



Phase I & II Geo-Environmental Assessment

37 Woodgate Road
Moulton Chapel
Lincolnshire
PE12 0XF

Prepared for:

Enchantment Homes Ltd
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37 WOODGATE ROAD, MOULTON CHAPEL

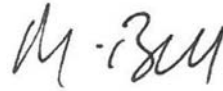
NON TECHNICAL SUMMARY

This report presents the findings of a combined Phase I Desk Study and Phase II intrusive Geo-Environmental Assessment undertaken to determine ground conditions and establish if there are any environmental risks associated with the site and its development. Pertinent findings and conclusions may be summarised as follows:

- This property consists of a large area of open ground which had recently been cleared of undergrowth by the developer in preparation for its intended development under planning for construction of several residential properties.
- Historically, the land formed a large garden for a bungalow situated to the north and until the recent clearance it included three small wooden outbuildings and a large greenhouse. A farm track was also constructed across the northern section to allow access between Woodgate Road on the east, to agricultural fields to the west of the property.
- Given that much of the western half of the plot will be used in future for residential gardens, potential risks were identified in relation to the interaction between future site residents and potentially contaminated materials used to form the farm track and former outbuildings and greenhouse bases, which could also have affected the underlying natural ground.
- During a site visit, excavations were made to investigate the subsurface and to collect soil samples for appropriate analyses. The ground was found to comprise mainly brown sandy silt and silty sands to beyond 1m and materials making up the track and building bases consisted mainly of road plainings and granite chippings.
- Laboratory results did not identify any contaminants of concern in shallow natural ground. The developer reported that the track and bases would be removed as part of the development to bring the site to level therefore, aside from general recommendations for good practice, EPS has not recommended any additional remediation work or control measures beyond this, but has asked that photographic evidence is provided to show that the work had been done.

The above points represent a simplified summary of the findings of this assessment and should not form the basis for key decisions for the proposed development. A thorough review of the details is contained within the following report, or get in touch and we'll talk you through it.

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Where ground investigations have been conducted, these have been limited to the level of detail required for the site in order to achieve the objectives of the investigation.

The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Objectives	1
1.2	Scope of Work.....	1
1.3	Limitations and Constraints	2
2	GEO-ENVIRONMENTAL SETTING	3
2.1	Site Description	3
2.2	Environmental Setting.....	4
2.3	Site History.....	5
3	CONCEPTUAL MODEL & PRELIMINARY RISK ASSESSMENT.....	6
3.1	Source Characterisation.....	6
3.2	Potential Receptors	6
3.3	Potential Pathways	7
3.4	Summary of Contaminant Linkages.....	8
3.5	Conceptual Site Model	9
4	SUMMARY OF INTRUSIVE INVESTIGATIONS	10
4.1	Borehole Locations.....	10
4.2	Soil Sampling.....	10
4.3	Environmental Laboratory Analysis.....	10
5	FINDINGS OF THE INVESTIGATION.....	11
5.1	Ground Conditions	11
5.1.1	<i>Topsoil / Made Ground</i>	11
5.1.2	<i>Tidal Flat Deposits</i>	11
5.1.3	<i>Groundwater</i>	11
5.2	Physical Evidence of Contamination.....	11
5.3	Laboratory Analysis.....	12
5.3.1	<i>Chemical Analysis-Soils</i>	12
6	GENERIC QUANTITATIVE RISK ASSESSMENT.....	13
6.1	Generic Screening.....	13
6.1.1	<i>Generic Screening - Soils</i>	13
6.2	Assessment of Soil Results.....	14
7	ENVIRONMENTAL CONCLUSIONS & RECOMMENDATIONS.....	15

TABLE OF CONTENTS (CONTINUED)

Figures

Figure 1	Site Location Plan
Figure 2	Current Site Layout Plan
Figure 3	Aerial Photograph
Figure 4	Borehole Location Plan
Figure 5	Site Context – CLR11

Tables

Table 1	Laboratory Testing Schedule
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Appendices

Appendix A	Selected Site Photographs
Appendix B	Proposed Development Plan
Appendix C	Surrounding Land Use
Appendix D	Geological Context
Appendix E	Groundwater Vulnerability Map and Flood Maps
Appendix F	A Selection of Historic Maps
Appendix G	Laboratory Data – Environmental
Appendix H	Generic Screening Criteria
Appendix I	Example Method Statement for Construction Workers Encountering Unexpected Contamination

1 INTRODUCTION

In June 2015, Environmental Protection Strategies Ltd (EPS) was commissioned by Enchantment Homes Ltd to complete a combined Phase I and II Geo-Environmental Assessment for a plot of land at 37 Woodgate Road, Moulton Chapel, Lincolnshire, PE12 0XF (the 'site'); see Figure 1.

This report presents the findings, conclusions, and recommendations of a Phase I Desk Study and subsequent Phase II Intrusive Investigation undertaken for the site.

Development proposals include clearance of all existing structures and construction of two detached residential dwellings and two semi-detached residential dwellings with associated domestic garden areas, car parking and access road off Woodgate Road. Planning permission has been granted by Holland District Council (HDC) (ref.: H13-0351-15) with conditions and this report has been prepared to address relevant conditions in respect of possible contamination.

1.1 Objectives

The objectives of this investigation were as follows:

- a) To compile a Conceptual Site Model (CSM) and undertake a Preliminary Risk Assessment to evaluate the potential risks the site may pose to human and environmental receptors, both currently and in future.
- b) To investigate potential contaminant linkages identified by the CSM by means of investigating shallow soils.
- c) To determine the potential risks posed by the site and make recommendations for further work that may be required, to ensure suitability for use and safe development in accordance with the *Model Procedures for the Management of Land Contamination - Contaminated Land Report 11* and the *National Planning Policy Framework* (2012).

1.2 Scope of Work

To perform an exploratory assessment of the site in accordance with the principles and requirements of DEFRA's 'Contaminated Land Statutory Guidance' (2012) and BS10175 (2011)—'Investigation of Potentially Contaminated Sites', the following tasks were undertaken:

Desk Study:

- Collection of site records.
- Study of existing geological, hydrogeological and historic maps of the area.
- Examination of environmental databases.
- Development of conceptual model and preliminary risk assessment.

Site Work:

- Site walkover, inspection of any visual evidence of contamination at the site, obtaining photographic records.
- Health and safety briefing / site supervision.

- Drilling of hand auger boreholes to a maximum depth of 1.25m below ground level (bgl) at six locations.
- Continual logging of ground conditions including inspection of samples for visual and olfactory contamination, and laboratory analysis of selected soil samples.

Reporting:

- Data collection and interpretation.
- Reporting.

The findings of these investigations and their conclusions are presented in the following sections.

1.3 Limitations and Constraints

The purpose of this report is to present the findings of a soil and water sampling investigation conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, Environmental Protection Strategies Ltd (EPS) makes the following statements:

No investigation method is capable of completely identifying all ground conditions that might be present in the soil or groundwater under a site. Where outlined in our report, we have examined the ground beneath a site by constructing a number of boreholes and / or trial pits to recover soil and / or groundwater samples. The locations of these excavations and sampling points are considered to be representative of the condition of the whole site subsurface however, ground conditions are naturally variable and it may be possible that the ground conditions encountered may differ to those encountered during the investigation.

The investigation was carried out to assess the significance of contamination resulting from the use of the site as identified in this report. Unless EPS has otherwise indicated, no assessment of potential impact of any other previous uses has been made.

No visible evidence of Japanese Knotweed was identified during the site walkover, however this plant can be difficult to identify in the early stages of growth and therefore it is not always possible to identify its presence at certain times of the year. For this reason EPS cannot confirm that Japanese Knotweed rhizomes do not exist and it is recommended that if it is suspected that this species or other similarly invasive plants are present at the site, a specialist contractor should be commissioned to make a detailed assessment.

2 GEO-ENVIRONMENTAL SETTING

The following section provides a summary of the information collected in relation to the site location and history.

2.1 Site Description

Detail	Description
Location	The site is located approximately 300m to the south of Moulton Chapel village on Woodgate Road. Moulton Chapel lies approximately 6.5km to the southeast of Spalding in Lincolnshire.
Grid Reference	NGR 529260, 317920
Topographic Elevation	Approximately 3m Above Ordnance Datum (AOD).
Topographic Gradient	Local topography is flat with no appreciable gradient.
Description of Site	A site walkover survey was undertaken on 6th August 2015 and found the proposed development site to consist of an area of land measuring approximately 40m by 50m, which had been recently cleared of vegetation and structures with several piles of recently cut down shrubs and undergrowth and a pile of wood. The EPS engineer met with the developer who advised that the property had originally been used as a garden for a bungalow situated adjacent to the north, (still standing but vacant) but the bungalow is not part of the proposed development plot under the planning application (see Figure 2). A farm access road lies along the northern boundary of the plot which separates the bungalow from the garden area and allows access for farming machinery between Woodgate Road to the east and agricultural fields to the west. Prior to the recent site clearance, the developer explained that the plot was heavily overgrown, there had been a total of three small wooden outbuildings situated toward the northern and western boundaries of the site, and a large glasshouse situated toward the centre of the site. These buildings had been removed during the site clearance, however all of the materials contained within them were stored on site pending disposal. Amongst the materials stored were sheets of potentially asbestos containing, corrugated cement board however all sheets appeared to be undamaged and no evidence of cement board fragments were observed in or around the former building footprints. The developer explained that these had been removed prior to demolition. He also explained that the remaining building footprints and farm track were also due to be removed during forthcoming site preparation works in order to bring the site to level and also to expose natural ground for the proposed gardens.

Detail	Description
Surrounding Land Use	The eastern, southern and western boundaries of the site are marked by medium to tall fir tree hedges and additional residential properties lie to the north and south. Woodgate road forms the eastern boundary of the site and beyond this lies more residential properties and gardens. Further residential properties lie to the north and south whilst open agricultural fields, set for wheat during the site visit, lie to the west. The vacant bungalow located to the north of the subject site included a large (approximately 2000litre), single skin, steel heating oil tank.

A plan showing the site location is provided as Figure 1, the current site layout is detailed on Figure 2 and an aerial photograph is included as Figure 3. Selected site photographs are included as Appendix A, an indicative proposed development plan as Appendix B and relevant extracts of a Landmark Envirocheck report are included as Appendix C.

2.2 Environmental Setting

Detail	Description	
Geology	Geological maps of the area show that the property lies upon Tidal Flat Deposits of clay and silt, which overlay Oxford Clay. An historical borehole log was examined from the British Geological Society (BGS) for a location approximately 200m to the north which describes brown clayey sandy silt extending from ground level to approximately 1.5m below ground level (bgl) underlain a mix of brown and grey brown silty fine and medium sands to total depth of 7m bgl. The site’s geological context is included in Appendix D.	
Geological Hazards	Hazard	On Site Risk
	Mining	No Hazard
	Collapsible Ground	No Hazard
	Compressible Ground	Moderate
	Ground Dissolution	No Hazard
	Running Sand	Moderate
	Landslide	Very Low
	Shrinking / Swelling Clay	Low
Radon	The BGS and Health Protection Agency (HPA) report entitled ‘ <i>Indicative Atlas of Radon in England and Wales</i> ’ (November 2007) shows the site to lie within a 1km grid section where the percentage of homes above the radon action level is between 0% and 1%. The joint Building Research Establishment Ltd (BRE) report entitled ‘ <i>Radon: Guidance on Protective Measures for New Buildings - 2007</i> ’ reports that the site does not lie within an area where basic radon protection methods will need to be employed.	

Detail	Description
Hydrogeology & Hydrology	Groundwater vulnerability maps for the area show the underlying tidal flat deposits and Oxford Clay be classified as unproductive strata. There are no abstractions within 500m of the site and all abstractions nearby are taken from surface water drainage for agricultural irrigation purposes. The site does not lie within a Source Protection Zone (SPZ) for groundwater abstraction. Numerous local drainage ditches are present in the surrounding area including a small surface water drain along the western boundary however, this appeared to be dry during the site visit. The site is located in Flood Zone 1 which is the area of lowest potential flood risk from fluvial or tidal flood events. Appendix E provides a summary of flooding and hydrogeological information
Landfill & Waste	No historical or active landfills are located within 1km of the subject site.
Industrial Land Use	The Envirocheck report lists only one trade entry within 500m of the site, which relates to petrol station located on Roman Road at around 350m to the northeast of the subject site. All other entries are beyond 500m distance.
Sensitive Land Use	The site is not located within, or close to any land area designated as sensitive such as Areas of Outstanding Natural Beauty, RAMSAR sites, Sites of Special Scientific Interest, Nature Reserves, or Nitrate Vulnerable Zones.

2.3 Site History

A summary of historical map data from 1887 to 2015 is provided below and copies of relevant historic maps during the investigation are included in this report as Appendix F.

- The earliest published maps showing the site (1887-1906) do not show any development, however at some point between 1906 and 1938 a single rectangular structure was erected at the property toward the central northern end.
- The farm access track appeared to have been constructed in the 1960s and an additional building was constructed adjacent to the first in the 1970s but was subsequently removed before 2006 after which time the plot has remained unchanged.
- The surrounding area does not appear to have had significant development between 1887 and 1990s however large greenhouses were noted to have been built within 100m to the northeast and south in the 1960s and remained until the late 1990s which could indicate some local commercial activities.
- Substantial residential development did not occur in the land surrounding the property until the early 1990's after which time dwellings were constructed on both sides of Woodgate Road to the north and south of the property.

3 CONCEPTUAL MODEL & PRELIMINARY RISK ASSESSMENT

The following section provides a review of the contaminant linkages that may be active at the site through examination of the potential sources that may be present as a result of historic and / or current site activities and where potential interaction between these sources and the identified human / environmental receptors may occur.

3.1 Source Characterisation

The following potential contaminant sources have been identified at the site and in the surrounding area:

Potential Source	Source Description	Principal Contaminants of Concern
Historic / Current Site Use	Potential shallow made ground materials associated with the previous buildings and access road. Materials used in former buildings.	Metals, PAH, ACM, TPH
Historical Surrounding Land Use	Residential property heating oil tank, agricultural activities and some potential local horticultural / nursery businesses.	Metals, PAH, TPH, Pesticides/ herbicides.
Current Surrounding Land Use	Heating oil storage in adjacent bungalow, and neighbouring agricultural activities.	TPH, Pesticides/ herbicides.

Notes: PAH Polycyclic Aromatic Hydrocarbons ACM Asbestos Containing Material
 TPH Total Petroleum Hydrocarbons

3.2 Potential Receptors

A framework for the assessment of risks arising from the presence of contamination in soils has been produced by the Environment Agency and the Department for the Environment, Food and Rural Affairs (DEFRA) and is presented with the report '*Using Science to Create A Better Place: Updated Technical Background to the CLEA Model – Science Report SC050021/SR3*'. This guidance document defines a series of standard land-uses, which form a basis for the development of a Conceptual Site Model.

It is understood that the site is to be developed as residential properties with associated domestic gardens. Therefore the land use, (in accordance with Science Report SC050021/SR3) has been considered as:

- Residential

In view of the environmental setting, current and potential future land use of the site and surrounding area, the potential receptors for any contaminant impact are discussed in the table as follows:

Receptor	Site Specific Description
Human	Construction workers through the development and future site users have the potential to be at risk of exposure to potential contaminants of concern within shallow soils by direct contact.
Groundwater	The underlying saturated deposits are characterised as unproductive strata however they are mainly sandy in nature and may contain small amounts of water hydraulically connected with local drainage. Groundwater should be considered as a potentially sensitive receptor to site derived contaminants of concern.
Surface Water Bodies	The nearest surface water course is a small drainage ditch situated along the western boundary of the property. Whilst this was dry during the site walkover, it has potential to connect with other land drains in the area and so surface water should be considered in this assessment.
Flora and Fauna	The proposed development includes the provision of domestic garden areas. Some of the identified contaminants of concern are known to be phytotoxic and as such the potential for this impact should be considered.
Buildings & Infrastructure	The identified contaminants of concern have the potential to adversely affect buried site infrastructure such as water supply pipes.
Adjacent Land	Immediate surrounding land use includes allotment gardens and a residential property, adjacent land / associated site users should therefore be considered as sensitive to site derived contaminants of concern.

3.3 Potential Pathways

Where contaminants may be present in soil, there are a number of potential pathways that enable human receptors to come into contact with or be exposed to them. The most direct pathways, considered under current UK legislation, can be summarised as follows:

- Direct ingestion of contaminated soil
- Ingestion of household dust
- Ingestion of contaminated vegetables
- Ingestion of soil attached to vegetables
- Dermal contact with contaminated soil
- Dermal contact with household dust
- Inhalation of fugitive soil dust
- Inhalation of fugitive household dust
- Inhalation of vapours outside
- Inhalation of vapours inside

Clearly, not all of these potential pathways apply for every standard land-use; the simplest example for exclusions being a commercial / industrial site which is covered by concrete hardstanding. The concrete precludes the direct exposure of humans working at the site to any contaminated soils.

However in addition to direct exposure pathways, a number of physical transport mechanisms / pathways may also exist at a site that allow remote or less accessible contaminants in soil or groundwater to reach human or environmental receptors both at a site and beyond the site boundary. These include the physical transport mechanisms listed below:

- Downward and lateral movement of contaminants in soil either by gravity or through being 'leached' by percolating rainwater
- Lateral migration of contaminants dissolved in groundwater.
- Direct seepage or leaching of contaminants from soil into subsurface drains or supply pipework.
- Volatilisation of contaminants from groundwater or unsaturated soils into buildings or outdoor air.

Through examination of the standard land use and environmental setting at each site, the presence of pathways and transport mechanisms described above must be considered when assessing whether a contaminant linkage may plausibly be active, and therefore be included in the conceptual site model.

3.4 Summary of Contaminant Linkages

Considering the site use and environmental setting, and the proposed land use; the plausible contaminant linkages that require further investigation are summarised in the following table:

Source	Pathway	Receptor
Contaminated Soil	Direct contact and inadvertent ingestion by eating or smoking with dirty hands, inhalation of fugitive dusts.	Future site users & construction workers during redevelopment
	Direct uptake and / or adherence of contaminated soil to vegetation and subsequent ingestion.	Future Site Users
	Direct uptake via root systems.	Plants
	Vertical migration through permeable geology and into underlying groundwater.	Groundwater
	Lateral migration through permeable geology into nearby surface water.	Surface Water
	Ingress / diffusion through permeable potable water supply pipes.	Site Users

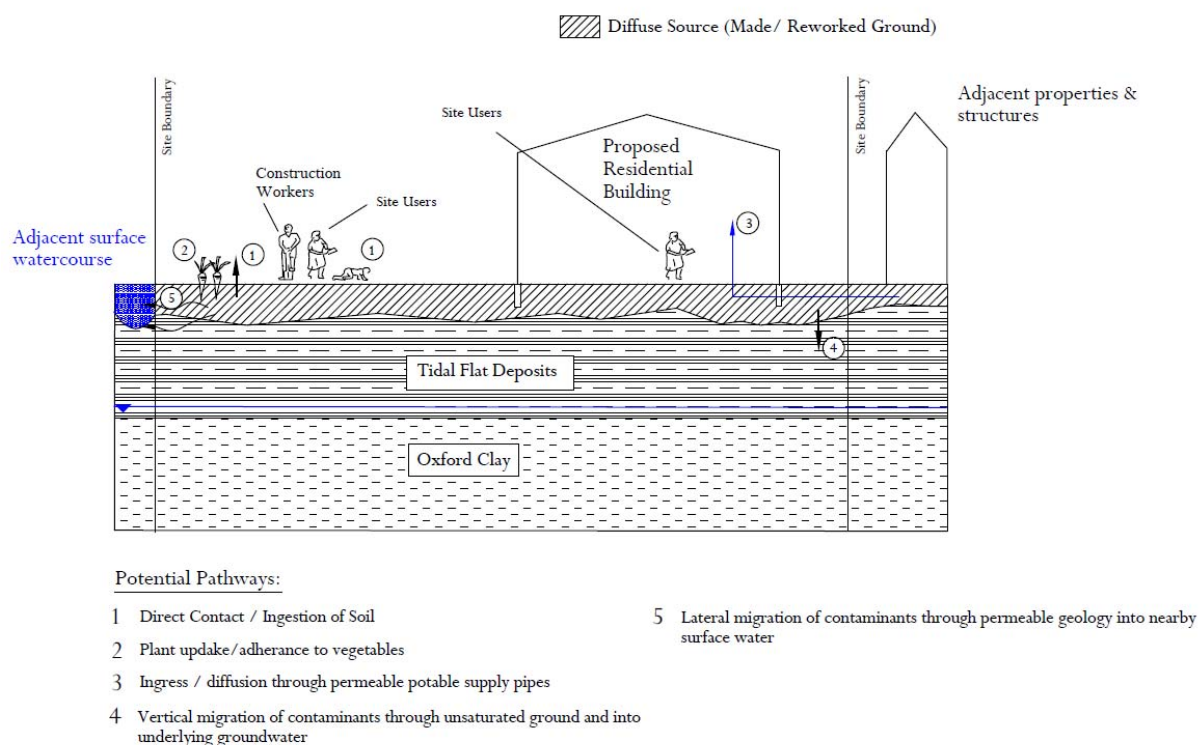
The following comments are made with respect to contaminant linkages which have been considered through development of the conceptual model, but have not been concluded as 'plausible' – i.e. through which a significant possibility of significant harm could occur to an identified receptor:

- A contaminant linkage associated with pesticides and / or herbicides migrating from off-site sources and posing an unacceptable risk to future site users has not been considered as plausible due to the distance of any local farm buildings where these materials are routinely stored.
- Any plausible contaminant linkage associated with surrounding commercial land use has been discounted due to distance from site, the low permeability and groundwater resource of underlying soils and the lack of any potential gradient which could increase the flow of contaminants in any groundwater beneath the site.

3.5 Conceptual Site Model

The following diagram provides a schematic representation of the conceptual site model, which includes a summary of the plausible contaminant linkages:

37 Woodgate Road, Moulton Chapel - Illustrative Conceptual Site Model



4 SUMMARY OF INTRUSIVE INVESTIGATIONS

The intrusive investigation was undertaken on 6th August 2015 in accordance with EPS standard operating procedures, copies of which will be made available on request. A summary of the investigation is presented in the following sections:

4.1 Borehole Locations

Borehole locations were selected through consideration of the potential contaminant linkages identified through the Phase I Desk Study, the location of former structures on site, the access road, and the proposed development layout and operational health & safety considerations.

A total of six hand auger boreholes (HA1-HA6) were drilled during the intrusive investigation in order to assess the nature and quality of underlying soils to depths of up to 1.25m below ground level (m bgl).

The overall objective in terms of borehole locations was to provide an appropriate lateral and vertical coverage of the site to determine the underlying ground conditions and identify potential contamination which may be present.

A detailed layout plan showing the locations of the boreholes formed during the investigation is presented as Figure 4.

4.2 Soil Sampling

Each borehole was logged for ground conditions encountered and inspected for any physical evidence of contamination such as soil staining, odour and the presence of separate phase liquids.

Shallow soil samples were obtained from each location and submitted for laboratory analysis to assess the nature and quality of underlying soils.

Where potentially volatile organic compounds are suspected, EPS carries a Photoionisation Detector (PID), which can be used to measure the relative concentrations of vapour associated with soil samples collected from different depths and locations at the site. In this case, no palpable evidence of volatile organic compounds was encountered therefore the PID was not used.

4.3 Environmental Laboratory Analysis

All samples obtained for analysis of identified contaminants of concern were submitted to Jones Environmental of Flintshire, who hold appropriate UKAS / MCERT accreditation for the required testing. Samples were transported in laboratory supplied containers and delivered to the laboratory by approved courier.

5 FINDINGS OF THE INVESTIGATION

This section of the report provides a summary of the findings of the various aspects of the investigation.

5.1 Ground Conditions

A total of six boreholes were formed at the site and the ground conditions encountered are briefly summarised as follows:

Geological Strata	Minimum Depth to Top of Strata(m bgl)	Strata Thickness (m)
Topsoil / Made Ground	0.5	0.5
Tidal Flat Deposits - brown fine sandy silt	0.1	0.6 to >1.2
Tidal Flat Deposits - orangey brown sandy silt / silty fine sand	0.6	>1.2

5.1.1 Topsoil / Made Ground

A layer of dark brown / black road plainings and granite chippings overlaying some minor black and purple factory clinker was encountered to a total depth of 0.5m bgl at HA1 located in the access track at the northern end of the plot. Made ground of granite chippings was also encountered at HA2 and HA3 which were situated in the bases of former outbuilding / greenhouse structures however this only extended to around 0.1m bgl.

5.1.2 Tidal Flat Deposits

Superficial Tidal Flat Deposits were encountered in all the boreholes drilled at the site and generally comprised brown or orangey brown fine sandy silts or silty fine sands. Occasional clay content was noted making the deposits slightly cohesive in places.

5.1.3 Groundwater

Groundwater was not encountered during the intrusive investigation at any hand auger borehole location.

5.2 Physical Evidence of Contamination

Aside from the road plainings and associated materials used to make up the farm track at the northern end of the property, no evidence of contamination was observed at the site or in the soil samples collected from the various boreholes.

5.3 Laboratory Analysis

5.3.1 Chemical Analysis-Soils

A laboratory analysis testing schedule is presented as Table 1 and all environmental sample results obtained from the laboratory are included as Appendix H.

The key results of laboratory testing on environmental soil samples are summarised as follows:

Contaminant	No. of Samples	No of Detections	Range of Detections (mg/kg)		Highest Location & Depth (m bgl)
			Min	Max	
Arsenic	5	5	6.7	14.7	HA3 / 0.2-0.6
Cadmium	5	2	-	0.2	HA3 / 0.2-0.6
Chromium	5	5	40.5	60.4	HA1 / 0.5-0.6
Chromium (6 ⁺)	5	0	-	-	-
Copper	5	5	6	27	HA2 / 0.3-0.5
Mercury	5	1	-	0.1	HA1 / 0.5-0.6
Nickel	5	5	17.9	22.5	HA3 / 0.2-0.6
Lead	5	5	7	83	HA3 / 0.2-0.6
Selenium	5	0	-	-	-
Zinc	5	5	44	84	HA2 / 0.3-0.5
Benzo[a]pyrene	5	4	0.06	0.34	HA2 / 0.3-0.5
PAH (Total of 16)	5	4	0.8	2.5	HA2 / 0.3-0.5
ACM Detected	5	0	-	-	-
Cyanide (Total)	5	0	-	-	-
Phenols (Total)	5	0	-	-	-
TPHCWG (Total)	3	1	-	196	HA2 / 0.3-0.5
MTBE	3	0	-	-	-
Benzene (ug/kg)	3	0	-	-	-
Toluene (ug/kg)	3	0	-	-	-
Ethylbenzene (ug/kg)	3	0	-	-	-
Xylenes (ug/kg)	3	0	-	-	-

Notes:

- = Contaminant not found above laboratory detection limits
- PAH = Polycyclic Aromatic Hydrocarbons
- ACM = Asbestos Containing Material
- TPHCWG = Total Petroleum Hydrocarbons Criteria Working Group
- MTBE = Methyl-tert-butyl-ether

- Where TPH was encountered in the sample collected from HA2, it consisted of aliphatic and aromatic hydrocarbons in the carbon range C16-C35.

6 GENERIC QUANTITATIVE RISK ASSESSMENT

The following section summarises the method used to measure the risk to human health and / or environmental receptors in the area by contaminants in soil and / or groundwater, and it identifies any results found by this investigation which warrant further consideration.

6.1 Generic Screening

6.1.1 Generic Screening - Soils

In order to screen laboratory data for concentrations of contaminant in soil with potential to cause harm to human health at a residential setting, (seen as a conservative representation of the site based on the likely child / young adult receptor), relevant generic screening values which are representative of minimal risk for contaminants in soil have been used. The technical framework used to derive the assessment criteria and the documents in which they are published are summarised as follows:

- *EA Science Reports* (SC050021/SR2, SC050021/SR3, and SC050021/SR7)
- *EA Soil Guideline Value Science Reports*
- *Suitable For Use Levels (S4ULs) for Human Health Risk Assessment* – LQM and CIEH (2015).
- *Soil Generic Assessment Criteria for Human Health Risk Assessment* - EIC/AGS/CL:AIRE (2010)

For concentrations of Lead in soil, EPS has used the Category 4 Screening Values (C4SLs) (residential with plant uptake) as an appropriate guide for professional judgement with respect to reasonable 'low risk' levels in the context of this site.

For the concentration of Total Cyanide in soil, EPS has used a screening criteria of 20mg/kg as an appropriate guide for professional judgement which has been adopted from the Dutch Intervention Level for Free Cyanide.

In addition to screening the concentrations of contaminant in soil for risks to human health, EPS has also screened the concentrations for potential to cause harm to water resources. The criteria used for this process were derived by EPS using the following technical guidance:

- *Environment Agency Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination*

EPS has also screened the reported groundwater concentrations at an initial Tier 1 level for potential to cause harm to controlled waters within the local area. The criteria used for this process has been taken as follows:

Resource Sensitivity of Area	Basis of Minimal Risk Screening Criteria
High Groundwater Resource Potential (HGwRP) - Principal aquifers	UK Drinking Water Standards (UKDWS)
Low Groundwater Resource Potential (LGwRP) - Secondary aquifers not being abstracted and Non-productive aquifers	UK Environmental Quality Standards (EQS)

Minimal Risk Screening criteria for Low Groundwater Resource Potential (LGwRP) have been adopted due to the site being underlain by unproductive strata.

A summary of the screening criteria and the methodology used to derive them is included in Appendix I.

6.2 Assessment of Soil Results

Screening Criteria representative of minimal risk to human receptors at a residential setting were not exceeded in any of the soil samples collected from site.

Soil screening criteria representative of minimal risk to controlled waters have also not been exceeded for any contaminant of concern at any sampling location.

7 ENVIRONMENTAL CONCLUSIONS & RECOMMENDATIONS

The Phase I Desk Study identified a number of plausible contaminant linkages that could be present at this site, primarily associated with direct contact between likely human receptors and potential contaminants of concern within shallow soils associated with the sites former structures and farm track.

However, subsequent Phase II sampling work has demonstrated that natural soils are present over the majority of the site and, where made ground exists, this has not impacted the underlying natural ground. Development proposals include for removal of all made ground materials in order to bring the site to level and also to provide for natural materials in proposed gardens.

On this basis, EPS concludes that no plausible contaminant linkages have been identified which may pose a risk to site residents and therefore no remedial actions or control measures will be required during the development to make the site safe and suitable for its proposed enduse.

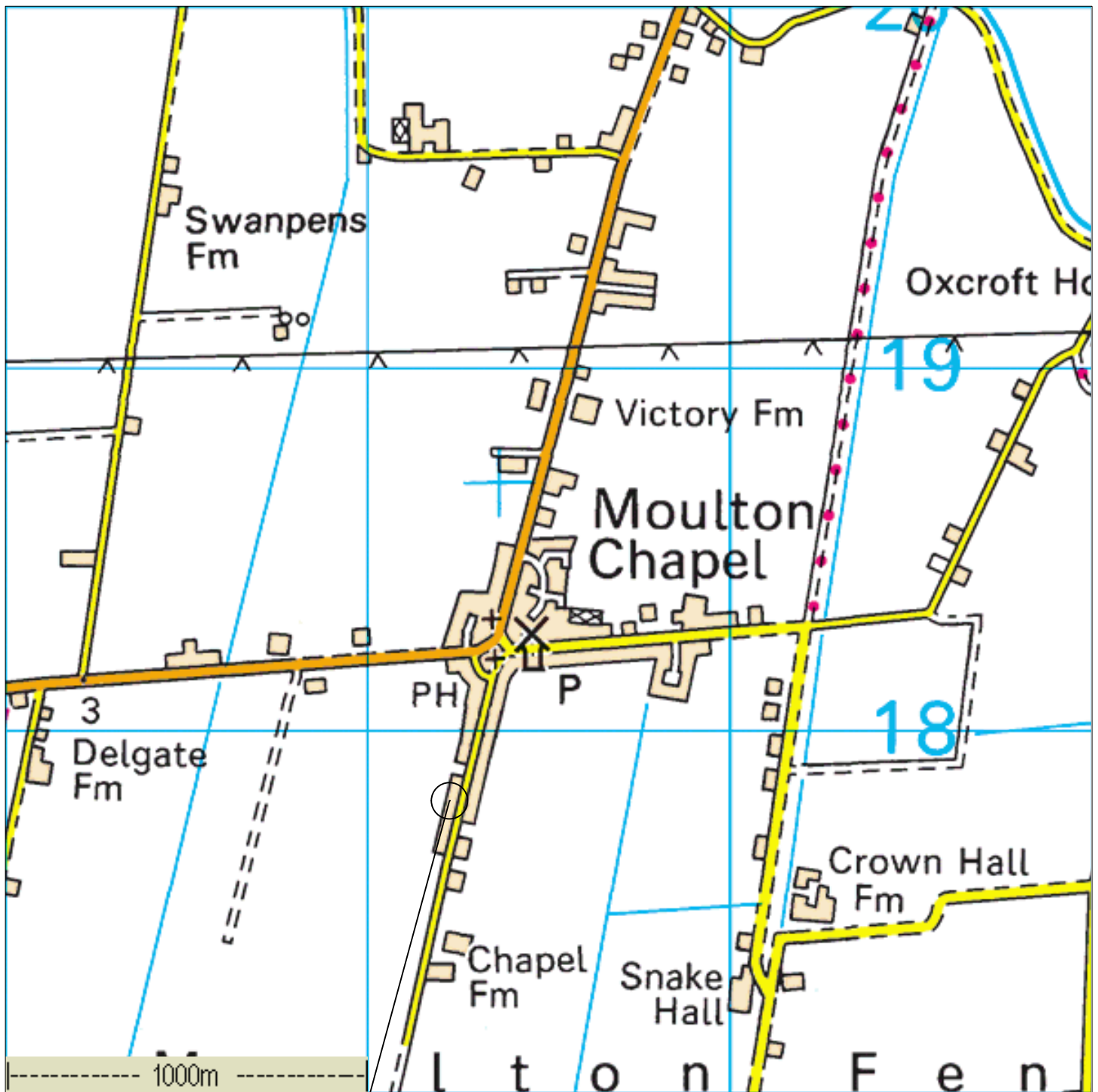
It is however recommended that the following advisory actions are taken:

- a) During excavation of shallow made ground materials dust suppression measures should be adopted such as damping down of material to prevent unnecessary creation of dust.
- b) Photographic evidence should be collected to document the removal of made ground materials and to show that underlying natural ground has been exposed.
- c) All construction workers operating at the site should be advised of the potential for contact with made ground materials containing road plainings and small amounts of factory clinker. Appropriate health and safety precautions should therefore be adopted during any excavation works to avoid exposure to impacted soils. Reference should be made to the following HSE document: *Protection of Workers and the General Public during Development of Contaminated Land, EM6: Personal Protective Equipment, EM8: Personal Decontamination and EM9: Disposal of Asbestos Waste*.
- d) Any cement bonded asbestos or asbestos containing materials should be removed in accordance with current best practise including the *Control of Asbestos Regulations 2012*. This process should remove any risks posed by this material to construction workers or end users at the site.
- e) Should any palpable evidence of unexpected contamination be encountered during the redevelopment work, it should be reported to EPS so that an inspection can be made and appropriate sampling and assessment work carried out. A method statement for encountering any unexpected contamination is included as Appendix J of this report.

A summary of the approach outlined in CLR11, marking the work already completed under the risk assessment phase, is presented as a flow diagram in Figure 5 of this report.

It is also recommended that a copy of this report be provided to Holland District Council for their assessment under planning and also so that the information may be incorporated into their land quality records.

FIGURES



Approximate Site Location

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Title: Site Location Plan

Project: 37 Woodgate Road, Moulton Chapel

Client: Enchantment Homes Ltd

Fig No: 1

Scale: As Shown

Drawn By: GL **Approved By:** WE

Job No: UK15.1964

Dwg No: EPS/Moulton/0815/01

Date: August 2015



Key:

— Approximate Site Boundary



Title: Current Site Layout Plan

Project: 37 Woodgate Road, Moulton Chapel

Client: Enchantment Homes Ltd

Fig No: 2

Scale: Approximately As Shown

Drawn By: GL **Approved By:** MB

Job No: UK15.1964

Dwg No: EHL/Woodgate Rd/0815/02

Date: August 2015



Key:

— Approximate Site Boundary



Title: Aerial Photograph

Project: 37 Woodgate Road, Moulton Chapel

Client: Enchantment Homes Ltd

Fig No: 3

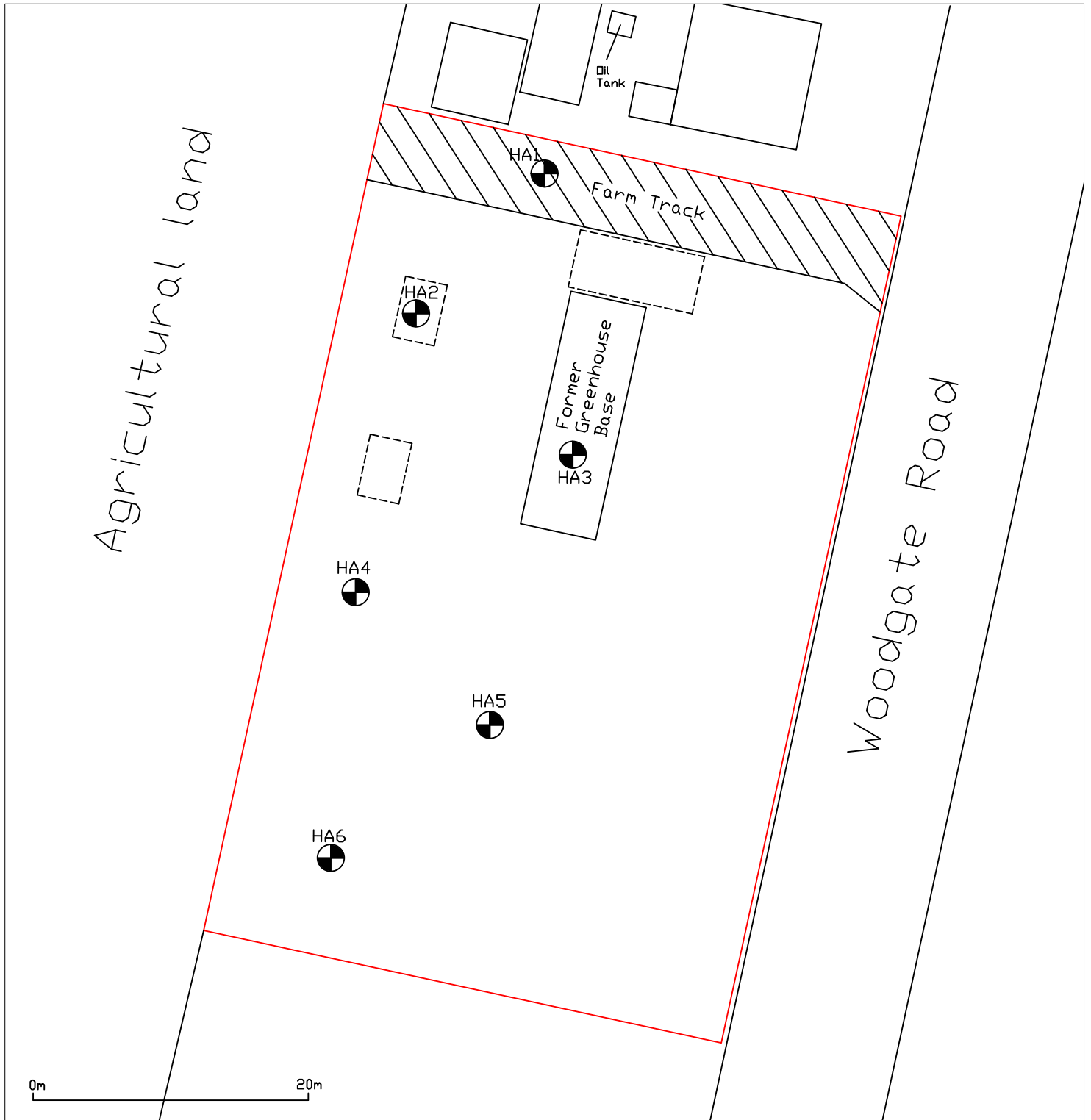
Scale: NTS

Drawn By: GL **Approved By:** MB

Job No: UK15.1964

Dwg No: EHL/Woodgate Rd/0815/03

Date: August 2015



Key:

- Approximate Site Boundary
- Former Outbuilding Footprint
- Hand Auger Borehole Location



Title: Borehole Location Plan

Project: 37 Woodgate Road, Moulton Chapel

Client: Enchantment Homes Ltd

Fig No: 4

Scale: Approximately as shown

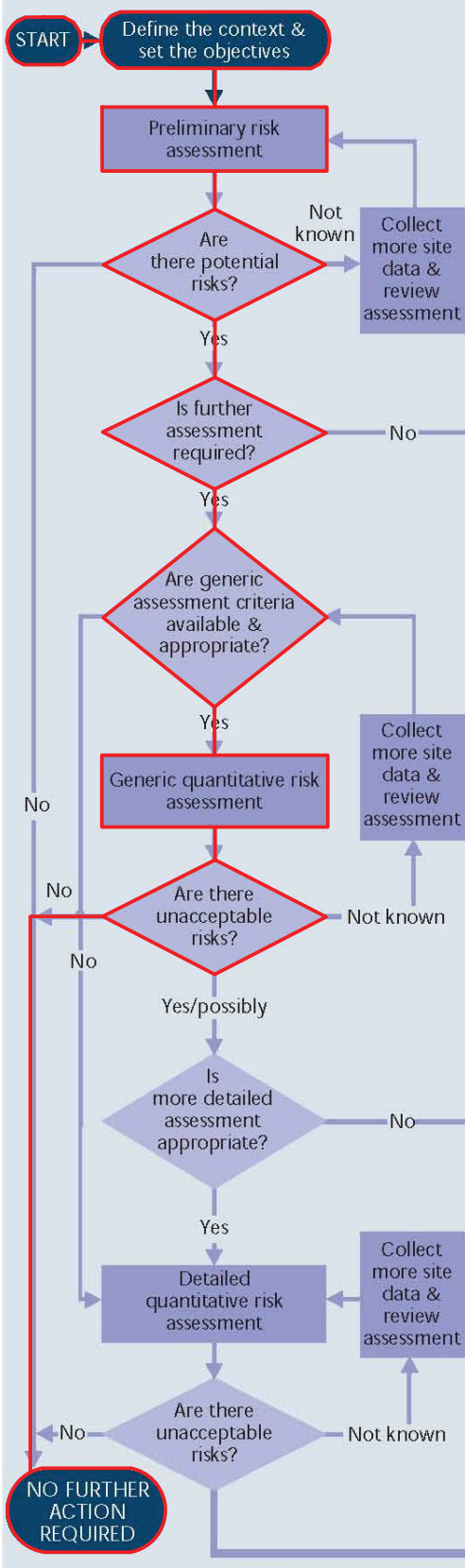
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Job No: UK15.1964

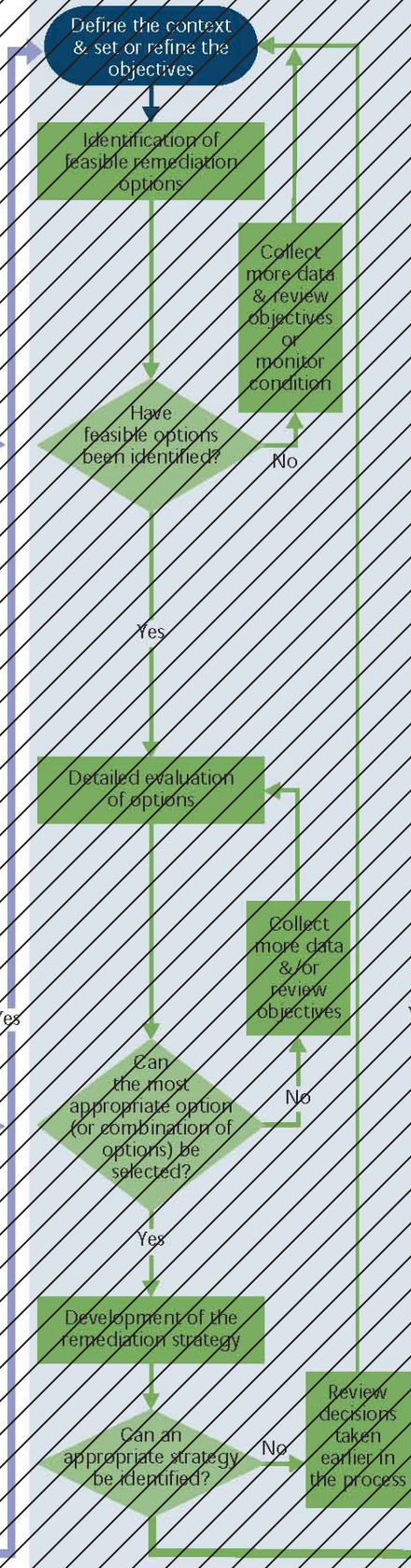
Dwg No: EHL/Woodgate Rd/0815/04

Date: August 2015

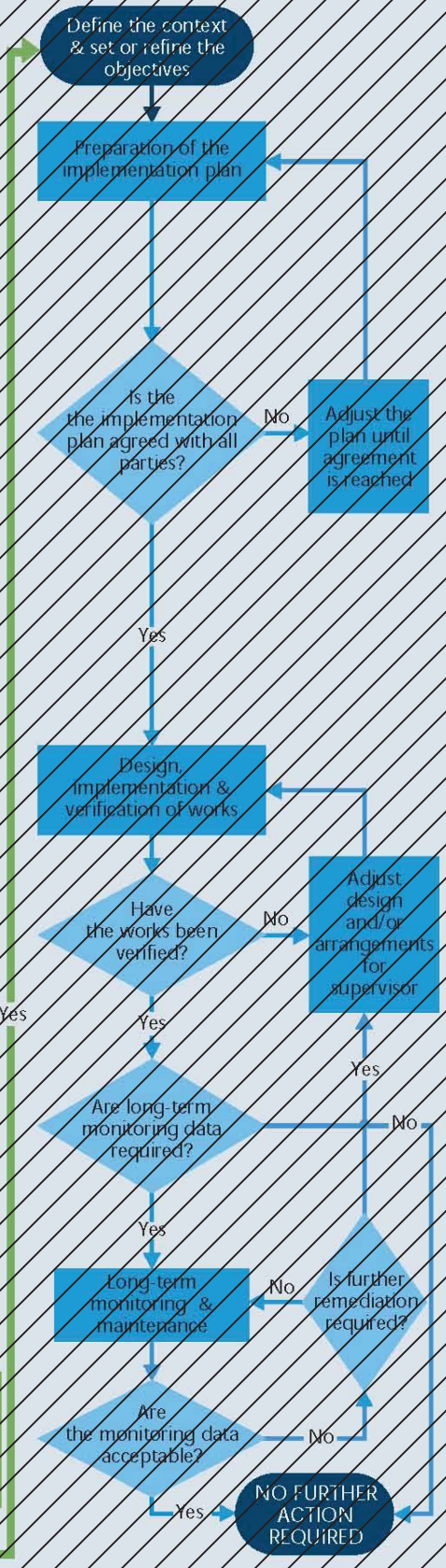
Risk Assessment



Options Appraisal



Implementation of the Remediation Strategy



Assessment Pathway for Site



Title: Site Context - CLR11

Project: 37 Woodgate Rd, Moulton Chapel

Client: Enchantment Homes Ltd

Fig No: 5

Scale: n/a

Drawn By: GL **Approved By:** MB

Job No: UK15.1964

Dwg No: EHL/Moulton/0815/05

Revision Date: August 2015

TABLES

Table 1 – Laboratory Testing Schedule

Sample ID	Sample Depth (m bgl)	EPS Mini Suite	EPS TPH Suite
HA1	0.5-0.6	1	1
HA2	0.3-0.5	1	1
HA3	0.2-0.6	1	-
HA4	0.3-0.6	-	1
HA5	0.1-0.5	1	-
HA6	0.4-0.7	1	-

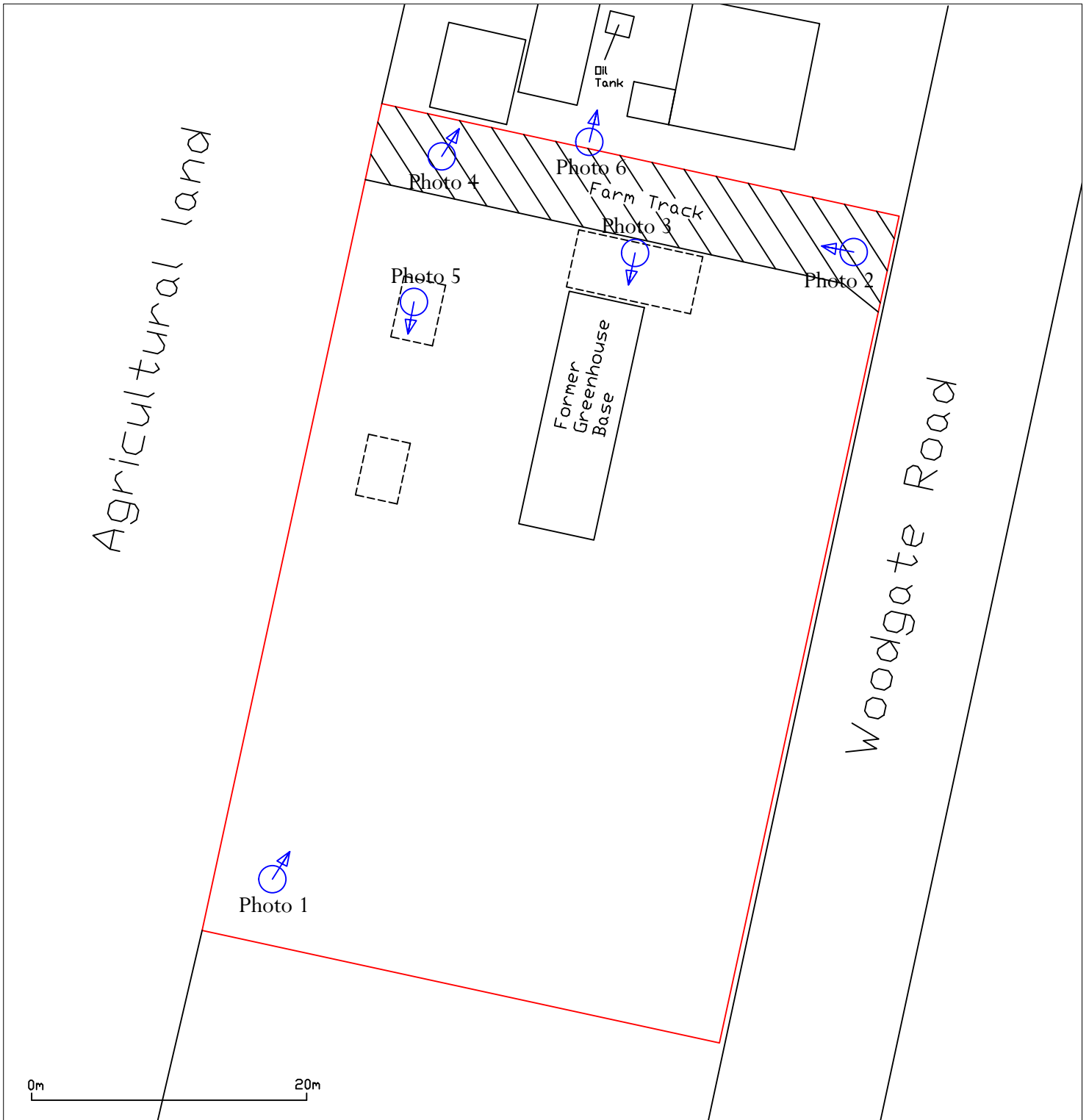
Notes:

m bgl	meters below ground level
1	Sample Taken
-	No Sample Taken
EPS Mini Suite	pH, Cyanide, Sulphate, Metals (Including Lead), PAH's, Phenols, Asbestos
EPS TPH Suite	TPHCWG, BTEX, MTBE

APPENDICES

APPENDIX A

Selected Site Photographs



Key:

- Approximate Site Boundary
- Former Outbuilding Footprint
- ⓘ Photograph Location & Direction



Title: Photograph Location Plan

Project: 37 Woodgate Road, Moulton Chapel
Client: Enchantment Homes Ltd

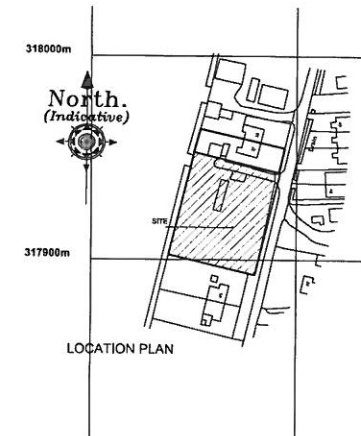
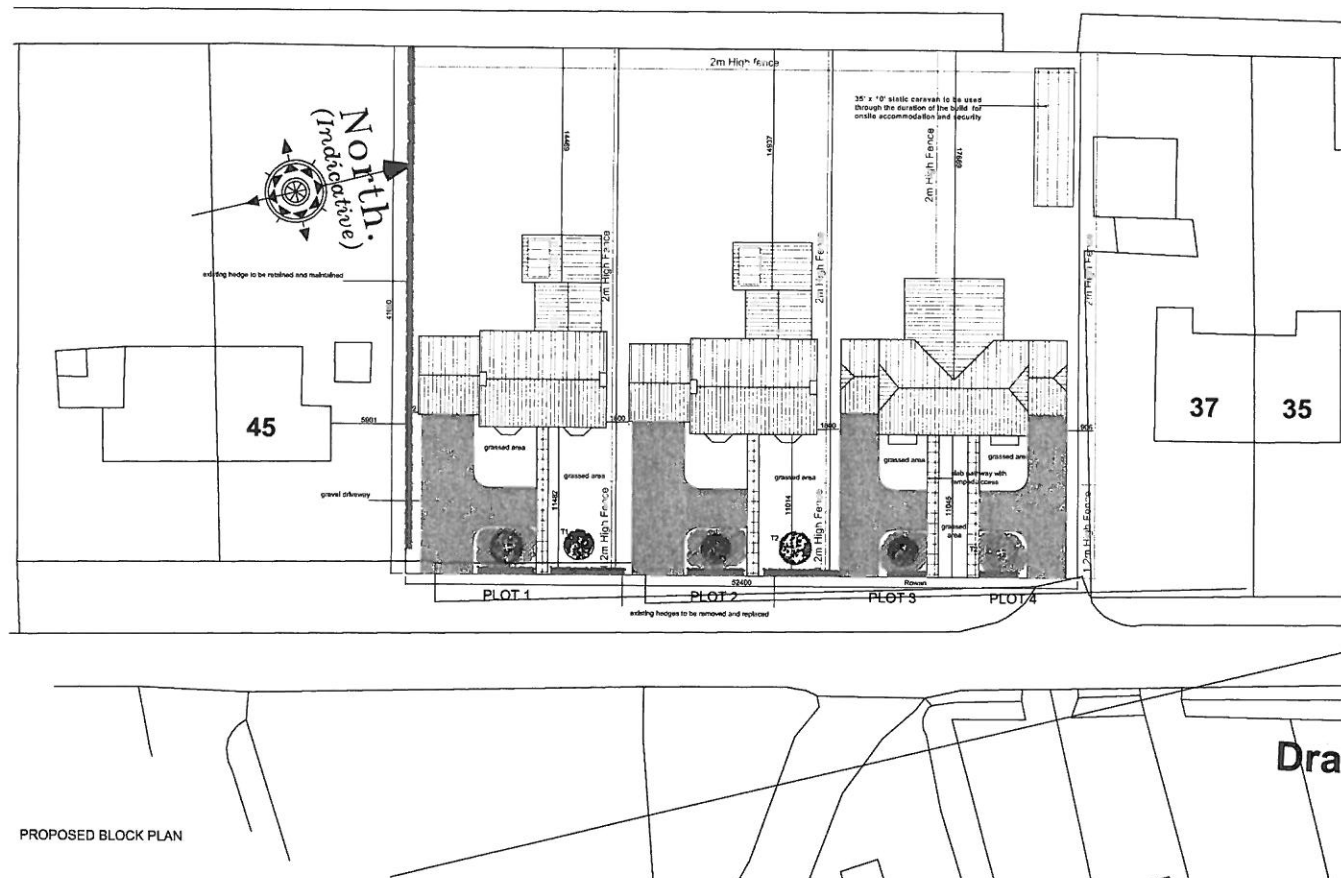
Appendix: A

Scale:	Approximately as shown	
Drawn By:	GL	Approved By: MB
Job No:	UK15.1964	
Dwg No:	EHL/Woodgate Rd/0815/A	
Date:	August 2015	

Photo 1: View looking from southwestern corner toward northern boundary showing vacant bungalow	Photo 2: View looking west from eastern boundary showing farm access track across the northern end of the site.
	
Photo 3: Photograph showing the outline and base of the former greenhouse.	Photo 4: Materials removed from outbuildings on site comprising mostly household items.
	
Photo 5: Photograph showing base of former outbuilding consisting of a thin layer of granite chippings	Photo 6: Photograph showing oil tank for adjacent vacant bungalow to the north of the site
	

APPENDIX B

Proposed Development Plan



Existing hedgerow
To be maintained at current height for privacy.

New Trees
T1: Rowan
T2: Wild Cherry

New trees to be half standard 800 mm high with well developed fibrous roots. On windward side provide pressure treated timber stake to support bottom 3rd of tree.
Set each tree in minimum 300 x 300 x 300 mm pit with peat mulching in base.
Ensure tree is well-heeled in.
Provide protection if rabbits are a problem.
Provide mulching mat to suppress weed growth around base of tree or until tree is established and cover with 20mm of soil.

The approved scheme of landscaping and/or screening shall be carried out in its entirety within a period of two years beginning with a date on which the development of land is commenced. The trees, shrubs or bushes shall be adequately maintained by the owner(s) of the land on which they are situated for a period of ten years beginning with the date of completion of the scheme, and all losses shall be made good during that period. For the first five years ensure mulch is maintained and remove any weeds manually, in periods of dry weather (usually March - August) ensure plants are watered & this to be carried out before leaves show signs of wilting.

Fencing
Refer to plan for type and height of timber fencing. Use pressure treated timber in all cases.

Hardsurfaces
Footpaths
Form 300mm wide footpaths to the perimeter of both new dwellings constructed from 450x450mm concrete paving slabs (natural colour) on sand & cement bed on min 75mm consolidated stone base. Hardstanding to meet the provisions of Part M of the Building Regulations.

Driveway
Permeable gravel drives

PLANTING SCHEDULE (Shrubs)

Planting area	Species	Height of planting (m) or planting	Number of plants to be planted
Plot 1	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 2	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 3	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 4	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 5	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 6	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 7	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 8	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 9	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 10	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 11	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 12	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 13	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 14	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 15	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 16	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 17	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 18	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 19	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 20	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 21	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 22	Wild Cherry	100 mm over 1.50m high on planting	100
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Plot 24	Wild Cherry	100 mm over 1.50m high on planting	100
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Plot 39	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 40	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 41	Wild Cherry	100 mm over 1.50m high on planting	100
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Plot 72	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 73	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 74	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 75	Wild Cherry	100 mm over 1.50m high on planting	100
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Plot 89	Wild Cherry	100 mm over 1.50m high on planting	100
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Plot 91	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 92	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 93	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 94	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 95	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 96	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 97	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 98	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 99	Wild Cherry	100 mm over 1.50m high on planting	100
Plot 100	Wild Cherry	100 mm over 1.50m high on planting	100

PLANTING AND AFTERCARE

All ground to be planted, cultivated and cleared prior to planting, and to be kept clear of weeds, rubbish and debris throughout the planting period.

All plants to be planted in the ground and not in containers.

During the first year of planting, all plants shall be watered and protected from frost and drought.

Any plants that die or are damaged shall be replaced within 12 months.

From the 1st year of planting, all plants shall be watered and protected from frost and drought.

All trees and shrubs are to be maintained for a five year period beginning with the date of completion of the scheme, and during that period a minimum standard shall be maintained.

APPENDIX C

Surrounding Land Use



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

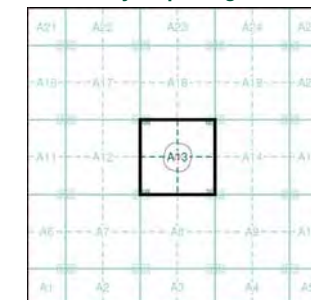
Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Segment A13



Order Details

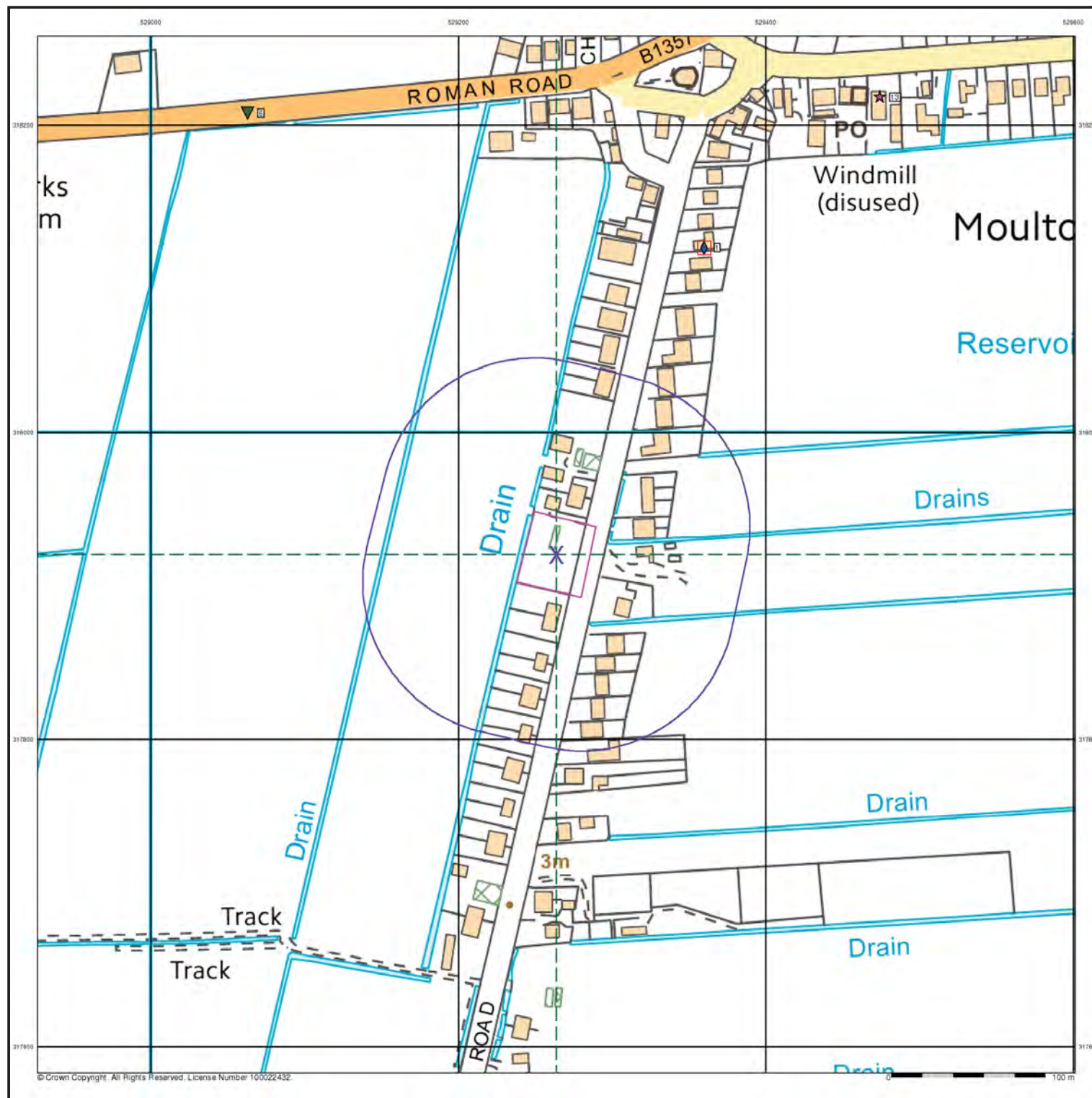
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Site Area (Ha): 0.2

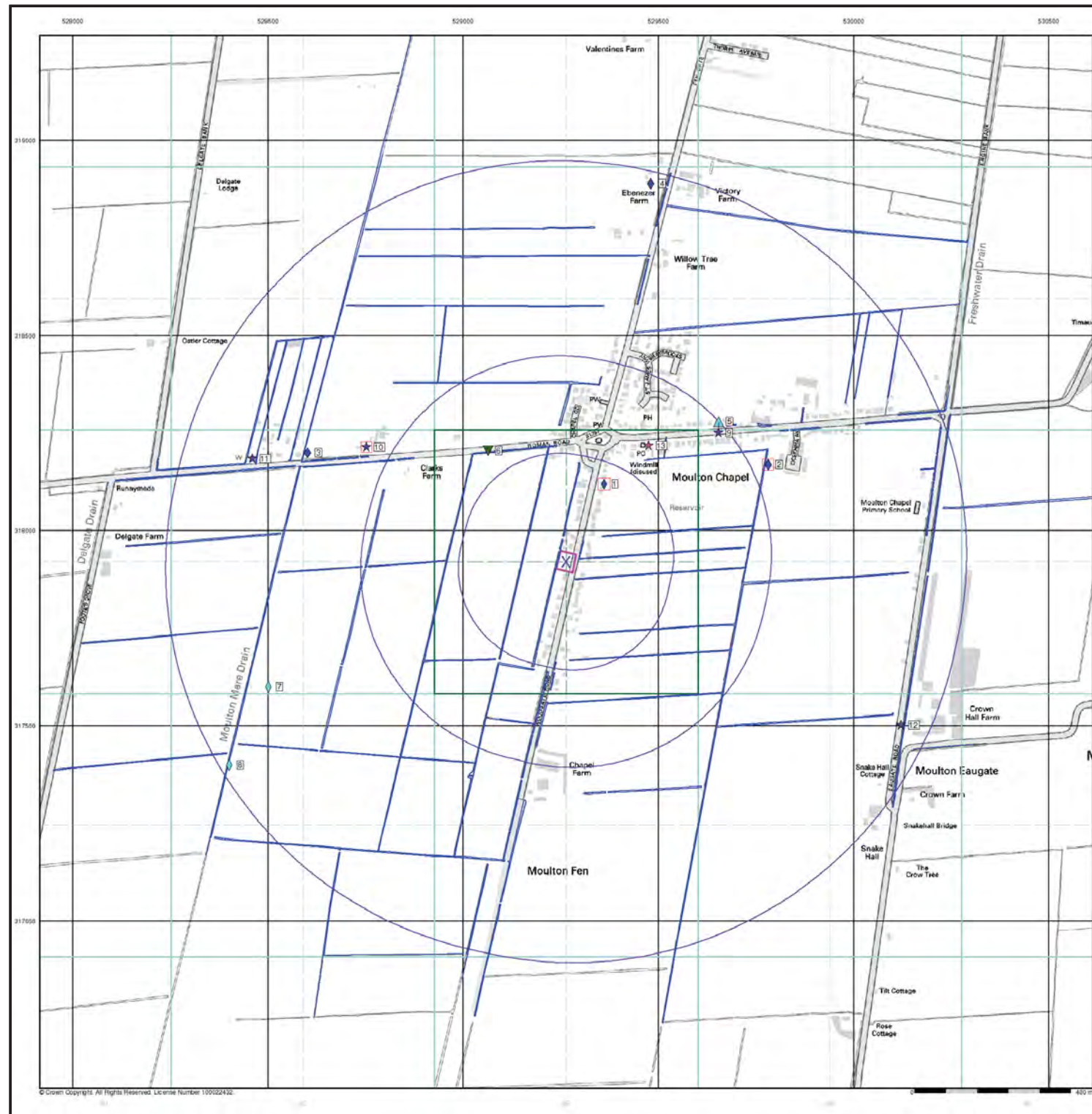
Site Details

Site at 529260, 317920



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Fax: 0844 844 9951
Web: www.envirocheck.co.uk





General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
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- Water Abstraction
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Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

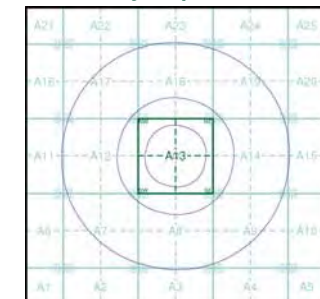
Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Slice A



Order Details

Order Number: 71021572_1_1
 Customer Ref: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details

Site at 529260, 317920



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APPENDIX D

Geological Context

Geology 1:50,000 Maps Legends

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	TFD	Tidal Flat Deposits	Clay and Silt	Holocene - Holocene
	TFD1	Tidal Flat Deposits, 1	Clay and Silt	Quaternary - Quaternary
	TFD1	Tidal Flat Deposits, 1	Sand and Silt	Quaternary - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WWB	West Walton Formation	Mudstone and Siltstone	Oxfordian - Oxfordian
	OXC	Oxford Clay Formation	Mudstone	Oxfordian - Callovian



Geology 1:50,000 Maps

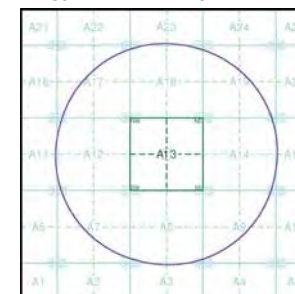
This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.

The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID: 1
 Map Sheet No: 144
 Map Name: Spalding
 Map Date: 1992
 Bedrock Geology: Available
 Superficial Geology: Available
 Artificial Geology: Available
 Faults: Not Supplied
 Landslip: Not Available
 Rock Segments: Not Supplied

Geology 1:50,000 Maps - Slice A



Order Details:

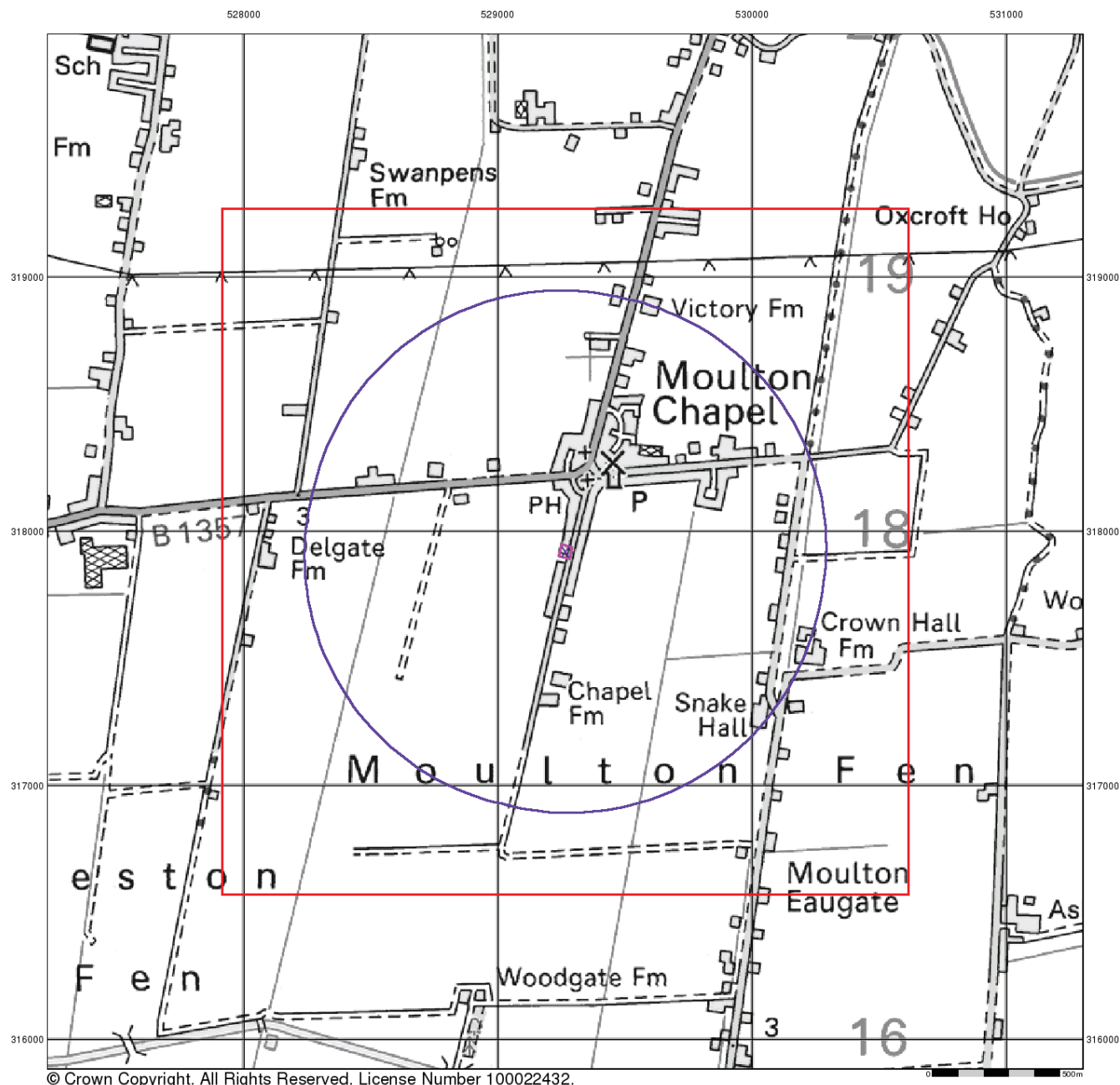
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 Customer Reference: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details:

Site at 529260, 317920



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Artificial Ground and Landslip

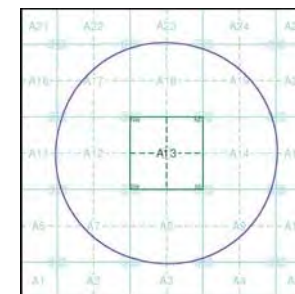
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



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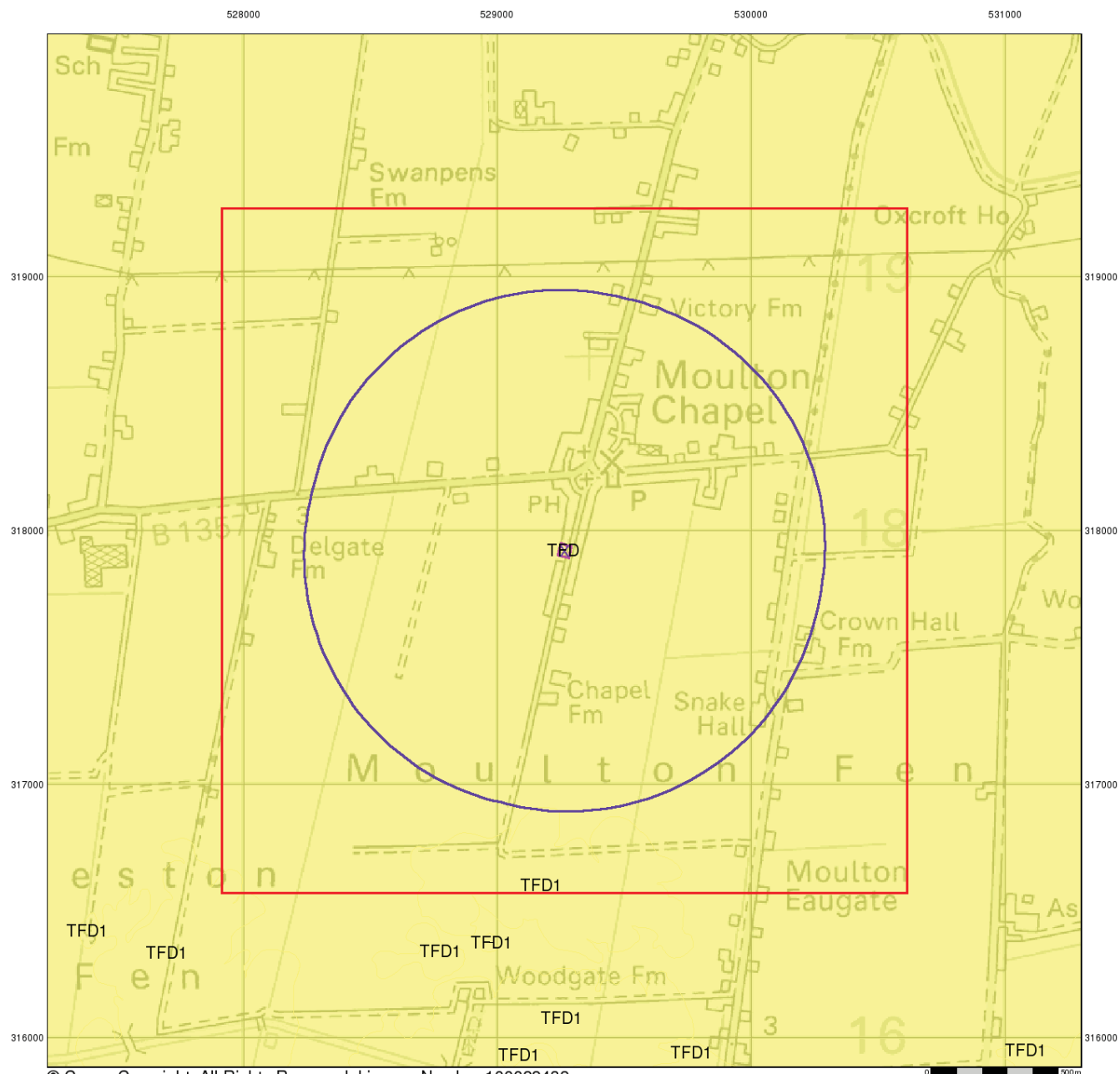
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 Customer Reference: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details:

Site at 529260, 317920



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 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



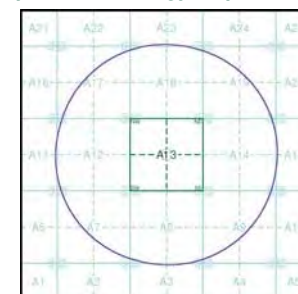
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



Order Details:

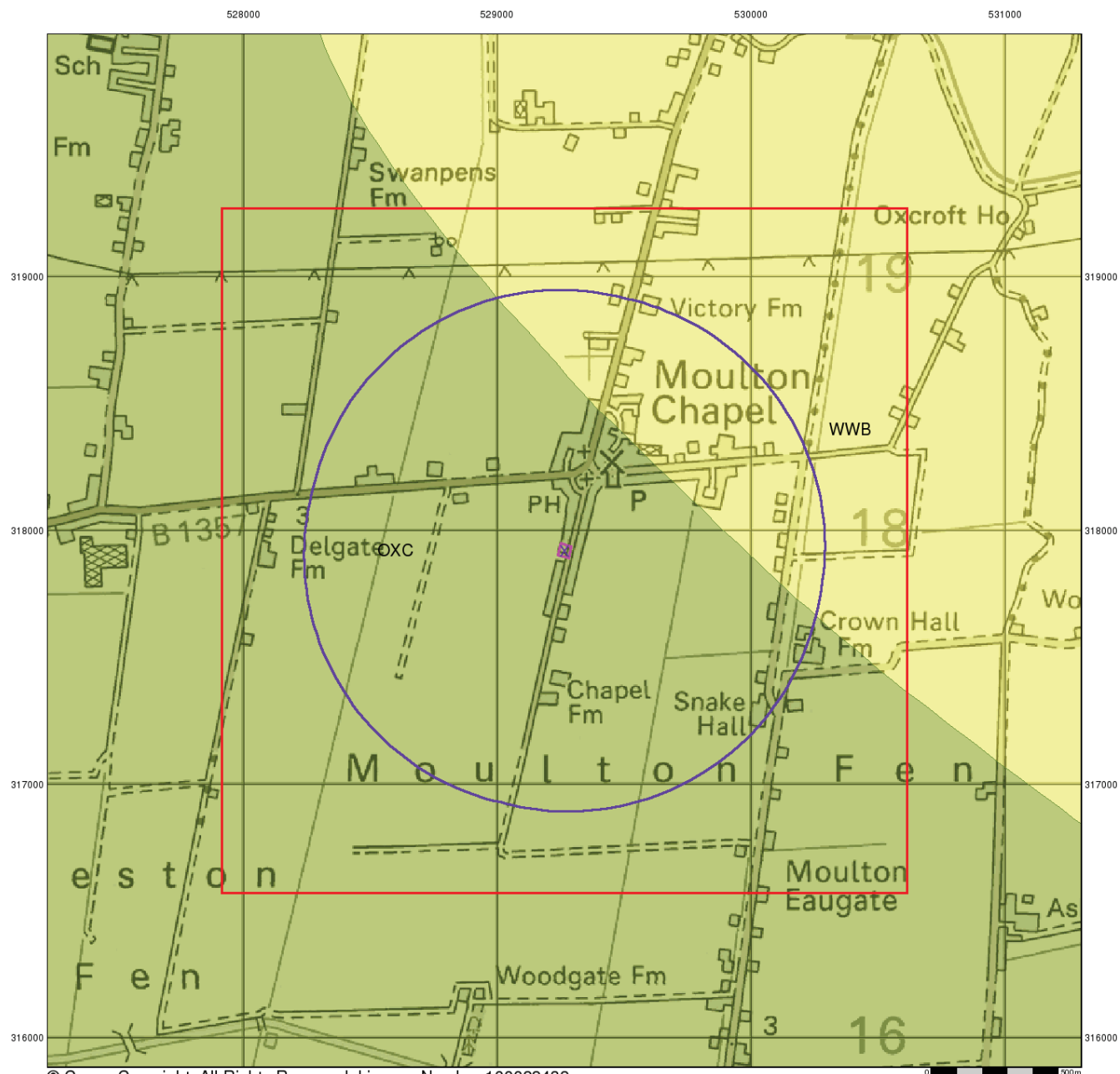
Order Number: 71021572_1_1
 Customer Reference: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details:

Site at 529260, 317920



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 Fax: 0844 844 9951
 Web: www.environmentalcheck.co.uk



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Bedrock and Faults

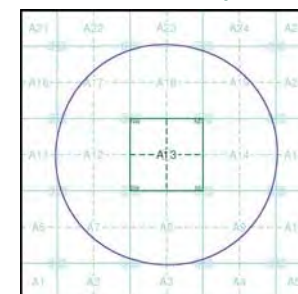
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



Order Details:

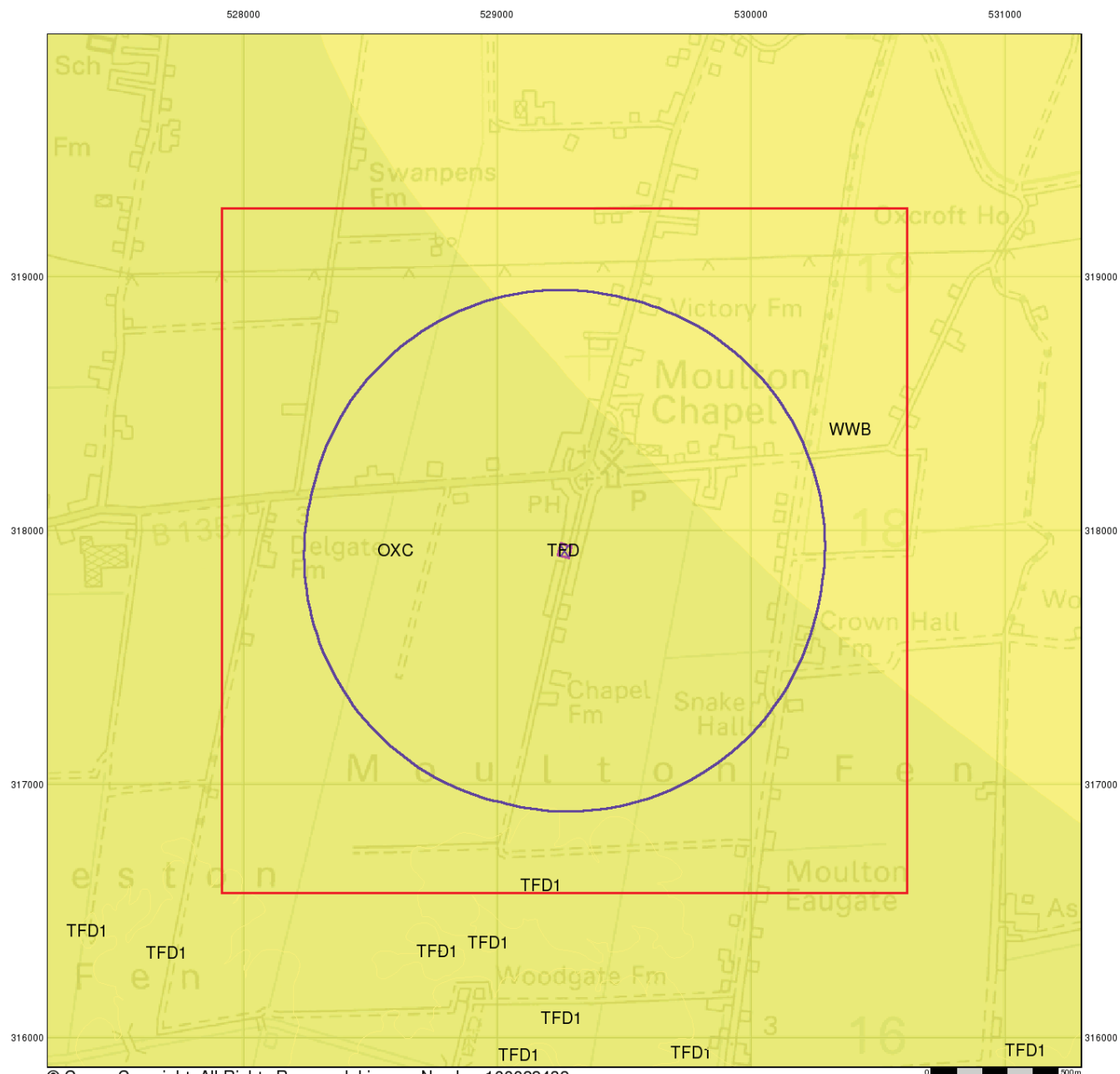
Order Number: 71021572_1_1
 Customer Reference: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details:

Site at 529260, 317920



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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

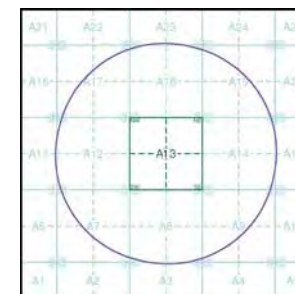
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number: 71021572_1_1
Customer Reference: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 1000

Site Details:

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TF/21 NE/7

National Grid Reference

M 1 Mouiton Chapel

British Geological Survey
For whom made Spalding Rural District Council

2932 1815

Town or Village Moulton Chapel County Lincoln

Exact site (reference to a fixed point on 1-in or 1:50 000 Map:

1-in or 1:50 000
New Series Map No.

Enter 'C' if
Confidential

144

Geological Survey British Geological Survey
Purpose for which made Proving sequence

Ground level at ^{shaft}_{bore} relative to O.D. 2.8 m. If not ground level give O.D. of beginning of ^{shaft}_{bore} _____ m.

Made by Pre-Piling Survey Date of sinking 1971

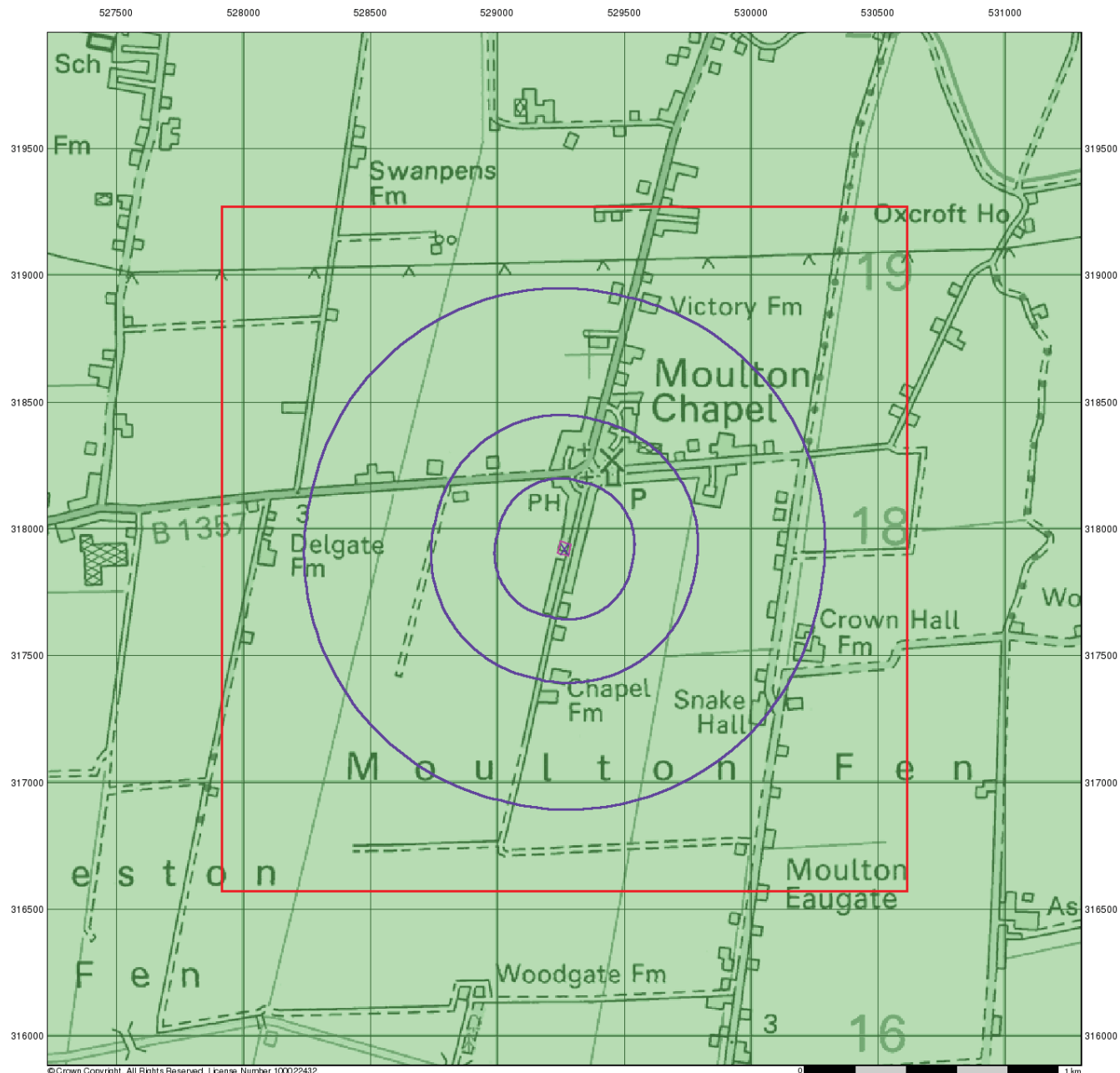
Information from Report Examined by _____

Specimen Numbers and Additional Notes

Geological Classification	Description of Strata	Thickness metres	Depth metres
	Brick rubble	0.1	0.1
	Brown clayey sandy silt with occasional gravel and brick fragments (probably backfill inside trench).	1.4	1.5
	Brown silty fine sand	1.8	3.3
	Grey brown silty fine sand	2.7	6.0
	Grey brown medium to fine sand	1.0	7.0

APPENDIX E

Groundwater Vulnerability and Flood Maps



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0 1 km



Groundwater Vulnerability

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

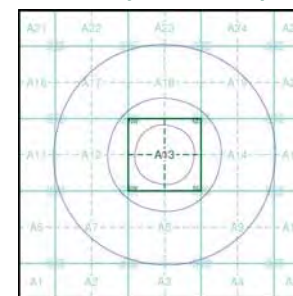
Agency and Hydrological

Geological Classes

- | | |
|---|---|
| Major Aquifer (Highly Permeable) | High (H) 1, 2, 3, U
Intermediate (I) 1, 2
Low |
| Minor Aquifer (Variably Permeable) | High (H) 1, 2, 3, U
Intermediate (I) 1, 2
Low |
| Non Aquifer (Negligibly Permeable) | |
| Water or Sea | |
| Drift Deposit | |

Soil Classes

Site Sensitivity Context Map - Slice A



Order Details

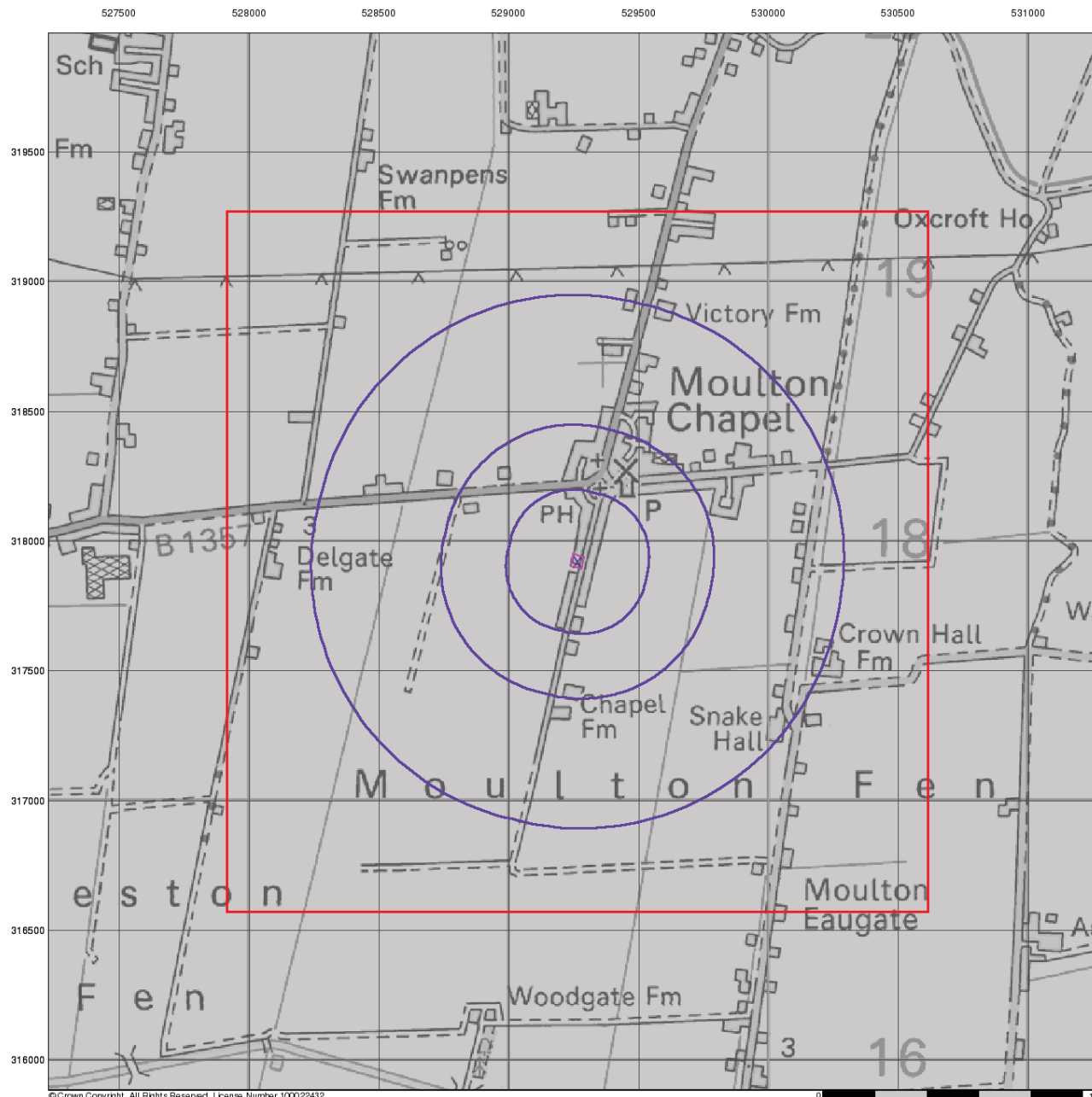
Order Number: 71021572_1_1
 Customer Ref: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details

Site at 529260, 317920



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0 1 km



Bedrock Aquifer Designation

General

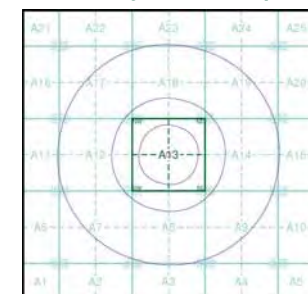
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

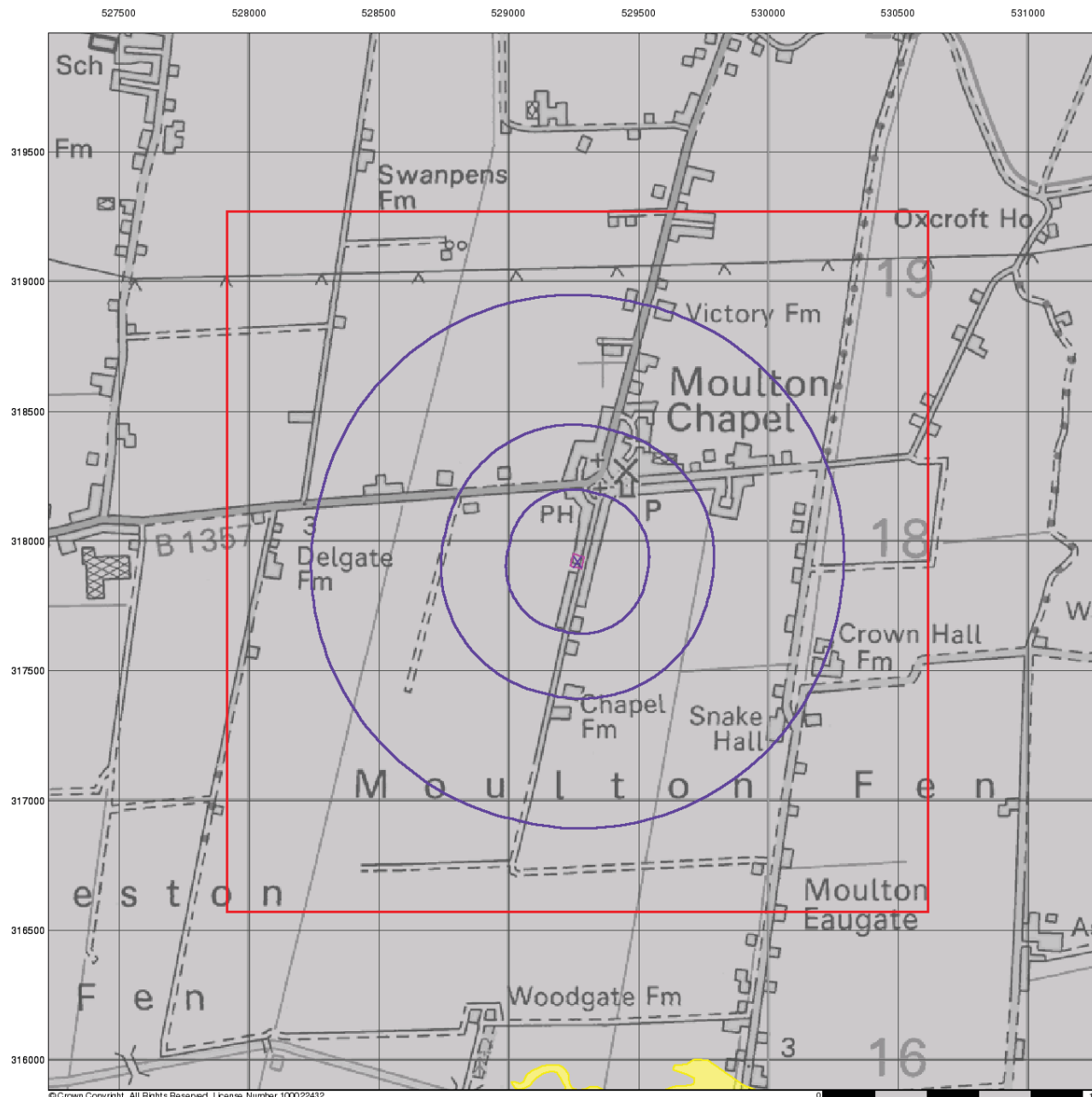
Order Number: 71021572_1_1
 Customer Ref: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details

Site at 529260, 317920



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0 1 km



Superficial Aquifer Designation

General

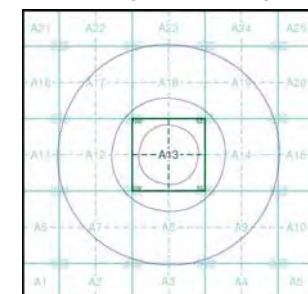
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

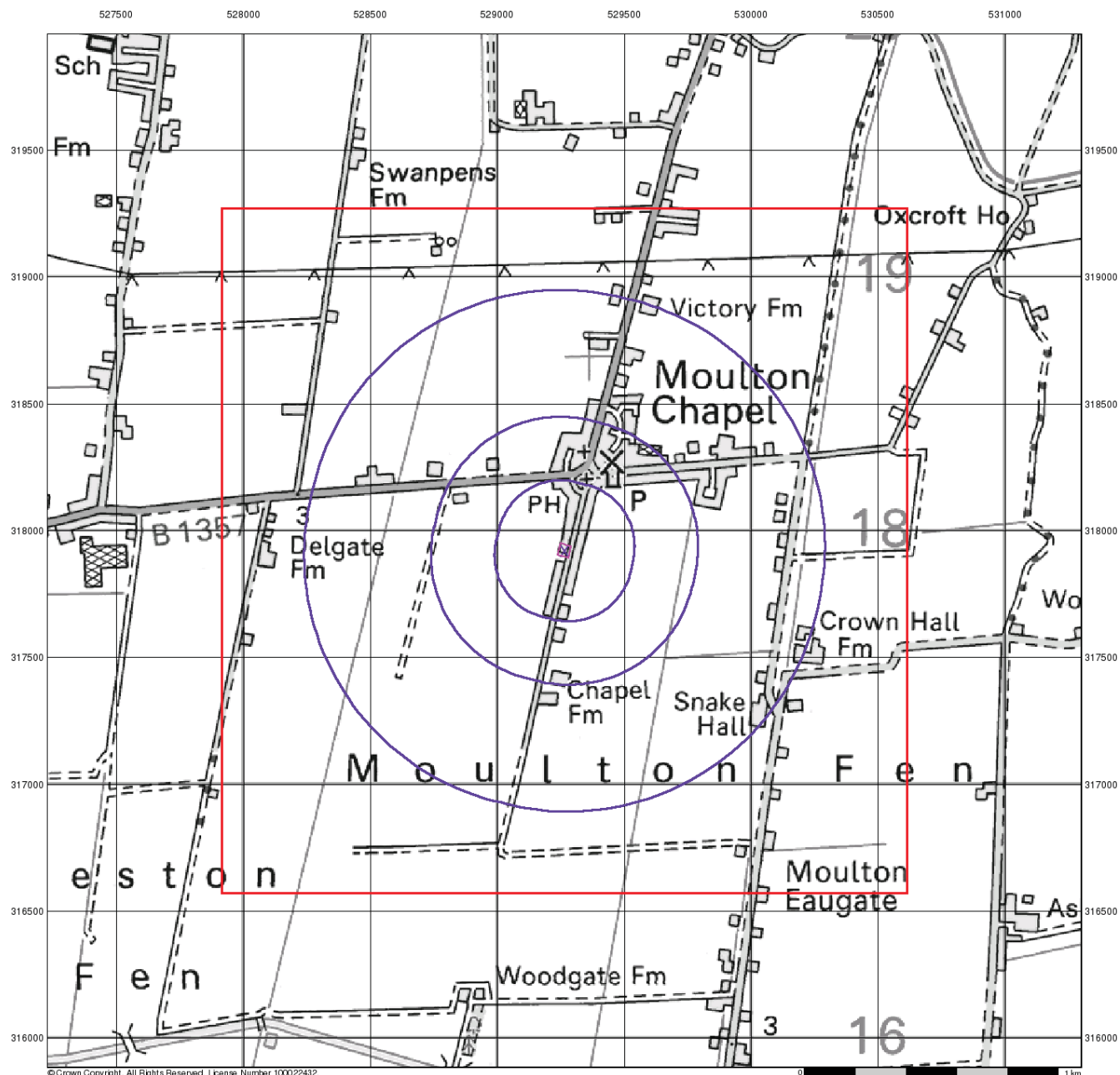
Order Number: 71021572_1_1
 Customer Ref: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details

Site at 529260, 317920



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Source Protection Zones

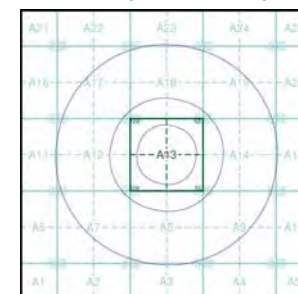
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 71021572_1_1
 Customer Ref: UK15.1964
 National Grid Reference: 529260, 317920
 Slice: A
 Site Area (Ha): 0.2
 Search Buffer (m): 1000

Site Details

Site at 529260, 317920



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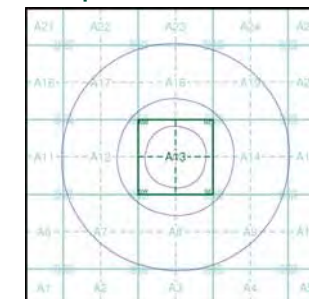
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

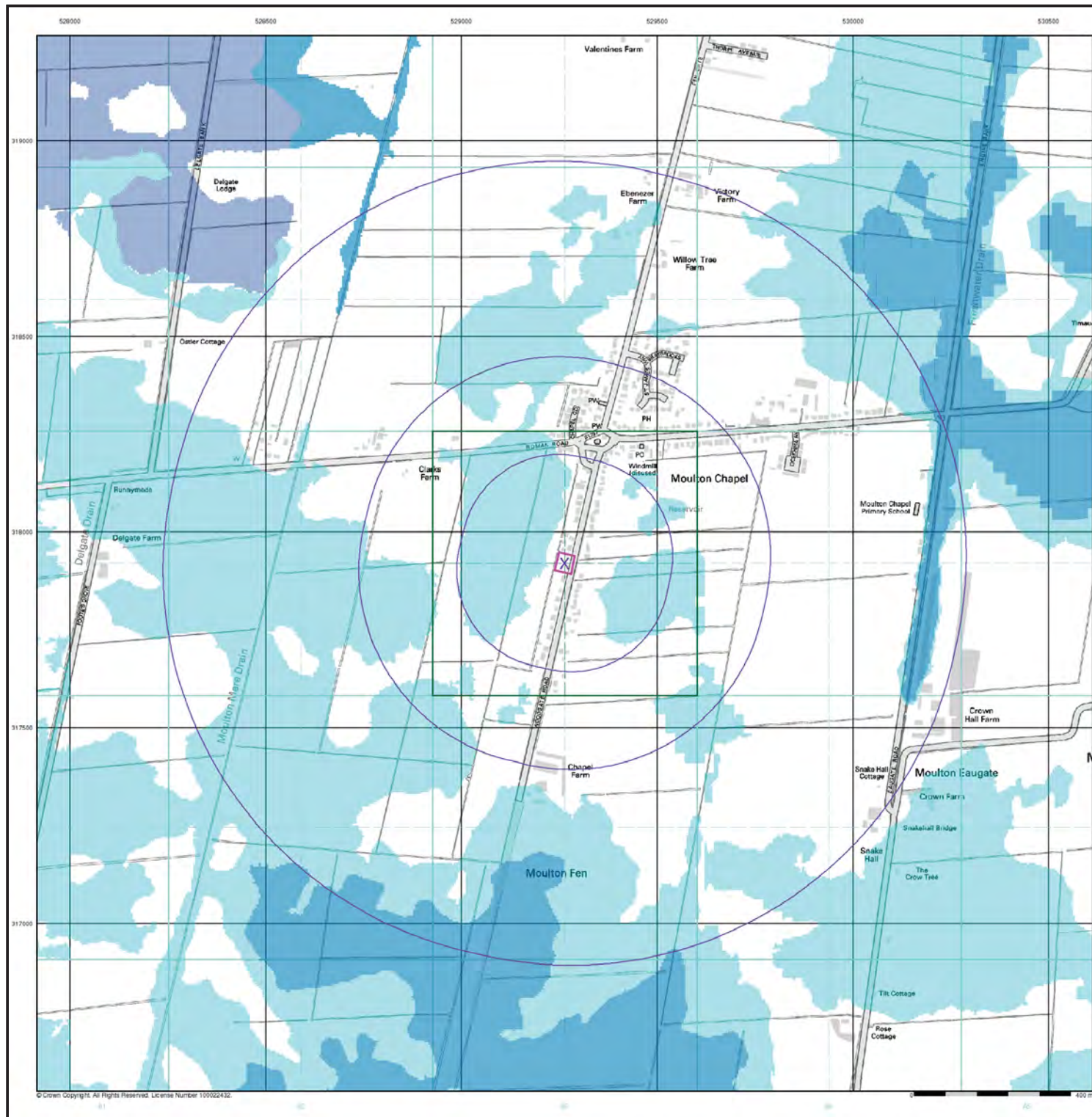
Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 1000

Site Details

Site at 529260, 317920



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APPENDIX F

A Selection of Historic Maps



Lincolnshire

Published 1888

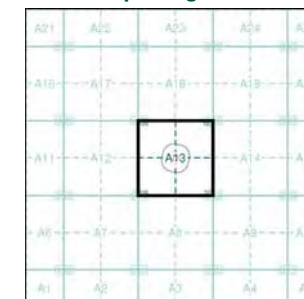
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

142 11 1888 1:2,500	142 12 1888 1:2,500
142 15 1888 1:2,500	142 16 1888 1:2,500

Historical Map - Segment A13



Order Details

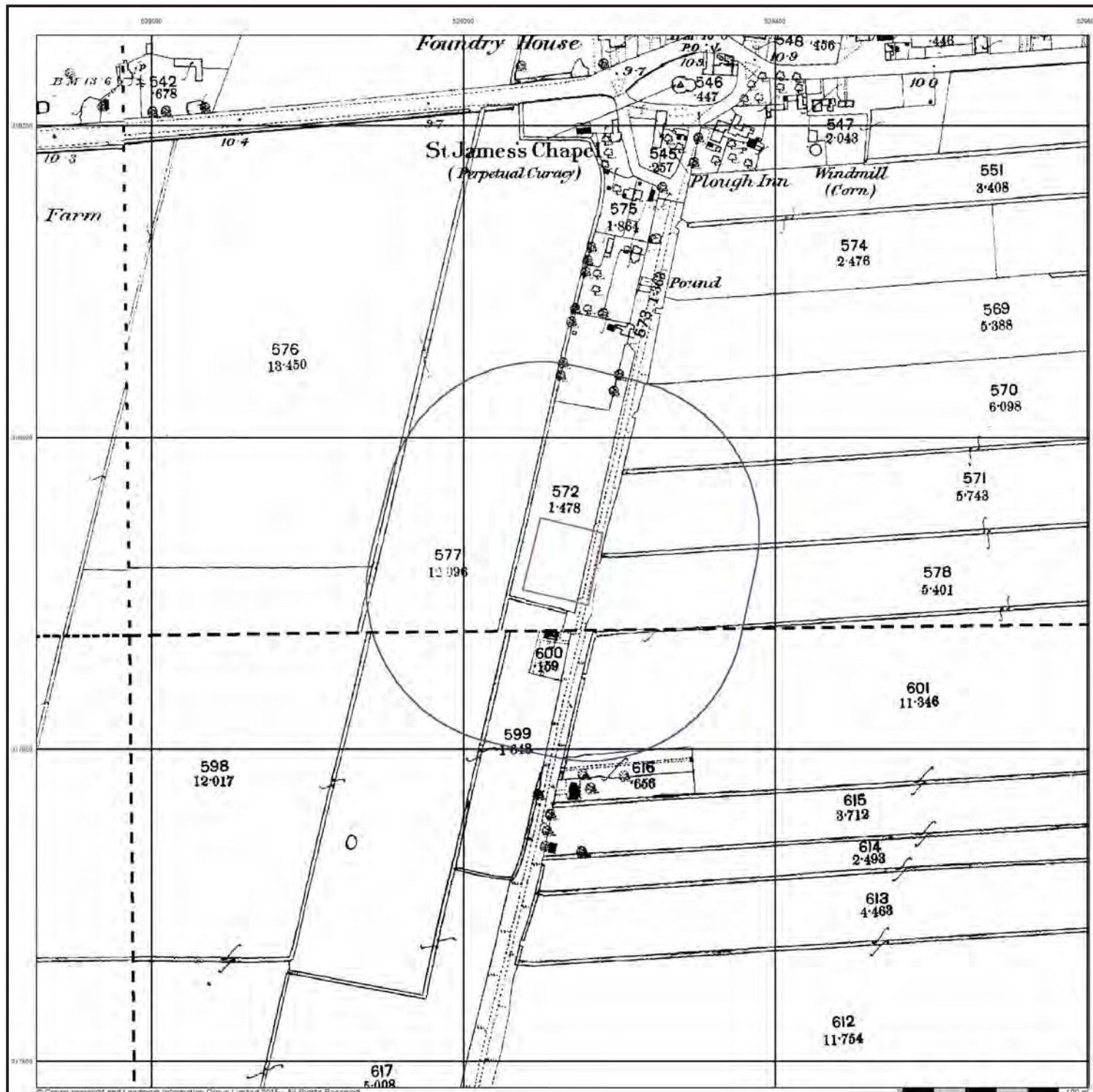
Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 100

Site Details

Site at 529260, 317920



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Lincolnshire

Published 1904

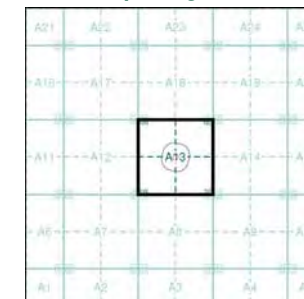
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

142_11 1904 1:2,500	142_12 1904 1:2,500
142_15 1904 1:2,500	142_16 1904 1:2,500

Historical Map - Segment A13



Order Details

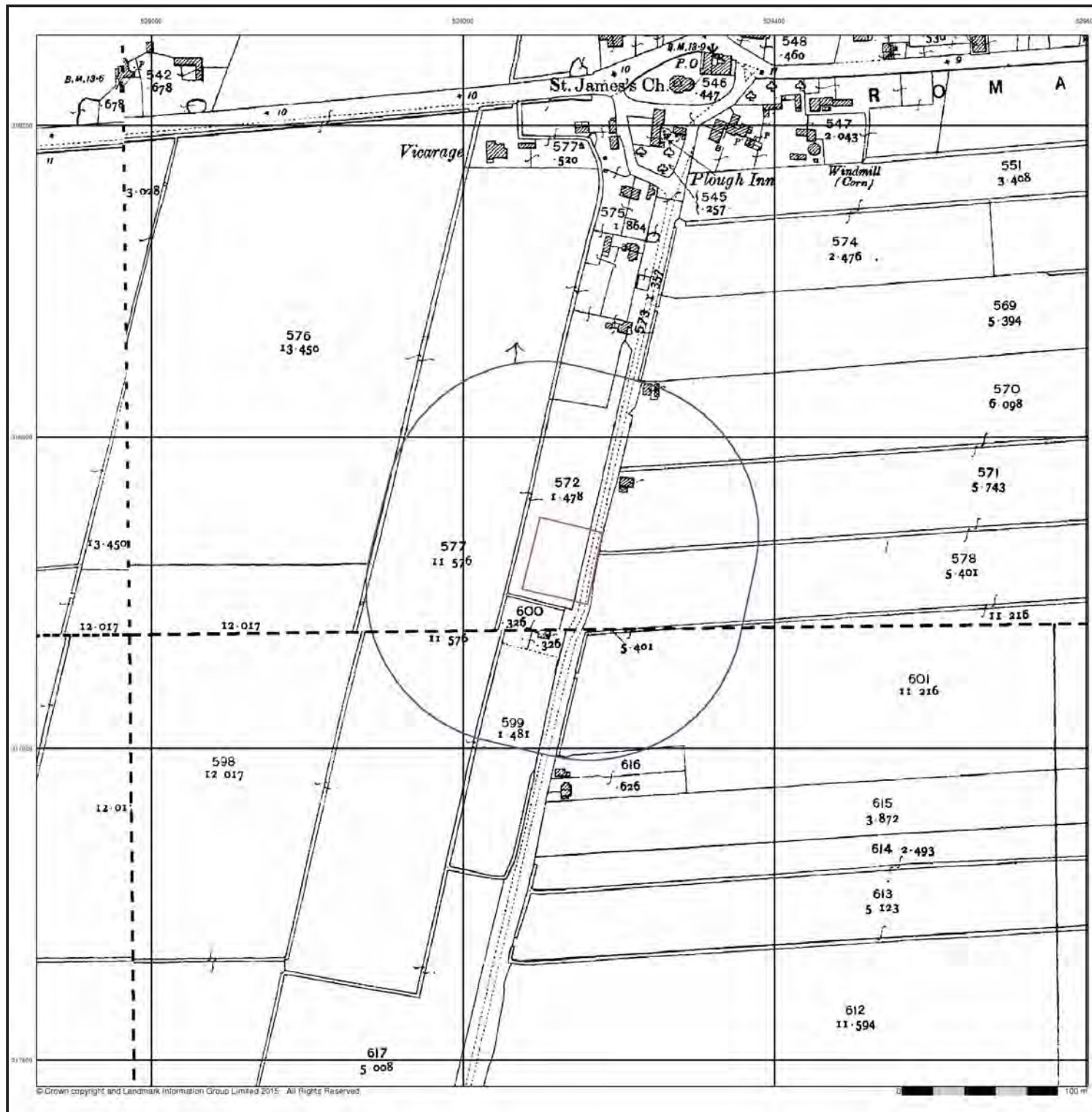
Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 100

Site Details

Site at 529260, 317920



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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1840's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Order Details

Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 1000

Site Details

Site at 529260, 317920





Ordnance Survey Plan

Published 1976

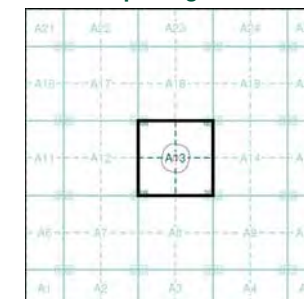
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

TF2816 1976 1:2,500	TF2916 1978 1:2,500
TF2817 1978 1:2,500	TF2917 1978 1:2,500

Historical Map - Segment A13



Order Details

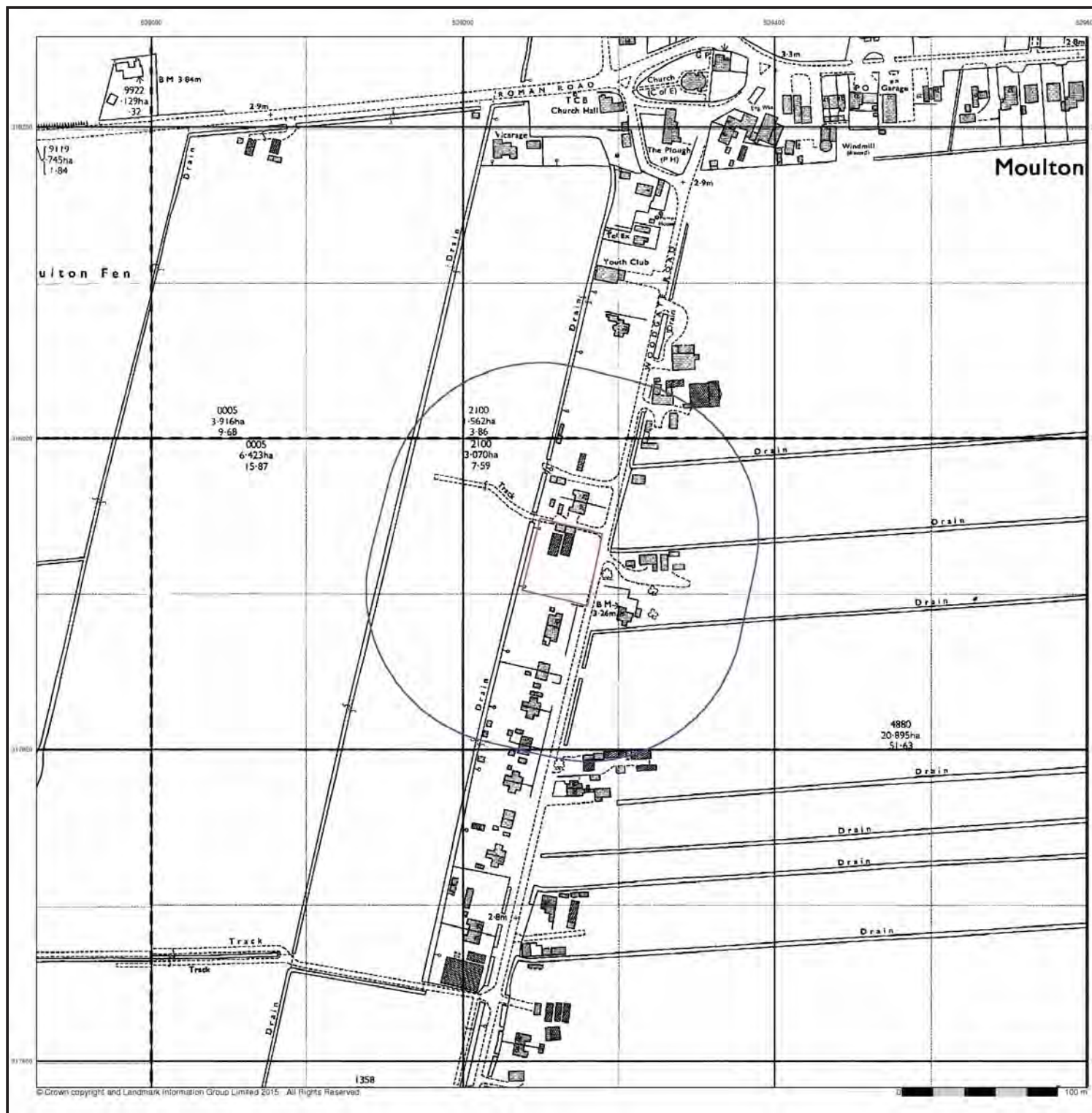
Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 100

Site Details

Site at 529260, 317920



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Additional SIMs

Published 1992

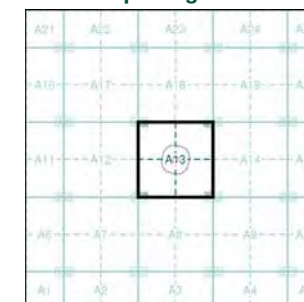
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TF2918	1992	1:2,500
TF2917	1992	1:2,500

Historical Map - Segment A13



Order Details

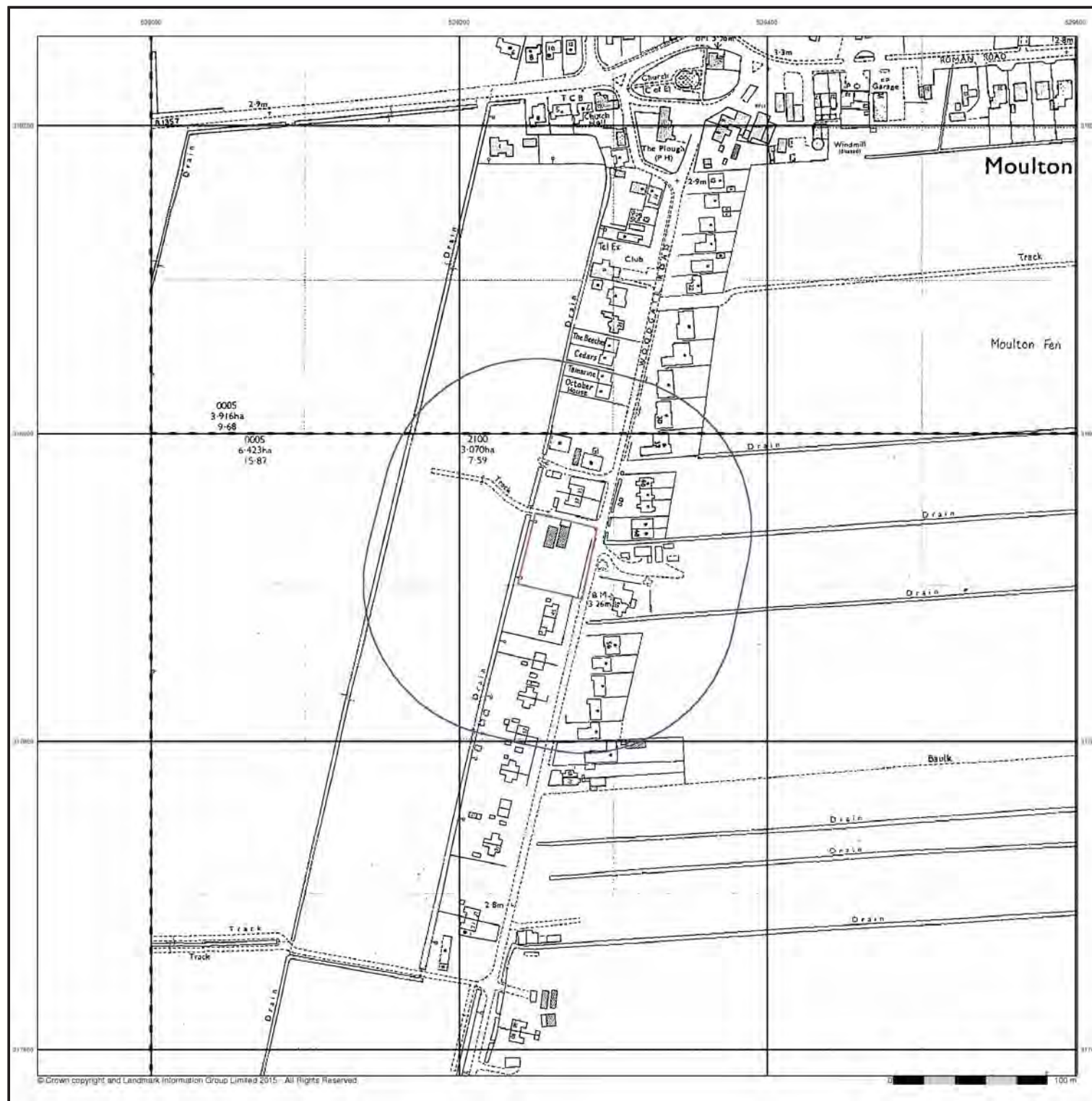
Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 100

Site Details

Site at 529260, 317920



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Large-Scale National Grid Data

Published 1995

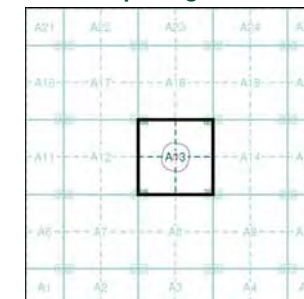
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TF2816 1995 1:2,500	TF2916 1995 1:2,500
TF2817 1995 1:2,500	TF2917 1995 1:2,500

Historical Map - Segment A13



Order Details

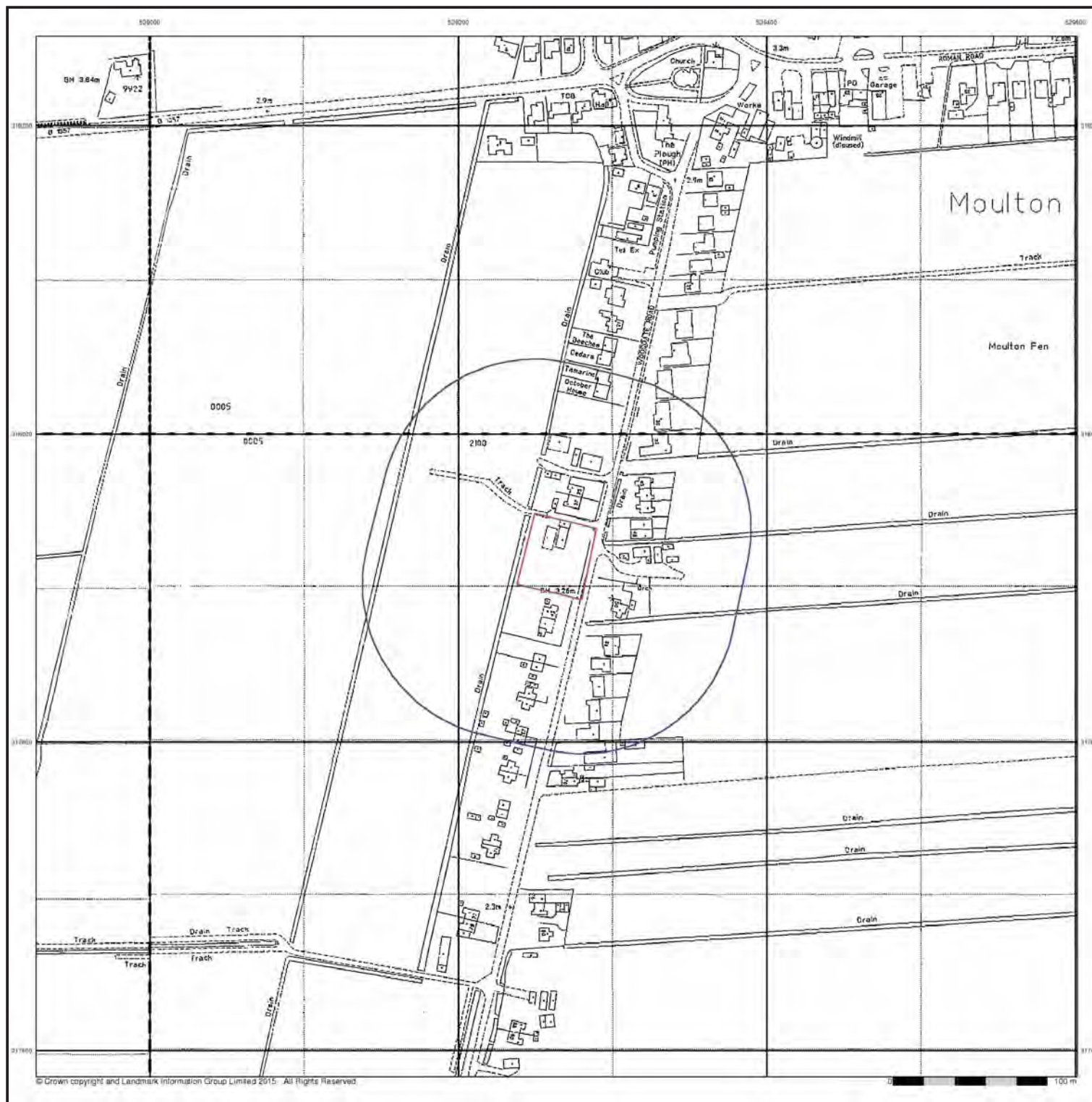
Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 100

Site Details

Site at 529260, 317920



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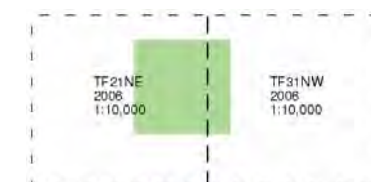
10k Raster Mapping

Published 2006

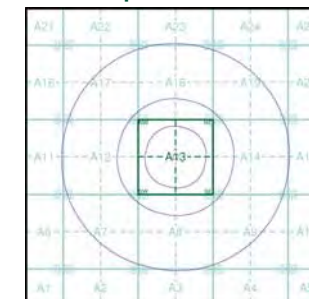
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 1000

Site Details

Site at 529260, 317920



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Fax: 0844 844 9951
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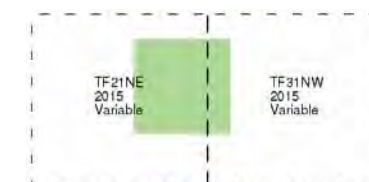
VectorMap Local

Published 2015

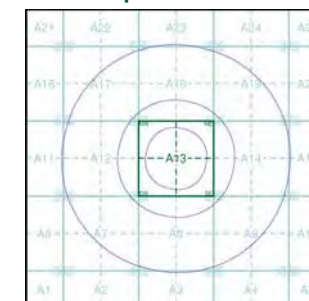
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 71021572_1_1
Customer Ref: UK15.1964
National Grid Reference: 529260, 317920
Slice: A
Site Area (Ha): 0.2
Search Buffer (m): 1000

Site Details

Site at 529260, 317920



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APPENDIX G

Laboratory Data – Environmental



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

EPS Ltd
7B Caxton House
Broad Street
Cambourne
Cambridgeshire
CB23 6JN

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Giles Lock
Date : 14th August, 2015
Your reference : UK15.1964
Our reference : Test Report 15/11172
Location : Moulton Chapel
Date samples received : 8th August, 2015
Status : Final report
Issue : 1

Six samples were received for analysis on 8th August, 2015 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.

Compiled By:

Belinda Lewsley BA
Project Co-ordinator

Client Name: EPS Ltd
Reference: UK15.1964
Location: Moulton Chapel
Contact: Giles Lock
JE Job No.: 15/11172

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-2	3-4	5-6	7-8	9-10	11-12					Please see attached notes for all abbreviations and acronyms		
Sample ID	HA1	HA2	HA3	HA4	HA5	HA6							
Depth	0.50-0.60	0.30-0.50	0.20-0.60	0.30-0.60	0.10-0.50	0.40-0.70							
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J							
Sample Date	06/08/2015	06/08/2015	06/08/2015	06/08/2015	06/08/2015	06/08/2015							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	08/08/2015	08/08/2015	08/08/2015	08/08/2015	08/08/2015	08/08/2015					LOD/LOR	Units	Method No.
Arsenic ^{#M}	9.6	11.8	14.7	-	9.0	6.7					<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	<0.1	0.2	0.2	-	<0.1	<0.1					<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	53.5	40.5	60.4	-	46.6	52.6					<0.5	mg/kg	TM30/PM15
Copper ^{#M}	15	27	26	-	10	6					<1	mg/kg	TM30/PM15
Lead ^{#M}	37	36	83	-	16	7					<5	mg/kg	TM30/PM15
Mercury ^{#M}	0.1	<0.1	<0.1	-	<0.1	<0.1					<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	17.9	18.1	22.5	-	18.6	18.3					<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	<1	<1	<1	-	<1	<1					<1	mg/kg	TM30/PM15
Total Sulphate ^{#M}	579	869	571	-	280	179					<50	mg/kg	TM50/PM29
Zinc ^{#M}	68	84	76	-	58	44					<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	<0.04	<0.04	-	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	-	<0.03	<0.03					<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	<0.05	<0.05	-	<0.05	<0.05					<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	<0.04	<0.04	-	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.15	0.13	0.14	-	0.06	<0.03					<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	<0.04	<0.04	-	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.22	0.31	0.34	-	0.17	<0.03					<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.16	0.29	0.32	-	0.15	<0.03					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.07	0.28	0.19	-	0.08	<0.06					<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.11	0.37	0.22	-	0.10	<0.02					<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene ^{#M}	0.10	0.50	0.25	-	0.12	<0.07					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.34	0.16	-	0.09	<0.04					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.14	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	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.17	0.08	-	0.05	<0.04					<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.9	2.5	1.8	-	0.8	<0.6					<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.07	0.36	0.18	-	0.09	<0.05					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.14	0.07	-	0.03	<0.02					<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	102	99	111	-	101	107					<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	<0.1	<0.1	-	<0.1	-	-					<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	<0.1	<0.1	-	<0.1	-	-					<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	-	<0.1	-	-					<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	<0.2	<0.2	-	<0.2	-	-					<0.2	mg/kg	TM5/PM16
>C12-C16 ^{#M}	<4	<4	-	<4	-	-					<4	mg/kg	TM5/PM16
>C16-C21 ^{#M}	<7	<7	-	<7	-	-					<7	mg/kg	TM5/PM16
>C21-C35 ^{#M}	<7	54	-	<7	-	-					<7	mg/kg	TM5/PM16
Total aliphatics C5-35	<19	54	-	<19	-	-					<19	mg/kg	TM5/PM16/PM12/PM15

Client Name: EPS Ltd
Reference: UK15.1964
Location: Moulton Chapel
Contact: Giles Lock
JE Job No.: 15/11172

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-2	3-4	5-6	7-8	9-10	11-12					Please see attached notes for all abbreviations and acronyms		
Sample ID	HA1	HA2	HA3	HA4	HA5	HA6							
Depth	0.50-0.60	0.30-0.50	0.20-0.60	0.30-0.60	0.10-0.50	0.40-0.70							
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J							
Sample Date	06/08/2015	06/08/2015	06/08/2015	06/08/2015	06/08/2015	06/08/2015							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	08/08/2015	08/08/2015	08/08/2015	08/08/2015	08/08/2015	08/08/2015					LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7	<0.1	<0.1	-	<0.1	-	-					<0.1	mg/kg	TM36/PM12
>EC7-EC8	<0.1	<0.1	-	<0.1	-	-					<0.1	mg/kg	TM36/PM12
>EC8-EC10 ^{#M}	<0.1	<0.1	-	<0.1	-	-					<0.1	mg/kg	TM36/PM12
>EC10-EC12	<0.2	<0.2	-	<0.2	-	-					<0.2	mg/kg	TM5/PM16
>EC12-EC16	<4	<4	-	<4	-	-					<4	mg/kg	TM5/PM16
>EC16-EC21	<7	15	-	<7	-	-					<7	mg/kg	TM5/PM16
>EC21-EC35	<7	127	-	<7	-	-					<7	mg/kg	TM5/PM16
Total aromatics C5-35	<19	142	-	<19	-	-					<19	mg/kg	TM5/PM16/PM15
Total aliphatics and aromatics(C5-35)	<38	196	-	<38	-	-					<38	mg/kg	TM5/PM16/PM15
MTBE [#]	<5	<5	-	<5	-	-					<5	ug/kg	TM31/PM12
Benzene [#]	<5	<5	-	<5	-	-					<5	ug/kg	TM31/PM12
Toluene [#]	<5	<5	-	<5	-	-					<5	ug/kg	TM31/PM12
Ethylbenzene [#]	<5	<5	-	<5	-	-					<5	ug/kg	TM31/PM12
m/p-Xylene [#]	<5	<5	-	<5	-	-					<5	ug/kg	TM31/PM12
o-Xylene [#]	<5	<5	-	<5	-	-					<5	ug/kg	TM31/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	-	<0.15	<0.15					<0.15	mg/kg	TM26/PM21
Natural Moisture Content	20.9	14.1	16.7	15.7	13.7	13.7					<0.1	%	PM4/PM0
Hexavalent Chromium [#]	<0.3	<0.3	<0.3	-	<0.3	<0.3					<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) ^{#M}	0.0369	0.0881	<0.0015	-	<0.0015	0.0131					<0.0015	g/l	TM38/PM20
Chromium III	53.5	40.5	60.4	-	46.6	52.6					<0.5	mg/kg	NONE/NONE
Total Cyanide ^{#M}	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	mg/kg	TM89/PM45
Organic Matter	4.6	2.8	2.2	-	1.6	0.7					<0.2	%	TM21/PM24
pH ^{#M}	8.05	8.14	8.49	-	8.33	8.64					<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay					None		PM13/PM0
Sample Colour	Dark Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown					None		PM13/PM0
Other Items	NA	stones	stones, roots	stones	stones	stones					None		PM13/PM0

Matrix : Solid

QF-PM 3.1.8 v10

Client Name: EPS Ltd
Reference: UK15.1964
Location: Moulton Chapel
Contact: Giles Lock

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

If asbestos fibres are reported at trace levels there will not be enough fibres to quantify and will be less than 0.001%.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
15/11172	1	HA1	0.50-0.60	2	11/08/2015	Mass of Dry Sample	49.4 (g)
					11/08/2015	General Description (Bulk Analysis)	soil/stones
					11/08/2015	Asbestos Containing Material	None
					11/08/2015	Asbestos Containing Material (2)	None
					11/08/2015	Asbestos Screen	NAD
					11/08/2015	Asbestos Screen (2)	NAD
					11/08/2015	Asbestos Level	NAD
15/11172	1	HA2	0.30-0.50	4	11/08/2015	Mass of Dry Sample	52.0 (g)
					11/08/2015	General Description (Bulk Analysis)	soil/stones
					11/08/2015	Asbestos Containing Material	None
					11/08/2015	Asbestos Containing Material (2)	None
					11/08/2015	Asbestos Screen	NAD
					11/08/2015	Asbestos Screen (2)	NAD
					11/08/2015	Asbestos Level	NAD
15/11172	1	HA3	0.20-0.60	6	11/08/2015	Mass of Dry Sample	45.7 (g)
					11/08/2015	General Description (Bulk Analysis)	soil-stones
					11/08/2015	Asbestos Containing Material	None
					11/08/2015	Asbestos Containing Material (2)	None
					11/08/2015	Asbestos Screen	NAD
					11/08/2015	Asbestos Screen (2)	NAD
					11/08/2015	Asbestos Level	NAD
15/11172	1	HA5	0.10-0.50	10	11/08/2015	Mass of Dry Sample	45.4 (g)
					11/08/2015	General Description (Bulk Analysis)	soil-stones
					11/08/2015	Asbestos Containing Material	None
					11/08/2015	Asbestos Containing Material (2)	None
					11/08/2015	Asbestos Screen	NAD
					11/08/2015	Asbestos Screen (2)	NAD
					11/08/2015	Asbestos Level	NAD
15/11172	1	HA6	0.40-0.70	12	11/08/2015	Mass of Dry Sample	50.0 (g)
					11/08/2015	General Description (Bulk Analysis)	soil-stones
					11/08/2015	Asbestos Containing Material	None
					11/08/2015	Asbestos Containing Material (2)	None
					11/08/2015	Asbestos Screen	NAD
					11/08/2015	Asbestos Screen (2)	NAD
					11/08/2015	Asbestos Level	NAD

Client Name: EPS Ltd
Reference: UK15.1964
Location: Moulton Chapel
Contact: Giles Lock

[illegible]

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.: 15/11172

SOILS

Please note we are only MCERTS accredited (UK soils only) 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 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 UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (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

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	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
CO	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
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/11172

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK 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.				
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.			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.			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.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			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.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	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.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM12/PM16	CWG GC-FID			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	

JE Job No: 15/11172

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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 CO ₂ 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
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.			AR	Yes
TM30	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
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	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
TM50	Acid soluble sulphate analysed by ICP-OES	PM29	Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.	Yes	Yes	AD	Yes

JE Job No: 15/11172

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	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
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes	Yes	AR	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes

APPENDIX H

Generic Screening Criteria

EPS Generic Quantitative Risk Assessment

Minimal Risk Generic Screening Criteria - Residential Land Use

Contaminant	Soil Targets		
	Human Health	Controlled Waters	
		LGwRP	HGwRP
Unit	mg/kg		
Arsenic	37	n/c	n/c
Cadmium	11	n/c	n/c
Chromium III	910	n/c	n/c
Chromium VI	6	n/c	n/c
Copper	2400	n/c	n/c
Mercury (elemental)	1.2	n/c	n/c
Nickel	180	n/c	n/c
Lead	NA	n/c	n/c
Selenium	250	n/c	n/c
Zinc	3700	n/c	n/c
Benzene	0.087	0.252	0.008
Toluene	130	1.17	1.17
Ethylbenzene	47	15.0	10.0
Xylene (para)	56	0.885	0.885
MTBE#	49	0.138	0.0276
Benzo(a)Pyrene	2.2	10	1.44
Naphthalene	2.3	0.934	0.02
Dibenz(ah)anthracene	0.24	n/c	n/c
Aliphatic C5-C6	42	5.27	1.05
Aliphatic C6-C8	100	23.2	4.64
Aliphatic C8-C10	27	175	35.1
Aliphatic C10-C12	130(48)*	1380	276
Aliphatic C12-C16	1100(8.48)**	27500	5490
Aliphatic C16-C35	65000 (8.48)**	3.46E+06	6.91E+05
Aromatic C8-C10	34	8.74	1.75
Aromatic C10-C12	74	13.8	2.76
Aromatic C12-C16	140	27.5	5.5
Aromatic C16-C21	260	86.9	17.4
Aromatic C21-C35	1100	690	138

Groundwater Targets	
Controlled Waters	
LGwRP	HGwRP
ug/l	
50	10
5	5
250	50
n/c	n/c
28	28
1	1
200	50
250	10
10	10
500	500
30	1
50	50
300	200
30	30
75	15
0.7	0.1
10	0.1
n/c	n/c
50	10
50	10
50	10
50	10
50	10
50	10
50	10
50	10
50	10

Notes:

LGWRP - Low Groundwater Resource Potential

HGWRP - High Groundwater Resource Potential

f = Oral, dermal and inhalation exposure compared with oral HCV N/C = Not Calculated

* = S4UL exceeds vapour saturation limit (in brackets)

** = S4UL exceeds solubility saturation limit (in brackets)

Soil Targets

Targets for Human Health have been taken from *S4ULs 'Suitable For Use Levels for Human Health Risk Assessment' – LQM and CIEH (2014)* derived using standard sandy loam soil with 1% SOM, except (#) = *EIC/AGS/CL:AIRE GAC 'Soil Generic Assessment Criteria' (2010)*. For sites where ground conditions differ significantly from sandy loam or site-specific SOM and pH are available, the generic human health targets may be revised.

Targets for Controlled waters have been derived using EA Remedial Targets Worksheet (v3.1) - using standard Sandy Loam ground conditions as described in Science Report SC050021/SR3, assuming no degradation for a 10m compliance distance with criteria of EQS or UKDWS for LGWRP and HGWRP respectively (see notes for GW targets).

Groundwater Targets

For LGWRP, targets have been taken as Freshwater EQS where available. For Ethylbenzene and BaP the WHO Health limit has been used and for MTBE and individual TPH fractions a 5 times multiplier of taste threshold and UKDWS has been taken respectively.

For HGWRP, targets have been taken as UKDWS where available, with the exception of Copper and Zinc where the EQS is lower than the DWS and therefore the EQS has been used as the groundwater target. For Ethylbenzene the upper WHO ATO limit has been used. For Toluene and Xylene, the WHO ATO limit is higher than the EQS and so the lower value has been taken. For MTBE the taste threshold has been taken.

Work carried out to calculate generic screening criteria for concentrations of contaminant in groundwater with respect of risks to Human Health has generally found that criteria far exceed (by at least 2 orders of magnitude) those listed for the protection of either LGWRP and HGWRP receptors. On this basis, the above Groundwater criteria are also considered protective of human health and further evaluation of these risks should be considered alongside any detailed quantitative risk assessments carried out for groundwater on a site specific basis.

APPENDIX I

Example Method Statement for Construction Workers Encountering Unexpected Contamination



METHOD STATEMENT

ACTIONS TO BE TAKEN IN THE EVENT OF DISCOVERING UNEXPECTED CONTAMINATION DURING INTRUSIVE GROUNDWORKS

If at any point during intrusive groundworks at a site, evidence of unforeseen contamination is encountered in the form of significant noxious odours, discolouration, or instability within soils or sheen / discolouration in groundwater, the following actions will be taken:

- Intrusive works in the immediate area of the impacted ground will be suspended and the continuation of work in other areas of the site will be considered within the context of the site specific health & safety plan.
- Environmental Protection Strategies Ltd (EPS) will be contacted and appraised of the situation so that arrangements can be made to characterise the impact and determine what action may be necessary in addition to the scheduled site works. Where possible / health & safety plan permits, digital photographs of the impacted ground will be taken and emailed to EPS at the address below to assist in the initial assessment.
- It may well be necessary for EPS to attend site to undertake visual inspection and obtain samples for field and/or laboratory analysis, although the actions taken will be dependent on the nature of what is encountered.
- In cases where EPS consider the unforeseen contamination likely to pose a significant risk of significant harm to adjacent site users or local environmental receptors, the local authority and the Environment Agency will be informed of the situation and the actions being taken.
- Once appropriate action has been agreed and undertaken a written summary will be produced by EPS for submission to the Local Authority (and where relevant, the Environment Agency) in accordance with planning requirements. The submission will include details of work undertaken, analytical results of investigative and validation samples obtained and conclusions and recommendations for any further actions considered necessary.
- Where regulatory bodies have been involved, site works should only recommence following their agreement and in all cases should only recommence when the site manager considers it safe to do so within the context of the site specific health & safety plan.

EPS Contact Details:

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