

REPORT C9402 MAY 2022

GEOENVIRONMENTAL APPRAISAL

of WYE CARR EAST HARLSEY, NORTHALLERTON

Prepared for COWESBY ESTATE VENTURES

QA Sheet



REPORT TYPE:	GEOENVIRONM	ENTAL APPRAISAI	-
REPORT NUMBER:	C9402	REPORT STATUS:	FINAL
REPORT DATE:	MAY 2022		
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GEOENVIRONMENTAL APPRAISAL

<u>of</u>

WYE CARR

EAST HARLSEY, NORTHALLERTON

Prepared for

Cowesby Estate Ventures

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APPENDICES

APPENDIX A FIGURES AND DRAWINGS

Drawing No.	Title	Scale
3396-002-В	Proposed Site Layout	1:500 @
		A1
C9402/01	Site Location Plan	1:25,000
C9402/02	Preliminary Conceptual Site Model	NTS
C9402/03	Exploratory Hole Location Plan	1:2000
C9402/04	Revised Conceptual Site Model	NTS

NTS: Not to Scale

APPENDIX B ENVIROCHECK REPORT

- APPENDIX C RISK ASSESSMENT METHODOLOGY
- APPENDIX D EXPLORATORY HOLE LOGS AND FIELD TEST RESULTS
- APPENDIX E LABORATORY TEST RESULTS
- APPENDIX F SIRIUS GENERIC ASSESSMENT CRITERIA



EXECUTIVE SUMMARY

Introduction	Sirius Geotechnical Ltd was commissioned by Fordy Marshall Ltd on behalf of Cowesby Estates Ventures to undertake a geoenvironmental appraisal of land at Wye Carr. East Harlsey, Northallerton,
	The site is proposed to be developed for a residential end use.
Site Details	The site is roughly rectangular in shape, of approximate dimensions of 85m by 40m, with ground levels falling from the west to the east from 109m AOD to 106m AOD. The site is currently cropped farmland.
Site History	The site has remained undeveloped farmland since the earliest available OS mapping of 1857.
Fieldwork	Drilling of 8 No. window sample boreholes to maximum 4.0m depth.
Laboratory Testing	Selected samples of soil were submitted for analysis of a range of metal, other inorganic and organic contaminants.
	Geotechnical testing was scheduled on selected samples.
	All testing was undertaken at MCERTS and/ or UKAS accredited laboratories.
Ground Conditions	Ground conditions were found to comprise cultivated topsoil of up to 0.25m in thickness overlying firm and stiff medium to high strength glacial till. Low strength clays / loose sand bands were locally encountered in WS1 to a depth of approximately 3.0m bgl.
Ground Stability	All soils should be assumed to be unstable in the short term within all excavations to any depth, and appropriate support should be provided to all excavations.
Mining and	No mining is recorded within the site on historical or geological mapping.
Quarrying	No quarries are recorded within the site on historical or geological mapping.
Soakaways	Soakaway testing was not conducted on this site.
Foundations and Floor Slabs	Traditional shallow spread foundations are likely to be suitable for the proposed development. Foundations may need to be deepened in west of the site in the vicinity of WS1.
	Ground bearing floor slabs are likely to be suitable for the site
Sulphate Class	DS-1 and ACEC-1s for buried concrete structures in contact with topsoil and glacial till soils.
Contamination	No evidence of contamination was found to be present across the site. Laboratory analysis has not detected any potentially significant contamination.
Asbestos	No evidence of asbestos was found to be present across the site. Laboratory analysis has not identified any detectable asbestos.
Ground Gas	Ground gas is not perceived to be a risk on this site.

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	No radon protective measures are required.		
Invasive Species	No evidence of any invasive plant species was observed during the investigation, however it is recommended that the absence or otherwise of		
	invasive species is confirmed by a qualified ecological consultant.		

The executive summary is an overview of the key findings and conclusions of the report. There may be other information contained in the body of the report which puts into context the findings of the executive summary. No reliance should be placed on the executive summary in isolation, particularly when deriving design detail/abnormal costs.



1. INTRODUCTION

Sirius Geotechnical Ltd. (Sirius) was commissioned by Fordy Marshal Ltd on behalf of Cowesby Estate Ventures to undertake a geoenvironmental appraisal of land at Wye Carr, East Harlsey, Northallerton (the "site"). It is understood that consideration is being given to development for a residential end use, comprising 2 to 3 storey houses with associated gardens and infrastructure.

The approximate site boundary and extent of proposed development is shown on Michael Hall Associated Drawing 3396-002-revB 'Proposed Site Layout' included within Appendix A. This geoenvironmental appraisal report details the findings of the investigation of the site.

The objectives of this investigation were to:

- Establish the historical development of the site and surrounding area from a review of available plans;
- Establish the environmental setting of the site;
- Investigate soil and groundwater conditions;
- Determine the potential risks posed by any ground contamination and provide recommendations on remedial measures to manage such risks;
- Establish the risks associated with hazardous ground gas;
- Evaluate whether past mining or other extractive industries could have an influence on the site;
- Provide advice relating to geotechnical issues associated with the site;
- Provide foundation recommendations.

The desk study element of this investigation includes an assessment of information provided by Landmark Information Group (Envirocheck Report), the British Geological Survey (BGS), the Coal Authority (CA) and/or other referenced sources.

Fieldwork was undertaken on 21st March and comprised the drilling of eight window sample boreholes across the site area.



This report, which was designed to meet the requirements of relevant current guidance, presents the factual information available during this appraisal, an interpretation of the data obtained and recommendations relevant to the defined objectives.

It has been assumed in the production of this report that the site is to be developed for a residential end use. In addition, it is assumed that ground levels will not change significantly from those described in this report. If these are not the case, then amendments to the recommendations made in this report may be required.

Where the report refers to the potential presence of invasive plants (such as Japanese Knotweed) or asbestos-containing materials (ACMs), such observations are for information only and should be verified by a suitably qualified expert.

The comments and opinions presented in this report are based on the findings of the desk study, ground conditions encountered during intrusive investigation works performed by Sirius and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of strata, contamination or other spatially variable features between or beyond investigation positions is conjectural and given for guidance only. Confirmation of ground conditions between exploratory holes should be undertaken if deemed necessary. Evaluation of groundwater is based on observations made at the time of the investigation and monitoring visits. It should be noted that groundwater levels and quality may vary due to seasonal and other effects.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview

All dimensions and orientations within this section are approximate.

Location	The site is located within farmland to the east of East Harlsey. A site
	location plan is provided as Drawing No. C9402/01 within Appendix
	Α.
National Crid	The site is contrad at approximate NCD 442700 400050
	The site is centred at approximate NGR 442769, 499956.
Reference (NGR)	
Topography and	The site is roughly rectangular in shape, of approximate dimensions
Features	of 85m by 40m, with ground levels falling from the west to the east
	from 109m AOD to 106m AOD. The site is currently grassed
	farmland.
Approximate Site Area	
Approximate Site Area	0.5 Ha
Site Boundaries	North – a mix of post and wire fencing, hedging and an access gate.
	East – open farmland.
	West – a mix of hedging and domestic fencing.
	South – open farmland.
Current Land Lise	The site is currently farmland used for growing crops
Current Land USe	The site is currently larmand used for growing crops.
Invasive Plant Species	No evidence of any invasive plant species was observed during
	fieldwork. An ecological survey should be carried out by a suitably
	qualified specialist to confirm if any invasive, protected or sensitive
	species or habitats are present.
Adjacent Land Uses	South and East – Predominantly farmland.
	North and West Housing appropriated with the village of East
	Harlsey.

The main site features are shown on Drawing No. C9402/03 within Appendix A.

3. ENVIRONMENTAL SETTING

3.1. Introduction

Published environmental, geological and historical data relating to the site has been reviewed. A summary of relevant information is provided below, and a copy of the Envirocheck Report is enclosed in Appendix B. Site History

Table 3.1 presents a summary of the site history from 1857-2021. It is not the intention of this report to describe in detail all of the changes that have occurred on or adjacent to the site, only those pertinent to the proposed development.

Table 3.1Site History

Map Dates	On-Site Features	Off-Site Features (only features
		within 500m that may affect the
		site are listed)
1857 to 1964	Undeveloped agricultural land	Historic 'earthwork', possibly ancient, recorded within land to the west. School, chape and smithy in East Harlsey Village to the west. St. Oswald's Church and graveyard is located approximately 200m to the south west. Well recorded to the north of the Wye Carr in 1894.
1964 to 2000	Undeveloped agricultural land	New houses built to the north of the main road by 1964. Farm buildings to the west replaced with new houses between 1974 and 2000.

3.2. Published Geological Information

A summary of available published geological information is provided in Table 3.2.

Table 3.2Geological Summary

Sources of	BGS GeoIndex and BGS Lexicon
Information	Borehole records held by the BGS
	Coal Authority Interactive Map Viewer

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Made Ground	No made ground is recorded on the published maps.
Superficial	BGS mapping indicates the presence of drift of the Vale of York
Deposits	Formation across the site and surrounding area. The Vale of York
	Formation is predominantly glacial till with interbedded sand, gravel and
	laminated clavs
	A BGS borehole record to the east at East Harlsey Manor records
	approximately 27feet (8m) of drift deposits (clays) overlying mudstone
	bedrock.
Solid Geology	The site is conjectured by the BGS to be underlain by the Redcar
Cond Ceology	Mudetene Eermetien being prodominantly grov mudetenes and
	siltstones. These strata were encountered in BGS borehole ref
	NZ40SW20 to the east of the site. The site is not recorded to be
	underlain by any geological faults, and is not recorded as being within a
	Coal mining area by the Coal Authority.
Mining and	Recorded underground Coal Mining:
Quarrying	The site is not within a Coal Mining reporting area.
	Unrecorded Underground Coal Mining:
	No coal bearing strata is recorded to be present at shallow depth, and
	the potential for past unrecorded coal mine workings is considered to be
	negligible.
	Quarries:
	None recorded on site or within 250m of the site boundary, on historical
	OS manning
	oo mapping.

3.4 Hydrology and Hydrogeology

A summary of available information pertaining to hydrology and hydrogeology is presented in Table 3.3 to Table 3.5, inclusive.



Table 3.3	Surface	Water	Features

	Presence/location	Comments	
Classified	None recorded.		
Watercourses (within			
500m)			
Unclassified	A small watercourse named	Tributary to Harlsey Beck.	
Watercourses (within	'The Keld' on historic plans		
500m)	flows from east to west		
	approximately 250m to the		
	south of the site.		
Licensed Surface Water	None recorded.		
Abstractions (within 1000m)			
Other Surface Water	None recorded.		
Features (Canals,			
Ponds, Lakes, etc.)			
(within 250m)			
Flood Risk Status	The site is not recorded to fall	within an area recorded to be at risk of	
	flooding from rivers or the sea	(zone 2 or 3).	
	The site is recorded by the	e EA as having limited potential for	
	groundwater flooding to occur.		

NR – None recorded.

Environment Agency former GQA assessments: A = very good to E = poor

Table 3.4 Groundwater Occurrence and Abstraction

	Presence/location	Comments
Licensed Abstractions (within 1000m)	315m south	JB Barnard for domestic and
		revoked.
Private Wells	A well was shown in the late 1800s to the north of the road.	Not within the subject site boundary.



	Presence/location	Comments
Source Protection	None recorded.	
Zones (within 500m)		
Springs	None recorded on historical mapping.	

NR - none recorded.

Table 3.5 Groundwater Vulnerability Status

	Environment Agency Classification			
Superficial Aquifer	The superficial deposits (Till, Devensian) are classified as a Secondary			
Designation	(Undifferentiated) Aquifer.			
Bedrock Aquifer	The bedrock underlying the site is recorded to be a Secondary			
Designation	(Undifferentiated) Aquifer.			
Groundwater	Groundwater below the site is recorded as medium vulnerability.			
Vulnerability				

3.3. Landfilling and Waste Management

Information on waste management and related activities that could impact upon the site is summarised in Table 3.6.

 Table 3.6
 Waste Management Activities

	Presence / Location	Comments
Recorded Landfills (within 1000m)	None recorded.	
Other Licensed Waste Management Facilities (within 500m)	None recorded.	
Evidence of Fly- Tipping on Site?	None recorded.	
Other Evidence of Waste Disposal on or	None recorded.	



resence /	Location		Commer	its				
lo sources	of ground	gas h	nave been	iden	tified and	subje	ct to	the
ndings of	intrusive	inve	stigations	the	potential	risk	to	the
evelopmen	t should be	consi	dered as b	eing	low.			
r	o sources ndings of evelopmen	o sources of ground ndings of intrusive evelopment should be	o sources of ground gas h ndings of intrusive inves	o sources of ground gas have been ndings of intrusive investigations evelopment should be considered as b	o sources of ground gas have been iden ndings of intrusive investigations the evelopment should be considered as being	o sources of ground gas have been identified and ndings of intrusive investigations the potential evelopment should be considered as being low.	o sources of ground gas have been identified and subject ndings of intrusive investigations the potential risk evelopment should be considered as being low.	o sources of ground gas have been identified and subject to ndings of intrusive investigations the potential risk to evelopment should be considered as being low.

NR - none recorded

3.4. Radon Risk

The BGS and HPA "Indicative Atlas of Radon in England and Wales" and the assessment contained within the Envirocheck Report, indicate that the site lies within an area in which **no radon protective measures are required**.

3.5. Ecological Receptors

No designated ecological receptors are recorded to be located within 500m of the site which are considered likely to have an impact on the proposed development. The site is located within a nitrate vulnerable zone.

3.6. Other

Other potentially contaminative activities or environmental constraints are listed below. The entries relate to activities within approximately 250m of the site, with the exception of COMAH facilities where the assessment is extended to a distance of approximately 1km from the site:

Table 3.7 Other Potentially C	contaminative Activities
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	Presence/ Location	Comments
COMAH (within 1000m)	None recorded.	
Pollution Incidents to controlled waters (within 250m)	None recorded	
Substantiated Pollution Incident Register (within 250m)	None recorded	

Contempor	ary	Trade	1 No. Contemporary Trade 185m to SW – Road haulage
Directory	Entries	(within	Directory Entries is located services.
250m)			within 250m of the site.
Discharge	consents	(within	2 located 72m and 85m NE Operated by Northumbrian
250m)			Water for sewage
			management. Including
			discharge to a tributary of The
			Keld.



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4. PREVIOUS INVESTIGATION FINDINGS

No previous desk study or site investigation reports relating directly to this site have been made available to Sirius.



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5. PRELIMINARY CONCEPTUAL SITE MODEL

Based on the desk study information reviewed, a combined preliminary conceptual site model and conceptual exposure model (CSM) has been developed for the proposed future land use (Residential with Gardens). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors to assess potential contaminant linkages.

A qualitative risk assessment has also been made of each contaminant linkage operating following the methodology described in Appendix C.

The preliminary CSM is presented in schematic form in Drawing No. C9402/02 in Appendix A.

In summary, the following potential contaminant linkages have been assessed as posing a potentially unacceptable level of risk (defined as being greater than "low" risk) in the proposed enduse:

 Ingestion, inhalation of dust and dermal contact with elevated concentrations of metals, organic and inorganic contaminants including asbestos fibres, in made ground potentially present due to historic agricultural use presenting a potential low to moderate risk to residential end-users, construction workers, plant growth in gardens/ landscaping, construction products and controlled waters.



6. FIELDWORK

6.1. Scope of Investigation

The information contained in this report is limited to areas of land accessible during the investigation within the site boundary, as indicated on the site plan presented in Appendix A as Drawing No. C9402/03.

The investigation, which was supervised by a Sirius Geoenvironmental Engineer, took place on 21st March 2022 and comprised:

• Drilling of 8 No. window sample boreholes (WS1 to WS8) to a maximum depth of 4m bgl.

Permanent monitoring installations for combined groundwater and ground gas monitoring were installed in WSs 1, 4, 7 and 8. At the time of the investigation, access for excavation of trial pits was not available due to the field being in crop.

6.2. Exploratory Hole Locations

The exploratory hole locations were selected using the findings of the preliminary conceptual site model in order to achieve general site coverage, target specific areas of interest and resolve key uncertainties, as detailed in Table 6.1. The principles given in BS 10175:2011+A2:2017 and BS EN 1997-2:2007 were followed when determining exploratory hole locations.

Table 6.1 Exploratory Hole Rationale

Exploratory Hole	Rationale
WS1 to WS8	General site coverage to obtain information on shallow ground conditions and install
	groundwater monitoring wells in selected window sample boreholes.

Exploratory hole locations are shown on Drawing No. C9402/03 in Appendix A of this report.

6.3. Strata Description

Strata descriptions were logged in accordance with Eurocode 7. Detailed descriptions of strata and groundwater observations made during investigation works, together with samples recovered and the results of all *in situ* field testing, are presented on the Engineer's records in Appendix D. The



depths of strata on the record sheets are recorded from current ground levels at each location, unless indicated otherwise.

6.4. Geotechnical Testing

Geotechnical laboratory testing on selected samples was carried out under subcontract by Professional Soils Laboratory (PSL), a UKAS-accredited laboratory.

Geotechnical and geochemical test results are included within Appendix E of this report.

6.5. Chemical Testing

Selected samples of the made ground and natural soils were tested for a range of potential contaminants under subcontract with Derwentside Environmental Testing Services (DETS), a UKAS and MCERTS-accredited laboratory.

The potential contaminants of concern identified by the preliminary conceptual site model and informed by the ground conditions encountered on the site were selected as the analytes for the samples recovered from the site. The results of soil analysis, as received from the laboratory, are presented in Appendix E of this report.



7. GROUND CONDITIONS AND MATERIAL PROPERTIES

7.1. Strata Profile

A summary of the strata profile encountered is provided in Table 7.1. Descriptions and intermediate depths of superficial deposits are derived from the window sample boreholes.

Table	7.1	Strata	Profile
I UNIC		onatu	1 101110

	Depth Range	
Strata	(Thickness	Description and Comments
	Range)	
Topsoil/	Ground Level	Topsoil was encountered across the site and comprised a
Reworked	(0.2m to	soft to firm brown sandy gravelly clay with gravel of
Topsoil	0.25m)	sandstone and mudstone and with frequent rootlets.
Glacial Till	0.2m to 4m (3.8m to >3.75m)	Glacial till was consistently present below the topsoil, where encountered, typically comprising a firm, to stiff, medium to high strength sandy to sandy gravelly clay. Within WS1, glacial till was found to be of low strength to a depth of approximately 3.0m bgl and potentially contained
		bands of loose saturated sand.

NP - not proven

*Stated bedrock depths obtained from rotary drilling records

7.2. Material Properties

Geochemical Analysis

The results of water soluble sulphate (SO4) and pH analyses performed on samples of topsoil, natural superficial strata and residual bedrock are presented in Table 7.2, below, along with the Design Sulphate Class and ACEC Class for buried concrete structures in contact with the referenced strata in accordance with BRE SD1 based on the samples tested.



Soil Type	No. of	Range of Results		Concrete Cla	ssification*
	Tests	Water	рН	Design	ACEC
		Soluble		Sulphate	Class
		Sulphate		Class	
		(mg/l)			
Topsoil	8	15 to 54	6.5 to 7.7	DS-1	AC-1s
Cohesive	8	25 to 52	8.5 to 9.0	DS-1	AC-1s
Natural Strata					
(Glacial Till)					

Table 7.2 Water Soluble Sulphate (SO4) and pH Analysis Results

*In accordance with BRE SD1, mobile ground water for natural ground locations

Classification Testing

The results of Atterberg limited determinations performed are presented in Table 7.3 below.

Table 7.3	Atterberg Limit Determination R	esults – Glacial Till

Test / Parameter	No.	Range of	Comments
	of	Results	
	Tests		
Natural Moisture	8	14 – 18	
Content (%)			
Liquid Limit (%)	8	25 – 43	
Plastic Limit (%)	8	12 – 21	
Plasticity Index (%)	8	13 – 22	The plasticity index indicates the soils are of Low
			to Intermediate Plasticity.
			Calculation of the modified Plasticity Index, in
			accordance with NHBC standards, indicates
			these soils to have a low to medium volume
			change potential.
Consistency Index	8		The Consistency Index (Ic) values for the samples
			tested indicate the material to be typically of stiff
			and very stiff consistency although the sample
			from WS1 at 3.6m indicated firm consistency.



Results of In Situ Tests

The results of in situ standard penetration tests (SPTs) undertaken in glacial till are summarised in Table 7.5, below. Correlation with laboratory plasticity indices enables a factor (f1) to be derived, allowing an estimate of undrained shear strength to be assessed as the product of f1 and $N^{(1)}$. Table 7.4, below, gives the f1 value for the cohesive soils encountered within the site.

Table 7.4Derived f1 Values

Soil Type	Average Plasticity Index	F1 value
Glacial Till	18.125	5

Indicative mass shear strengths for cohesive soils are also given in the Table 7.5, below. It should be recognised, however, that in accordance with Eurocode 7, the use of in situ SPTs within cohesive has a low applicability for assessing undrained shear strength. In view of this, the results of the SPTs should be considered only tentatively and, typically, greater emphasis is given to the results of hand shear vane test results.

Table 7.5	Summary	of Standard	Penetration	Test Results

Depth (m bgl)	Number of tests	Minimum N60 Value*	Maximum N60 Value*	Median N60 Value*	Average N60 Value*	Indicative undrained shear strength (kN/m²)** or Density	
Natural Superficial Deposits (Glacial Till)							
1.01 - 2.0	8	5	20	14.5	14.125	23 – 102	Loose to medium dense
2.01 - 3.0	8	2	26	20	19	11 – 130	Loose to Dense
3.01 – 4.0	8	14	20	17	17.25	68 – 102	Medium dense
4.01- 4.45	8	12	23	19	17.75	62 – 113	Medium dense

*N60 calculation: N Value x Energy Ratio (%) x Rod Length Factor λ / 60. Value given to nearest whole number.

** Shear strength calculated using unrounded N60 value

⁽¹⁾ Stroud, M.A. "The standard penetration test in insensitive clay and soft rocks", *Proceedings of the European Symposium on Penetration Testing*, *2*, 367-375 1975.

The results of the in situ hand shear vane tests undertaken superficial deposits are summarised in Table 7.6, below.

Depth (m bgl)	Number of tests	Minimum Result (kN/m²)	Maximum Result (kN/m²)	Average Result (kN/m ²)	Median Result (kN/m²)	Indicative strength	
Natural Super	Natural Superficial Deposits (Glacial Till)						
0.0 - 1.0	32	68	150	96	90	Medium to high	
1.01 - 2.0	18	86	150	128	120	High	
2.01-3.0	18	110	150	137	144	High	
3.01-4.0	15	52	145	102	110	Medium to high	

Table 7.6	Summary of Hand Shear Vane Test Results
-----------	-----------------------------------------

*Results of 150kPa reached the maximum value of the equipment used.



7.3. Obstructions

No sub-surface obstructions were encountered during the Sirius site investigation.

7.4. Ground Stability

All boreholes were recorded to be stable during drilling for the short period they remained open.

7.5. Groundwater

Groundwater strikes were not typically recorded during the investigation with the exception of within WS1 at 2.5m bgl.

Groundwater levels were measured in WS1, WS4, WS7 and WS8 on two occasions following completion of the fieldwork and results are summarised in Table 7.7 below.

 Table 7.7
 Summary of Monitored Groundwater Levels

Location	Groundwater level (m bgl) 29.03.22	Groundwater level (m bgl) 04.04.22
WS1	0.9	0.7
WS2	0.83	0.45
WS7	3.38	2.44
WS8	2.28	1.87

7.6. Visual / Olfactory Evidence of Contamination

During our works, there was no olfactory or visual evidence of hydrocarbon or similar contamination, with no made ground being encountered across the site during the investigation.

7.7. Infiltration Testing

Soakaway tests were not undertaken during this investigation.

7.8. Ground Gas

Ground gas monitoring has not been carried out.



8. RESULTS OF CHEMICAL TESTING

The results of chemical analysis are provided in full within Appendix E.

8.1. Assessment Methodology

Soil Data

For the purposes of this appraisal, the primary 'averaging zone' is considered to be in-situ naturally derived soils (topsoil and subsoil). Consequently, no geographical zoning of this soil type is considered necessary and samples selected for testing were chosen using a simple random pattern to provide a relatively even spread across the proposed development area.

The laboratory test data for the relevant soil strata were reviewed for completeness and consistency. Those determinands that represent potential contaminants of concern were subject to further evaluation.

For each potential contaminant of concern, analytical data for soil samples were evaluated against the relevant Generic Assessment Criterion (GAC), taking account of the Soil Organic Matter (SOM) content. For this site, measured values were compared to GACs derived for a residential end use. Source data for all GACs are provided in Appendix F.

For this site, it can be demonstrated that the use of benzo(a)pyrene as a surrogate marker for other Polycyclic Aromatic Hydrocarbons (PAHs) is appropriate.

If any samples recorded contaminant concentrations that exceeded that GAC, then consideration was given to the applicability of statistical data evaluation in line with the methods described CL:AIRE 2020 "Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration".

8.2. Soil Analysis

Topsoil / Subsoil

Table 8.1 presents a summary of the analytical results obtained and their evaluation against the applicable GACs.



Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (5% SOM)	No. of Samples >GAC	Location of Exceedance
Metals					
Inorganic Arsenic	8	6.9 - 8.8	37	0	
Cadmium	8	< 0.1 - 0.3	11	0	
Chromium (III)	8	23 – 30	910	0	
Lead	8	16 – 48	200	0	
Inorganic Mercury	8	< 0.05 - 0.06	40	0	
Selenium	8	<0.5	250	0	
Copper	8	19 – 27	200	0	
Nickel	8	18 – 35	130	0	
Zinc		50 – 69	450	0	
Inorganics		1			
рН	16	6.5 – 9.0	<5 or >9	0	
Water Sol. Sulphate	16	15 – 54mg/l	500 mg/l	0	
Speciated PAH				-	
Acenaphthene	8	< 0.03	920	0	
Anthracene	8	< 0.03 - 0.04	9400	0	
Acenaphthylene	8	< 0.03	760	0	
Benzo(a)anthracene	8	<0.03 - 0.09	B(a)P**	**	
Benzo(b)fluoranthene	8	<0.03	B(a)P**	**	
Benzo(k)fluoranthene	8	<0.03	B(a)P**	**	
Benzo(g,h,i)perylene	8	<0.03	B(a)P**	**	
Benzo(a)pyrene	8	<0.03	2.2	0	
Chrysene	8	<0.03	B(a)P**	**	
Dibenzo(a,h)anthracene	8	<0.03	B(a)P**	**	
Fluoranthene	8	<0.03	820	0	
Fluorene	8	<0.03 - 0.05	730	0	
Indeno(1,2,3-cd)pyrene	8	<0.03	B(a)P**	**	
Naphthalene	8	<0.03	4.6	0	
Pyrene	8	< 0.03 - 0.04	1900	0	
Phenanthrene	8	< 0.03 - 0.04	380	0	
Others				_	
Phenol	8	< 0.3 - 0.5	330	0	
TOC	8	0.5 – 2.7	3 w/w%	0	
Asbestos	8	NAD	Fibres present	0	

Table 8.1 Summary of Total Soil Concentrations – Topsoil / Subsoil

** Assessed using benzo(a)pyrene as a surrogate marker

Table based on a Residential with Gardens end use with a 5% Soil Organic Matter.

NAD = No Asbestos Detected

NA – Not Applicable.

Metals and Metalloids

No metals recorded concentrations above the relevant GAC.

Report: C9402 – Wye Carr, East Harlsey, Northallerton. Prepared for: Cowesby Estate Ventures.



Other Inorganic Analytes

No inorganics recorded concentrations above the relevant GAC.

Organics

No organic substances recorded concentrations above the relevant GAC.



9. CONCEPTUAL SITE MODEL

The conceptual model has been developed for the proposed future land use (Residential development). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors.

The revised conceptual model is presented in schematic form in Appendix A, Drawing No. C9402/04.

9.1. Summary Contaminant Linkages

The CSM has identified no potentially significant contaminant linkages and the site is considered to present a **low** risk to human health.

The CSM has not identified any potential sources of hazardous ground gas that could present a risk to the proposed development. The intrusive ground investigation has not identified any potential additional sources of gas or pathways that could result in a risk to future development or end users.



10. CONCLUSIONS AND RECOMMENDATIONS

10.1. General

This geoenvironmental appraisal has been performed for land at Wye Carr, East Harlsey, Northallerton.

It has been assumed in the production of this report that the site is to be developed for a residential end use. In addition, it has been assumed that ground levels will not change significantly from those described in this report. If these are not the case, then amendments to the interpretation and conclusions in this report may be required.

10.2. Flood Risk

The Environment Agency website indicate that the site is not at risk of flooding from rivers or the sea.

The site is recorded to have a limited potential for groundwater flooding to occur.

10.3. Geotechnical

Foundations

The investigation has identified ground conditions comprising topsoil of up to 0.25m in thickness overlying firm to stiff, medium to high strength glacial till. Recorded undrained shear strengths at depths of up to 3.0m depth generally returned results in the order of 68 to 110kN/m², with greater shear strength values locally recorded. The exception to this was WS1 where lower strength clays with a higher proportion of sand and potentially waterlogged sand bands were encountered to depth of up to 3.0m below ground level. SPT results obtained from 3.0m bgl indicate that ground conditions were at least of medium strength or medium density below this depth. A minimum characteristic undrained shear strength of 60kN/m² is considered appropriate at normal founding depth, with the exception of the area around WS1, where suitable founding strata may not be encountered until approximately 3.0m below ground level. This area appears to be relatively localised, with WS2, positioned on the other side of the proposed dwelling (plot 1), encountering high strength glacial till from shallow depth. It is expected that foundations to plot 1 will need to be deepened, at least in part and around the northern edge, to reach a suitable bearing stratum and an allowance should be made for a suitable engineering design. If softer ground conditions are found to be very localised then a stepped trench fill foundation solution may be appropriate subject to detailed design by a structural engineer. Further investigation of this specific area of the site

would provide additional information which may help to determine the most cost effective foundation solution. It is recommended that a trial pit is excavated to allow improved observation of ground conditions when access is available.

Topsoil is not expected to be present at anticipated foundation depths. Notwithstanding the above, this material is however unsuitable as bearing strata for the support of structural loads associated with this type of development due to the potential for excessive total and differential settlements.

Structural loads associated with the proposed development should be supported on conventional spread foundations (such as strip/trench fill) taken down through any topsoil, into the underlying natural ground of adequate strength/ bearing capacity.

The underlying glacial till of medium to high strength is considered to have a characteristic undrained shear strength (C_u) of at least 60kN/m² at a typical founding depth of 0.9m bgl. Founding depths are likely to be deeper and up to 3m bgl for plot 1. By way of example, calculations indicate that a 0.6m wide strip bearing on the glacial till or residual soils at a depth of 0.9m bgl, can impose a maximum line load of 90kN/m run. Considering the over consolidated nature of the glacial till and and the nature of residual soils, the application of such a pressure is expected to limit settlements to 25mm or less.

The glacial till on this site have been found to be of low to medium volume change potential as defined in NHBC Standards, Chapter 4.2. In view of this foundations placed into glacial till soils should be a minimum of 900mm deep (below finished or original ground levels, whichever is the lower), locally deepened within the zone of influence of existing or proposed trees. A tree survey was beyond the scope of this investigation but should be undertaken to enable production of a detailed foundation schedule. The removal of trees or hedgerows during development of the site may cause heave of cohesive soils and heave protection measures should be adopted in foundation design where appropriate.

Foundations should be taken below a line drawn up at 45° from the base of any existing or proposed services.

It is recommended that a plot specific foundation schedule is prepared to enable detailed design of individual foundations for the exact line loads anticipated within each plot.

If greater structural loads are anticipated alternative foundation solutions may be required.

It should be noted that any groundwater encountered may have an adverse effect on foundation construction and performance (such as softening/loosening of founding materials, instability of



excavation walls, etc.), particularly in winter months. This should be considered when designing foundations.

Floors

Based on proven ground conditions and in accordance with current NHBC Standards, it is considered that ground bearing floor slabs (bearing upon natural materials), could be utilised across the site.

Suspended floor slabs may be required where soil swelling could occur, where the ground has insufficient bearing capacity, where made ground in excess of 600mm thick is encountered, or if ground gas protective measures are required which include provision of a subfloor void.

Sulphate Attack

Based on the samples tested, the below Design Sulphate Class and ACEC Class should be used for buried concrete structures in contact with the below strata:

Stratum	DS Class	ACEC Class
Topsoil	DS-1	AC-1s
Cohesive Natural Strata	DS-1	AC-1s
(Glacial Till)		

Groundworks, Excavation Stability and Groundwater Dewatering

Excavations into existing natural soils should be assumed to be unstable. No personnel entry into unsupported excavations shall be allowed without an appropriate risk assessment. Reference to CIRIA report 97 (1983) and BS5975:2019 Code of Practice for Temporary Works should be made to establish suitable means of support or battering of excavation sides.

Based on the results of this investigation, significant groundwater seepages or inflows within shallow excavations (<2.0m) are considered unlikely across the site. However, if groundwater is encountered at shallow depth then it should be possible to deal with seepages through normal site pumping practices for any shallow excavations open for short periods of time. For deeper excavations additional systems for example use of sheet piles or a point dewatering system may be required. Disposal/discharge of water will require appropriate treatment/consent. Observations from WS1 indicate that bands of saturated (running) sand may be encountered locally.



It is recommended that an adequate drainage system for surface water be installed by a competent contractor in order to prevent surface water ponding or collecting both during and post construction, as this may lead to deterioration of the founding stratum.

To reduce the possibility of softening or swelling of cohesive soils at the base of foundation trenches, these should be suitably blinded with concrete.

Pavements and Highways

All adoptable road design should be discussed with the relevant local authority if highways are to be subject to a Section 38 agreement.

10.4. Asbestos-Containing Materials

ACMs were not observed within any of the soils encountered during this investigation and asbestos was not detected by laboratory analysis. The likelihood of previously unidentified asbestos containing material being encountered outwith the localised area of made ground in the north of the site is considered to be very low.

However, if previously unidentified made ground suspected to contain asbestos is encountered, advice should be sought from an appropriately qualified asbestos specialist and an appropriate strategy developed for the safe removal and disposal of the material.

10.5. Soil and Groundwater Contamination

Risk Evaluation for the Proposed Land Use (Residential Development)

The CSM indicates that no potentially unacceptable contaminant linkages exist for future site users, construction workers and future plant growth. Contaminant linkages assessed as a Low or Negligible risk are not considered significant or requiring remedial action and are not discussed further.

10.6. Waste & Soil Resource Management

Soils Re-use

Article 4 of the revised EU Waste Framework Directive (Directive 2008/98/EC) sets out five steps for dealing with waste, ranked according to environmental impact - the 'waste hierarchy'. The five steps are prevention, preparing for re-use, recycling, other recovery and as a final option disposal.



All site won, imported and exported soils are classified as a waste material unless demonstrated otherwise.

With reference to the Waste Hierarchy, where possible to do so, it is recommended that site won soils should be retained and re-used on site as far as practicable. If re-use is an option, it must be demonstrated that the soils are not a waste and there is certainty of use. This should be done using a Materials Management Plan (MMP) in accordance with the Definition of Waste Code of Practice (DoWCoP). Any surplus natural, uncontaminated soils have the potential to be transferred to other development sites subject to meeting the requirements of the DoWCoP. Contaminated soils and made ground can only be re-used on the site of origin if suitable for use. Where soils are re-used under an MMP a Verification Plan and subsequent Verification Report will be required. It is recommended that consideration of re-use of soil is undertaken as early as possible in the planning process to ensure that the most cost efficient and sustainable options for soil re-use can be explored.

At this stage it is considered that site won topsoil and subsoil will be chemically suitable for re-use within the development.

Surplus Soils

If any surplus soils or materials are generated during construction which cannot be re-used (either on site or at another development site under the DoWCoP) they will be regarded as a waste and should be disposed of in accordance with current UK waste legislation to a suitably licenced facility under appropriate Duty of Care. It is the waste producers responsibility to adequately classify the waste, which should be undertaken in accordance with Guidance on the classification and assessment of waste (1st Edition v1.1), Technical Guidance WM3. Please note that this ground investigation is unlikely to be sufficient to provide a detailed classification of any waste generated on site.

10.7. Ground Gas

Ground gas is not perceived to be a risk on this site. No plausible sources of hazardous ground gas have been identified either within the desk study Conceptual Site Model or subsequent intrusive investigation. It is concluded that the risk to the proposed development from hazardous ground gas is negligible and that no specific mitigation measures are necessary for the proposed development.

Information contained within the Envirockeck report based on BGS data and the UK radon map database indicate that the site is located within a low probability radon area. This is consistent with

the recorded geology which comprises rocks of generally low radon potential. A substantial thickness of glacial clay is also present below the site. Based on current guidance, radon protective measures would not be required for the proposed development.

10.8. Invasive Plants

Invasive plant species were not observed on this site at the time of investigation.

It is recommended that the presence or absence of invasive plant species is confirmed by qualified consultant ecologist and their advice taken on appropriate treatment. The treatment of any invasive species should take place in advance of the proposed construction works.



11. REGULATORY APPROVALS

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other relevant organisations for their comment and approval prior to undertaking any works on site.




APPENDIX A

FIGURES AND DRAWINGS





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Model DRAWING NO. REVISION NO. 09402/04 0 DRAWN BY APPROVED BY JF DB DATE SCALE May 2022 NTS			Revised Co	ncer	otual Sit	te	
DRAWING NO. C9402/04REVISION NO. 0DRAWN BY JFAPPROVED BY DBDATE May 2022SCALE NTSPAPER SIZE A3			Model	· - r			
DRAWING NO. C9402/04 DRAWN BY JF DATE May 2022 REVISION NO. 0 APPROVED BY DB PAPER SIZE A3						<u></u>	
DRAWN BY APPROVED BY DB JF DATE SCALE PAPER SIZE May 2022 NTS A3		DR c:	AWING NO. 9402/04		REVISIO 0		NO.
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		DAT M	E ay 2022	SCAL NT	E S	Ī	PAPER SIZE A3



APPENDIX B

ENVIROCHECK REPORT



Envirocheck® Report:

Datasheet

Order Details:

Order Number: 292731680_1_1

Customer Reference: 22268/C9402/EB

National Grid Reference: 442770, 499940

Slice:

A

Site Area (Ha): 0.26

Search Buffer (m): 1000

Site Details:

1 Manor Cottages, East Harlsey NORTHALLERTON DL6 2DH

Client Details:

Ms S Howson Sirius Geotechnical Ltd 4245 Park Approach Thorpe Park Leeds LS15 8GB





Contents

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	10
Hazardous Substances	-
Geological	11
Industrial Land Use	13
Sensitive Land Use	14
Data Currency	15
Data Suppliers	19
Useful Contacts	20

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.

Tor this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client. In this datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Report Version v53.0



Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 3		2	2	1
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls					
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 4		Yes		
Pollution Incidents to Controlled Waters	pg 4			1	
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality	pg 4				1
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 4			1	(*6)
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 6	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 6	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 6	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 7		2	1	21



Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 10	2	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 11	Yes	n/a	n/a	n/a
BGS Recorded Mineral Sites					
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 11	Yes	Yes	n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 11		Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 11	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 11		Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 11	Yes	Yes	n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a



Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries	pg 13		1	1	
Fuel Station Entries					
Gas Pipelines					
Underground Electrical Cables					
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 14	1			
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility				
	Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (W)	0	1	442774 499944
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (N)	22	1	442774 500000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (N)	129	1	442750 500100
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SE (SE)	144	1	442850 499800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (S)	162	1	442750 499750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (S)	162	1	442774 499750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13SE (S)	167	1	442800 499750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (S)	172	1	442700 499750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (N)	195	1	442700 500150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13SW (S)	212	1	442750 499700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (N)	222	1	442774 500200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (N)	226	1	442750 500200
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (N)	229	1	442850 500200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (SW)	236	1	442650 499700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	242	1	442950 499750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (S)	262	1	442774 499650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (N)	272	1	442774 500250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (N)	275	1	442750 500250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13SW (SW)	282	1	442650 499650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (N)	293	1	442900 500250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (SW)	302	1	442600 499650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	309	1	443050 499750



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (S)	312	1	442750 499600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NW (S)	312	1	442774
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	318	1	442500 500150
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (SW)	329	1	442550 499650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (S)	330	1	442650 499600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (S)	342	1	442900 499600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8NW (SW)	347	1	442600 499600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (NW)	354	1	442500 500200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (NE)	359	1	442950 500300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (SE)	365	1	442950 499600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A18SE (N)	376	1	442850 500350
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	380	1	443100 499700
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (E)	388	1	443200 499900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (SW)	394	1	442600 499550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (SW)	399	1	442500 499600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (SW)	414	1	442550 499550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A18SE (N)	422	1	442800 500400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (NW)	424	1	442450 500250
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NW (SW)	431	1	442450 499600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (SE)	434	1	443000 499550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8NW (SW)	440	1	442500 499550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12NE (NW)	459	1	442400 500250



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater F	looding Susceptibility				
	Flooding Type:	Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (SW)	469	1	442450 499550
	BGS Groundwater F	looding Susceptibility				
	Flooding Type:	Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (SW)	482	1	442500 499500
	BGS Groundwater F	looding Susceptibility				
	Flooding Type:	Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (E)	487	1	443300 499900
	BGS Groundwater F	looding Susceptibility				
	Flooding Type:	Potential for Groundwater Flooding of Property Situated Below Ground Level	A17SE (NW)	495	1	442400 500300
	Discharge Consents	3				
1	Operator: Property Type: Location: Authority: Catchment Area: Reference: Permit Version: Effective Date: Issued Date: Revocation Date: Discharge Type: Discharge Environment: Receiving Water: Status:	Yorkshire Water Services Ltd PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Ingleby Road Sps, Ingleby Road, East Harsley, Northallerton, DI6 2dj Environment Agency, North East Region Swale 27/23/0182 1 26th March 2002 19th March 2002 19th March 2002 Not Supplied Sewage Discharges - Pumping Station - Water Company Freshwater Stream/River Trib Of The Keld New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)	A13NE (NE)	73	2	442860 500010
	Positional Accuracy:	amended by Environment Act 1995)				
1	Discharge Consents Operator: Property Type: Location: Authority: Catchment Area: Reference: Permit Version: Effective Date: Issued Date: Revocation Date: Discharge Type: Discharge Environment: Receiving Water: Status: Positional Accuracy:	Yorkshire Water Services Ltd Not Given EAST HARLSEY, North Yorkshire Environment Agency, North East Region Swale WADC896 Not Supplied Not Supplied Not Supplied Not Supplied Storm sewage overflow discharge Freshwater Stream/River Tributary Of Brompton Beck Not Supplied Located by supplier to within 100m	A13NE (NE)	85	2	442850 500040
	Discharge Consents	5				
2	Operator: Property Type: Location: Authority: Catchment Area: Reference: Permit Version: Effective Date: Issued Date: Revocation Date: Discharge Type: Discharge Environment: Receiving Water: Status: Positional Accuracy:	Gary Johnson WWTW (NOT WATER CO) (NOT STP AT A PRIVATE PREMISES) Manor Stables, East Harsley, Northallerton, North Yorkshire Environment Agency, North East Region Swale C5225 2 26th July 2012 26th July 2012 26th July 2012 26th July 2012 Not Supplied Sewage Discharges - Final/Treated Effluent - Not Water Company Land/Soakaway Discharge To Land Transferred from COPA 1974 Located by supplier to within 100m	A14SW (E)	413	2	443200 499800



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Discharge Consents	S				
2	Operator: Property Type: Location: Authority: Catchment Area: Reference: Permit Version: Effective Date: Issued Date:	Gary Johnson WWTW (NOT WATER CO) (NOT STP AT A PRIVATE PREMISES) Manor Stables, East Harsley, Northallerton, North Yorkshire Environment Agency, North East Region Swale C5225 1 22nd August 1988 22nd August 1988	A14SW (E)	413	2	443200 499800
	Discharge Type: Discharge Environment: Receiving Water: Status:	Sewage Discharges - Final/Treated Effluent - Not Water Company Land/Soakaway Discharge To Land Transferred from COPA 1974				
	Positional Accuracy:	Located by supplier to within 100m				
	Discharge Consents	S				
3	Operator: Property Type: Location: Authority: Catchment Area: Reference: Permit Version: Effective Date:	J N Barnard WWTW (NOT WATER CO) (NOT STP AT A PRIVATE PREMISES) Morton Grange, East Harlsey, Northallerton, North Yorkshire Environment Agency, North East Region Swale S/P/736 1 28th May 1963	A7SE (SW)	981	2	442200 499100
	Issued Date: Revocation Date: Discharge Type: Discharge Environment: Receiving Water:	28th May 1963 Not Supplied Sewage Discharges - Final/Treated Effluent - Not Water Company Freshwater Stream/River The Keld				
	Status:	New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)				
	Positional Accuracy:	Located by supplier to within 100m				
	Nearest Surface Wa	ter Feature	A13SE	213	-	442823
			(S)			499709
4	Pollution Incidents Property Type: Location: Authority: Pollutant: Note: Incident Date: Incident Date: Incident Area: Receiving Water: Cause of Incident: Incident Severity: Positional Accuracy:	to Controlled Waters Other General Premises Morton Grange Farm, EAST HARLSEY Environment Agency, North East Region Oils - Kerosene Fuel Oil Swale Tributary; Fish Killed: No Information 4th November 1998 DT980492 Swale Tributaries Freshwater Stream/River Not Given Category 3 - Minor Incident Located by supplier to within 100m	A8NW (S)	312	2	442750 499600
	River Quality Name: GQA Grade: Reach: Estimated Distance (km): Flow Rate: Flow Rate: Year:	River_Wiske/Carr_Beck River Quality C Source_Trenholme_Stel 8.5 Flow less than 0.31 cumecs River 2000	A14SE (E)	893	2	443644 499619
	Water Abstractions					
5	Operator: Licence Number: Permit Version: Location: Authority: Abstraction: Abstraction Type: Source: Daily Rate (m3): Yearly Rate (m3): Details: Authorised Start: Authorised Start: Authorised End: Permit Start Date: Permit End Date:	J B Barnard 2/27/23/345 Not Supplied Location Description Not Available Environment Agency, North East Region Domestic & Agriculture Not Supplied Groundwater 45 16593 Lias Licence Revoked Not Supplied Not Supplied Not Supplied Not Supplied Located by supplier to within 100m	A8NE (S)	315	2	442800 499600
	. solucital / loculacy.					



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions					
	Operator: Licence Number: Permit Version: Location:	J I Whittaker 2/27/23/659 1 Borehole - Sherwood Sandstone - Hambleton	A17NW (NW)	1060	2	441990 500690
	Authority: Abstraction: Abstraction Type: Source: Daily Rate (m3): Yearly Rate (m3): Details: Authorised Start: Authorised Start: Authorised End: Permit Start Date: Permit End Date: Positional Accuracy:	Environment Agency, North East Region Amenity: Make-Up Or Top Up Water Water may be abstracted from a single point Groundwater Not Supplied East Harsley, Northallerton, North Yorkshire 01 January 31 December 1st April 2008 Not Supplied Located by supplier to within 10m				
	Water Abstractions					
	Operator: Licence Number: Permit Version: Location: Authority: Abstraction: Abstraction Type: Source: Daily Rate (m3): Yearly Rate (m3): Yearly Rate (m3): Details: Authorised Start: Authorised Start: Authorised End: Permit Start Date: Permit End Date: Positional Accuracy:	J & J Whittaker Ne/027/0023/059 1 Borehole - Sherwood Sandstone - Hambleton Environment Agency, North East Region Amenity: Make-Up Or Top Up Water Water may be abstracted from a single point Groundwater Not Supplied Not Supplied Not Supplied O1 April 31 March 6th November 2020 Not Supplied Located by supplier to within 10m	A17NW (NW)	1061	2	441990 500691
	Water Abstractions				_	
	Operator: Licence Number: Permit Version: Location: Authority: Abstraction: Abstraction Type: Source: Daily Rate (m3): Yearly Rate (m3): Details: Authorised Start: Authorised Start: Authorised End: Permit Start Date: Permit End Date: Positional Accuracy:	J I Whittaker 2/Z7/23/659/R01 1 Borehole - Sherwood Sandstone - Hambleton Environment Agency, North East Region Amenity: Make-Up Or Top Up Water Water may be abstracted from a single point Groundwater Not Supplied Not Supplied East Harsley, Northallerton, North Yorkshire 01 April 31 March 1st April 2017 Not Supplied Located by supplier to within 10m	A17NW (NW)	1061	2	441990 500691
	Water Abstractions	Mr. 1111backiesen		4005		444000
	Uperator: Licence Number: Permit Version: Location: Authority: Abstraction: Abstraction Type: Source: Daily Rate (m3): Yearly Rate (m3): Details: Authorised Start: Authorised Start: Authorised End: Permit Start Date: Permit End Date:	 Nil J F Hutchinson 2/27/23/359 100 Borehole - Jurassic Other - Arncliffe Environment Agency, North East Region General Farming And Domestic Water may be abstracted from a single point Groundwater 18 6640 Cock Bush Farm, Ingleby, Arncliffe 01 January 31 December 7th February 1975 Not Supplied 	(E)	1385	2	444200 500000
	Positional Accuracy:	Approximate location provided by supplier				



Map ID	Details			Estimated Distance From Site	Contact	NGR
	Water Abstractions					
	Operator: Licence Number: Permit Version: Location: Authority:	Mr J H Hutchinson 2/27/23/088 100 Borehole - Jurassic Other - Ingleby Cross Environment Agency, North East Region	A15NE (E)	1485	2	444300 500000
	Abstraction Type: Abstraction Type: Source: Daily Rate (m3): Yearly Rate (m3): Details: Authorised Start: Authorised End: Permit Start Date:	Water may be abstracted from a single point Groundwater 5 1591 Cock Bush, Ingleby Cross, Northallerton 01 January 31 December 20th January 1966				
	Permit End Date: Positional Accuracy:	Not Supplied Approximate location provided by supplier				
	Water Abstractions					
	Operator: Licence Number: Permit Version: Location: Authority: Abstraction: Abstraction Type: Source: Daily Rate (m3): Yearly Rate (m3):	Mr J L Miles 2/27/23/255 100 Well - Oolitic Limestone - Low Siddle East Harley Environment Agency, North East Region General Farming And Domestic Water may be abstracted from a single point Groundwater 0 136	(N)	1961	2	442400 501900
	Details: Authorised Start: Authorised End: Permit Start Date: Permit End Date: Positional Accuracy:	Low Siddle, East Harlsey 01 January 31 December 20th May 1970 Not Supplied Located by supplier to within 100m				
	Groundwater Vulne	rability Map				
	Combined Classification: Combined Vulnerability: Combined Aquifer: Pollutant Speed: Bedrock Flow: Dilution: Baseflow Index: Superficial Patchiness: Superficial Thickness: Superficial Recharge: Groundwater Vulne	Secondary Superficial Aquifer - Medium Vulnerability Medium Productive Bedrock Aquifer, Productive Superficial Aquifer Intermediate Well Connected Fractures <300 mm/year <40% >90% 3-10m Low rability - Soluble Rock Risk	A13SW (W)	0	3	442774 499944
	Nono	Tability - Soluble Rock Risk				
	Bedrock Aquifer De Aquifer Designation:	signations Secondary Aquifer - Undifferentiated	A13SW (W)	0	3	442774 499944
	Superficial Aquifer Aquifer Designation:	Designations Secondary Aquifer - Undifferentiated	A13SW (W)	0	3	442774 499944
	Extreme Flooding fr	rom Rivers or Sea without Defences				
	Flooding from Rivers or Sea without Defences None					
	Areas Benefiting fro	om Flood Defences				
	Flood Water Storag	e Areas				
	Flood Defences None					



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 257.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: The Keld Catchment Name: Ouse Yorkshire Primacy: 1	A13SE (S)	213	4	442823 499709
7	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 674.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: The Keld Catchment Name: Ouse Yorkshire Primacy: 1	A13SE (S)	216	4	442836 499710
8	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 137.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A13SW (SW)	336	4	442600 499612
9	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 43.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A7NE (SW)	576	4	442391 499460
10	OS Water Network LinesWatercourse Form:Inland riverWatercourse Length:325.6Watercourse Level:On ground surfacePermanent:TrueWatercourse Name:Not SuppliedCatchment Name:Ouse YorkshirePrimacy:1	A9NW (SE)	602	4	443145 499447
11	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 136.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9NW (SE)	676	4	443165 499370
12	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 136.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9NW (SE)	684	4	443366 499545
13	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 274.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9NW (SE)	754	4	443378 499450
14	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 15.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9NE (SE)	764	4	443493 499599



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
15	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 285.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: The Keld Catchment Name: Ouse Yorkshire Primacy: 1	A9NE (SE)	764	4	443494 499601
16	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 132.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Harlsey Beck Catchment Name: Ouse Yorkshire Primacy: 1	A7SE (SW)	779	4	442320 499263
17	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 113.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A8SE (SE)	797	4	443097 499190
18	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 395.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9SW (SE)	816	4	443209 499231
19	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 4.7 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9SW (SE)	816	4	443207 499229
20	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 123.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A17SE (NW)	881	4	442140 500585
21	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 287.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Harlsey Beck Catchment Name: Ouse Yorkshire Primacy: 1	A7SE (SW)	890	4	442204 499209
22	OS Water Network Lines Watercourse Form: Inland river Watercourse Level: On ground surface Permanent: True Watercourse Name: River Wiske Catchment Name: Ouse Yorkshire Primacy: 1	A14SE (E)	911	4	443710 499776
23	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 150.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9NE (SE)	915	4	443560 499419



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
24	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 4.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9NE (SE)	927	4	443562 499402
25	OS Water Network Lines Watercourse Form: Lake	A17SW	947	4	442020
	Watercourse Length: 10.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	(NW)			500557
26	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 255.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A14SE (E)	971	4	443753 499701
	OS Water Network Lines				
27	Water course Form: Inland river Watercourse Length: 36.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Wiske Catchment Name: Ouse Yorkshire Primacy: 1	A14SE (E)	971	4	443753 499701
	OS Water Network Lines				
28	Watercourse Form: Inland river Watercourse Length: 222.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Ouse Yorkshire Primacy: 1	A9NE (SE)	985	4	443710 499539
	OS Water Network Lines				
29	Watercourse Form: Inland river Watercourse Length: 70.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Wiske Catchment Name: Ouse Yorkshire Primacy: 1	A14SE (E)	994	4	443768 499668



Waste

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage				
	Name: Hambleton District Council - Has no landfill data to supply		0	5	442774 499944
	Local Authority Landfill Coverage				
	Name: North Yorkshire County Council - Has no landfill data to supply		0	6	442774 499944



Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Lias Group	A13SW	0	1	442774 499944
	Coal Mining Affected Areas In an area that might not be affected by coal mining				100011
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	442774 499944
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	22	1	442774 500000
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	194	1	442811 499725
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	442774 499944
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	22	1	442774 500000
	Moderate Moderate Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	194	1	442811 499725
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	442774 499944
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	22	1	442774 500000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	442774 499944
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	22	1	442774 500000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SW (S)	121	1	442772 499791
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SW (S)	241	1	442763 499671
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	442774 499944
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	22	1	442774 500000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	194	1	442811 499725
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	442774 499944
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	22	1	442774 500000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	191	1	442782 499722



Geological

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrink	ing or Swelling Clay Ground Stability Hazards				
	Hazard Potential: Source:	Low British Geological Survey, National Geoscience Information Service	A13NE (N)	239	1	442790 500218
	Radon Potential - R	adon Affected Areas				
	Affected Area: Source:	The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	442774 499944
	Radon Potential - R	adon Protection Measures				
	Protection Measure: Source:	No radon protective measures are necessary in the construction of new dwellings or extensions British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	442774 499944



Industrial Land Use

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Contemporary Trad	e Directory Entries				
30	Name: Location: Classification: Status: Positional Accuracy:	N & H Carr & Son 3, Hall Cottages, East Harlsey, Northallerton, North Yorkshire, DL6 2BP Road Haulage Services Inactive Automatically positioned to the address	A13SW (SW)	185	-	442569 499846
	Contemporary Trad	e Directory Entries				
31	Name: Location: Classification: Status: Positional Accuracy:	V Wood East Harlsey, Northallerton, North Yorkshire, DL6 2DQ Road Haulage Services Inactive Automatically positioned to the address	A12SE (W)	457	-	442298 499790



Sensitive Land Use

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Nitrate Vulnerable	Zones				
32	Name: Description: Source:	River Wiske From Trenholme Stell To River Swale Nvz Surface Water Environment Agency, Head Office	A13SW (W)	0	3	442774 499944



Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices Environment Agency - Head Office Hambleton District Council - Planning & Environmental Services	June 2020 September 2017	Annually Annual Rolling Update
Discharge Consents Environment Agency - North East Region	January 2022	Quarterly
Enforcement and Prohibition Notices Environment Agency - North East Region	March 2013	
Integrated Pollution Controls Environment Agency - North East Region	January 2009	
Integrated Pollution Prevention And Control Environment Agency - North East Region	January 2022	Quarterly
Local Authority Integrated Pollution Prevention And Control Hambleton District Council - Planning & Environmental Services	May 2016	Variable
Local Authority Pollution Prevention and Controls Hambleton District Council - Planning & Environmental Services	May 2016	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements Hambleton District Council - Planning & Environmental Services	May 2016	Variable
Nearest Surface Water Feature Ordnance Survey	January 2022	
Pollution Incidents to Controlled Waters Environment Agency - North East Region	December 1998	
Prosecutions Relating to Authorised Processes Environment Agency - North East Region	July 2015	
Prosecutions Relating to Controlled Waters Environment Agency - North East Region	March 2013	
Registered Radioactive Substances Environment Agency - North East Region	June 2016	As notified
River Quality Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points Environment Agency - Head Office	April 2012	
River Quality Chemistry Sampling Points Environment Agency - Head Office	April 2012	
Substantiated Pollution Incident Register Environment Agency - North East Region - Dales Area Environment Agency - North East Region - Yorkshire Area	January 2022 January 2022	Quarterly Quarterly
Water Abstractions Environment Agency - North East Region	January 2022	Quarterly
Water Industry Act Referrals Environment Agency - North East Region	October 2017	
Groundwater Vulnerability Map Environment Agency - Head Office	June 2018	As notified
Bedrock Aquifer Designations Environment Agency - Head Office	January 2018	Annually
Superficial Aquifer Designations Environment Agency - Head Office	January 2018	Annually
Source Protection Zones Environment Agency - Head Office	May 2021	Bi-Annually
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	February 2022	Quarterly



Agency & Hydrological	Version	Update Cycle
Flooding from Rivers or Sea without Defences		
Environment Agency - Head Office	February 2022	Quarterly
Areas Benefiting from Flood Defences		
Environment Agency - Head Office	February 2022	Quarterly
Flood Water Storage Areas		
Environment Agency - Head Office	February 2022	Quarterly
Flood Defences		
Environment Agency - Head Office	February 2022	Quarterly
OS Water Network Lines		
Ordnance Survey	January 2022	Quarterly
BGS Groundwater Flooding Susceptibility		
British Geological Survey - National Geoscience Information Service	May 2013	As notified
Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	November 2002	As notified
Historical Landfill Sites		
Environment Agency - Head Office	January 2022	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - North East Region	January 2009	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - North East Region - Dales Area	January 2022	Quarterly
Environment Agency - North East Region - Yorkshire Area	January 2022	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - North East Region - Dales Area	January 2022	Quarterly
Environment Agency - North East Region - Yorkshire Area	January 2022	Quarterly
Local Authority Landfill Coverage		
Hambleton District Council - Planning & Environmental Services	February 2003	Not Applicable
North Yorkshire County Council	February 2003	Not Applicable
Local Authority Recorded Landfill Sites		
Hambleton District Council - Planning & Environmental Services	October 2018	
North Yorkshire County Council	October 2018	
Registered Landfill Sites		
Environment Agency - North East Region - Dales Area	March 2006	Not Applicable
Environment Agency - North East Region - Yorkshire Area	March 2006	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - North East Region - Dales Area	April 2018	
Environment Agency - North East Region - Yorkshire Area	April 2018	
Registered Waste Treatment or Disposal Sites		
Environment Agency - North East Region - Dales Area	June 2015	
Environment Agency - North East Region - Yorkshire Area	June 2015	



Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	January 2022	Bi-Annually
Explosive Sites		
Health and Safety Executive	March 2017	Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	August 2001	
Planning Hazardous Substance Enforcements		
Hambleton District Council - Planning & Environmental Services	February 2016	Variable
North Yorkshire County Council	October 2007	Annual Rolling Update
North Yorkshire Moors National Park	September 2007	Annual Rolling Update
Planning Hazardous Substance Consents		
Hambleton District Council - Planning & Environmental Services	February 2016	Variable
North Yorkshire County Council	October 2007	Annual Rolling Update
North Yorkshire Moors National Park	September 2007	Annual Rolling Update
Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology		
British Geological Survey - National Geoscience Information Service	January 2009	As notified
BGS Recorded Mineral Sites		
British Geological Survey - National Geoscience Information Service	November 2021	Bi-Annually
CBSCB Compensation District		
Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	
Cheshire Brine Subsidence Compensation Board (CBSCB)	November 2020	As notified
Coal Mining Affected Areas		
The Coal Authority - Property Searches	March 2014	Annual Rolling Update
Mining Instability		
Ove Arup & Partners	June 1998	Not Applicable
Non Coal Mining Areas of Great Britain		
British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	April 2020	As notified
Potential for Compressible Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Ground Dissolution Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Landslide Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Running Sand Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards	Jonuary 2010	As potified
	January 2019	AS HULIIIEU
Radon Potential - Radon Attected Areas	luly 2014	Appually
	July 2011	Annually
Radon Potential - Radon Protection Measures	lub/ 2014	Appually
Diffish Geological Survey - National Geoscience Information Service	July 2011	Annually



Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	January 2022	Quarterly
Fuel Station Entries Catalist Ltd - Experian	March 2022	Quarterly
Gas Pipelines National Grid	October 2021	Bi-Annually
Underground Electrical Cables National Grid	May 2021	Bi-Annually
Sensitive Land Use	Version	Update Cycle
Ancient Woodland Natural England	February 2021	Bi-Annually
Areas of Adopted Green Belt Hambleton District Council - Planning & Environmental Services North Yorkshire Moors National Park	October 2020 October 2020	Quarterly Quarterly
Areas of Unadopted Green Belt Hambleton District Council - Planning & Environmental Services North Yorkshire Moors National Park	October 2020 October 2020	Quarterly Quarterly
Areas of Outstanding Natural Beauty Natural England	January 2021	Bi-Annually
Environmentally Sensitive Areas Natural England	January 2017	
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	February 2021	Bi-Annually
Marine Nature Reserves Natural England	July 2019	Bi-Annually
National Nature Reserves Natural England	January 2021	Bi-Annually
National Parks Natural England	February 2018	Bi-Annually
Nitrate Sensitive Areas Natural England	April 2016	Not Applicable
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA) Environment Agency - Head Office	April 2016 June 2017	Bi-Annually
Ramsar Sites Natural England	August 2020	Bi-Annually
Sites of Special Scientific Interest Natural England	February 2021	Bi-Annually
Special Areas of Conservation Natural England	July 2020	Bi-Annually
Special Protection Areas Natural England	February 2021	Bi-Annually



A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo	
Ordnance Survey	Map data	
Environment Agency	Environment Agency	
Scottish Environment Protection Agency	SEPÃO Scottish Environment Protection Agency	
The Coal Authority	The Coal Authority	
British Geological Survey	British Geological Survey	
Centre for Ecology and Hydrology	Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL	
Natural Resources Wales	Cyfoeth Naturiol Cymru Natural Resources Wales	
Scottish Natural Heritage	SCOTTISH NATURAL HERITAGE 迎公派剂	
Natural England	NATURAL ENGLAND	
Public Health England	Public Health England	
Ove Arup	ARUP	
Stantec UK Ltd	Stantec	



Useful Contacts

Contact	Name and Address	Contact Details	
1	British Geological Survey - Enquiry Service British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk	
2	Environment Agency - National Customer Contact Centre (NCCC) PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk	
3	Environment Agency - Head Office Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409	
4	Ordnance Survey Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 03456 05 05 05 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk	
5	Hambleton District Council - Planning & Environmental Services Civic Centre, Stone Cross, Northallerton, North Yorkshire, DL6 2UU	Telephone: 01609 779977 Fax: 01609 767228 Website: www.hambleton.gov.uk	
6	North Yorkshire County Council County Hall, Northallerton, North Yorkshire, DL7 8AD	Telephone: 01609 780780 Fax: 01609 778199 Website: www.northyorks.gov.uk	
7	Natural England County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk	
-	Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org	
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk	

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.














Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:2,500	1894	2
Yorkshire	1:2,500	1912 - 1913	3
Yorkshire	1:2,500	1928	4
Ordnance Survey Plan	1:2,500	1964 - 1975	5
Additional SIMs	1:2,500	1964	6
Additional SIMs	1:2,500	1987	7
Large-Scale National Grid Data	1:2,500	1994	8

Historical Map - Segment A13



Order Details

 Order Number:
 292731680_1_1

 Customer Ref:
 22268/C9402/EB

 National Grid Reference:
 442770, 499940

 Slice:
 A

 Site Area (Ha):
 0.26

 Search Buffer (m):
 100

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH



0844 844 9952 0844 844 9951 www.envirocheck.co.uk

A Landmark Information Group Service v50.0 17-Mar-2022





Yorkshire

Published 1894

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)



Historical Map - Segment A13



Order Details

292731680_1_1
22268/C9402/EB
442770, 499940
A
0.26
100

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH









Published 1912 - 1913 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)



Historical Map - Segment A13



292731680_1_1
22268/C9402/EB
442770, 499940
A
0.26
100

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH







Yorkshire

Published 1928

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)



Historical Map - Segment A13



Order Details

292731680_1_1
22268/C9402/EB
442770, 499940
A
0.26
100

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH









Ordnance Survey Plan Published 1964 - 1975 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)



Historical Map - Segment A13



Order Details

Order Number:	292731680_1_1
Customer Ref:	22268/C9402/EB
National Grid Reference:	442770, 499940
Slice:	A
Site Area (Ha):	0.26
Search Buffer (m):	100

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH







Additional SIMs

Published 1964

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)



Historical Map - Segment A13



Order Details

Order Number:	292731680_1_1
Customer Ref:	22268/C9402/EB
National Grid Reference:	442770, 499940
Slice:	A
Site Area (Ha):	0.26
Search Buffer (m):	100

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH







Additional SIMs

Published 1987

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)



Historical Map - Segment A13



Order Details

Order Number:	292731680_1_1
Customer Ref:	22268/C9402/EB
National Grid Reference:	442770, 499940
Slice:	A
Site Area (Ha):	0.26
Search Buffer (m):	100

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH







Large-Scale National Grid Data

Published 1994

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)

_	_	_		_	_	_
L	NZ	4200	Т	NZ4	300	I
L	199 1:2	94 ,500	Т	199 1:2,5	4 500	I
L			1			Т
_				_		
_	_	_		_	_	_
1	SE	4299	1	SE4	399	_ı
 	SE 199 1:2	4299 94 ,500		SE4 199 1:2,5	-399 4 500	- - -
 	SE 199 1:2	4299 94 ,500	 	SE4 199 1:2,5	399 4 500	- 1 1

Historical Map - Segment A13



Order Details

Order Number:	292731680_1_1
Customer Ref:	22268/C9402/EB
National Grid Reference:	442770, 499940
Slice:	A
Site Area (Ha):	0.26
Search Buffer (m):	100

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH









General			
🔼 Specified Site	Specified Buffer(s)	Х	Bearing Referenc
Several of Type a	t Location		
Agency and	l Hydrological	W	aste
Contaminated Lan (Location)	d Register Entry or Notice	▼	BGS Recorded La
🚫 Contaminated Lan	d Register Entry or Notice	\square	BGS Recorded La
🔶 Discharge Consei	nt	\odot	EA Historic Landfi
A Enforcement or P	rohibition Notice		EA Historic Landfi
🛕 Integrated Pollutio	n Control		Integrated Pollutio
Integrated Pollutio	n Prevention Control	\boxtimes	Licensed Waste M
Local Authority In and Control	tegrated Pollution Prevention	•	Licensed Waste N
🛆 Local Authority Po	ollution Prevention and Control		Local Authority Re
Control Enforcem	ollution Prevention and ent	Ш	Local Authority Re
OPollution Incident t	o Controlled Waters	\square	Registered Landfi
Prosecution Relat	ing to Authorised Processes	►	Registered Landfi
🔶 Prosecution Relat	ing to Controlled Waters		Registered Landfi
🛕 Registered Radioa	active Substance		Registered Landfi
🥆 River Network or '	Water Feature	۲	Registered Waste
🕂 River Quality Sam	pling Point		Registered Waste
🔶 Substantiated Poll	ution Incident Register	\bigcirc	Registered Waste (Location)
🔶 Water Abstraction	n		Registered Waste
🔶 Water Industry Ad	ct Referral	Ha	azardous
Geological		1	COMAH Site
BGS Recorded Mi	neral Site	M	Explosive Site

Industrial Land Use

- ★ Contemporary Trade Directory Entry
- 🖈 Fuel Station Entry
- Site Sensitivity Map Slice A
 - A24 - A23-A2 A'3 A4

Order Details

Order Number:	292731680_1_1
Customer Ref:	22268/C9402/EB
National Grid Reference:	442770, 499940
Slice:	A
Site Area (Ha):	0.26
Search Buffer (m):	1000

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH

Tel: Fax: Web:



ce Point 🛛 🛽 Map ID

- a⊓dfill Site (Location) andfill Site fill (Buffered Point) fill (Polygon) on Control Registered Management Facility Management Facility (Location) Recorded Landfill Site (Location) Recorded Landfill Site fill Site fill Site (Location) fill Site (Point Buffered to 100m) fill Site (Point Buffered to 250m) e Tra⊓sfer Site (Location) e Transfer Site e Treatment or Disposal Site e Treatment or Disposal Site Substances K Explosive Site 🙀 NIHHS Site 🗱 Planning Hazardous Substance Consent 🗱 Planning Hazardous Substance Enforcement

0844 844 9952 0844 844 9951 www.envirocheck.co.uk

A Landmark Information Group Service v50.0 17-Mar-2022 Page 1 of 5







General

🔼 Specified Site C Specified Buffer(s)

X 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:
 292731680_1_1

 Customer Ref:
 22268/C9402/EB

 National Grid Reference:
 442770, 499940
 Slice: Site Area (Ha): Search Buffer (m):

А 0.26 1000

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH









General

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

Agency and Hydrological (Boreholes)

- 😑 BGS Borehole Depth 0 10m
- BGS Borehole Depth 10 30m
- 🔴 BGS Borehole Depth 30m +
- Confidential

⊖ Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

Order Number:292731680_1_1Customer Ref:22268/C9402/EBNational Grid Reference:442770, 499940Slice:ASite Area (Ha):0.26Search Buffer (m):1000

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH









Order Number:	292731680_1_1
Customer Ref:	22268/C9402/EB
National Grid Reference:	442770, 499940
Slice:	A
Site Area (Ha):	0.26
Search Buffer (m):	1000

Historical Mapping Legends

Ordnance	Survey County Series 1:10,560	Ordnance Survey Plan 1:10,000	1:10,000 Raster Mapping
Grav Pit	vel Sand Other Pit Pits	مرین کر Chalk Pit, Clay Pit کر Gravel Pit در Chalk Pit, Clay Pit در Chalk Pit	Gravel Pit Gravel Pit Gravel Pit
C Qua	rry Shingle Orchard	Sand Pit Oisused Pit	Rock (scattered)
په ^م نه ^م نه ² من منه مرفق من منه منه ² من منه منه منه من منه منه منه منه منه منه منه منه منه م	ers	Refuse or Lake, Loch	ີ້ໍ້ໍີ Boulders Boulders (scattered)
4 2 5 4 6 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	and the second s	Dunes 200 Boulders	Shingle Mud Mud
Mixed Woo	d Deciduous Brushwood	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Sand Sand Sand Pit
			Slopes reaction Top of cliff
Fir	Furze Rough Pasture	ஒ் ் Orchard ெ தொல் \Y்ஸ் Coppice ரிரி Bracken ஸ்ப்ப்ச் Heath பட்டா, Rough ரி Grassland	General detail — — — — Underground detail — — — Overhead detail — — — — Narrow gauge railway
++++→ Ai flo	rrow denotes <u>a</u> Trigonometrical ow of water Station	<u> معا</u> يد Marsh ،،،∨//، Reeds <u>معا</u> دد Saltings	railway railway
r ∔• Si	ite of Antiquities 🔹 🔹 Bench Mark	Direction of Flow of Water Building	Civil, parish or County boundary (England only) Civil, parish or community boundary
• Pr Si • 285 S	ump, Guide Post, Well, Spring, ignal Post Boundary Post urface Level	Glasshouse Sand	District, Unitary, Metropolitan, Constituency London Borough boundary boundary
Sketched	Instrumental Contour	Pylon ————————————————————————————————————	Area of wooded vegetation Area of vegetation Area of vegetatio
Main Roads	Fenced Minor Roads	Cutting Embankment Standard Gauge	Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coniferous Coni
	Sunken Road Raised Road	Road ''''''' Road Level Foot Single Track	★ trees (scattered) ★ tree Coppice or Osiers
And the second s	Road over Railway over Railway River	Under Over Crossing Bridge Siding, Tramway or Mineral Line	متله Rough متله Grassland میلاه ۱۹۹۲ Heath
	Railway over Level Crossing	—— —— Geographical County	∩o_ Crub →⊻∠ Marsh, Salt →⊻∠ Marsh or Reeds
	Road over Road over River or Canal Stream	Administrative County, County Borough or County of City Municipal Borough Urban or Bural District	Water feature Flow arrows
	Road over Stream	Burgh or District Council Borough, Burgh or County Constituency Shown only when not coincident with other boundaries	MHW(S) Mean high water (springs) Mean low water (springs)
	County Boundary (Geographical)	Civil Parish — — — — Civil Parish Shown alternately when coincidence of boundaries occurs	Telephone line (where shown)
	County & Civil Parish Boundary	BP, BS Boundary Post or Stone Pol Sta Police Station	← Bench mark Triangulation
	County Borough Boundary (England)	Ch Church PO Post Office CH Club House PC Public Convenience	Point feature Pylon, flare stack
Co. Boro. Bdy.	County Burgh Boundary (Scotland)	FE Sta Fire Engine Stadon PH Public House FB Foot Bridge SB Signal Box Fn Fountain Spr Spring	or Mile Stone)
y	Rural District Boundary	GP Guide Post TCB Telephone Call Box MP Mile Post TCP Telephone Call Post	· ↓• Site of (antiquity) Glasshouse
	Civil Parish Boundary	MS Mile Stone W Well	General Building Important Building

sirtus

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1857	2
Yorkshire	1:10,560	1895	3
Yorkshire	1:10,560	1914 - 1915	4
Yorkshire	1:10,560	1930	5
Ordnance Survey Plan	1:10,000	1956 - 1957	6
Ordnance Survey Plan	1:10,000	1968	7
Ordnance Survey Plan	1:10,000	1974 - 1978	8
Ordnance Survey Plan	1:10,000	1983	9
Ordnance Survey Plan	1:10,000	1989	10
10K Raster Mapping	1:10,000	1999 - 2000	11
Street View	Variable		12

Historical Map - Slice A



Order Details

 Order Number:
 292731680_1_1

 Customer Ref:
 22268/C9402/EB

 National Grid Reference:
 442770, 499940
 Slice: Site Area (Ha): Search Buffer (m):

А 0.26 1000

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH









































10k Raster Mapping Published 1999 - 2000 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:
 292731680_1_1

 Customer Ref:
 22268/C9402/EB

 National Grid Reference:
 442770, 499940

 Slice:
 A

 Site Area (Ha):
 0.26

 Search Buffer (m):
 1000

Site Details

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Street View

Published 2022

Source map scale - 1:10,000

Street View is a street-level map for the whole of Great Britain produced by the Ordnance Survey. These maps are provided at a nominal scale of 1:10,000

Map Name(s) and Date(s)





Order Details

 Order Number:
 292731680_1_1

 Customer Ref:
 22268/C9402/EB

 National Grid Reference:
 442770, 499940
 Slice: Site Area (Ha): Search Buffer (m):

А 0.26 1000

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH







Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice

Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment

A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant

A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:





British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL





Envirocheck reports are compiled from 136 different sources of data.

Client Details

Ms S Howson, Sirius Geotechnical Ltd, 4245 Park Approach, Thorpe Park, Leeds, LS15 8GB

Order Details

 Order Number:
 292731680_1_1

 Customer Ref:
 22268/C9402/EB

 National Grid Reference:
 442770, 499940

 Site Area (Ha):
 0.26

 Search Buffer (m):
 1000

Site Details

1 Manor Cottages, East Harlsey, NORTHALLERTON, DL6 2DH

Full Terms and Conditions can be found on the following link: http://www.landmarkinfo.co.uk/Terms/Show/515



Tel: Fax: Web: 0844 844 9952 0844 844 9951 www.envirocheck.co.uk

A Landmark Information Group Service v50.0 17-Mar-2022 Page 1 of 1



APPENDIX C

RISK ASSESSMENT METHODOLOGY



Qualitative Risk Assessment Methodology

The approach adopted by Sirius for the qualitative assessment of risk is based upon that given in Annex 4 of NHBC-Environment Agency-CIEH "Guidance for the Safe Development of Housing on Land Affected by Contamination" (2008) and is consistent with other current guidance.

The risk posed by viable contaminant linkages is based upon the consideration of both:

- a) the magnitude of the potential consequence (i.e. its severity); and,
- b) the probability (likelihood) of that consequence being realised.

The classifications used in this report for consequence and probability are given in Tables 1 and 2, respectively. The derived risk classifications are defined in Table 3.

Where there is no viable contaminant linkage there is no potential risk.

Table 1. Classification of Consequence

Classification	Definition
Severe	Contaminant concentrations at the receptor that are likely to result in "significant harm" to human health (as defined in Part 2A of the Environmental Protection Act 1990).
	Major pollution of controlled waters that could have persistent and/or extensive effects on water quality, for example fish kills, closure of an abstraction, or substantial deterioration in quality of the receiving water body.
	Major impact on receptor amenity value or major damage to agriculture or commerce.
	Major damage to an ecosystem that is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population.
	Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations at the receptor that might result in "significant harm" to human health (as defined in Part 2A of the Environmental Protection Act 1990).
	A pollution incident that has significant effect on water quality or abstraction potential.
	An incident that has a marked effect on receptor amenity value, agriculture or commerce.
	Damage to an ecosystem that may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.
	Significant damage to crops, buildings or property.



Classification	Definition
Mild	Potential human health impact at the receptor point but unlikely to be classified as "significant harm" (as defined in Part 2A of the Environmental Protection Act 1990).
	Pollution of water that will have a small or short-lived effect on water quality and marginal effects on its amenity or resource value or its use in agriculture or commerce.
	Minor or short-lived damage to ecosystems, which is unlikely to result in a substantial adverse change
	Minor damage to crops, buildings or property
Minor	No potential measurable detrimental human health impacts at the receptor point.
	Impact on water that will have no or minimal effect on water quality or use.
	No or minor and easily repairable effects on buildings, structures and services.

Table 2. Classification of Probability

Classification	Definition
High	An impact is already occurring or is very likely in the short-term and almost inevitable over the long-term.
Medium	It is probable that an event would occur. This is not inevitable but possible in the short-term and likely over the long-term.
Low	Circumstances are possible under which an event could occur. However, it is by no means certain that an event will take place, even over the long-term.
Unlikely	Circumstances are such that it is improbable that an event would occur even over the very long-term.

Table 3. Risk Classification

		Consec	quence	
Probability	Severe	Medium	Mild	Minor
High	Very High	High	Moderate	Low
Medium	High	Moderate	Low to Moderate	Low
Low	Moderate	Low to Moderate	Low	Very Low
Unlikely	Low to Moderate	Low	Very Low	Negligible



Table 4 provides a context for interpretation of the risk classification categories. The definitions provided are based on those given in CIRIA (2001) "Contaminated Land Risk Assessment. A Guide to Good Practice", Report C552.

Table 4. Interpretation	on of Risk Classific	ation Categories
-------------------------	----------------------	------------------

Risk Classification	Definition
Very High	There is a high probability that severe harm to one or more identified receptors could occur or there is evidence that this is already happening. This risk is likely to result in a substantial liability. Urgent investigation and remediation are likely to be required.
High	Harm is likely to be caused to one or more identified receptors. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could be caused to one or more identified receptors. However, it is relatively unlikely that such harm would be severe. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low	It is possible that harm could be caused to one or more identified receptors but it is likely that this harm, if realised, would normally be mild. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are unlikely to be required.
Very Low	There is a low probability that harm could be caused to one or more identified receptors. In the event of such harm being realised, it is likely to be mild, at worst. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are very unlikely to be required.
Negligible	It is unlikely that harm could be caused to one or more identified receptors. In the event of harm being realised, it is likely to be minor. No further investigation is considered necessary to assess risk or environmental liability. Remedial works are not expected.



APPENDIX D

EXPLORATORY HOLE LOGS AND FIELD TEST RESULTS

		$\overline{}$		WINDOW SAMPLING RECORD	BH N	10.	WS1 Sheet 1 of 1
				Site: Wye Carr	Contrac	ct No:	C9402
	\ Sir í	ìUS/		Client: Cowesby Estates Ventures	Date:	21/03	/2022
				Method: Tracked Window Sample Rig		Scale:	1:25
	SAMPLE	DETAILS		STRATA RECORD	Logged By:	AS PD Dril	Checked By: DCB
Туре	Depth From - To(m)	SPT (N), {ppm}, Vane Result	Ground- water	Description	Depth (m)	Level	Legend Well
ES	0.00 - 0.20	(KN/m2) 68.0 85.0 76.0		Brown soft to firm sandy gravelly CLAY of high plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. Frequent rootlets. (TOPSOIL) Medium to high strength brown mottled grey firm to stiff sandy gravelly CLAY of low plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	0.25	108.75	
D	1.60 - 1.70	N=4 (1,1/1,1,1,1)	1-	Low strength brown very sandy gravelly CLAY of low plasticity. Gravel is subangular to rounded sandstone and mudstone. Possible saturated sand bands of loose sand recorded to approximately 3.0m bgl.	— 1.15	107.85	
		N=2 (0,0/0,1,0,1)	2-				
D	3.60 - 3.70	N=16 (4,4/2,4,5,5)	3-		4.00	105.00	
Remar 1. Bore Co-ordin	ks and Grou hole remained nates obtained	ndwater Obs stable. 2. Grou	5 - servati undwat	End of Borehole at 4.00m Ons: er encountered at 2.5m bgl. 3. Borehole cased to 2.5m bgl. 4. End of Borehole at 4.00m GL (m. 109.00 Easting 442754 442754	4.00 AOD) m AOD ;: 4.00	Fig No	\M/C 1
		0.2.0.000		442754 Northi 499925	ng:).00	-	WSI

		$\overline{}$		WINDOW SAMPLING RECORD	BH N	lo.	WS Sheet 1	2 of 1
				Site: Wye Carr	Contrac	ct No:	C9402	
	\ Siľ í	ìUS∕		Client: Cowesby Estates Ventures	Date:	21/03	/2022	
				Method: Tracked Window Sample Rig	1	Scale:	1:25	
	SAMPLE	DETAILS		STRATA RECORD	Logged By:	AS	Checked By:	DCB
Туре	Depth	SPT (N), {ppm}, Vane Result	Ground-	Description	Driller:	Level	Legend	Well
ES	0.00 - 0.20	(kN/m2)	water	Brown soft to firm sandy gravelly CLAY of high plasticity (field	(m)	(m AOD)		
ES	0.30 - 0.40	89.0 72.0 92.0		estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. Frequent rootlets. (TOPSOIL) High strength brown mottled grey firm to stiff sandy gravelly CLAY of low plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	0.20	108.30	x - x - x - x - x - x - x - x - x - x -	
		N=18 (2,2/4,3,5,6)	1-	High strength brown stiff to very stiff slightly sandy slightly gravelly CLAY of low plasticity (field estimate). Sand is fine to medium. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	- 0.90	107.60	1	
D	1.70 - 1.80	92.0 92.0 86.0 N=20 (2,3/4,4,6,6)	2-	<u>ר Sand lense from 1.66m bgl to 1.69m bgl.</u>			14.14.14.14.14.14.14.14 1.18.18.18.18.18.18.18 2.18.18.18.18.18.18.18	
D	2.70 - 2.80	110.0 116.0 114.0 N=15 (2,2/3,4,3,5)	3-				1*1*1*1*1*1*1*1*1*1*1*1*1*1*1*1*1*1*1*	
D	3.50 - 3.60	60.0 64.0 52.0 N=11			4.00	104 50		
Remar 1. Bore handhel	ks and Groui hole remained d GPS.	(2,2/2,3,3,3) ndwater Obs stable. 2. No C	5 - servati	DNS: water encountered. 3. Co-ordinates obtained using low resolution Easting: 442770	OD) n AOD	Fig No		
				Northin 499921	g: .00		vv52	

				WINDOW SAMPLING RECORD	BH N	10.	WS Sheet 1	3 of 1
				Site: Wye Carr	Contrac	ct No:	C9402	
	\Sir'i	íUS/		Client: Cowesby Estates Ventures	Date:	21/03	/2022	
				Method: Tracked Window Sample Rig		Scale:	1:25	
	SAMPLE	DETAILS		STRATA RECORD	Logged By:	AS	Checked By:	DCB
Туре	Depth	SPT (N), {ppm}, Vane Result	Ground-	Description	Driller: Depth	Level	Legend	Well
ES	0.00 - 0.20	(kN/m2)	water	Brown soft to firm sandy gravelly CLAY of high plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. Frequent rootlets. (TOPSOIL)	(m)	(m AOD) 108.37		
ES	0.40 - 0.50	110.0 120.0 125.0 128.0 135.0 150.0 N=14 (2,2/3,3,4,4)	1-	High strength brown stiff to very stiff slightly sandy slightly gravelly CLAY of low plasticity. Sand is fine to coarse. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	- 0.80	107.77	134 - 134 - 134 - 134 - 134 - 134 - 134 - 134 - 134 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136 - 136	
D	1.60 - 1.70	150.0 150.0 142.0 N=17 (2,3/3,4,5,5)	2-				1.4.1.4.1.4.1.4.1.4.1.4.1.4.1.4.1.4.1.4	
D	2.60 - 2.70	144.0 150.0 142.0 N=15 (2,3/3,4,4,4)	3-				24 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 124 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 12 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 126 - 12	
		N=17 (2,3/3,5,5,4)	4-	End of Borehole at 4.00m	- 4.00	104.57		
Remar 1. Bore handhe	ks and Grou hole remained ld GPS.	ndwater Obs stable. 2. No (ervati Groundv	ONS: water encountered. 3. Co-ordinates obtained using low resolution Easting: 442771. Northin 499942.	OD) n AOD 00 g: 00	Fig No	WS3	

				WINDOW SAMPLING RECORD	BH N	lo.	WS4 Sheet 1 of 1	
		-)		Site: Wye Carr	Contra	ct No:	C9402	
	\Sir'i	`US/		Client: Cowesby Estates Ventures	Date:	21/03	3/2022	
				Method: Tracked Window Sample Rig		Scale:	1:25	
	SAMPLE	DETAILS		STRATA RECORD	Logged By: Driller:	AS RP Dri	Checked By: DCB	
Туре	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground- water	Description	Depth (m)	Level (m AOD)	Legend Well	
ES	0.00 - 0.20	(NV/102)		Brown soft to firm sandy gravelly CLAY of high plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. Frequent rootlets. (TOPSOIL) High strength brown mottled grey firm to stiff sandy gravelly CLAY of intermediate plasticity. Sand is fine to coarse. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	0.20	107.80		
		82.0 92.0 98.0 N=12 (2,2/2,3,3,4)	1	High strength brown stiff to very stiff slightly sandy slightly gravelly CLAY of intermediate plasticity. Sand is fine to medium. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	- 0.90	107.10		
D	1.80 - 1.90	N=23 (3,3/4,6,5,8)	2-					
D	3.60 - 3.70	N=12 (2,1/2,3,3,4) 86.0 92.0 78.0	3		- 400	10/ 00		
Remar 1. Bore handhe	ks and Groui hole remained ld GPS.	N=11 (2,1/2,2,3,4) ndwater Obs stable. 2. No C	5	DNS: water encountered. 3. Co-ordinates obtained using low resolution GL (m 108.00 Eastin 44278 North	AOD) m AOD j: 1.00 mg:	Fig Nc	WS4	
		$\overline{}$		WINDOW SAMPLING RECORD	BHN	lo.	WS Sheet 1	5 of 1
-------------------	-----------------------------	----------------------------------------------------------	--------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------	------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------
				Site: Wye Carr	Contrac	ct No:	C9402	
	\ Sir i	íUS/		Client: Cowesby Estates Ventures	Date:	21/02	/2022	
		$\mathbf{\mathcal{I}}$		Method: Tracked Window Sample Rig		Scale:	1:25	
	SAMPLE				Logged By:	AS	Checked By:	DCB
	Depth	SPT (N), {ppm},	Ground-		Driller: Depth	RP Dril Level	ing	
ES	From - To(m) 0.00 - 0.20	Vane Result (kN/m2)	water -	Description Brown soft to firm sandy gravelly CLAY of high plasticity (field	(m)	(m AOD)	Legend	Well
ES	0.30 - 0.40	98.0 90.0		estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. Frequent rootlets. (TOPSOIL) High strength brown mottled grey firm to stiff sandy gravelly CLAY of low plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	0.20	107.72	ratratratia 1 - 1 - 1 - 1 - 1 1 - 1 - 1 - 1 - 1 - 1	
		100.0 110.0 98.0 115.0 N=13 (2,3/3,3,3,4)	1-	High strength brown stiff to very stiff slightly sandy slightly gravelly CLAY of low plasticity. Sand is fine to medium. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	- 0.80	107.12	+ ** ** ** ** ** ** ** 	
D	1.70 - 1.80	110.0 120.0 120.0 N=15	2				x x x x x x x x x x	
D	3.60 - 3.70	120.0 125.0 120.0 N=16 (2,4/3,4,5,4)	3-				Me in the streth of the streth	
		N=17 (3,2/3,5,4,5)	4-	End of Borehole at 4.00m	- 4.00	103.92		
Remar	ks and Groui	ndwater Obs	l ervatio	DNS: GL (m A 107.92n	DD) DADD	Fig No		
1. Bore handhe	hole remained ld GPS.	stable. 2. No C	Ground	vater encountered. 3. Co-ordinates obtained using low resolution Easting: 442783.	00	1	\\/<	
				Northin 499952	g: 00	1	0000	

		$\overline{}$		WINDOW SAMPLING RECORD	BHN	lo.	WS Sheet 1	6 of 1
			·	Site: Wye Carr	Contrac	ct No:	C9402	
	\Sir'i	íUS/		Client: Cowesby Estates Ventures	Date:	21/03	/2022	
				Method: Tracked Window Sample Rig		Scale:	1:25	
	SAMPLE	DETAILS		STRATA RECORD	Logged By:	AS RP Dril	Checked By:	DCB
Туре	Depth From To(m)	SPT (N), {ppm}, Vane Result	Ground-	Description	Depth	Level	Legend	Well
ES	0.00 - 0.20	(kN/m2) 78.0 86.0 88.0		Brown soft to firm sandy gravelly CLAY of high plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. Frequent rootlets. (TOPSOIL) High strength brown mottled grey firm to stiff sandy gravelly CLAY of low plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	0.20	106.96	t verte teken solar 1 - 1 - 1 - 1 - 1 - 1 - 1 1 - 1 - 1 - 1	
		90.0 92.0 N=12 (2,2/2,2,4,4)	1-				8. 1% 1% 1% 1% 1% 1% 1% 1% 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18	
D	1.80 - 1.90	110.0 120.0 115.0 N=22 (2,4/4,5,6,7)	2-	High strength brown stiff to very stiff slightly sandy slightly gravelly CLAY of intermediate plasticity. Sand is fine to medium. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	- 1.75	105.41		
D	3.60 - 3.70	N=15 (5,5/3,3,4,5) 125.0 140.0 145.0 N=20	3-	End of Borehole at 4.00m	- 4.00	103.16		
Remar 1. Bore handhe	ks and Groui hole remained ld GPS.	ndwater Obs	5- ervatio	ONS: vater encountered. 3. Co-ordinates obtained using low resolution 442795 Northi 400042	AOD) m AOD : : :000	Fig No	WS6	

				WINDOW SAMPLING RECORD	BH N	10.	WS7 Sheet 1 c	7 of 1
				Site: Wye Carr	Contrac	t No:	C9402	
	\Sir'i	íUS/		Client: Cowesby Estates Ventures	Date:	21/03	/2022	
				Method: Tracked Window Sample Rig	+	Scale:	1:25	
	SAMPLE	DETAILS		STRATA RECORD	Logged By:	AS	Checked By:	DCB
Type	Depth	SPT (N), {ppm}, Vane Result	Ground-	Description	Driller: Depth	RP Dril	ing Legend	Well
ES	From - To(m) 0.00 - 0.20	(kN/m2)	water	Brown soft to firm sandy gravelly CLAY of high plasticity (field	(m)	(m AOD)		
ES	0.30 - 0.40	72.0 86.0 90.0		estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. Frequent rootlets. (TOPSOIL) High strength brown mottled grey firm to stiff sandy gravelly CLAY of low plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	0.20	106.35	x 1x 1x 1x 1x 1x 1x 1 s s s s s s s s s s	
		N=15 (2,3/3,3,4,5)	1	High strength brown stiff to very stiff slightly sandy slightly gravelly CLAY of intermediate plasticity. Sand is fine to medium. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	- 0.90	105.65	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
D	1.70 - 1.80	N=18 (2,3/3,4,5,6)	2				14 14 14 14 14 14 14 14 14 14 14 14 14 1	
D	2.70 - 2.80	150.0 148.0 145.0 N=18 (2,3/3,4,5,6)	3-					
		120.0 125.0 114.0						
		N=17 (3,2/4,4,4,5)	5-	End of Borehole at 4.00m	- 4.00	102.55		
Remar 1. Bore handhel	ks and Groui hole remained ld GPS.	ndwater Obs stable. 2. No G	ervatio Groundy	DNS: vater encountered. 3. Co-ordinates obtained using low resolution 442802 Northin 499968	OD) n AOD .00 g: .00	Fig No	WS7	

				WINDOW SAMPLING RECORD	BH N	lo.	WS8 Sheet 1 o	3 of 1
				Site: Wye Carr	Contrac	ct No:	C9402	
	\ Sir í	îUS/		Client: Cowesby Estates Ventures	Date:	21/03	/2022	
				Method: Tracked Window Sample Rig	+	Scale:	1:25	
	SAMPLE	DETAILS		STRATA RECORD	Logged By:	AS	Checked By:	DCB
Туре	Depth	SPT (N), {ppm}, Vane Result	Ground-	Description	Driller:	Level	Legend	Well
ES	0.00 - 0.20	(kN/m2)	water	Brown soft to firm sandy gravelly CLAY of high plasticity (field	(m)	(m AOD)		
ES	0.40 - 0.50	88.0 90.0 90.0		estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone and mudstone. Frequent rootlets. (TOPSOIL) High strength brown mottled grey firm to stiff sandy gravelly CLAY of low plasticity (field estimate). Sand is fine to coarse. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	0.20	106.55	x: 1x: 1x: 1x: 1x: 1x: 1x: [31] [31] [31] [31] [31] [32] [1] [31] [31] [31] [31] [31]	
		N=11 (2,2/2,3,3,3)	1	High strength brown stiff to very stiff slightly sandy slightly gravelly CLAY of intermediate plasticity. Sand is fine to medium. Gravel is fine to coarse subangular to rounded sandstone and mudstone.	- 0.90	105.85		
D	1.70 - 1.80	N=18 (3,2/3,4,5,6)	2					
		135.0 145.0 145.0 N=15 (5,5/3,3,4,5)	3-					
D	3.60 - 3.70	105.0 110.0 115.0						
		N=20 (3,3/4,5,5,6)	4	End of Borehole at 4.00m	- 4.00	102.75		
Remar 1. Bore handhe	ks and Grou hole remained ld GPS.	ndwater Obs stable. 2. No G	ervatio Ground	DNS: vater encountered. 3. Co-ordinates obtained using low resolution 442814 Northir 49958	.00 .00 .00 .00	Fig No	WS8	



APPENDIX E

LABORATORY TEST RESULTS



Certificate Number 22-05737

Client Sirius Geotechnical & Environmental Russel House Suite 2 Mill Road Langley Moor DH7 8HJ

- Our Reference 22-05737
- Client Reference C9402
 - Order No 22285/C9402/AS
 - Contract Title Wye Carr, Northumberland
 - Description 8 Soil samples.
 - Date Received 24-Mar-22
 - Date Started 24-Mar-22
- Date Completed 30-Mar-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

hurod

Kirk Bridgewood General Manager



Derwentside Environmental Testing Services Limited Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

Issued: 30-Mar-22



Summary of Chemical Analysis Soil Samples

Our Ref 22-05737 *Client Ref* C9402 *Contract Title* Wye Carr, Northumberland

			Lab No	1986872	1986873	1986874	1986875	1986876	1986877
		.Sa	mple ID	WS1	WS2	WS4	WS6	WS7	WS8
			Depth	0.00-0.20	0.00-0.20	0.00-0.20	0.00-0.20	0.00-0.20	0.00-0.20
		(Other ID						
		Sam	ple Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampl	ing Date	21/03/2022	21/03/2022	21/03/2022	21/03/2022	21/03/2022	21/03/2022
		Sampli	ing Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	7.7	8.0	8.2	8.8	8.1	8.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.2	0.2	0.2	0.3	0.2
Chromium	DETSC 2301#	0.15	mg/kg	23	26	28	27	27	28
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	23	21	19	22	20
Lead	DETSC 2301#	0.3	mg/kg	39	48	45	47	44	46
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.05	< 0.05	0.05	0.06	0.06
Nickel	DETSC 2301#	1	mg/kg	20	19	18	20	22	19
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	68	69	67	66	67	65
Inorganics									
рН	DETSC 2008#		рН	7.1	6.8	6.5	6.7	7.7	6.7
Total Organic Carbon	DETSC 2002	0.1	%	1.9	2.1	2.7	2.4	2.3	2.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	21	20	22	20	21	15
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.08	0.08	0.09	0.08	0.09	0.08
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.09	0.08	0.08	0.07
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.17	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.4	0.5	0.5	0.5	0.4



Summary of Chemical Analysis Soil Samples

Our Ref 22-05737 *Client Ref* C9402 *Contract Title* Wye Carr, Northumberland

			Lab No	1986878	1986879
		.Sa	mple ID	WS1	WS6
			Depth	0.50-0.60	0.50-0.60
		(Other ID		
		Sam	ple Type	SOIL	SOIL
		Sampl	ing Date	21/03/2022	21/03/2022
		Sampli	ing Time	n/s	n/s
Test	Method	LOD	Units		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	6.9	8.2
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.1
Chromium	DETSC 2301#	0.15	mg/kg	28	30
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	27	25
Lead	DETSC 2301#	0.3	mg/kg	17	16
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	29	35
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	56	50
Inorganics					
рН	DETSC 2008#		рН	7.4	7.7
Total Organic Carbon	DETSC 2002	0.1	%	0.5	0.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	23	54
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.02	0.04
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.07	0.06
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

I DETS

Summary of Asbestos Analysis Soil Samples

Our Ref 22-05737 Client Ref C9402 Contract Title Wye Carr, Northumberland

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1986872	WS1 0.00-0.20	SOIL	NAD	none	Lee Kerridge
1986873	WS2 0.00-0.20	SOIL	NAD	none	Lee Kerridge
1986874	WS4 0.00-0.20	SOIL	NAD	none	Lee Kerridge
1986875	WS6 0.00-0.20	SOIL	NAD	none	Lee Kerridge
1986876	WS7 0.00-0.20	SOIL	NAD	none	Lee Kerridge
1986877	WS8 0.00-0.20	SOIL	NAD	none	Lee Kerridge
1986878	WS1 0.50-0.60	SOIL	NAD	none	Lee Kerridge
1986879	WS6 0.50-0.60	SOIL	NAD	none	Lee Kerridge

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * · not included in laboratory scope of accreditation.



Information in Support of the Analytical Results

Our Ref 22-05737 *Client Ref* C9402 *Contract* Wye Carr, Northumberland

Containers Received & Deviating Samples

		Date		Holding time exceeded for	Inappropriate container for
Lab No	Sample ID	Sampled	Containers Received	tests	tests
1986872	WS1 0.00-0.20 SOIL	21/03/22	GJ 250ml, PT 1L		
1986873	WS2 0.00-0.20 SOIL	21/03/22	GJ 250ml, PT 1L		
1986874	WS4 0.00-0.20 SOIL	21/03/22	GJ 250ml, PT 1L		
1986875	WS6 0.00-0.20 SOIL	21/03/22	GJ 250ml, PT 1L		
1986876	WS7 0.00-0.20 SOIL	21/03/22	GJ 250ml, PT 1L		
1986877	WS8 0.00-0.20 SOIL	21/03/22	GJ 250ml, PT 1L		
1986878	WS1 0.50-0.60 SOIL	21/03/22	GJ 250ml, PT 1L		
1986879	WS6 0.50-0.60 SOIL	21/03/22	GJ 250ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report



LABORATORY REPORT



4043

Contract Number: PSL22/2137

Report Date: 06 April 2022

Client's Reference: C9402

Client Name: Sirius Durham Suite 2, Russel House Mill Road Langley Moor Durham DH7 8HJ

For the attention of: Andrew Smeaton

Contract Title:	Wye Carr, Northallerton
Date Received: Date Commenced:	23/3/2022 23/3/2022
Date Completed:	6/4/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins (Director) R Berriman (Quality Manager) S Royle (Laboratory Manager)

£##

L Knight (Assistant Laboratory Manager) S Eyre (Senior Technician) T Watkins (Senior Technician)

Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS1		D	3.60	3.70	Brown slightly gravelly very sandy CLAY.
WS2		D	1.70	1.80	Brown slightly gravelly very sandy CLAY.
WS3		D	1.60	1.70	Brown slightly gravelly very sandy CLAY.
WS4		D	1.80	1.90	Brown slightly gravelly very sandy CLAY.
WS5		D	1.70	1.80	Brown slightly gravelly very sandy CLAY.
WS6		D	1.80	1.90	Brown slightly gravelly sandy CLAY.
WS7		D	1.70	1.80	Brown slightly gravelly sandy CLAY.
WS8		D	1.70	1.80	Brown slightly gravelly sandy CLAY.



SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m ³	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
WS1		D	3.60	3.70	18			25	12	13	97	Low Plasticity CL
WS2		D	1.70	1.80	16			35	18	17	94	Intermediate Plasticity CI
WS3		D	1.60	1.70	15			34	16	18	96	Low Plasticity CL
WS4		D	1.80	1.90	16			36	18	18	97	Intermediate Plasticity CI
WS5		D	1.70	1.80	17			33	17	16	97	Low Plasticity CL
WS6		D	1.80	1.90	14			43	21	22	94	Intermediate Plasticity CI
WS7		D	1.70	1.80	16			39	19	20	95	Intermediate Plasticity CI
WS8		D	1.70	1.80	16			41	20	21	98	Intermediate Plasticity CI

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.









ANALYTICAL TEST REPORT

- Contract no:107881Contract name:Wye Carr, NorthallertonClient reference:PSL22/2137Clients name:Professional Soils LaboratoryClients address:5/7 Hexthorpe Road
Doncaster
DN4 0AR
- Samples received: 06 April 2022
- Analysis started: 06 April 2022
- Analysis completed: 11 April 2022
- **Report issued:** 11 April 2022

Key

- U UKAS accredited test
- M MCERTS & UKAS accredited test
- \$ Test carried out by an approved subcontractor
- I/S Insufficient sample to carry out test
- N/S Sample not suitable for testing

Approved by:

Rachael Burton Reporting Team Lead

SOILS

Lab number			107881-1	107881-2	107881-3	107881-4	107881-5	107881-6
Sample id			WS1	WS2	WS3	WS4	WS5	WS6
Depth (m)			3.60-3.70	1.70-1.80	1.60-1.70	1.80-1.90	1.70-1.80	1.80-1.90
Sample Type			D	D	D	D	D	D
Date sampled			-	-	-	-	-	-
Test	Method	Units						
рН	CE004 ^U	units	8.7	9.0	8.5	8.8	8.6	8.7
Sulphate (2:1 water soluble)	CE061 ^U	mg/I SO ₄	52	25	45	31	35	36

SOILS

Lab number			107881-7	107881-8
Sample id			WS7	WS8
Depth (m)			1.70-1.80	1.70-1.80
Sample Type			D	D
Date sampled			-	-
Test	Method	Units		
рН	CE004 ^U	units	8.5	8.7
Sulphate (2:1 water soluble)	CE061 ^U	mg/I SO ₄	37	35

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	рН	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

- N No (not deviating sample)
- Y Yes (deviating sample)
- NSD Sampling date not provided
- NST Sampling time not provided (waters only)
- EHT Sample exceeded holding time(s)
- IC Sample not received in appropriate containers
- HP Headspace present in sample container
- NCF Sample not chemically fixed (where appropriate)
- OR Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
107881-1	WS1	3.60-3.70	Y	All (NSD)
107881-2	WS2	1.70-1.80	Y	All (NSD)
107881-3	WS3	1.60-1.70	Y	All (NSD)
107881-4	WS4	1.80-1.90	Y	All (NSD)
107881-5	WS5	1.70-1.80	Y	All (NSD)
107881-6	WS6	1.80-1.90	Y	All (NSD)
107881-7	WS7	1.70-1.80	Y	All (NSD)
107881-8	WS8	1.70-1.80	Y	All (NSD)

Chemtech Environmental Limited ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope. Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling. All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing. Methods, procedures and performance data are available on request. Results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without prior written approval. Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed. For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet. Analytical results are inclusive of stones, where applicable.



APPENDIX F

SIRIUS GENERIC ASSESSMENT CRITERIA



SIRIUS GENERIC ASSESSMENT CRITERIA

Context

The framework for conducting site investigations, risk assessments and undertaking any necessary remedial works in the UK is provided by Environment Agency report CLR11 "Model Procedures for the Management of Contaminated Land". This presents a phased approach to risk assessment, involving: identification and qualitative assessment of potential pollutant linkages (source-pathway-receptor relationships) by means of a Conceptual Site Model; Generic Quantitative Risk Assessment (GQRA) of potentially significant pollutant links by comparing contaminant concentrations with appropriate Generic Assessment Criteria (GAC) values; and, if required, a Detailed Quantitative Risk Assessment (DQRA) based on site-specific conditions.

Assessment of Risk to Human Health

Introduction

A staged approach to GQRA has been adopted by Sirius for the evaluation of soil concentration data, as shown schematically in Figure 1.



Figure 1. GQRA Process.



The first stage of GQRA comprises assessment of the data against GAC values derived using toxicological parameter values based on "minimum risk". Any contaminants exceeding their GACs at this stage are further assessed against Stage 2 GACs, which have been derived using Low Level of Toxicological Concern (LLTC) criteria, where these are available.

With appropriate justification, a contaminant concentration that does not exceed the relevant Stage 2 GAC value may be considered to indicate that the land is "suitable for use". The appropriate use of LLTC-based criteria within the planning regime is considered reasonable by government agencies, as most recently highlighted in the letter (dated 3rd September 2014) to all local authorities from Lord de Mauley, Parliamentary Under Secretary at DEFRA.

A narrative "risk evaluation" must therefore accompany any Stage 2 assessment to justify the conclusions drawn. Where appropriate, this may provide a basis for eliminating from further consideration those contaminants whose concentrations do not exceed the applicable Stage 2 GAC value.

For the specific case of lead, the Category 4 Screening Level criteria given in CL:AIRE (2014)¹ have been adopted directly as GACs, as these are considered to be based on expert interpretation of current toxicological evidence.

In some areas, background concentrations of lead, other metals and metalloids, and/or individual PAHs may exceed their respective GACs and it may be appropriate to consider relative site and background concentration data as part of a more detailed assessment of the data.

Derivation of GACs

Except where otherwise stated, GACs have been derived by Sirius using CLEA version 1.071.

The GAC values have been derived for a sandy soil type, which will be conservative for the majority of soils (including made ground) encountered on historically contaminated sites. For organic contaminants of concern, criteria have been derived for a number of Soil Organic Matter (SOM) contents.

Genotoxic PAHs are assessed by the "Surrogate Method" using benzo(a)pyrene. Further information on this approach is given below.

Unless specifically stated, chemical properties and Health Criteria Values (HCVs) were obtained from:

- Environment Agency Science Report SC050021 series;
- Nathanail *et al.* (2009) "The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment", 2nd edition, Land Quality Press, Nottingham;
- CL:AIRE AGS EIC (2010) "Soil Generic Assessment Criteria for Human Health Risk Assessment". CL:AIRE, London.

GACs for arsenic, benzene, benzo(a)pyrene, cadmium and chromium (VI) have been derived using the

¹ CL:AIRE (2014) "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination", Report SP1010, rev. 2.



Low Level of Toxicological Concern (LLTC) criteria given in CL:AIRE (2013). These criteria are considered a reasonable basis for assessment as they are still highly precautionary and definitely do not approach an intake level that could be defined as approaching Significant Possibility of Significant Harm to human health in the context of Part 2A of the Environmental Protection Act 1990. It must be further understood that the GACs derived will still incorporate a residual level of conservatism resulting from the exposure parameters used and the assumptions inherent in the model algorithms.

GACs for Genotoxic PAHs

Our approach to the assessment of genotoxic PAHs retains the use of benzo(a)pyrene as a surrogate marker. This approach for genotoxic PAHs is recommended by the HPA (2010)², which we consider to be the authoritative current guidance produced by a UK expert body and note that it was retained in the DEFRA Category 4 Screening Levels project (CL:AIRE, 2014).

The surrogate marker approach allows the assessment of the combined carcinogenic risk associated with all genotoxic PAHs³ present as a mixture within soil, even though detailed toxicological information for many of the individual compounds may be lacking. The approach is based on determining the risk posed by the genotoxic PAH mixture using the concentration of benzo(a)pyrene present as an indicator.

To use the GAC for benzo(a)pyrene as a surrogate marker, a number of requirements must be met (HPA, 2010):

- Benzo(a)pyrene must be present in all soil samples containing genotoxic PAHs for which this method of assessment is being used;
- A similar profile of the genotoxic PAHs relative to benzo(a)pyrene should be present in all of the samples being assessed;
- The PAH profile of PAHs in the soil samples should be similar to that present in the pivotal toxicity study on which toxicological criterion for benzo(a)pyrene was based (Culp et al., 1998⁴). Table 1 provides the basis for defining the acceptable range.

Data indicate that contaminated soils in the UK generally meet these criteria⁵ but the assessor <u>must</u> review their dataset before adopting this approach. If the above criteria are not met, then the surrogate marker approach must not be adopted and individual GAC or SSAC values are to be applied.

² HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5.

³ The genotoxic PAHs included in the USEPA PAH 16 analysis reported by analytical labs are: benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo(a)pyrene,

chrysene, dibenz[a,h]anthracene and indeno[1,2,3-c,d]pyrene.

⁴ Culp, S. *et al.* (1998) Carcinogenesis, 19, 117-124.

⁵ Bull, S. & Collins, C. (2013) Environ. Geochem. Health, 31, 101-109.



Table 1. Profile of Genotoxic PAHs Relative to Benzo(a)pyrene that are Considered Acceptable for Application of Benzo(a)pyrene as a Surrogate Marker.

РАН	Acceptable Ratio of PAH Concentration to Benzo(a)pyrene for Application of Surrogate Marker Assessment					
	Lower Limit	Upper Limit				
Benz[a]anthracene	0.12	12.43				
Benzo[b]fluoranthene	0.11	10.85				
Benzo[k]fluoranthene	0.04	3.72				
Benzo[g,h,i]perylene	0.08	8.22				
Chrysene	0.12	11.61				
Dibenz[a,h]anthracene	0.01	1.38				
Indeno[1,2,3-c,d]pyrene	0.07	7.27				

For further information see: HPA (2010).

Soil Criteria Set for Purposes Other Than Human Health Protection

The Sirius GACs for sulphate, total organic carbon (TOC) and calorific value are set on basis of risks other than human health and their exceedance does not indicate a potential risk to future site users:

- The GAC for sulphate content is based on potential detrimental effects on buried concrete⁶ and must be assessed with reference to the soil pH;
- The GAC for TOC content is provided for indicative assessment of disposal options if off-site landfill of soil were to be considered. This GAC is set at the 'Inert' waste threshold and should be considered as being applied for information purposes only;
- The GAC for calorific value is set to assist in an initial assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

Assessment criteria more stringent than those for human health may be set for specific purposes, for example, elimination of nuisance odours or ensuring that potentially mobile free-phase organic products are not present.

Controlled Waters

The Environment Agency's "Remedial Targets Methodology" (2006) provides a framework for assessing the potential for pollution of controlled waters and for deriving remedial target concentrations in soil and groundwater.

There are no generic groundwater or surface water quality standards that are applicable to all sites. Drinking Water Standards and Environmental Quality Standards (EQS) are used by Sirius as assessment criteria where they are appropriate to the contaminant linkages under consideration. Given that these standards apply at the receptor point, this is a conservative approach for samples collected at a source or along a transport pathway.

⁶ BRE (2005) "Concrete in Aggressive Ground", Special Digest No. 1; 3rd Edition.



Soil Leachability

Sirius specifies that the analytical laboratory undertakes leachate preparation by BS EN 12475-2:2002. Where specific circumstances require a different method to be used, then this will be explained and justified within the report body text.

The results of leachate analysis are compared to the relevant GAC values for controlled waters.

The Sirius Group Stage 1 Generic Assessment Criteria for Soils

24 January 2020

Parameter Residential Commercial / Industrial Note (mg/kg, unless otherwise stated) (mg/kg, unless otherwise stated) With Homegrown Produce Without Homegrown Produce 1% SOM 2.5% SOM 5% SOM 1% SOM 2.5% SOM 5% SOM 1% SOM 2.5% SOM 5% SOM Metals/Metalloids Arsenic (inorganic) 37 40 630 [1] 190 11 85 Cadmium [2] Chromium (III) 910 4000 8600 Chromium (VI) 6.0 6.1 [3] 33 7100 68000 Copper 200 [4] 200 310 2300 [5] Lead Mercury (inorganic) 40 56 1100 [6] Nickel 130 180 980 [7] 250 430 12000 Selenium 410 1200 9000 Vanadium 450 40000 750000 [4] Zind Other Inorganics <5 or >9 <5 or >9 <5 or >9 nН Total Sulphate 2400 2400 2400 [8] Water-Soluble Sulphate 0.5 g/l 0.5 g/l 0.5 g/l [8] ree Cyanide 34 34 1400 [9] Organics PAHs 200 490 3600 92000 100000 920 2000 4900 75000 Acenaphthene 170 400 760 2000 3600 4900 76000 93000 100000 Acenaphthylene 9400 30000 34000 520000 540000 540000 Anthracene 2300 36000 [10] Benzo(a)anthracene Assessed using benzo(a)pyrene as a surrogate marker [10] 27 2.1 2.1 27 [11] Benzo(a)pyrene 2.2 2.3 2.3 2.3 27 Benzo(b)fluoranthene Assessed using benzo(a)pyrene as a surrogate marker Benzo(k)fluoranthene Assessed using benzo(a)pyrene as a surrogate marker Benzo(g,h,i)perylene Assessed using benzo(a)pyrene as a surrogate marker [10] [10] Chrvsene Assessed using benzo(a)pyrene as a surrogate marker Dibenzo(a,h)anthracene Assessed using benzo(a)pyrene as a surrogate marker [10] 280 560 820 1500 1600 1600 23000 23000 23000 Fluoranthene 170 390 730 4000 60000 67000 70000 2200 3400 Fluorene [10] Indeno(1.2.3-c.d)pvrene Assessed using benzo(a)pyrene as a surrogate marker 4.6 260 510 1.0 2.3 110 Naphthalene 1.0 2.4 4.7 95 220 380 1300 1400 1500 22000 22000 23000 Phenanthrene 54000 620 1200 1900 3700 3800 3800 54000 54000 Pyrene BTEX and related 0.063 0.13 0.24 0.30 0.38 Benzene 0.16 15 28 49 100 240 460 370 830 1100 33000 68000 11000 Toluene 26 62 120 34 81 110 3200 7400 14000 Ethylbenzene 28 67 130 33 78 3200 7700 110 15000 [12] Xylenes (total) 0.22 0.53 1.1 0.24 0.58 1.2 39 93 170 1,2,4-trimethylbenzene 16 17 6.6 32 6.8 33 1300 3100 6100 Iso-propylbenzene 100 110 3800 9100 17000 Propylbenzene 21 51 23 6.9 16 49 32 21 93 3100 6100 9500 Styrene TPH Aliphatic EC 5-6 24 41 68 24 41 68 2400 4100 6900 Aliphatic EC >6-8 53 110 210 53 110 210 5300 11000 21000 Aliphatic EC >8-10 13 31 61 13 31 61 1300 3100 6000 150 150 15000 28000 62 300 62 300 6100 Aliphatic EC >10-12 510 1200 2300 1200 2300 43000 72000 85000 Aliphatic EC >12-16 510 41000 70000 90000 70000 90000 Aliphatic EC >16-35 42000 >1E6 >1E6 >1E6 [13] 53 110 150 300 538 15000 28000 48000 Aromatic EC >5-7 200 100 240 460 370 820 1500 33000 68000 110000 Aromatic EC >7-8 48 94 54 100 2200 5200 9800 Aromatic EC >8-10 20 22 560 Aromatic EC >10-12 63 150 290 120 290 11000 22000 30000 570 1900 Aromatic EC >12-16 140 320 1100 2200 35000 37000 37000 840 1900 1900 28000 260 540 1800 28000 28000 Aromatic EC >16-21 1500 1700 1900 Aromatic EC >21-35 1100 1900 1900 28000 28000 28000 **Chlorinated Organics** Chlorobenzene 0.19 0.44 0.86 0.19 0.45 0.87 31 71 140 Dichloromethane (DCM) 470 0.47 0.78 1.7 340 1.2 1.2 2.4 250 1.4 2.4 4.0 1.4 2.4 4.1 260 420 690 1,1-dichloroethane (DCA) 0.0048 0.0053 0.008 1,2-dichloroethane (DCA) 0.0031 0.0076 0.0035 0.34 0.51 0.81 1,1-dichloroethene (DCE) 0.15 0.26 0.45 0.15 0.26 0.46 24 43 74 cis-1,2-dichloroethene (DCE) 0.066 0.12 0.20 0.069 0.12 0.21 14 23 38 0.11 0.38 0.12 0.22 0.39 37 65 trans-1,2-dichloroethene (DCE) 0.21 21 Pentachlorophenol 0.21 0.52 1.0 27 30 31 400 400 400 1,1,1,2-tetrachloroethane 0.56 1.3 2.6 0.63 1.5 2.9 59 140 270

Revision:

Parameter	Residential						Commercial / Industrial			Note
	(mg/kg, unless otherwise stated)					(mg/kg, unless otherwise stated)				
	With Homegrown Produce Without Homegrown Produce				Produce					
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM 2.5% SOM 5% SOM			
1,1,2,2-tetrachloroethane	0.98	2.1	4.0	1.6	3.4	6.3	150	310	570	
Tetrachloroethene (PCE)	0.074	0.17	0.32	0.07	0.17	0.33	10 23 45			
Tetrachloromethane (CT)	0.011	0.024	0.046	0.011	0.024	0.046	1.6 3.6 6.9			
1,1,1-trichloroethane (TCA)	3.7	7.8	15	3.8	7.9	15	370 770 1400			
1,1,2-trichloroethane (TCA)	0.39	0.85	1.6	0.51	1.1	2.0	89 180 320			
Trichloroethene (TCE)	0.0070	0.015	0.028	0.0071	0.015	0.028	1.5 2.8 44			
Trichloromethane (CF)	0.43	0.80	1.4	0.48	0.89	53	98	170	300	
Vinyl Chloride	0.00034	0.00045	0.00062	0.00037	0.00048	0.00066	0.038	0.049	0.068	
Miscellaneous Organics										
Carbon disulphide	0.066	0.13	0.25	0.066	0.13	0.25	6.7 14 25			
Di-(2-ethylhexyl)-phthalate	290	660	1100	3900	4000	4100	85000 85000 8600			
МТВЕ	31	55	94	39	68	120	7400 12000 19000			
Phenol	110	190	330	420	440	440	440			[14]
Methylphenols (cresols), total	78	170	330	5600	8200	9900	160000	170000	18000	[15]
2,4-dimethylphenol (m-xylenol)	18	43	82	200	430	720	15000	23000	28000	
Other Parameters										
TOC	3% w/w			3% w/w			3% w/w			[16]
Calorific Value	2 MJ/kg			2 MJ/kg			2 MJ/kg			[17]
Asbestos	Fibres present			Fibres present			Fibres present			

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) "Updated Technical Background to the CLEA Model", report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al., (2015). No correction has been made for the "Top Two" crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:

Environment Agency Science Report SC050021 Series;

Nathanail et al. (2015);

• CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Based on oral GAC as this is the lower GAC and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure. Plant uptake concentration factors applied were as given in CL:AIRE (2014). The GAC values are based on data for soils having a pH value in the range 6-8; caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[3] Both oral and inhalation HCVs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] For the Residential with Homegrown Produce land use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The equivalent GAC values for human health protection in the Residential with Homegrown Produce land use are around an order of magnitude greater.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2013) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: "...the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low" (Environment Agency report SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised, therefore the lower of the GAC values for oral and inhalation HCVs have been adopted.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5). Separate information on this approach is provided.

[11] Calculated using a 'minimum risk' oral index dose derived from the application of a 10,000x safety factor to the BMD10 presented in CL:AIRE (2014) for benzo(a)pyrene as a surrogate marker and the inhalation index dose specified in CL:ARE (2014) and Nathanail et al. (2015). As a conservative measure, the GAC is based on combined exposure pathways to account for systemic carcinogenic effects. Further information on the derivation can be provided upon request.

[12] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[13] "No GAC" indicates that no value has been specified for this land use as the TDSI cannot be exceeded at achievable soil concentrations.

[14] 440mg/kg is the minimum concentration that is protective for direct skin contact with phenol (See Environment Agency SR050021/Phenol SGV) and is adopted where GACs for chronic exposure are higher.

[15] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[16] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.

[17] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

Sirius Geotechnical Ltd.

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