
Organic Matter	1.2	2.4	0.7	2.4	3.0	2.1	2.3		<0.2	%	TM21/PM24
pH <sup>#M</sup>	8.46	8.20	8.42	8.37	8.25	8.17	8.07		<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay			None	PM13/PM0
Sample Colour	Medium Brown	Medium Brown	Light Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown			None	PM13/PM0
Other Items	clinker and roots	stones	clinker and vegetation	clinker	grass	none	vegetation			None	PM13/PM0

Client Name:Geosphere EnvironmentalReference:995, SILocation:HaverhillContact:Stephen Gilchrist

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
					No deviating sample report results for job 14/14102	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/14102

#### SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

#### WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

## Method Code Appendix

### **JE Job No:** 14/14102

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
ТМ30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
ТМ30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes

## Method Code Appendix

### **JE Job No:** 14/14102

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes
ТМ73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes	Yes	AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes

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	ISSUED BY	ST REPORT. : SOIL PROPERTY TESTING LTD. : 17/11/14 PAGE 1 of 35 Pages Serial No. S28232
Bri Bri Ips	sphere Environmental ghtwell Barns ghtwell wich 0 OBJ	Ltd. <b>Soil Property Testing</b> 18 Halcyon Court, St Margarets Way, Stukeley Meadows, Huntingdon, Cambs. PE29 6DG. Telephone (01480) 455579 Fax (01480) 453619
		Email enquiries@soilpropertytesting.com
	<b>UBMITTED BY:</b> sphere Environmental	APPROVED SIGNATORIES: Ltd. J.C.GARNER B.Eng (Hons.) FGS Technical Director S.P.TOWNEND FGS Quality Manager T.FOORD BSc (Hons.) FGS Site Services Manager
SAMPLES L	ABELLED: NW Haverhill	
DATE RECE	<b>IVED:</b> 31/10/14	SAMPLES TESTED BETWEEN 31/10/14 and 17/11/14
REMARKS :	For the attention of Your Ref: 995	Mr S Gilchrist
NOTES: 1	All remaining samples will be disposed of a we are notified to th	s or remnants from this contract after 21 days from today, unless ne contrary.
2	(a) UKAS - United Kir	ngdom Accreditation Service.
3	Tests marked "NOT UKA are not included in t this testing laborate	AS ACCREDITED" in this test report the UKAS Accreditation Schedule for bry.
4	This test report may except with the prior	not be reproduced other than in full written approval of the issuing laboratory.

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ISSUED BY : SOIL PROPERTY TESTING LTD.

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Contract NW Haverhill Serial No. S28232

#### SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX Moisture Liquid Plastic Plast-SAMPLE PREPARATION Liqu~ Borehole/ Depth Sample Content Limit Limit icitu idity Ret'd Corr'd Curing Description CLASS Pit No. Π. M∕C Index Index Method 0.425mm Time (%) (%) (%) (%) S/N <0.425mm (%) (%) (hrs.) BHI 1.20 D1 20 37 18 19 0.42\* s 22 (M) 26 24 Stiff yellowish brown CT slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk B∺1 3.45 D3 71 35 1.17 18 0.39\* s 11(M) 24 24 Stiff pale brown slightly CL/ gravelly slightly sandy silty CT CLAY. Gravel is fine and medium chalk BH1 8.00 Ü2 18 33 17 16 0.19\* s 10(M) 20 24 Ward (Extremely high CL. strength) dark grey slightly gravelly slightly sandy silty CLAY/extremely weak MUDSTONE. Gravel is fine and medium chalk and rare flint BH2 2.45 Đ2 19 30 Stiff mottled yellowish brown 3.6 14 0.36\* S 9 (M) 21 24 CL and grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk EH3 4.00 υı 18 48 19 29 0.03\* s 10(M) Very stiff olive grey 20 24 ĊТ slightly gravelly slightly sandy silty CLAY with rare selenite crystals. Gravel is fine to coarse chalk and rare flint BHS 6.50 U2 17 42 17 25 0.04\* S 7 (M) 18 $\mathbf{24}$ Hard (Extremely high C1 strength) dark grey slightly gravelly slightly sandy silty CLAY/extremely weak MUDSTONE. Gravel is fine to coarse chalk внб 2.00 313 18 48 19 29 0.00\* s 6 (M) Very stiff (Very high 19 24 Сī strength) light olive brown slightly gravelly slightly sandy silty CLAY with occasional grey mottling. Gravel is fine and medium chalk METHOD OF PREPARATION : BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2 S = Wet Sieved Specimen N = prepared from Natural : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4 METHOD OF TEST : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter. A = Assumed, M = Measured TYPE OF SAMPLE KEY COMMENTS : Liquidity Index, \*=calculated liquidity index assumes material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1. **REMARKS TO INCLUDE** : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.



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	Donth		noisture	Liquid	Plastic	Plast-	Liqu-		SAMPLE PR	REPARATION	¥.		Ì
Borehole/ Pit No.	Depth	Sample	Content (%)	Limit (%)	Limit (%)	icity Index (%)	idity Index (%)	Method S/N	Ret'd 0.425mm (%)	Corr'd N/C K0.425mm	Time	Description	CLA
BH7	4.00	U2	20	42	19	23	0.13*	S	8 (M)	22	24	Very stiff (Very high strength) dark olive grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse chalk and rare flint	CI
BH8	1.20	D1	24	51	20	31	0.13	N	0 (A)		24	Firm dark yellowish brown slightly sandy CLAY	Сн
TP4	0.60 -0.70	Bl	21	45	21	24	0.13*	5	14(M)	24	72	Stiff olive yellow slightly gravelly slightly sandy silty CLAY with occasional recently active roots. Gravel is fine to coarse chalk and rare flint	CI
TP7	0.70 ~1.00	B1.	20	46	19	27	0.11*	S	7 (M)	22	24	Very stiff olive yellow slightly gravelly slightly sandy silty CLAY with rare recently active roots. Gravel is fine to coarse chalk and rare flint	CI
TP13	0.80 -0.90	81	19	44	20	24	0.04*	C2	11 (M)	21	72	Stiff light yellowish brown slightly gravelly slightly sandy silty CLAY with grey mottling. Gravel is fine to coarse chalk and rare flint	CI
ETHOD OF										S = Wet	Sieve	d Specimen from Natural	
ETHOD OF YPE OF SA			3s 1377 J = Und									er, SPT = Split Spoon Sampl	
		;	С = Сог	e Cutte	er. A =	Assun	ned, M	= Measu	ired		w włast	er, sei = spiit spoon sampl	e,

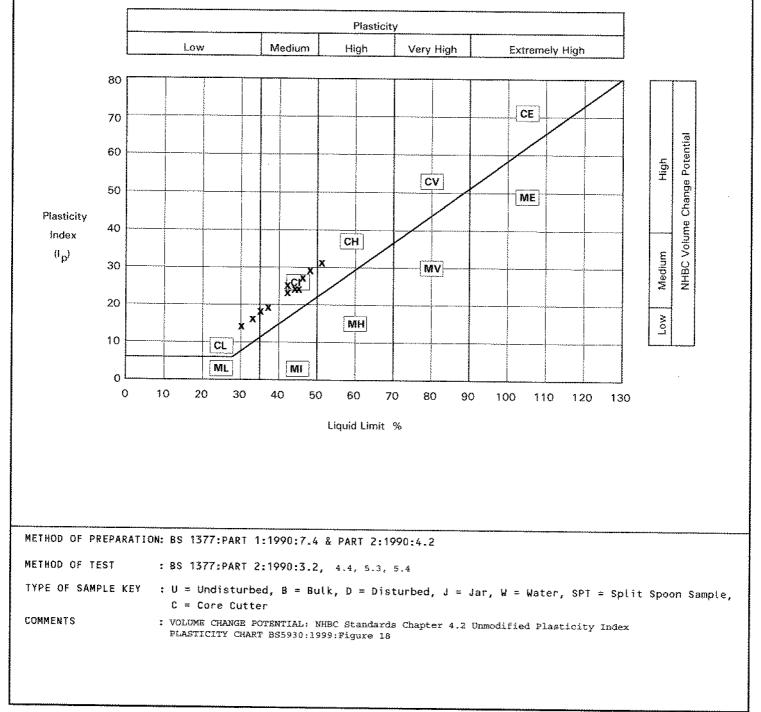


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## PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART



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# OETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT ANO PLASTIC LIMIT AND OERIVATION OF PLASTICITY INDEX ANO LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content X		Description		Remarks		
BHI	I.20	D1	20	Stiff yellowia slightly sandy medium chalk					
	P	REPARAT	ION		Liquid Limit	37 🕺			
Method of Preparation Sieved Specimen					Plastic Limit	18 🕺			
Sample retained 0.425 sieve (Measured) 22 %					Plasticity Index	19 🕺			
Corrected mo	isture content	for material p	assing 0.425mm	26 🕺	Liquidity Index	0.42			
Curing Time				24 Hours	Clay Content	Not analysed. 🔏			
					Derived Activity (PI/CC	)	Not analysed.		
C = CL/ Plastic Index (I <sub>p</sub> ) M = SIL	city %	60 50 40 30 20 10 6 0 10		CI MI MI 40 50	CH CV CV MH MV 60 70 80 9		Tow Medium High High NHBC Volume Change Potential		
METHOD OF	PREPARATI	ON: BS 1377	PART 1:1990	:7.4 & PART		· · · · · · · · · · · · · · · · · · ·			
METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4 TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter									
<pre>COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18 VOLUME CHANGE POTENTIAL: NNEC Standards Chapter 4.2 Unmodified Plasticity Index NOTE: Modified Plasticity Index I'p = Tp x (% less than 425 microns/100) 7% retained on 2mm sieve. Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.</pre>									

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erial No. S28232

# DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description					8enerks	
BH1	3.45	D3	21	Stiff pale brown slightly gravelly slightly sandy silty CLAY. Gravel is fine and međium chalk						
	Р	REPARAT	ION		Liquid Limit				35 🕱	
Method of Preparation Sieved Specimen					Plastic Limit				17 💈	
Sample retair	ued 0.425 siev	e (Measured	1) .	11 %	Plasticity Index				18 🎗	
Corrected mo	sture content	for material p	assing 0.425mm	24 🕺	Liquidity Index				0,39	
Curing Time				24 Hours	Clay Content	Not analysed, 🔏				
					Derived Activity (PI/CC)			Not analysed.		
c = cL/ Plastic Index (I <sub>p</sub> ) M = SIL	ci <b>ty</b> %	70       60       50       40       30       20       10       6	ML					Low Medium High	NHBC Volume Change Potential	
		ION: BS 1377:	20 30 PART 1:1990	40 50	<u>60 78 8</u> 2 • 1990 • 4 - 2	<u>0 90 100</u>	110 120	LIYUI		
METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2 METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4										
<pre>TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter : PLASTICITY CHART BSS930:1999:Figure 18 voLUME CHARGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100) 9% retained on 2mm sizeve. Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.</pre>										

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Borehole/ Pit No.	Depth m.	Sampte	Moisture Content ≰		Descript	tion		Renarks			
BH1	8.00	U2		Hard (Extreme slightly grav CLAY/extremel and medium ch	elly slight: y weak MUDS	ly sandy si TONE. Grave	ltv			· · ·	
	PI	REPARAT	ION		Liquid Lu	nit				33 <b>X</b>	
Method of Pr	eparation	Sieved Specin	nen		Plastic L	mit				17 %	
Sample retai	ned 0.425 siev	e (Measured	1)	10 %	Plasticit	y Index				16 <b>A</b>	
Corrected mo	isture content	for material p	assing 0.425mm	20 <b>%</b>	Liquidity	Index				0.19	
Curing Time				24 Hours	Clay Cont	ent			Not a	unalysed. 🕇	
					Derived A	ctivity (P1/C	C)		Not a	nalysed.	
c = cL) Plasti Index (I <sub>p</sub> )	city %	70       60       50       50       40       30       20       10       6	CL		CH MH		CE		Low Medium High	NHBC Volume Change Potential	
M = SII	_ T	0	20 <u>30</u>	40 50	<u> </u>		90 100	110 120	Liqui	id Limit %	
METHOD O		: BS 1377: : U = Und C = Cor : PLASTICI VOLUME CI NOTE: MO 8% retain Corrected	PART 2:1990 isturbed, B e Cutter FY CHART ES59 HANGE FOTENTI dified Flasti red on 2mm si ed on 2mm si	:7.4 & PART :3.2, 4.4, 5 = Buik, D = 30:1999:Figure AL: NHBC Stand city Index I'n eve. ntent and cald 7:Part2:1990 (	.3, 5.4 Disturbed, e 18 Hards Chapte = Ip x (% rulated light	, J = Jar, er 4.2 Unmo less than	dified Plast 425 microns/	icity Inde 100)	x		

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			tract Haverhil		ye :	Se:	rial No S28232	•	UKAS TESTING 0998
	(*)		I OF MOIST VATION OI						
Borehole/ Pit No.	Depth ສ.	Sample	Moisture Content X		Descrip	tion			Remarks
BH2	2.45	D2		Stiff mottled slightly grav Gravel is find	ally slight	ly sandy silt	ey CLAY.		
		PREPARA	TION		Liquid Li	mit	I		
Method of Pre	paration	Sieved Spec	ímen	······	Plastic L				30 ×
Sample retain	ied 0.425 si			9 %	Plasticit				16 \$ 14 \$
Corrected moi	sture conte	nt for material	passing 0.425mm	21 🕱	Liquidity	Index			0.36
Curing Time				24 Hours	Clay Cont				Not analysed. <b>%</b>
						ctivity (PI/CC)			-
C = CLA	۲.	70							Not analysed.
		60	CL	CI	Сн	cv	CE		
								****	High Potential
		50							dge Po
Plastic	city	40			_				e Change I
Index	%	30	····						Medium NHBC Volume
(I <sub>p</sub> )									Aed BC V
		20	×				~		NH Low
		10			{ <u>MH</u> }	MV]	{ <u>me</u> }		
M ≖ SIL	т.		ML						Liquid Limit %
			<u>20 30</u> 7:PART 1:1990	40 50 :7.4 & PART	<u>60 70</u> 2:1990:4.2	80 90	100	110 120	
METHOD OF			7:PART 2:1990						
TYPE OF S	AMPLE KE	( :U = Un	disturbed, B			J ≕ Jar, W	= Water,	SPT = S	plit Spoon Sample,
COMMENTS		C = CO : PLASTIC VOLUMB NOTE: M 6% reta Correct	re cutter ITY CHART BS59: CHANGE POTENTLA odified Plastic ined on 2mm sie	10:1999:Figure LL: NHEC Stand ity Index I'p we. tent and calc	18 lards Chapte = Ip x (%	er 4.2 Unmodi less than 42	fied Plasti 5 microns/1	city Ind 00}	

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Borehole/ Pit No.	Depth m.	Sample	Hoisture Content %		Description Remarks						
BH3	4.00	U.	18	slightly sandy	Very stiff olive grey slightly gravelly blightly sandy silty CLAY with rare selenite crystals. Gravel is fine to coarse chalk and are flint						
		48 <b>X</b>									
Method of Pri	eparation	Sieved Specin	1en	· · · · · · · · · · · · · · · · · · ·	Plastic Limit		19 💈				
Sample retain	ned 0.425 siev	e (Measured	)	10 🕺	Plasticity Index		29 <b>X</b>				
Corrected mo	isture content	for material p	assing 0.425mm	20 %	Liquidity Index		0.03				
Curing Time				24 Hours	Clay Content		Not analysed, 🕺				
					Derived Activity (PI/CC)	)	Not analysed.				
c = cL/ Plasti Index (I <sub>p</sub> )	city %	70       60       50       40       30       20       10       6			CH CV		Low Medium High NHBC Volume Change Potential				
M = SIL		010	<u>ML</u> 20 30	40 50	<u>60 70 80 90</u>		Liquid Limit %				
			,	1:7.4 & PART							
METHOD OF TYPE OF S Comments	<sup>2</sup> TEST Sample Key	: U = Undi C = Core : PLASTICIT VOLUME CH NOTE: Mod 5% retain Corrected	Sturbed, B Cutter Y CHART BS59 ANGE POTENTI Lified Plasti Led on 2mm si Moisture co	30:1999:Figure AL: NHEC Stand City Index I'p eve. ntent and calc	Disturbed, J = Jar, W	fied Plasticity Inde S microns/100)	ex				
		1			TTTTAK O NOLW Y.						

Borehole/	Al Depth	DATE Cont NW 1	DED BY COF ISS Tract Haverhil OF MOIS (ATION O Moisture	: SOIL UE : As pa 1 FURE CON		STING LTD. of 35 Serial No. S28232	
Pit No. BH5	M. 6.50	U2	Content *	77-5-5-7-3 (77-0-1-1-5-5-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	ly high strength) da:		NOJIGE 65
			1,	slightly grave	elly slightly sandy ; y weak MUDSTONE. Grav	silty	
	PF	REPARAT	ION		Liquid Limit		42 \$
Method of Pre	eparation s	Sieved Specin	nen		Plastic Limit		E7 🕱
Sample retain	ned 0.425 sieve	) (Measured	1)	7 %	Plasticity Index		25 🕺
Corrected mo	isture content	for material p	assing 0.425mm	18 🕺	Liquidity Index		0.04
Curing Time				24 Hours	Clay Content		Not analysed. 🛪
					Derived Activity (PI	/00)	Not analysed.
c = cL/ Plastic Index (I <sub>p</sub> )	city 4		CL	×	CH CV	CE	v Medium High NHBC Volume Change Potential
METHOD OF	T PREPARATIO TEST	: BS 1377:	PART 2:1990	40 50 :7.4 & PART : :3.2, 4.4, 5	.3, 5.4	90 100 110	Liquid Limit %
TYPE OF S	SAMPLE KEY	C = COP : PLASTICI: VOLUME CI NOTE: Mod 5% retain Corrected	e Cutter NY CHART ES59 HANGE POTENTI lified Plasti ned on 2mm si 1 moisture co	30:1999:Figure AL: NHBC Stand city Index I'p eve. ntent and calc	- 18 ards Chapter 4.2 Uns = Ip x (% less than	Dodified Plasticity 425 microns/100)	= Split Spoon Sample, Index greater than 0.425mm

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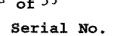


Borehole/ Pit No.	Depth m.	Sæmple	Moisture Content %		Description R					Remarks		
BH6	2.00	υı	18	Very stiff (V brown slight) CLAY with occ fine and medi	y gravelly s asional grey	lightly sand	ly silty					
	PF	REPARAT	ION		Liquid Lim	it				48 <b>X</b>		
Method of Pr	eparation :	Sieved Specin	តខរា		Plastic Lin	nit				19 📫		
Sample retai	ned 0.425 sieve	e (Measured	1)	6 %	Plasticity	Index				29 <b>%</b>		
Corrected mo	isture content	for material p	assing 0.425mm	19 🕺	Liquidity	Index				0.00		
Curing Time				24 Hours	Clay Conter	nt			Not a	nalysed. 💈		
					Dørived Act	tivity (PI/CC)			Not a	nalysed.		
<sup>c</sup> ≖ c⊔/ Plasti Index (I <sub>p</sub> )	city "		CL.	CI	CH		CE		Low Medium High	NHBC Volume Change Potential		
M = SII	. F	0 L <u>10</u>	20 30	40 50	60 70	80 90		110 120	Liqui	d Limit %		
METHOD OF		: BS 1377; : U = Und C = Cor : PLASTICI VOLUME C NOTE: Moc 4% retain Corrected	PART 2:1990 isturbed, B e Cutter TY CHART ES59 HARGE FOTENTI dified Plasti aed on 2mm si i moisture co	2:7.4 & PART 2:3.2, 4.4, 5 = Bulk, D = 30:1999:Figure AL: NHBC Stand city Index I'; eve. ntent and cale 7:Part2:1990 (	.3, 5.4 Disturbed, all lands Chapter = Ip x (% )	r 4.2 Unmodi less than 42	fied Plast: 5 microns/	icity Inde: 190)	¢			

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Borehole/ Pit No.	Depth m.	Sample	Moisture Content X	Description Remarks				rks		
<b>洛</b> 拱7	4.00	U2		Very stiff (Ve grey slightly CLAY. Gravel i flint	gravelly	slightly say	ldy silty			
	PF	REPARAT	ION		Liquid	Limit				42 \$
Method of Pri	eparation s	ieved Specin	000		Plastic	Limit				19 <b>\$</b>
Sample retai	ned 0.425 sieve	e (Measured	()	8 %	Plastic	ity Index				23 🕱
Corrected mo	isture content	for material p	assing 0.425mm	22 %	Liquidi	ty Index				0.13
Curing Time				24 Hours	Clay Co	ntent			Not. a	analysed, 🔏
					Derived	Activity (PI/	XC)		Not a	analysed.
c = cL/ Plasti Index (Ip)	city 4 % 3			CI X		CV NV			Low Medium High	NHBC Volume Change Potential
M = SIL	. f	0 10	<u>ML</u> 20 30	40 50		0 80	90 100	110 120	Liqui	id Limit %
METHOD OF		: BS 1377: : U = Und C = Core : PLASTICIT VOLUME CF NOTE: MO 6% retain Corrected	PART 2:1990 isturbed, B cutter TY CHART BS59 HANGE POTENTI. lified Plasti- ued on 2mm si- a moisture coi	:7.4 & PART : :3.2, 4.4, 5 = Bulk, D = 30:1999:Figure AL: NHBC Stand city Index I'p eve. ntent and calo 7:Part2:1990 C	.3, 5.4 Disturbe ards Chap = $Ip \times H$ ulated li	d, J = Jar, Dter 4.2 Unmc % less than guidity inde	dified Plast 425 microns/	lcity Inde 100}	ex	



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Borehole/ Pit No.	Depth m.	Sample	Moisture Content K		Descrip	tion	<u></u>		Remarks			
BH8 1.20 Di 24 Firm dark yellowish brown slightly sa								CLAY				
	mit.					51 🕺						
Method of Pr	eparation	Specimen fro	m Natural Soil	L	Plastic L	mit					20 🗴	
Sample retai	ned 0.425 siev	e (Assumed	)	0 🐔	Plasticit	y Index					31 🔏	
Corrected mo	isture content	for material	passing 0.425mm	*	Liquidity	i Index					0.13	
Curing Time	••••••••••••••••••••••••••••••••••••••		······	24 Hours	Clay Cont	ent				Not a	analysed. 🎗	
		****			Derived A	ctivity (PI	/00)			Not a	analysed.	
c = cL Plasti Index (I <sub>p</sub> )	city %			CI MI	CH MH			CE ME		Low Medium High	NHBC Volume Change Potential	
M = SIL METHOD OI		0 10 10 ON: BS 1377	20 30 :PART 1:1990	40 50	<u>60</u> 70	80	90	100	110 12		id Limit %	
METHOD OI	TEST	: BS 1377 : U = Und C = Cor : PLASTICI VOLUME C	PART 1:1990 PART 2:1990 Sturbed, B e Cutter TY CHART BS59 HANGE POTENTI dified Plastic	:3.2, 4.4, 5 = Bulk, D = 1 00:1999:Figure L: NHBC Stand	.3, 5.4 Disturbed, 18 ards Chapte	, J ≖ Jar	nodified	¶ ⊅1⇒c+	idity Th		ooon Sampie,	

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Borehole/ Pit No.	Depth m.	Sample	Moisture Content X		Descri	ption			Rena	rks
T₽4	0.60 -0.70	Bl		Stiff olive ye sandy silty CI active roots. and rare fline	AY with of Gravel is	ccasional re	ecently			
	Pi	REPARAT	ON		Liquid L	imi£				45 <b>X</b>
Method of Pr	eparation	Sieved Specin	1011		Plastic	Limit				21. K
Sample retai	ned 0.425 siev	e (Measured	{}	14 %	Plastici	ty Index				24 🕺
Corrected mo	isture content	for material p	assing 0.425mm	24 %	Liquidit	iy Index				0.13
Curing Time				72 Hours	Clay Con	tent			Not a	analysed. 🕺
·					Der i ved	Activity (PI/(	X)		Not. a	analysed.
c = cL) Plasti Index (I <sub>p</sub> )	city %	70       60       50       50       60       30       20       6		CI X			CE ME		Low Medium High	NHBC Volume Change Potential
M ≍ SII		0	20 30	40 50	<u>60</u> 70		90 100	110 120	Liqu	id Limit %
METHOD OI		: BS 1377: : U = Und C = Core : PLASTICT VOLUME CT NOTE: Mod 12% reta: Corrected	PART 2:1990 Sturbed, 8 Cutter TY CHART BS59 HANGE POTENTI Lified Plasti Lined on 2mm s I moisture co	<pre>:7.4 &amp; PARJ :3.2, 4.4, 5 = Bulk, D = 30:1999:Figure AL: NHBC Stand city Index I'p ieve. ntent and calc 7:Part2:1990 c</pre>	.3, 5.4 Disturbed 18 lards Chapt $P = Jp \propto (3)$ rulated lic	i, J = Jar, ter 4.2 Unmc % less than muldity inde	difled Plast 425 microns/	icity Inde 100)	x	

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Borehole/ Pit No.	Depth m.	Sampie	Moisture Content %		Descr i p	tion		Re	narks					
TP7	0.70 -1.00	BI	20	Very stiff oli slightly sandy active roots. and rare flint	silty CLA Gravel is	Y with rare :	recently							
	PF	REPARATI	ON		Liquid Li	mit			46 \$					
Method of Pri	eparation s	Sieved Specin	1CD		Plastic L	imit			19 \$					
Sample retain	ned 0.425 sieve	e (Measured	t)	7 %	Plasticit	y Index			27 🕺					
Corrected mo	isture content	for material p	assing 0.425mm	22 🕱	Liquidity	Index			0.11					
Curing Time				24 Hours	Clay Cont	ent		Not	analysed, 🕺					
					Derived A	ctivity (PI/CC)	)	Not	analysed.					
c = cL/ Plasti Index (I <sub>p</sub> )	city 4 %			CI X			CE		NHBC Volume Change P					
M ≈ SIL		0 10	20 30	40 50	60 70	80 90		120 Liq	uid Limit %					
METHOD OF		: BS 1377: : U = Und C = Core : PLASTICIT VOLUME CON NOTE: MOC 5% retain COrrected	PART 2:1990 isturbed, 8 cutter TY CHART ESS HANGE POTENTI dified Plasti ded on 2mm si moisture co	930:1999:Figure TAL: NHBC Stand Loity Index I'p	.3, 5.4 Disturbed, 18 ards Chapt: = Ip x (% ulated lign	, J = Jar, N er 4.2 Unmod: less than 4: uidity inder	ified Plastici 25 microns/100	y Index	Spoon Sample, Chan 0.425mm					

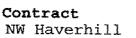
[			· · · · · · · · · · · · · · · · · · ·				
		DATE Cont NW H	ED BY OF ISSU ract Haverhil OF MOIST	:SOIL UE : As pa 1 FURE CON	Se TENT, LIQUID LII	f JS rial No. S28232 WIT AND PLAS	
Borehole/ Pit No. TP13	A Depth m.	ND DERIV Sample B1	Moisture Content %	Stiff light ye	Description Description	y gravelly	EX Remarks
					to coarse chalk and		
	P	REPARAT	ON		Liquid Limit		44 \$
Method of Pri	eparation	Sieved Specir	ien	······································	Plastic Limit		20 🎽
Sample retain	ned 0,425 siev	e (Measured	1)	1.1 %	Plasticity Index		24 \$
Corrected mo	isture content	for material p	assing 0.425mm	21 %	Liquidity Index		0.04
Curing Time				72 Hours	Clay Content		Not analysed. 🛪
			·······		Derived Activity (PI/O	C)	Not analysed.
c = cL/ Plasti Index (I <sub>p</sub> )	city %	70       60       50       40       30       20       10		CI X			Low Medium High NHBC Volume Change Potential
M = SIL			20 30	40 50		<u>   </u> 90 100 110 1	Liquid Limit %
METHOD OF				1:7.4 & PART			
	SAMPLE KEY				.3, 5.4 Disturbed, J = Jar,	W = Water, SPT = :	Split Spoon Sample.
COMMENTS		C = Core : PLASTICI VOLUME CI NOTE: Mod 9% retain Corrected	Cutter TY CHART BS59 HANGE POTENTI Lified Plasti Led on 2mm si I moisture co	30:1999:Figure AL: NHBC Stand city Index I'p eve. stent and calc		dified Plasticity In 425 microns/100)	dex



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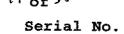
#### DETERMINATION OF DENSITY, MOISTURE CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE Moisture Bulk MOHRS CIRCLE Dru Lateral Deviator Shear Bonehole/ Depth ANALYSIS Sample Content 0ensitu Density Pressure Stress Stress Description Pit No. m. Cu Ø (%) (Mg/m<sup>3</sup>) (Mg/m<sup>3</sup>) (kPa) (kPa) (kPa) (kPa) (degrees) BH1 8.00 U2 2.14 18 1.81 159 Hard (Extremely high strength) 623 312 272.4 5.0 33.9 658 329 dark grey slightly gravelly 479 684 342 slightly sandy silty CLAY/extremely weak MUDSTONE. Gravel is fine and medium chalk and rare flint BH2 5.00 Ü2 20 2.07 1.73 100 390 95 80.5 4.4 Stiff (High strength) dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to 200 207 104 301 224 112

	-										coarse chalk
BH4	3.00	U1_	18	2.10	1.78	62 118 182	577 622 653	289 311 327	211.4	13.9	Very stiff (Very high strength) dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse chalk
BH4	9.50	ט2	16	2.14	1.84	189 380 572	835 892 937	417 446 469	349,4	6.8	Hard (Extremely high strength) dark grey slightly gravelly slightly sandy silty CLAY/extremely weak MUDSTONE. Gravel is fine to coarse chalk and rare flint
BHS	1.20	UI	18	2.11	1.79	23 49 71	465 485 520	232 243 260	148.3	21.5	Very stiff (Very high strength) olive brown slightly gravelly slightly sandy silty CLAY with occasional grey mottling. Gravel is fine to coarse chalk
внь	6.50	U2	17	2,15	1.84	130 259 390	721 752 781	361 376 390	312,5	5.9	Hard (Extremely high strength) dark grey slightly gravelly slightly sandy silty CLAY/extremely weak MUDSTONE. Gravel is fine to coarse chalk
BH6	2.00	<b>υ</b> 1	1.8	2,09	1,77	39 83 118	466 493 514	233 247 257	174.]	13.6	Very stiff (Very high strength) light olive brown slightly gravelly slightly sandy silty CLAY with occasional grey mottling. Gravel is fine and medium chalk
METHOD OF	PREPARAT	110N - RS	1377 · p	APT 1.1	000-7 /	220	DADT 2.	1000 7 0			
METHOD OF METHOD OF TYPE OF SA	TEST	:BS No sp :U	1377:P ;P te Mult ecimen i	ART 2:19 ART 7:1 i-stage preclude turbed,	990:3 De 990:8 Un test us es the t	etermina ndrained sed when taking o	ition of 1 Shear 1 specim	Moistur Strengt en has g	re Conte h granular	ont 1990 1990 conter	<ul> <li>3</li> <li>9:7 Determination of Density</li> <li>9:9 Multi-stage test</li> <li>1:4 behaviour and length of specimens.</li> <li>7, SPT = Split Spoon Sample,</li> </ul>
domini, jo		i									
REMARKS TO	D INCLUDE	* 44	mple di test sj	sturband pecímen	ce, loss within	; of moi origina	sture, I sampl	variatic e. Oven	on from drying	test pr tempera	ocedure, location and origin ture if not 105-110 deg C.



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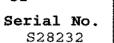
#### DETERMINATION OF DENSITY, MOISTURE CONTENT AND UNDRAINED SHEAR STRENGTH

Borehole/	Barts		Moisture	Bulk	Dry	Lateral	Deviator	Shear		CIRCLE	
Pit No.	Depth m.	Sample	Content	Density	Density	Pressure	Stress	Stress	ANAL Cu	YSIS Ø	Description
			(%)	(Mg/m <sup>3</sup> )	(Mg/m <sup>3</sup> )	(kPa)	(kPa)	(kPa)		(degrees)	
BH7	4.00	¥2	20	2.12	1.77	78 160 243	461 478 491	230 239 245	205.6	4.8	Very stiff (Very high strength) dark olive grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse chalk and rare flint
BH8	8.00	UI	18	2,16	1.83	159 320 483	487 514 534	244 257 267	217.2	3.9	Very stiff (Very high strength) grey slightly gravelly slightly sandy silty CLAY. Gravel is fir to coarse chalk
METHOD OF METHOD OF TYPE OF SA	TEST	:85 No sp :U	1377:P/ :P/ te Multi ecimen p	ART 2:19 ART 7:19 i-stage preclude curbed,	90:3 De 90:8 Ur test us	termina drained ed when aking o	tion of Shear specim	Moistur Strength en has g Domedia	re Conte 1 Fanular	nt 1990 1990 conten	.5 :7 Determination of Density :9 Multi-stage test t / behaviour and length of specimens. , SPT = Split Spoon Sample,
COMMENTS		: ; Sai	mple dis	turbanc	e, loss	of moi:	sture, N	variatio	n from	test pr	, SPT = Split Spoon Sample, ocedure, location and origin ture if not 105-110 deg C.



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## DETERMINATION OF UNDRAINED SHEAR STRENGTH

Borebole/ Dept Pit No. m.	h Samp∤e			Descriptio	ĥ			Renarks	\$
BH1 8.0	D U2	gravelly .	remely high st slightly sandy Gravel is fin	silty CL	AY/extr	emelv weak	flint		
Initial Specimen		<u> </u>	····	1				·····	
Depth of Top of Specimen	131	ght M	Diameter sm		ght	Moistu Conti %	E	Wet Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>
8.07	200	.0			56	18		2.14	1.81
EST INFORMATION		Rate of Stra	in 1.9 7	per Min	Rubber	Membrane Thic	kness	I	0.6 mma
710				695	••••••				
leasured leviator stress (kPa)	5 10			- Shear Stress (kPa) 0	0	MOHI	RS CIRCLE A	NALYSIS	1164
		) 15 IN %	20			-	TOTAL STRESS (KI	°a)	
	Measured Cell Pressure	Strain at	Stress Corr	ection (kPa		orrected Max.	Shear Stress	Mohrs Circ	e Analusis
Specimen at Failure	σ <sub>3</sub> (kPa)	Failure (≴)	Membrane Thickness	Pisto Fricti	າ 🎼	viator Stress $\sigma_1 - \sigma_3$ (kPa)	$\frac{\mathcal{C}^{Cu}}{\mathcal{C}_{\mathrm{I}}} = \mathcal{O}_{\mathrm{3}}_{\mathrm{f}}$	Cu (kPa)	PHI *
	159	14.1	1.7	1		623	312		
F	319	16.9	1.9	7.3		658	329	272.40	4.98
<u> </u>	479	19.5	2.2	16.2		684	342		
METHOD OF PREP METHOD OF TEST TYPE OF SAMPLE COMMENTS	: BS 13 has g x 100 KEY : U = U C = C : Teste	77:PART 7:19 renular cont mm dia by 20 ndisturbed, ore Cutter d in Vertica	990: 990:8 Definit ent / behavi DOmm long spe B = Bulk, D al Orientatio loads from 0.:	our and cimens. = Distur! n.	length ⊃ed, J	of specime	en precludes	the taking	of 3
REMARKS TO INC	.UDE : Sampl	e disturbanc	ce, loss of m within origi	oisture,	variat	tion from : en drving :	test procedur temperature i	e, location	and origi

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#### DETERMINATION OF UNDRAINED SHEAR STRENGTH

Borehole/ Dept Pit No. m.	h Sample			Description			Remarks	
BH2 5,0	0 ¥2	Stiff (High slightly chalk	gh strength) d sanđy silty CL	ark grey s AY. Gravel	lightly gravelly is fine to coars	¢		
Initial Specimen Depth of Top of Specimen	Heiç		Diareter mm	Weigi g	nt Moist Cont	ent	Wet Density Mg/m <sup>3</sup>	Dry Density Mg/m 3
5.20	156	.0	102.9	2693	20		2.07	1.73
TEST INFORMATION		Rate of Stra	in 2.5 )	i per Min	Rubber Membrane Thic	kness		0,6 mm
Measured Deviator Stress (kPa) 0	5 10		20	Shear Stress (kPa)	>	RS CIRCLE A		526
	STRA	IN %				TOTAL STRESS (kf	'a)	
Specimen at Failure	Celi Pressure Ø3 (kPa)	Strain at Failure (%)	Stress Corn Membrane Thickness	ection (kPa) Piston Friction	Corrected Max. Deviator Stress OTI-OT3 (kPa)	Shear Stress Gu $V_2(\sigma + - \sigma_3)_f$ (kPa)	Mohrs Circi Cu (kPa)	e Analysis PHI
	100 200 301	14.1 16.9 19,9	1.7 1.9 2.2	/ 7.0 10.5	190 207 224	95 104 112	80.47	4.41
METHOD OF PREP METHOD OF TEST TYPE OF SAMPLE COMMENTS REMARKS TO INCL	: BS 13 has g x 100 KEY : U = U C = C : Tester UKAS C	77:PART 7:19 ranular cont nm dia by 20 ndisturbed, ore Cutter d in Vertica alibration -	P90:8 Definit ent / behavi Omm long spe B = Bulk, D l Orientatio loads from 0.	our and to cimens. = Disturbo n. 2 to 10kN,	d. 1990:9 Multi- ength of specime ed, J = dar, W = variation∵from -	en precludes ≂ Water, SPT	the taking = Split Spo	of 3 on Sample,



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#### DETERMINATION OF UNDRAINED SHEAR STRENGTH

Borehole/ Pit No.	Đepth ጣ.	Sample			Description			Remarks	
BH4	3.00	Ul	Very stif gravelly coarse ch	slightly sandy	trength) dan silty CLAY,	ck grey slightly Gravel is fine	to		
Initia	I Specimen								, ',
$\Box$	Depth of Top of Specimen	(m) Heig		Dianeter ma	Weight 9	Moist Cont %		Wet Density Mg/m <sup>3</sup>	Dry Density Mg/m
	3.11	199	-7	103.2	3516	. 18		2.10	1.78
EST INFORM	AT ION		Rate of Str	ðin 1.9 🕈	per Min Ru	ubber Membrane Thic	kness		0,6 mm
670 <b>-</b>					499,				
leasured leviator tress kPa) 0.		5 i0 STRA			Shear Stress (kPa) 0				836
		Measured				();;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	fotal stress (ki	'a)	
Specimen a	t failure	Cell Pressure <b>0</b> 3	Strain at Failure		ection (kPa)	Corrected Max. Deviator Stress	Shear Stress Cu	Mohrs Circl	e Analysis
		(kPa)	(%)	Membrane Thickness	Piston Friction	$\sigma_1 - \sigma_3$ (kPa)	$\frac{1}{(\text{kPa})} \sigma_3_f$	Cu (kPa)	PHI
	7	62 118 182	8.3 10.3 12.5	1,1 1.3 1.5	/ 4.1 7.1	577 622 653	289 311 327	21144	13.93
METHOD	OF PREPAR	ATION: BS 13	77:PART 1:1	990:	L				1
	OF TEST SAMPLE * S	x 100 (EY : U = U C = C ; Teste	nm dia by 20 ndisturbed, pre Cutter d in Vertica	)Omm long spe	our and ten cimens. = Disturbed n.	1990:9 Multi- gth of specime I, J = Jar, W =	n precludes	the taking o	of 3
REMARKS	TO INCLU	IDE : Sampl	e disturban	ce, loss of m	oisture, va	iriation from 1 Oven drying 1	est procedur	e, location	and origi



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### DETERMINATION OF UNDRAINED SHEAR STRENGTH

Borehole/ Dep Pit No. m.	Sample			Description	I			Renarks	
BH4 9,1	50 U2	gravelly	remely high st slightly sandy Gravel is fin	silty CLA	Y/extre	nelv weak	flint		
Initial Specime Depth o Top of Specime	f Hei	ght m	mrc		ht	Moista Cont %		Wet Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>
9.56	185	5.1			5	16		2.34	1.84
TEST INFORMATION		Rate of Stra	ain 2.0 🏌	per Min	Rubber Me	embrane Thic	kness		0.6 mm
Measured Deviator Stress (kPa) 0	5 10 STRA	, – – – – – – – – – – – – – – – – – – –	20	Shear Stress (kPa) 0			RS CIRCLE A		1510
······································	Measured	Strain at	Starce Care	ection (kPa)	Cor	rected Max.	Shear Stress		
Specimen at Failure	Cett Pressure Ø3 (kPa)	Failure (%)	Membrane Thickness	Piston Friction	0evi	ator Stress 01-03 (kPa)		Mohrs Circi Cu (kPa)	e Analysis PH1 °
$\bigcirc$	189 380 572	13.7 16.1 17.7	1.7 1.9 2.0	/ 11.1 19.9		835 892 937	417 446 469	349.36	6.76
METHOD OF PREP METHOD OF TEST TYPE OF SAMPLE COMMENTS REMARKS TO INC	: BS 13 has g x 100 KEY : U = U C = C : Teste UKAS C	677:PART 7:19 ranular cont mm dia by 20 ndisturbed, ore Cutter d in Vertica Calibration -	290:8 Definit ent / behavi Domm long spe B = Bulk, D l Orientation loads from 0.2 ce, loss of m	our and to cimens. = Disturb n. 8 to 10kN. oisture,	ength o ≥d, J = variatī	t specime Jar, W = on from 1	m precludes Water, SPT	the taking ( = Split Sport	of 3 on Sample,

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### DETERMINATION OF UNDRAINED SHEAR STRENGTH

Borehole/ Pit No.	Depth m.	Sample			Description				Remarks	
BH5	1,20	131	gravelly	f (Very high s slightly sandy Gravel is fin	' silty CLA	Y with od	wn slight ccasional	ly grey		
	Specimen Depth of Top of Specimen ()			((81)		Weight Moistu 9 %			Wet: Density Mg/m 3	Dry Density Mg/m <sup>3</sup>
	1.29	199	.8			2	18		2.11	1.79
TEST INFORMA	TION		Rate of Stri	ain 1.9 5	i per Min	Rubber Men	nbrane Thic	kness	l	0.6 (mil
Measured Deviator Stress (kPa) 0 0		5 10 STRA		5 20	Shear Stress (kPa) 0	0		FOTAL STRESS (k		592
		Measured	Strain at	Stress Corr	ection (kPa)	COFF	ected Max.	Shear Stress	Mohrs Circ	- <b>-</b>
Specimen at	Failure	Cell Pressure Ø3 (kPa)	Failure (%)	Membrane Thickness	Piston Friction	0	itor Stress 71 - <b>0</b> 73 (kPa)	$\frac{\mathcal{C}_{u}}{\mathcal{C}_{1}} = \frac{\mathcal{C}_{u}}{\mathcal{C}_{3}}$	Cu (kPa)	PHI 2
		23 49 71	4.5 6.7 9.1	0.8 0,9 1.2	/ 3.3 4.8		465 485 520	232 243 260	148.26	21,45
METHOD C TYPE OF COMMENTS	DF TEST Sample K	EY : U = U C = C : Tester UKAS C	77:PART 7:1 ranular con mm dia by 20 ndisturbed, pre Cutter d in Vertica alibration -	990: 990:8 Definit tent / behavi DOmm long spe B = Bulk, D al Orientatio loads from 0.: ce, loss of m	our and t cimens. = Disturb n. 2 to 10kN,	ength of	∙specime Jar, W =	n precludes ∙Water, SPT	the taking = Split Spo	of 3 on Sample,

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#### DETERMINATION OF UNDRAINED SHEAR STRENGTH

Borehole/ Dep Pit No. m.	Sample			Description			Remarks		
ВН5 6.:	50 U2	gravelly	tremely high st slightly sandy . Gravel is fin						
Initial Specime Depth o Top of	f He	ight ma	Diameter лю	Weight 9	Moist Cont		Wet Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	
Specime و.58	15	5.7	103.5	2821	17		2.15	1.84	
EST INFORMATION		Rate of Str	ain 2.4 🏌	i per Min R	ubber Membrane Thic	kness	I	0.6 ណា	
leasured leviator tress kPa) 0			5 20	Shear Stress (kPa) 0		TOTAL STRESS (kf		1171	
	Measured	Strain at	Stress Corr	ection (kPa)	Corrected Max.	Shear Stress			
Specimen at Failure	Cell Pressure Ø3 (kPa)	Failure (%)	Membrane Thickness	Piston Friction	Deviator Stress O(1-O3 (kPa)	<sup>Cu</sup> %(σ1-σ3) <sub>f</sub> (kPa)	Mohrs Circl Cu (kPa)	PHI "	
D	13D 259 390	14.9 17.5 20.1	1.8 2.0 2.2	/ 7.8 12.6	721 752 781	361 376 390	312.47	5,86	
METHOD OF PREF METHOD OF TEST TYPE OF SAMPLE COMMENTS REMARKS TO INC	: BS 1 has x 10 C EY : U = 1 : Test uKAS	377:PART 7:1 granular con Omm dia by 2 Undisturbed, Core Cutter ed in Vertic Calibration le disturbar	990:8 Definit tent / behavi 00mm long spe	our and lef cimens. = Disturbed n. 2 to lokN. oisture, va	, 1990:9 Multi- ngth of specim d, J = Jar, W = ariation from	en precludes = Water, SPT test procedur	the taking = Split Spo e, location	of 3 on Sample, and origi	



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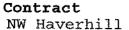
#### DETERMINATION OF UNDRAINED SHEAR STRENGTH

Borehole/ Pit No.	Depth m.	Sample			Descriptio	n			Remarks	
BH6	2.00	υı	slightly	f (Very high s gravelly sligh l grey mottlin	tly sandy	silty (	CLAY with	m		
	Specimen Depth of Top of	Heig m		Diameter MM	Weig	~	Moista Conto %		Wet Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>
	Specimen (i 2.08	n) 199	.7	103.3	345	95	18		2.09	1.77
TEST INFORMAT	10N	f	Rate of Stri	ain 1.9 %	per Min	Rubber	Membrane Thic	kness	I	0.6 maa
Measured Deviator Stress (kPa)		7 10 5 10 STRA		5 20	Shear Stress (KPa) 0	0		TOTAL STRESS (ki		632
Specimen at	Failure	Measured Cell Pressure	Strain at Failure	Stress Corr	Y'	De	rrected Max. viator Stress	Shear Stress Cu	Mohrs Circl	e Analysis
opeorinen ee	- under c	σ3 (kPa)	(\$)	Membrane Thickness	Pistor Frictio		$\sigma_{1} - \sigma_{3}$ (kPa)	%( <i>О</i> 1 - <i>О</i> 3) <sub>(</sub> (kPa)	Cu (kPa)	PH1 °
N		39 83 118	6.1 8.5 11.5	0.8 1.2 1.4	/ 4.2 6.2		466 493 514	233 247 257	174.06	13.57
METHOD O METHOD O TYPE OF COMMENTS REMARKS	F TEST SAMPLE K	EY : U = U C = C : Tester UKAS C DE : Sampl	77:PART 7:1 ranular com mm dia by 21 ndisturbed, ore Cutter d in Vertica alibration - e disturban	990: 990:8 Definit tent / behavi DOmm long spe B = Bulk, D al Orientation loads from 0.2 ce, loss of m within origi	our and f cimens. = Disturb n. 2 to l0kw. oisture,	ength med, J variat	of specime = Jar, W = tion from 1	en precludes • Water, SPT test procedui	the taking o ≃ Split Spoo re. Location	of 3 on Sample,



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#### DETERMINATION OF UNDRAINED SHEAR STRENGTH

	pth	Sample			Descriptio	n			Remarks	
BH7 4	.00	U2	gravelly	ff (Very high s slightly sandy halk and rare f	silty CL	dark ol AY, Gra	live grey sl wel is fine	ightly to		
Initial Specim	en				1					
Depth Top of Specin		Height min	<u>.</u>	Diameter M	Wei S		Moist Cont %		Wet Density Mg/m	Dry Density Mg/m <sup>3</sup>
4.1	1	199.7		103.3	35:	51	20		2.12	1.77
TEST INFORMATION			Rate of Str	ðin 1.9 🕺	per Min	Rubber	Membrane Thic	kness		0.6 mm
510					438			····		·
Measured Deviator Stress (kPa)					Shear Stress (kPa)	0	MOH	RS CIRCLE A	NALYSIS	
0	5	10 STRAIN	)! \$	5 20				TOTAL STRESS (ki	°a)	734
	Measi Cell Pr		Strain at	Stress Corre	ection (kPa		orrected Max.	Shear Stress	Mobrs Circl	• Analusis
Specimen at Faifur	e <b>σ</b> (kP	3	Failure (%)	Membrane Thickness	Pisto Fricti	1 🔯	eviator Stress $\sigma_1 - \sigma_3$ (kPa)	$\frac{\omega}{\omega}$	Cu (kPa)	PH1 *
(E)	78	1	14.1	1.7	1		461	230		
E	160 243		17.1 20.1	1.9 2,2	5.2 9.5		478 491	239 245	205.58	4.82
HETHON OF DOF										
METHOD OF PRE METHOD OF TES TYPE OF SAMPL COMMENTS	ΈΤ : Ε ΚΕΥ :	BS 137 has gra x 100mm U = Unc C = Cor Tested	7:PART 7:1 anular con dia by 2 fisturbed, e Cutter in Vertic	990: 990:8 Definit tent / behavi 00mm long spe B = Bulk, D al Orientation loads from 0.2	our and i cîmens. = Disturl	bed, J	of specime	en precludes	the taking o	of 3
REMARKS TO IN	CLUDE :	Sample of test	disturban t specimen	ce, loss of m Within origi	oísture, nal samp	Varia le. Ovi	tion from · en drying ·	test procedur temperature i	re, location If not 105-11	and origin 0 deg C.

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TEST REPORT.

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Contract NW Haverhill

## S28232

#### DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE Bonehole/ Depth Sample Description Remarks Pit No. m. BH8 8.00 171 Very stiff (Very high strength) grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse chalk Initial Specimen Moisture Wet Dru Height Diameter Height Densitų Density Depth of Content 8**3**11 ា g Mg/m % Mg∕m ∶ Top of Specimen (m) 199.8 102.3 3548 18 2.16 1.83 8.09 TEST INFORMATION Rate of Strain 🛪 per Min Rubber Membrane Thickness 1.9 0.6 ηm 560 608 MOHRS CIRCLE ANALYSIS Measured Deviator Shear Stress Stress (kPa) (kPa) o o 1018 0 5 10 15 20 STRAIN X TOTAL STRESS (kPa) Measured Corrected Max. Shear Stress Strain at Stress Correction (kPa) Mohrs Circle Analysis Cell Pressure Deviator Stress $\sigma_1 - \sigma_3$ Failure Cu Specimen at Failure σ3 Membrane Piston %(σi σ<sub>3</sub>), (%) PH1 ° (kPa) Cu (kPa) Thickness Friction (kPa) (kPa) 159 15.3 1.8 1 487 244 320 17 7 2.0 8.8 514 257 217 24 3.90 483 20.1 2.2 17.1 534 267 METHOD OF PREPARATION: BS 1377:PART 1:1990: : BS 1377:PART 7:1990:8 Definitive Method. 1990:9 Multi-stage loading - used when specimen METHOD OF TEST has granular content / behaviour and length of specimen precludes the taking of 3 x 100mm dia by 200mm long specimens. : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, TYPE OF SAMPLE KEY C = Core Cutter COMMENTS : Tested in Vertical Orientation. UKAS Calibration - loads from 0.2 to 10kN. REMARKS TO INCLUDE ; Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.



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#### LABORATORY CALIFORNIA BEARING RATIO TESTS ADJUSTED FOR SEASONAL MOISTURE CONTENT CHANGES.

Due to seasonal variations of water content in near surface soils, many clients require CBR test samples to be subjected to sample preparation in the laboratory before testing. With Clay soils, liquid and plastic limits and moisture contents are carried out to classify them on material passing 20mm. The plastic limit is then compared against the moisture content with due regard to the proportion of material then retained on a 0.425mm sieve. If the moisture content is already 2% or more above the plastic limit, compaction may take place immediately. If this is not the case a calculated amount of water is added to the sample and cured for 24 hours before compaction. The samples are then cured for a further 24 hours before CBR tests are carried out at both the top and bottom of the sample.

#### **CALCULATION OF ADJUSTED MOISTURE CONTENT FOR CBR TESTING**

When a significant proportion of a basically clay material is >0.425mm, the adjusted moisture content (MC) for test shall be derived as follows:

Obtain test specimens for CBR, Limits and Moisture content from Material Passing 20mm. (If the sample is large enough a moisture content may also be carried out on a representative portion of the whole sample including material greater than 20mm, and reported for information)

The Plastic Limit (PL) for the fine fraction is obtained by testing material passing the 0.425mm sieve. A notional 5% Moisture Content is to be allowed for material passing 20mm, and retained on the 0.425mm sieve. The proportion passing the 0.425mm is obtained by the wet sieve preparation method.

If X% passes 0.425mm, (100-X) % is retained on 0.425mm and with the 5% MC required to be incorporated for the retained 0.425mm portion, the adjusted MC for test shall be at least:

 $\frac{X(PL+2) + (100-X)5\%}{100}$  for the sample passing 20mm

#### **CALCULATIONS:**

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TP4 B1 @ 0.60m

86% passing 0.425mm therefore X = 86
Plastic limit of specimen = 20.6%
Moisture content as received (excluding +20mm) = 21.0%
1% of the original sample retained on 20mm sieve and excluded from tests

<u>86(20.6+2) + (100-86)5</u> = 20.1% 100

Therefore moisture content adjustment not required Moisture Content after CBR Test (excluding +20mm) = 21%



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TP7 B1 @ 0.70m

93% passing 0.425mm therefore X = 93
Plastic limit of specimen = 18.7%
Moisture content as received (excluding +20mm) = 20.3%
1% of the original sample retained on 20mm sieve and excluded from tests

 $\frac{93(18.7+2) + (100-93)5}{100} = 18.7\%$ 

Therefore moisture content adjustment not required Moisture Content after CBR Test (excluding +20mm) = 20%

TP13 B1 @ 0.80m

87% passing 0.425mm therefore X = 87
Plastic limit of specimen = 19.6%
Moisture content as received (excluding +20mm) = 18.8%
1% of the original sample retained on 20mm sieve and excluded from tests

 $\frac{87(19.6+2) + (100-87)5}{100} = 19.4\%$ 

Therefore moisture content adjustment required Moisture Content after CBR Test (excluding +20mm) = 20%

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TP4

TOP

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TEST REPORT.

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**DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)** Bonehote/ Depth Pit No./ Sample Description Remarks m. Chainage 0.60 Stiff olive yellow slightly gravelly slightly sandy silty CLAY with occasional recently active roots. Gravel 21 -0.70 is fine to coarse chalk and rare flint 3 Moisture Content X TOP: 21 3 BOTTOM: 21 Average: 21 Buik Densitu Ma/m 2.04 Dry Density Mg/m 3.69 % material retained on 20mm sieve **CBR VALUES** and removed before test : 1 Average CBR % (Shown if Top & Bottom CBR Values are within 10% of their Mean value) Penetration mm Force kN Calculated CBR 🕺 Corrected CBR % Highest C8R 🕺 METHOD OF PREPARATION 2.50.72 5,4 BS 1377:Part 4:1990 7.2.4 2.5kg 5.4 Rammer Method. 5.0 1.05 5.2 5.5 2.5 0.74 5.6 Surcharge weights (kg) : 15 BOTTOM 5.6 5.01.02 5.1 SOAKED TEST : NO 1.30 1.20 Ċ \* ୍ଦ୍ର ତ G 1.10 Ð 09 ું હ 1.00 -@ 0 0.90 e 0.80 Force ¢ on 0.70 Plunger kΝ 0,60 0.50 0.40 ٢ 0.30 0.20

0.10 0.00 0 0.51.0 1.5 2.0 3.5 4.0 2.5 3.0 4.5 5.0 5.5 6.5 6.0 7.0 7.5 Penetration mm METHOD OF PREPARATION: BS 1377:PART 1:1990:7.6.1 & 7.6.5 & PART 4:1990:7.2 METHOD OF TEST : BS 1377:PART 4:1990:7.4 : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, TYPE OF SAMPLE KEY C = Core Cutter COMMENTS :

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

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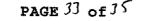
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**DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)** Borehole/ Depth Pit No./ Sample Description Resarks Ø. Chainage TP7 0.70 В1 Very stiff olive yellow slightly gravelly slightly sandy -1.00 silty CLAY with rare recently active roots. Gravel is fine to coarse chalk and rare flint 3 3 Moisture Content % TOP: 20 BOTTOM: 20 Bulk Density Mg/m Average: 20 1.24 Dry Density Ma/m 1.03 % material retained on 20mm sieve **CBR VALUES** and removed before test : 1 Average CBR % (Shown if Top & Bottom CBR Values are within 10% of their Mean value) Penetration mm Force kN Calculated CBR % Corrected CBR % Highest CBR % METHOD OF PREPARATION 2.50.95 7.2 BS 1377:Part 4:1990 7.2.4 2.5kg TOP 7.2 Rammer Method. 5.0 1,30 6.5 7.5 Surcharge weights (kg) 2.5 1.03 7.8 : 15 BOTTOM 7.8 5.0  $\odot$ 1,43 7.1 SOAKED TEST : NO 1.70  $\odot$ 1,60  $\odot$ 6 1.50  $\langle \cdot \rangle$  $\odot$ 1,40 Ò ୍  $\odot$ + 1.30  $\odot$ 1.20 \*  $\overline{(\cdot)}$ à 1.10  $\overline{\odot}$ Force 1.00  $\odot$ OΠ 0.90 Plunger kΝ  $\odot$  -0.80 র্ব \* 0.70 (÷) 0.60 0.50 Ť 0.40 3 0.30 0.20  $(\cdot)$ 0.10 0.00 0 0.5 1.0 1.5 2.0 2.5 3.5 4.0 3.0 4.5 5.05.5 6.0 6.5 7.0 7.5 Penetration ma METHOD OF PREPARATION: BS 1377:PART 1:1990:7.6.1 & 7.6.5 & PART 4:1990:7.2 METHOD OF TEST : BS 1377:PART 4:1990:7.4 TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter COMMENTS ÷ REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin

of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

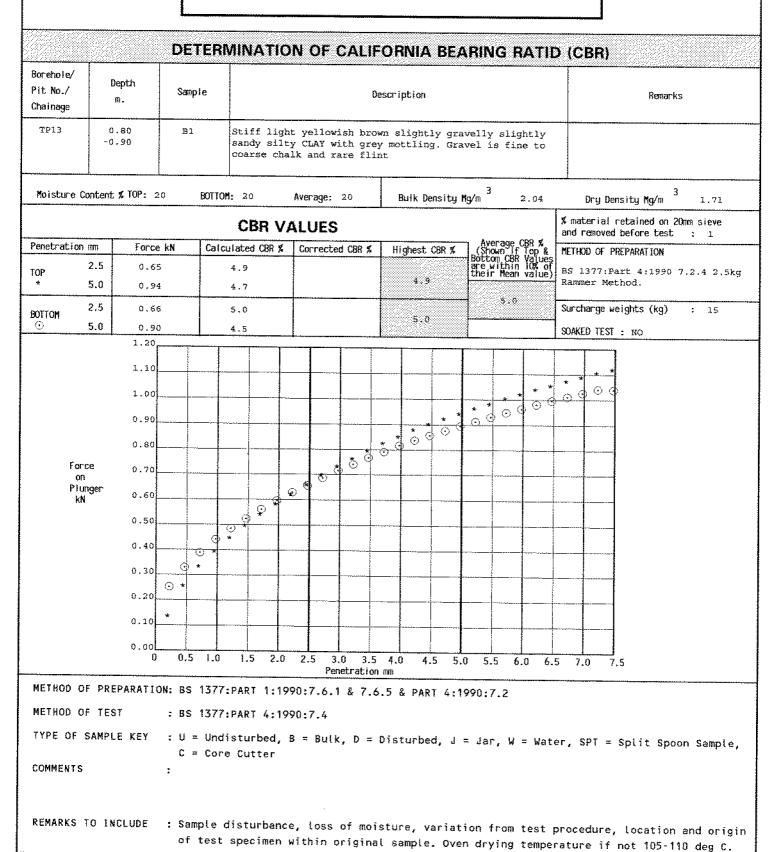
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orehole/	Depth		Concentrat So	<u>ion of Solub</u> ii		% of sample	Description	
Pit No.	Щ.	Sample	Acid Soluble SD3 %	Mater Soluble 2:1 SD3 g/1	Groundwater g/l	passing 2m≣ sieve		Remarks
BH1	6.50	D7		0.21		98	Very stiff grey slightly gravely slightly sandy silty CLAY. Gravel is fine and medium chalk	
BH2	2.45	D2		<0.02		94	Stiff mottled yellowish brown and grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	
BH2	5.00	U2		0.08		99	Stiff (High strength) dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse chalk	
ВН2	9,00	D10		0.14		100	Very stiff grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	Chalk crushed to pas 2mm sieve
внз	8.00	. Dð		0.31		99	Very stiff dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	
BH4	9.50	U2		0.34		100	Hard (Extremely high strength) dark grey slightly gravelly slightly sandy silty CLAY/extremely weak MUDSTONE. Gravel is fine to coarse chalk and rare flint	
BH7	4.00	U2		0,07		94	Very stiff (Very high strength) dark olive grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse chalk and rare flint	
BH7	7.50	D8		0.15		99	Stiff dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	
METHOD	OF PREPAR	ATION: BS	1377:PAR	T 1:1990:	7.5 BS13	77:PART 3	:1990:5.2 Acid Soluble, 5.3 Soi	l/Water Extract
	OF TEST			T 3:1990:!		_	:5.4 Groundwater	
		С	≕ Core Cu	tter		Disturb	ed, J ≖ Jar, W ≖ Water, SPT = S	plit Spoon Sample,
COMMENT	5	: Te:	st not UKA,	5 accredite	d.			
	TO INCLU							



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Borehole/ Pit No.	Depth m.	Sample	pH Value	Description	Remarks
BH1	6.50	D7	7.4	Very stiff grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	
BH2	2.45	D2	7,3	Stiff mottled yellowish brown and grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	
BH2	5.00	02	7.6	Stiff (Bigh strength) dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse chalk	
BH2	9.00	DIQ	6.9	Very stiff grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	Chalk crushed to pass 2mm siev
BN3	8.00	D9	7.2	Very stiff dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	
BH4	9.50	υ2	7.7	Hard (Extremely high strength) dark grey slightly gravelly slightly sandy silty CLAY/extremely weak MUDSTONE. Gravel is fine to coarse chalk and rare flint	
<b>送</b> 田7	4.00	U2	7.6	Very stiff (Very high strength) dark olive grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse chalk and rare flint	
BN7	7.50	DS	7.1	Stiff dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium chalk	
METHOD OI	PREPARATI	ON: BS 137	7:PART 1:1990	D:7 BS 1377:PART 3:1990:9.4	
METHOD OF	TEST	: BS 1377	7:PART 3:1990	0:9.5	
TYPE OF S	SAMPLE KEY	: U = Uno	disturbed, B	= Bulk, D = Disturbed, J = Jar, W = Water	, SPT = Split Spoon Sample,
COMMENTS		C = Cor	re Cutter : UKAS accredi		
REMARKS 1	O INCLUDE	: Sample	disturbance	, loss of moisture, variation from test pr	

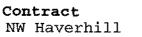
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Bri Bri Ips	osphere Environmental Lto ghtwell Barns ghtwell wich 0 OBJ	d. Soil Property Testing 18 Halcyon Court, St Margarets Way, Stukeley Meadows, Huntiugdon, Cambs. PE29 6DG. Telephone (01480) 455579 Fax (01480) 453619 Email enquiries@soilpropertytesting.com
	<b>UBMITTED BY:</b> sphere Environmental Lto	APPROVED SIGNATORIES:
SAMPLES L	ABELLED: NW Haverhill	
DATE RECE	IVED: 21/11/14 SAM	APLES TESTED BETWEEN 21/11/14 and 08/12/14
REMARKS:	For the attention of Mr Your Ref: 995,SI	r S Gilchrist
NOTES: 1	All remaining samples of will be disposed of aft we are notified to the	or remnants from this contract er 21 days from today, unless contrary.
2	<ul><li>(a) UKAS - United Kingd</li><li>(b) Opinions and interp the scope of UKAS a</li></ul>	lom Accreditation Service. pretations expressed herein are outside accreditation.
3	Tests marked "NOT UKAS are not included in the this testing laboratory	ACCREDITED" in this test report UKAS Accreditation Schedule for
4	This test report may no except with the prior w	ot be reproduced other than in full written approval of the issuing laboratory.

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Bh./ Tp No.	Sample Ref	Depth (from)		1.140	4-111 4-111	200 34101 34101	SC	HE De Co Co Pe Co Co Co Co Co Co Co Co Co Co Co Co Co	DU entre and the particular	LE Mation ation ation	OF	LA	BC	Tes	ТО	RY	TE	ST	S			Remarks
TP24	Bl	0.20	*	*	*	*	*				[						Ĺ		<u> </u>			
TP29	B1	0.70	*	*	*	*	*		ļ			ļ		<u> </u>	<u> </u>					<u> </u>		
TP31	<u>B1</u>	0.70	*	*	*	*	*			1	}	<u> </u>										
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			Noisture	l (muid	Plastic	Plast-	Liqu-		SAMPLE PR	EPARAT IO	ł		
Borehole/ Pit No.	Depth m.	Sample	Content (%)	Limit (%)	Limit (%)	icity Index (%)	idity Index (%)	Method S/N	Ret'd 0.425mm	Corr'd	Curing Time	Description	CLAS
TÞ24	0.20 -0.50	81	26	52	23	29	0.21*	S	10(M)	29	24	Firm dark olive brown and light yellowish brown slightly gravelly slightly sandy CLAY with rare recently active roots. Gravel is fine and medium chalk	СН
TP29	0.70	B1.	19	41	18	23	0.13*	S	8(M)	21	72	Stiff yellowish brown slightly gravelly slightly sandy silty CLAY with rare recently active roots. Gravel is fine to coarse chalk and rare flint	cĭ
TP31	0.70	Bl	20	50	20	30	0.07*	ŋ	8 (M)	22	72	Stiff mottled yellowish brown and grey slightly gravelly slightly sandy CLAY. Gravel is fine to coarse chalk and rare flint	CI/ CH
												~	
IETHOD OF	PREPARA	TION :	BS 1377	- PART	1-1000	-768	DADT	2.1000-		<u> </u>	<u>Siava</u>	d Crossing	
ETHOD OF			BS 1377									d Specimen from Natural	
YPE OF S	AMPLE KE	Y:	U = Und C = Cor	listurb e Cutt	ed, B	≕ Bulk	, D ≠ D neci M	isturb	ed, J =	∓ Jar, '	W = War	ter, SPT = Split Spoon Sampl	le,
OMMENTS		:						11000					

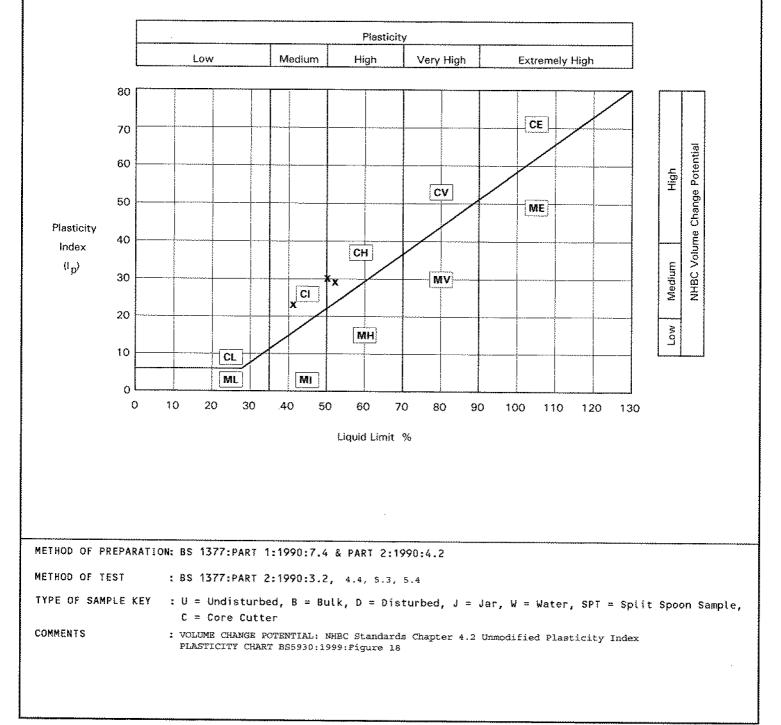


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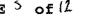
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#### PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART



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Borehole/ Pit No.	Depth m.	Sample	Moisture Content X	Description Remark Firm dark olive brown and light yellowish brown slightly gravelly slightly sandy CLAY (Medium Volume Chark with rare recently active roots. Gravel is fine and medium chalk				Remarks		
TP24	0.20 -0.50	B1								
	PF	REPARATI	ON		Liquid l	init				52 🗶
Method of Pro	eparation	Sieved Specin	1071		Plastic	Limlt				23 🔏
Sample retained 0.425 sieve (Measured) 10 \$				Plasticity Index 29				29 🖇		
Corrected mo	sture content	for material p	assing 0.425mm	29 🕺	Liquidit	y Index				0.21
Curing Time				24 Hours	Clay Cor	tent			Not a	nalysed. 🐔
					Der i ved	Activity (PI/CC	)		Not a	nalysed.
c = cL/ Plasti Index (I <sub>p</sub> )	city '		CL	CI K		CV MV	CE		Low Medium High	NHBC Volume Change Potential
M = SIL	T	0	20 <u>30</u>	40 50	<u>60 7(</u>	) 80 9	0 100	110 12	Liqui	id Limit %
METHOD OF		: BS 1377: : U = Und C = Core : PLASTICIT VOLUME CR NOTE: Moc 7% retain Corrected	PART 2:1990 isturbed, B cutter ry CHART ES59 HANGE POTENTI. lified Plasti. ded on 2mm si. moisture co.	:7.4 & PART ; :3.2, 4.4, 5. = Bulk, D = H 30:1999:Figure AL: NHBC Stand city Index I'p eve. ntent and calc 7:Part2:1990 C	.3, 5.4 Disturbed 18 ards Chap = Ip x ( ulated li	l, J = Jar, ter 4.2 Unmod ≹ less than 4 Buidity inder	ified Plas 25 microns	ticity Ind /100)	iex	

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DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

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#### Bonehole/ Depth Moisture Sample Description Remarks Content Pit No. m. \* TP29 0.70 B1 19 Stiff yellowish brown slightly gravelly NHEC Modified I'p = 21% slightly sandy silty CLAY with rare recently (Medium Volume Change active roots. Gravel is fine to coarse chalk Potential) and rare flint PREPARATION Liquid Limit 41 Method of Preparation Sieved Specimen Plastic Limit 18 Sample retained 0.425 sieve 8 % (Measured) Plasticity Index 23 Corrected moisture content for material passing 0.425mm 21 % Liquidity Index 0.13 Curing Time 72 Hours Clay Content Not analysed. 🕺 Derived Activity (PI/CC) Not analysed. 70 C = CLAYCL CI СН CV CE 60 Potential High 50 Change 40 Plasticity **NHBC Volume** Index % Medium 30 $(l_{D})$ × 20 Low 10 MI MH MV ME

6 ML a M = SILT Liquid Limit % 10 20 30 4<u>0</u> 50 60 110 70 80 90 100 METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2 METHOD OF TEST : BS 1377: PART 2: 1990: 3.2, 4.4, 5.3, 5.4 TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18 VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index NOTE: Modified Plasticity Index I'p = Ip x (% less than 425 microns/100) 6% retained on 2mm sieve. Corrected moisture content and calculated liquidity index assume material greater than 0.425mm

non porous. See BS1377:Part2:1990 Clause 3 Note 1.

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Borehole/ Pit No.	Depth m.	Sample	Moisture Content X		Description		Remarks	
TP31	0.70	B1		slightly grave	yellowish brown and grey ally slightly sandy CLAY. arse chalk and rare flint		NHBC Modified I'p = 28% (Medium Volume Change Potential)	
PREPARATION					Liquid Limit	50 🕺		
Method of Preparation Sieved Specimen					Plastic Limit	20 🖌		
Sample retained 0.425 sieve (Measured) 8 🛠					Plesticity Index	30 <b>%</b>		
Corrected mo	sture content	for material p	assing 0.425mm	22 %	Liquidity Index		0.07	
Curing Time				72 Hours	Clay Content	tent Not analysed. #		
					Derived Activity (PI/CC)	Not analysed.		
c = cl/ Plasti Index (I <sub>p</sub> )	city %	70       60       50       40       30       20       10	CL.	CI KI			Low Medium High NHBC Volume Change Potential	
M = SIL	T	0 10	20 30	40 50	<u>60 70 80 90</u>	100 110 120	Liquid Limit %	
METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2								
METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4								
TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample,								
C = Core Cutter COMMENTS : PLASTICITY CHART ESS930:1999:Figure 18 VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index NOTE: Modified Plasticity Index I'p = Tp x (% less than 425 microns/100) 6% retained on 2mm sieve. Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.								



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S28297

#### LABORATORY CALIFORNIA BEARING RATIO TESTS ADJUSTED FOR SEASONAL MOISTURE CONTENT CHANGES.

Due to seasonal variations of water content in near surface soils, many clients require CBR test samples to be subjected to sample preparation in the laboratory before testing. With Clay soils, liquid and plastic limits and moisture contents are carried out to classify them on material passing 20mm. The plastic limit is then compared against the moisture content with due regard to the proportion of material then retained on a 0.425mm sieve. If the moisture content is already 2% or more above the plastic limit, compaction may take place immediately. If this is not the case a calculated amount of water is added to the sample and cured for 24 hours before compaction. The samples are then cured for a further 24 hours before CBR tests are carried out at both the top and bottom of the sample.

#### **CALCULATION OF ADJUSTED MOISTURE CONTENT FOR CBR TESTING**

When a significant proportion of a basically clay material is >0.425mm, the adjusted moisture content (MC) for test shall be derived as follows:

Obtain test specimens for CBR, Limits and Moisture content from Material Passing 20mm. (If the sample is large enough a moisture content may also be carried out on a representative portion of the whole sample including material greater than 20mm, and reported for information)

The Plastic Limit (PL) for the fine fraction is obtained by testing material passing the 0.425mm sieve. A notional 5% Moisture Content is to be allowed for material passing 20mm, and retained on the 0.425mm sieve. The proportion passing the 0.425mm is obtained by the wet sieve preparation method.

If X% passes 0.425mm, (100-X) % is retained on 0.425mm and with the 5% MC required to be incorporated for the retained 0.425mm portion, the adjusted MC for test shall be at least:

 $\frac{X(PL+2) + (100-X)5\%}{100}$  for the sample passing 20mm

#### CALCULATIONS:

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TP24 B1 @ 0.20m

90% passing 0.425mm therefore X = 90Plastic limit of specimen = 23.3% Moisture content as received = 26.5%

Therefore moisture content adjustment not required Moisture Content after CBR Test (excluding +20mm) = 27%



### **TEST REPORT.**

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TP29 B1 @ 0.70m

92% passing 0.425mm therefore X = 92
Plastic limit of specimen = 17.9%
Moisture content as received (excluding +20mm) = 19.2%
1% of the original sample retained on 20mm sieve and excluded from tests

 $\frac{92(17.9+2) + (100-92)5}{100} = 18.7\%$ 

Therefore moisture content adjustment not required Moisture Content after CBR Test (excluding +20mm) = 19%

TP31 B1 @ 0.70m

92% passing 0.425mm therefore X = 92
Plastic limit of specimen = 20.3%
Moisture content as received (excluding +20mm) = 19.7%
1% of the original sample retained on 20mm sieve and excluded from tests

 $\frac{92(20.3+2) + (100-92)5}{100} = 20.9\%$ 

Therefore moisture content adjustment required Moisture Content after CBR Test (excluding +20mm) = 22%



Depth

ή.

0.20

~0.50

Sample

**B**1

Bonehole/

Pit No./

Chainage TP24

### TEST REPORT.

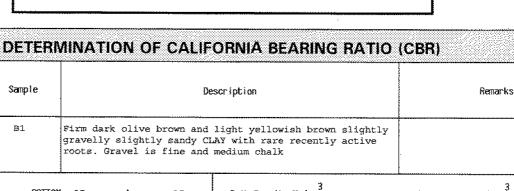
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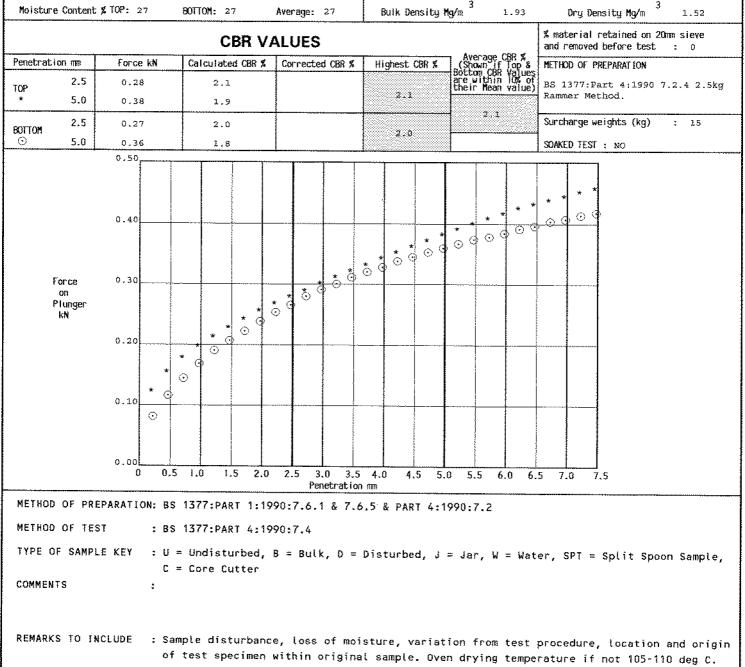
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Borehole/ Pit No./ Chainage TP29	Дері я. 0.7	th	DATH Cont NW	JED BY S OF IS Tract Haverh MINATI	SSUE ill ON OF	: SOIJ : As p : CALI	L PR age 1 FOR Descrip	NIA y grav	PAGE BEA	TE g (( , , , , , , , , , , , , , , , , , ,	STIN of () Seri S2 G RA	2 al 2829 ATIC	<b>No</b> . 97	- ,	Rema	KAS DESTING 0998	
		TOP					···			. 3						3	
Moisture Co	ntent %	10P: 19	BOTTO	M: 19	Average		В	ulk De	nsity l	lg/a	2.	.05	≭ mat	erial	nsity Mg/m retained on	1.7 20mm siew	
Penetration	men	Force	kN Calc	CBR V	CBR VALUES				CBR %	א ר	rage_C <u>₿</u>	R X	and removed before test : 1				
	2.5	0.60	un our	4.5				yicsu	2DN /#	Botto	rage CB wn if T m CBR V ithin I Mean v	uuues 0% of alues			REPARATION art 4:199	3 7.2.4 2	2.5kg
	5.0	0.82		4.1				4.5			4.2		Ramn	er Ne	thod.		_
BOTTOM	2.5	0.52		3.9				3.9			4,2		Surch	narge w	eights (kg)	; 15	5
<u> </u>	5.0	0.73	<u> </u>	3.6									SOAKE	D TEST	: NO		· · · · · · · · · · · · · · · · · · ·
Forc on Plur kN		0.90 0.80 0.70 0.60 0.50 0.40 0.30 0.20 0.10 0.00 0	*	× · · · · · · · · · · · · · · · · · · ·	0 2.5	* * * * * * * * * * * * * * *	· · · · · · · · · · · · · · · · · · ·		* * 			× * • • •	·				
METHOD OI	PREP	ARATIO	N: BS 1377	':PART 1:1	990:7.6	.1 & 7.	.6.5 8	& PAR	T 4:1	990:7	7.2						
METHOD OF TYPE OF S COMMENTS REMARKS 1	SAMPLE		: : Sample	lísturbed, e Cutter	B ≖ Bu nce, ios	ik, D = s of mo	Distur	~e, v	ariat	ion f	<sup>;</sup> rom t	est j	oroce	dure	, locatio	on and o	rígin

TEST REPORT.

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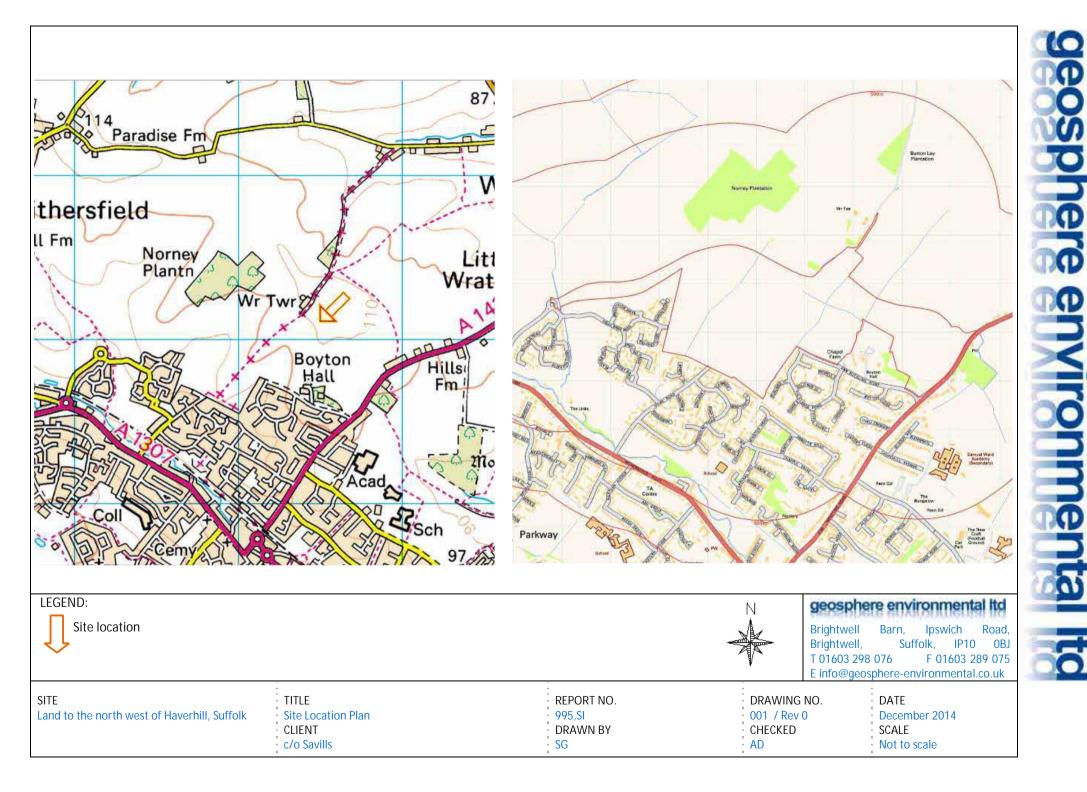
Contract NW Haverhill Serial No. S28297

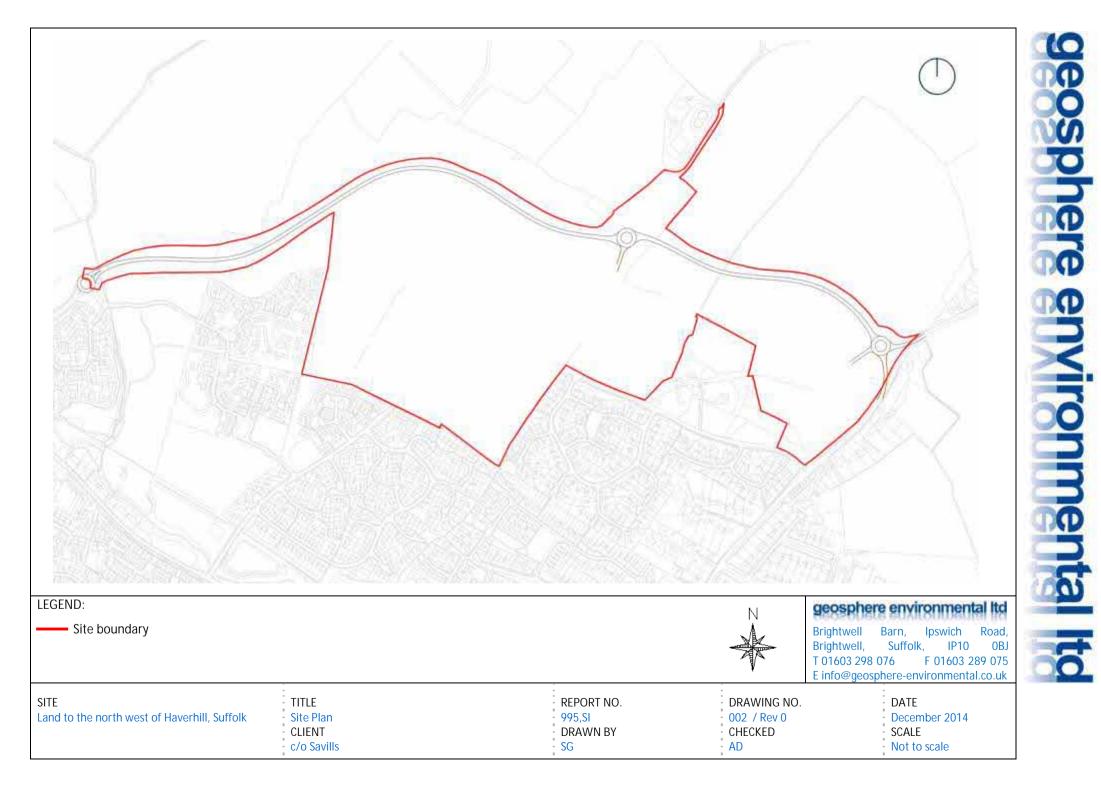
**DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)** Borehole/ Depth Pit No./ Sample Description Resarks m. Chainage TP31 0,70 В1 Stiff mottled yellowish brown and grey slightly gravelly slightly sandy CLAY. Gravel is fine to coarse chalk and rare flint 3 3 Moisture Content % TOP: 21 BOTTOM: 22 Average: 22 Bulk Density Mg/m 2 01 Dry Density Mg/s 1.66 % material retained on 20mm sieve **CBR VALUES** and removed before test : 1 Average CBR % (Shown if Top & Bottom CBR Values are within 10% of their Mean value Penetration mm Force kN Calculated CBR 🕺 Corrected CBR 🕺 Highest CBR % METHOD OF PREPARATION 2.5 0,65 4.9 BS 1377:Part 4:1990 7.2.4 2.5kg TOP 4.9 Rammer Method. 5.0 0.86 4.3 4,7 2.5 0.60 Surcharge weights (kg) ; 15 4.5 BOTTOM 4.5 5.0  $\odot$ 0.84 4 2 SOAKED TEST : NO 1.10 1.00 \*\*\*\* ٢ 0.90 <u>\*</u> \* 0.80 \* © -0 \* 0.70 Force  $\odot$ ΟĤ 0.60 Plunger  $\odot$ \* kΝ 0.50 T. \* ୍ 0.40 \* 0.30  $\odot$ G 0.20  $\odot$ 0.10 0.00 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 Penetration mm METHOD OF PREPARATION: BS 1377:PART 1:1990:7.6.1 & 7.6.5 & PART 4:1990:7.2 METHOD OF TEST : BS 1377:PART 4:1990:7.4 TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter COMMENTS 5

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

#### **APPENDIX 11 – DRAWINGS**

Site Location Plan – Drawing ref. 995,SI 001/Rev 0 Location Plan – Drawing ref. 995,SI 002/Rev 0 Proposed Development Plan – Drawing ref. 995,SI 003/Rev 0 Exploratory Hole Location Plan – Drawing ref. 995,SI 004/Rev 0



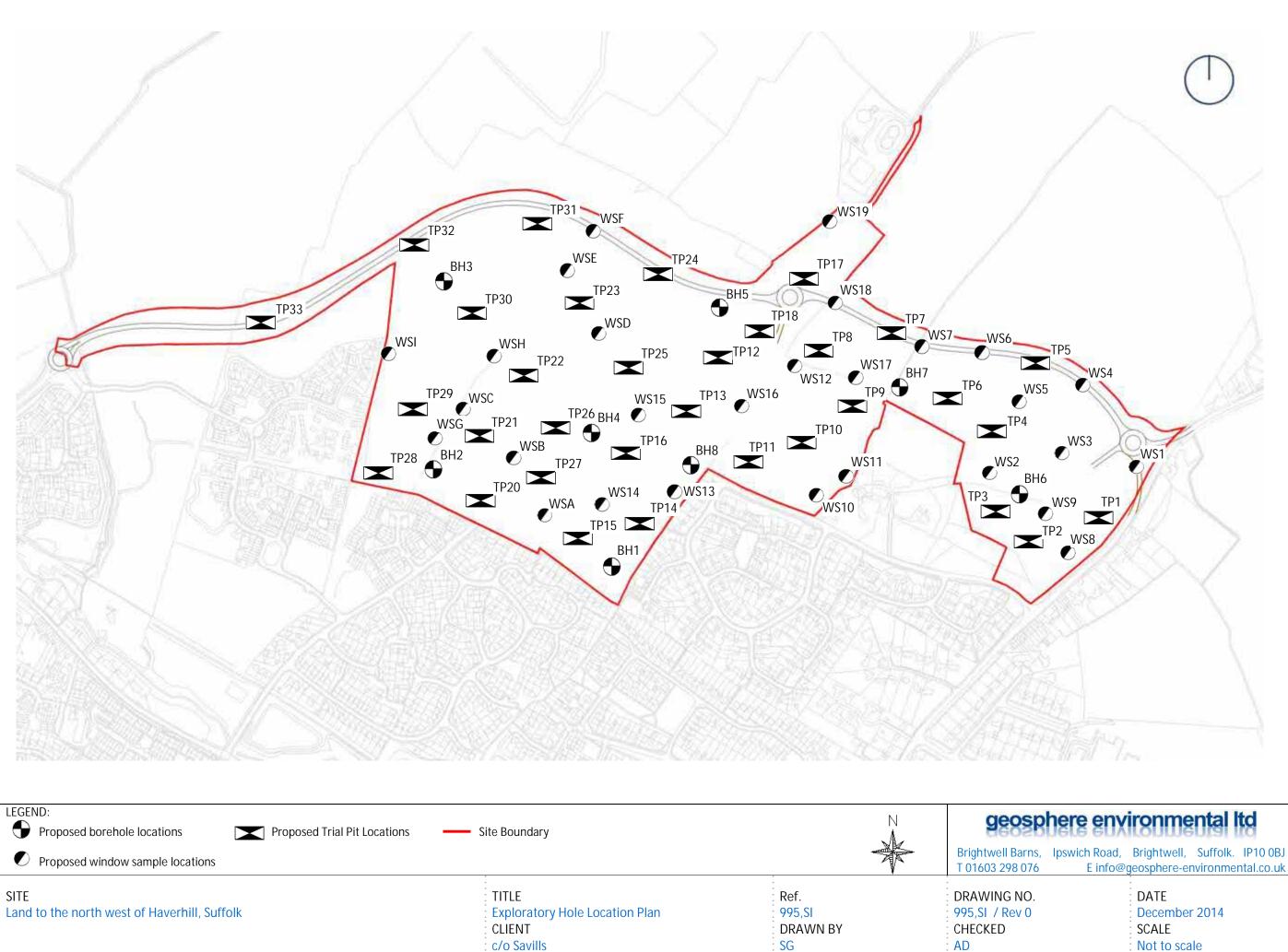




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#### APPENDIX 12 - PHOTOGRAPHS

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#### Investigate design resolve

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Looking east across the south west portion of the site



#### Photograph 2

Looking south west across the western most portion of the site



### Photograph 3

Looking west at a wider view of the western portion of the site

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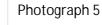
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#### Photograph 4

Looking north at the northern most portion of the site



Looking east at a central portion of the site

Photograph 6

Looking north west at the southern most portion of the site





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Photograph 5

Looking east at a portion of the site to the south east

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