

GEO-ENVIRONMENTAL SITE ASSESSMENT  
UYS FACILITY  
GARSINGTON ROAD  
COWLEY. OX4 2BW

REPORT PREPARED FOR:

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Site Photos

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Environmental Database

APPENDIX E

Borehole Logs

Dynamic Probe Logs

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BH Permeability Sheets

APPENDIX G

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APPENDIX H

Geotechnical Laboratory Test Results

SPT Variation Graphs

CBR Variation Graphs

## 1.0 EXECUTIVE SUMMARY

Site Setting	Sensitivity Rating	Comments	Report Section
On site/Off Site Sources	Moderate	Site is an industrial site, adjacent to historical railway sidings with IBC's and contaminated waste stored onsite	3.6
Offsite Receptors	Low	Adjacent to commercial units and agricultural fields	3.2
Published Geology	Low/Moderate	Bedrock comprises the Ampthill Clay Formation (Mudstone) and Wheatley Limestone Member (Limestone). Superficial comprise alluvium deposits (Clays, Silts and Sands). Radon affected areas between 3% and 5%	3.4
Hydrology/Hydrology	Low/Moderate	Underlain by Secondary A and Unproductive bedrock and superficial Secondary A aquifer. Outside of Agency Source Protection Zone. Hollow Brook watercourse adjacent to NE. Lies outside of flood risk zone.	3.4
History	Moderate	Worked ground in the north and northwest (1969) and a railway to the north of the site until 2003 when the main building at UYS was constructed.	3.7
Landfill/Infilled Land	Low	No active landfills within 250m from the site boundaries.	3.6.6
UXO	Low	Intrusive investigations will not require on site screening due to low risk	3.6.11
Initial Conceptual Model	Low/Moderate	Human Health - Low/Moderate Risk Controlled Waters – Low/Moderate Ground Gas Risk – Low	4.4
Site Assessment	Risk Rating	Comments	Report Section
Proven Ground Conditions	Low	Surface cover of Topsoil/Bituminous Paving/ Reinforced Concrete to 0.2m, made ground to 0.7m, overlying gravelly clay to 2.20m. Siltstone encountered at 2.2m Groundwater encountered between 0.48 and 1.06m bgl.	5.4
Ground Gas	Low/moderate	No elevated ground gas readings, however radon barrier required.	6.0
Contamination Results	Low/moderate	Exceedances of soil GACs for non-volatile PAH's in made ground from BH3 at 0.65m. All other soil samples were compliant with adopted GACs. No exceedances in water or leachate samples.	7.0
Waste	Moderate/High	Made ground from BH3 at 0.65m bgl classed as hazardous for offsite disposal. Further WAC testing require to determine the type of landfill classification.	7.4
Ground Engineering	Low/moderate	Medium strength clay, which is partially desiccated in BH4 and BH5 Two storey developments can utilise shallow foundations, adopting an allowable bearing capacity of 100kN/m <sup>2</sup>	8.0
Recommendations		No further actions required for site in current configuration for continued commercial use. Redevelopment in the future likely to require further actions, comprising plume delineation, investigation beneath existing building footprint followed by Remedial Strategy/Verification Plan	9.0

## 2.0 INTRODUCTION

WDE Consulting Limited (WDE) was appointed by Charterhouse Investment Oxford Ltd (the Client), to conduct a Geo-Environmental Site Assessment at UYS Facility, Garsington Road, Cowley (Figure 1) to determine the ground conditions prior to acquisition of the site.

The works described in this report are subject to the WDE Service Constraints presented in Appendix A. This report was finalised in August 2021 and should be read in the light of any subsequent changes in legislation, statutory requirements, statutory guidance, non-statutory guidance, relevant research and industry practices. This report is currently assigned only to the Client for their sole reliance.

### 2.1 RELEVANT GUIDANCE

WDE Consulting has duly taken account of the recommendation contained within relevant guidance documents and legislation during the preparation of this report, details of which are presented in Appendix B.

### 2.2 AIMS AND OBJECTIVES

#### 2.2.1 Aims

The aims of this report are as follows:

1. To identify whether there is any contamination onsite which is likely to cause significant harm to human health, the environment, or other sensitive receptors.
2. To identify the geotechnical properties of the ground to enable preliminary design parameters for foundations and drainage.

#### 2.2.2 Objectives

In order to achieve the aims set out in Section 2.3.1 WDE proposes the following objectives:

1. Complete walkover survey to identify any areas of potential contamination.
2. Investigate the nature of material that is present onsite through field investigations.
3. Investigate the nature and extent of any contamination onsite through field investigations.
4. Compare onsite soil and water concentrations with generic UK based assessment criteria.
5. Investigate the drainage potential of the materials onsite through field investigations.

### 2.3 WORK AND PROGRAMME

WDE Consulting's scope of work includes the following:

- Walkover survey
- Intrusive site investigation

Groundwater and ground gas monitoring  
Laboratory analyses (contamination & geotechnical)  
Geo-Environmental Site Assessment Report

The programme of work that was undertaken comprises the following elements presented in Table 1.

Table 1 – Programme of Works

Item	Description	Start Date	Completion Date
1	Walk over survey	23/06/2021	23/06/2021
2	Intrusive investigation	28/06/2021	29/06/2021
3	Monitoring visit	30/06/2021	30/06/2021
4	Laboratory analysis	06/07/2021	12/07/2021
5	Geo-Environmental Site Assessment	09/07/2021	16/07/2021



### 3.0 BACKGROUND INFORMATION

#### 3.1 SOURCES OF INFORMATION

The sources of information that were used during the desk study included the following items:

- Site walkover (Photos presented in Appendix C)
- Environmental Database (Appendix D)

#### 3.2 SITE LOCATION

The UYS site is located off Garsington Road, Cowely at Postcode OX4 2BW and National Grid Reference 456838, 204303 (Figure 1). It is situated within a semi commercial setting with access via the UniPart Group Facility to the west, with agricultural fields to the north, east and south. A summary of the surrounding land uses are as follows:

- Northern – Woodland with Oxford Road and agricultural fields beyond
- Eastern – Agricultural fields
- Southern – Lorry Park and commercial units with agricultural fields beyond
- Western – Commercial units (part of the Unipart Facility)

#### 3.3 SITE DESCRIPTION AND WALKOVER

The site is approximately square shaped, measuring 2.33ha with maximum dimensions of ~150m NE to SW and ~160m NW to SE at the maximum dimensions. Access to the site is via Oxford Road along Transport Way through the Unipart Security Gate. Access to the site is in the western corner (Photo 1). It currently comprises a central industrial workshop (approximately 95m<sup>2</sup>) in the central and southeast area of the site. A second industrial building (approximately 30m<sup>2</sup>) lies in the northern corner. The north-west portion of the site comprises a car park area with hardstanding and hard-standing access road around carpark and both buildings (Photo 2).

A number of historical monitoring well covers were identified on site during the site walkover, the locations of which are shown on Figure 2.

##### 3.3.1 Bulk Storage Tanks and Containers

Several bulk storage tanks and containers were identified during the site walkover, details are presented in Table 2 and locations are shown on Figure 2.

Table 2 – Bulk storage Tanks and Containers

Item	Description	Contents	Volume	Secondary Containment	Signs of surface spillage	Photo
1	6no. IBC containers	Waste water	1,000 litres each	Spill trays below	No	3, 5
2	1no. Steel Above Ground tank	Waste water/ oil	2,500 litres	No	No	4, 5
3	5no. Steel containers	Waste oil, empty aerosols, lead acid batteries	800 litres each	No	No	5, 6, 7, 8
4	2no. 12-yard skips	Metal waste	Each is 9.8m <sup>3</sup>	No	No	9
5	Liquid pure argon and liquid carbon dioxide tanks	Ar and CO <sub>2</sub>	-	-	No	10

No other bulk fuel tanks, or gross contamination have been identified onsite. There was no evidence of invasive plant species onsite. Topography is roughly level onsite and hardstanding areas are in good condition.

### 3.4 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

Published geological information indicates that the bedrock comprises the Ampthill Clay Formation (Mudstone) with the Wheatley Limestone Member (Limestone). Superficial alluvium deposits (Clay, silt, sand and gravel) and Head (Clay, silt, sand and gravel) have been identified within the site boundaries. Bedrock onsite has been deemed Unproductive and as a Secondary A aquifer whilst superficial deposits have been deemed as a Secondary A aquifer. The site does not lie within an Agency Source Protection Zone. There are no abstraction licenses within 250m of the site.

The nearest surface water feature is Hollow Brook watercourse 5m NE and lies outside of any identify flood risk areas from rivers or seas.

### 3.5 GEOLOGICAL HAZARD

The Groundsure Review Findings have identified:

Moderate – High natural ground subsidence

The site is in a Radon Affected Area with between 3% and 5% effected

### 3.6 LAND USES ADJACENT TO SITE

#### 3.6.1 Industrial Land Use

There are several industrial land uses within 250m off the site boundaries, a summary of which are detailed below:

Tanks (Generic) – Onsite  
Refuse Disposal Facilities – 25m SW  
Chimney – 30m SW  
Depot – 66m S  
Tanks (Generic) – 175m SW  
Tanks (Generic) – 182m SW  
Electricity Substation – 188m SW

### 3.6.2 Historical Potentially Contaminative Uses

There are several historical potentially contaminative land uses within 250m of the site boundaries:

Railway Sidings (1965) – Onsite  
Car Storage Depot (1974) – Onsite  
Sewage Works (1974) – 55m NW  
Unspecified Tanks (1974) – 63m NW  
Railway Buildings (1974) – 114m SW  
Unspecified Warehouse (1974) – 197m SW

### 3.6.3 Fuel Station Entries

There are no fuel station recorded within 250m of the site boundaries.

### 3.6.4 Historical Petrol and Fuel Sites

There are no historical petrol or fuel sites recorded within 250m of the site boundaries.

### 3.6.5 Historical Garages and Motor Vehicle Repair Database

There have been no identified historical garage and motor vehicle repair sites within 250m of the site boundaries.

### 3.6.6 Historical/Current Landfill and Waste Sites

There are no active landfills, historical landfill, or waste exemption sites within 250m of the site boundaries. There is one waste site no longer in use:

Incinerator-32m SW

### 3.6.7 Recorded Pollution Incidents

There have been no identified pollution incidents within 250m of the site boundaries.

### 3.6.8 Water Abstractions

There are no potable water abstraction recorded within 250m of the site boundaries.

### 3.6.9 Historical Tank Database

There are several historical tanks recorded within 250m of the site, a summary of which is presented below:

- Tanks (1998) – Onsite
- Tanks (1993-1994) – 110m SW
- Tanks (1968 – 1994) – 120m SW
- Unspecified Tanks (1968 – 1994) – 131m SW
- Unspecified Tanks (1968 – 1998) – 150m SW
- Tanks (1993 – 1998) – 171m SW
- Tanks (1968 – 1998) – 181m SW

### 3.6.10 Historical Energy Features

There is one historical energy features within 250m of the site, a summary of which is presented below:

- Electricity Substation (1968 - 1998) – 181m SW

### 3.6.11 UXO

The site is located within a low risk area from UXO on the Zentica web map.

## 3.7 HISTORICAL LAND USE ON SITE AND IN SURROUNDING AREA

Historical ordnance survey maps and aerial maps indicate the following historical land uses on site and in the surrounding area and is summarised in Table 3.

Table 3 – Summary of Historical Land Use

Date	On Site	Off Site
1886	Open land, crossed by a drain from the centre north to the south west	Railway line on the northern boundary
1880 - 1966	No significant change	No significant change
1969	Work ground established in the north and northwest. Development of Unipart and UYS land	Development of Unipart land. Land adjacent to the south used as a car storage depot.
1969 - 1975	No significant change	No significant change
1993	Drain diverted from the southwest to the southeast	No significant change
1993 - 1994	No significant change	No significant change
2003	Unit built in the centre and south west (position of UYS facility) along with tank in the southwest and tanks in the centre east	Railway line adjacent to site does not appear to be in use
2017	Additional unit built in the north east	No significant change

Anecdotal evidence from the site walkover indicates that the UYS facility was constructed in 1997. Since this time, it has been used for the manufacture of vehicle exhausts.

### 3.8 SENSITIVE LAND USE

There are two sensitive land use within 250m of the site, details of which are summarised below:  
 Oxford Green Belt– 4m NE

### 3.9 AREAS OF CONCERN

The following potential areas of concern identified during the site walkover are summarised Table 3 and shown of Figure 2:

Table 4 – Summary of Potential Areas of Concern

Ref	Item	On/Off-Site	Photo
A	6 IBC containers	Onsite	3, 5
B	Waste water/oil storage tank	Onsite	4, 5
C	5 steel containers containing waste oil, batteries and aerosols	Onsite	5, 6, 7, 8
D	2no. 12-yard skips for metal waste	Onsite	9
E	Industrial units	Onsite	2
F	Argon and carbon dioxide tanks	Onsite	10
G	Historical railway sidings	Onsite and offsite	-
H	Historical car storage depot	Onsite and offsite	11
-	Substation	Offsite	-
-	Potential made ground	Onsite	-

## 4.0 PRELIMINARY RISK ASSESSMENT

### 4.1 IDENTIFICATION OF CRITICAL RECEPTORS

Based on future residential land use, the potentially sensitive receptors are considered to be:

- Commercial Human: Current/Future occupants onsite
- Commercial Human Health: Current occupants offsite
- Groundwater: Secondary A
- Surface Water: Hollow Brook Water Course
- Onsite workers\*

\*The risks to onsite workers can be minimised by following appropriate health and safety guidance on site (i.e. wearing protective clothing and washing).

### 4.2 IDENTIFICATION OF CONTAMINANT SOURCES

The list of potential sources of contamination on site and in the surrounding area are summarised in Table 5.

Table 5 – Identification of Potential Sources of Contamination

Location	Potential Source	Potential Contaminants
Onsite source	IBC containers, waste storage containers, historical railway sidings, historical car storage depot, potential made ground	Hydrocarbons (TPH, BTEX, PAH), VOCs, heavy metals, inorganics, asbestos, ground gas
Offsite source	Industrial land uses, Tanks, Substation	Hydrocarbons (TPH, BTEX, PAH), heavy metals, inorganics, ground gas, PCBs

The potential contaminants of PCBs arising from the electricity substation located offsite have been discounted as PCBs are not considered to be sufficiently mobile or soluble<sup>1</sup>.

### 4.3 IDENTIFIED OF POTENTIAL PATHWAYS

#### 4.3.1 Human Health Pathways

The potential human health exposure pathways, based on the Agency Soil Science Report SR3<sup>2</sup>, for a residential receptor are indicated in Table 6.

<sup>1</sup> Department of the Environment, 1996, Industry Profile: Engineering works. P.14 Sect 3.2.1

<sup>2</sup> Environment Agency, August 2008, Updated technical background to the CLEA model, Science Report - SC050021/SR3

Table 6 – Identification of Potentially Active Human Health Exposure Pathways

Potential Pathway	Active/ Inactive	Notes
Ingestion of fruit/home-grown produce	Inactive	No further assessment required
Ingestion of soil and dusts	Active	Qualitative Risk Assessment required
Dermal contact with soils and dust	Active	Qualitative Risk Assessment required
Inhalation of dusts	Active	Qualitative Risk Assessment required
Inhalation of organic vapours (generated by shallow soils) in external areas or inside buildings	Active	Qualitative Risk Assessment required
Inhalation of organic vapours generated by dissolved phase groundwater migrating offsite to neighbouring commercial properties	Active	Qualitative Risk Assessment required
Inhalation of organic vapours generated by dissolved phase groundwater migrating onto site from surrounding offsite sources	Active	Qualitative Risk Assessment required
Contaminants from site entering groundwater and migrating into licensed water abstraction borehole for human consumption	Inactive	No abstraction boreholes with 250m. No further assessment required.
Contaminants from site entering groundwater and migrating into public water abstraction borehole for human consumption	Inactive	Outside of any SPZ. No further assessment required

#### 4.3.2 Controlled Waters Pathways

The potentially active controlled waters migration pathways are indicated in Table 7.

Table 7 – Identification of Potentially Active Controlled Water Pathways

Potential Pathway	Active/ Inactive	Notes
Impacted soils leaching to groundwater within Secondary A Aquifer	Active	Qualitative Risk Assessment required
Impacted soils leaching to groundwater and migration to surface water	Active	Qualitative Risk Assessment required

#### 4.3.3 Ground Gas Pathways

The potentially active migration pathways for ground gas are indicated in Table 8.

Table 8 – Identification of Potentially Active Ground Gas Pathways

Potential Pathway	Active/ Inactive	Notes
Ground gas generated from current/historical landfills within 250m radius	Inactive	No landfill within 250m. No further assessment required
Ground gas generated from current/historical buried land within 250m radius	Active	Railway siding onsite. Qualitative Risk Assessment required
Radon gas generated from Radon Affected Areas (3-5%) onsite	Active	Qualitative Risk Assessment required

#### 4.4 QUALITATIVE RISK ASSESSMENT

To assess the potential for risk, the Source Pathway Receptor relationships have been evaluated to determine whether there are potentially active pollutant linkages between sources and receptors. Only when there is an active pollutant linkage, can there be a potential risk to a receptor from a source via a particular pathway. Each active pathway has been assigned a qualitative assessment as to the level of risk as explained in Table 9 as per R&D 6618 . A summary of the relevant pollutant linkages based on a source-pathway-receptors analysis is provided in Table 10.

Table 9 – Qualitative Risk Classification Scheme

		CONSEQUENCE			
		Severe	Medium	Mild	Minor
PROBABILITY (Likelihood)	High likelihood	Very High Risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk



Table 10 – Summary of Potentially Active Source-Pathway-Target Assessment

Sources	Potential Pathway	Potential Receptor	Risk Classification
Onsite Sources	Dermal contact, ingestion, outdoor and indoor inhalation	Human Health (Onsite Commercial)	Moderate Risk
Onsite Sources	Vapour inhalation from dissolved phase groundwater migrating from site to neighbouring commercial properties	Human Health (Offsite Commercial)	Low/Moderate Risk
Onsite Sources	Impacted soil leaching to groundwater within Secondary A Aquifer	Controlled Waters (Groundwater)	Low/Moderate Risk
Onsite Sources	Impacted soil leaching to surface water within water course	Controlled Waters (Surface water)	Moderate Risk
Offsite Source	Vapour inhalation from dissolved phase migration from offsite sources	Human Health (Onsite Commercial)	Low Risk
Infilled land, bedrock geology	Source for ground gas and radon generation	Human Health (Onsite Commercial)	Low/Moderate Risk

## 5.0 INVESTIGATION WORKS

### 5.1 FIELD METHODS USED

The locations of the intrusive investigation were agreed with UYS personnel during the initial site walkover (Figure 2) and comprised the following:

- 5no. boreholes (BH1 to BH4, and BH7) were drilled to a maximum depth of 2.70m bgl using a mechanical window sampler with SPT's (Photo 12)
- 2no. boreholes (BH5 and BH6) were drilled to a maximum depth of 2.20m bgl using a mechanical window sampler and dynamic probe.
- 4no. monitoring wells (BH2, BH4, BH6 and BH7) were installed to a depth of 2.70m bgl.

All of the fieldwork was completed under the supervision of a WDE site engineer. Each location was scanned prior to drilling using a Cable Avoidance Tool (CAT) and then hand dug to 1.2m. Logs for each of the intrusive locations are presented in Appendix D. Organic Vapour Concentrations (OVCs) were measured during the fieldwork on recovered soil samples using a Photo-ionisation Detector (PID). Soil samples were transported within a cooler box to a UKAS accredited laboratory under chain of custody conditions.

The monitoring well was installed to a maximum depth of 2.70m bgl using 50mm diameter well material, gas valve and lockable cover, which were subsequently monitored for groundwater and ground gas levels (oxygen, carbon dioxide and methane). Groundwater was sampled using low flow methods with parameters recorded using a YSI multimeter.

### 5.2 RATIONALE ADOPTED FOR INTRUSIVE LOCATIONS

The intrusive locations are indicated on Figure 3, with rationale used for the selection of locations presented in Table 11.

Table 11 – Rationale for Exploratory Hole Locations

Ref	Item	Borehole Location
A	6 IBC containers	BH4
B	Waste water/oil storage tank	BH4
C	5 steel containers containing waste oil, batteries and aerosols	BH4
D	2no. 12-yard skips for metal waste	BH4
E	Industrial units	BH1 to BH7
F	Argon and carbon dioxide tanks	BH7

G	Historical railway sidings	BH1 and BH2
H	Historical car storage depot	BH3 and BH4
-	Substation	-
-	Potential made ground	-

### 5.3 CONSTRAINTS

The site was active during the investigation, with access only granted to external areas.

### 5.4 FIELD RESULTS

#### 5.4.1 Geology

A summary of the geology encountered during the intrusive investigation is summarised in Table 12, with the full descriptions presented in Appendix E.

Table 12 – Summary of Geology Proved Onsite

Description	Min – Max Depth (m bgl)	Average Depth (m bgl)
Surface covering (topsoil/bituminous paving/ concrete)	0.00 – 0.30	0.00 – 0.20
Made Ground	0.05 – 1.00	0.20 – 0.70
Gravelly Clay	1.70 - 2.70	0.70 – 2.20
Siltstone*	2.20+	2.20+

\*Proved only in BH7

#### Surface Covering:

Topsoil as dark brown silty clay with rootlets was encountered in BH5 and BH6 and was proven to a maximum of 0.20m depth. Bituminous paving was encountered in BH1 and BH2 to a maximum depth of 0.05m bgl. Reinforced Concrete was encountered in BH3, BH4 and BH7 to a maximum depth of 0.30m bgl.

Made Ground: Made ground was encountered in all locations and proved to a maximum depth of 1.00m bgl. Red/orange sandy gravelly fill was encountered beneath bituminous paving and reinforced concrete in BH1 to BH4 and BH7 and proved to a maximum depth of 0.70 m bgl. Reworked light brown clayey gravel with concrete fragments was encountered below red/orange sandy gravel fill in BH3 and BH4, and beneath topsoil in BH5 and BH6, and proved to a maximum depth of 1.00m bgl.

Gravelly Clay: Soft to stiff light brown/grey gravelly Clay was encountered in all locations and proven to a maximum depth of 2.20m bgl.

Siltstone: Very strong light grey Siltstone was encountered in BH7 between 1.65m and 1.70m bgl where window sampler refused. All of the other boreholes are likely to have encountered siltstone at their base, which prevented further penetration.

#### 5.4.2 SPT N-Value Results

SPTs in boreholes and dynamic probes were taken until >50 blows were measured. SPTs in boreholes were completed at 5no. locations (BH1 to BH4 and BH7) to a maximum depth of 2.70m bgl. Dynamic probe testing was carried out at 2no. locations (BH5 and BH6) to a maximum depth of 1.80m bgl. A copy of the logs is provided in Appendix E and a summary of the N-values are provided in Table 13 and Table 14.

Table 13 – N-Values from SPT Results in Boreholes

SPT Depth (m)	BH1	BH2	BH3	BH4	BH7
1.0	9	8	9	6	7
1.7	-	-	-	-	>50
2.0	>50	>50	>50	>50	-
2.7	-	-	-	>50	-

Table 14 – Calculated N-Values from Dynamic Probes

DP Depth (m)	DP5	DP6
0.0-0.3	4	3
0.3-0.6	2	5
0.6-0.9	3	5
0.9-1.2	>50	3
1.2-1.5	-	3
1.5-1.8	-	>50

#### 5.4.3 Groundwater Observations

Groundwater was encountered between 0.80m and 2.30m bgl in locations BH1 to BH6. Groundwater was not encountered in BH7.

#### 5.4.4 Contamination Observations

No grossly contaminative material or strong odours were encountered during the intrusive investigation, with all PID readings ≤ 0.0 ppm (v).

#### 5.4.5 Groundwater Monitoring Results

A summary of the groundwater monitoring data obtained during the monitoring visit on 30<sup>th</sup> June 2021 from historical and WDE boreholes is presented in Table 15, with groundwater parameters in Table 16. The locations of the monitoring wells are indicated on Figure 2.

Table 15 – Groundwater Field Monitoring Results

Date	Location	Depth to Water (m bgl)	Depth to Base (m bgl)	Comment
30/06/2021	HBH1	0.735	2.02	No product detected
	BH2	0.485	1.80	No product detected
	BH4	2.022	2.58	No product detected
	HBH5	0.730	1.51	No product detected
	BH6	1.060	1.920	No product detected
	BH7	Dry	1.330	No product detected
	HBH7	1.200	1.610	No product detected

Table 16 – Groundwater Field Monitoring Parameter Results

Date	Location Ref	pH	Redox (mV)	DO (mg/l)	DO (%)	Conductivity (uS/cm)	Observations
30/06/2021	BH2	7.25	-20.1	4.50	46.1	844	Colourless, no odour
	BH4	11.1	-238.4	6.79	69.1	1630	Opaque brown, no odour
	BH6	7.96	-60.1	3.89	37.6	640	Opaque brown, no odour
	HBH7	7.43	30.2	2.29	24.7	2521	Colourless, no odour

Following sampling, BH4 and BH6 did not recharge within 30 minutes. There was insufficient water within HBH7 to sample and did not recharge within 30 minutes, suggesting that the groundwater is perched.

#### 5.4.6 Ground Gas Monitoring Results

A summary of the one round of ground gas monitoring results during the monitoring visit on 30<sup>th</sup> June 2021 from historical and WDE boreholes is presented in Table 17 and are presented in full in Appendix F.

Table 17 – Ground Gas Field Monitoring Results

Date	Location Reference	O <sub>2</sub> (%)	CO <sub>2</sub> (%)	CH <sub>4</sub> (%)	Atmospheric Pressure (mB)	Flow rate (l/hr)
30/06/2021	HBH1	18.5	3.7	0.1	1009	+0.0
	BH2	21.0	0.3	0.1	1009	+0.1
	BH4	19.2	0.1	0.1	1009	-0.0
	HBH5	18.2	1.8	0.1	1010	+0.1

	BH6	19.9	0.4	0.1	1010	+0.1
	BH7	18.3	0.9	0.1	1009	+0.0
	HBH7	14..7	2.3	0.1	1009	+0.0

#### 5.4.7 Permeability Results

A summary of the falling head test results is presented in Table 18 and is presented in full in Appendix F.

Table 18 – Permeability Field Results

Location	Drainage	Comments
BH2	>10 <sup>-6</sup>	Poor permeability

## 6.0 GROUND GAS ASSESSMENT

### 6.1 PUBLISHED GUIDANCE

A ground gas assessment has been undertaken to assess risks associated with carbon dioxide and methane to new buildings and their users. The relevant guidance has been used to assess the risks posed by ground gas (Appendix B).

### 6.2 COMPARISON WITH SITE DATA

Taking a conservative viewpoint, the highest readings from the monitoring wells have been selected for the determination of the relevant gas screening values. If the readings were <0.01 a value of 0.01 is used in line with CIRIA, 2007 guidelines. A summary of gas screening calculations and the associated characterisation of the site are identified below in Table 19.

Table 19 – Summary of Gas Screening Values

Gas	Screening Value	Characterisation Situation	Comments
Methane (CH <sub>4</sub> )	$((0.1/100) \times 0.01) = 0.00001$	1 (Very Low)	-
Carbon Dioxide (CO <sub>2</sub> )	$((3.7/100) \times 0.01) = 0.00037$	1 (Very Low)	-

There are very low levels of ground gas detected onsite which has returned a maximum characterisation value of 1 (Very Low) from one round of ground gas monitoring, suggesting that no further actions are required.

The site is on a radon effected area of 3-5% and thus appropriate radon membrane will be required.

## 7.0 CONTAMINATION ASSESSMENT

### 7.1 SOIL ANALYTICAL TEST RESULTS

The results from the WDE laboratory analyses of the soil samples are presented in full in Appendix G. Below detection limit is abbreviated to BDL in all subsequent tables. The Generic Assessment Criteria (GACs) that have been adopted are based on the Land Quality Management (LQM) Suitable for Use Levels (S4UL)<sup>3</sup>. These published values are available for residential with/without home grown produce, commercial, allotment and public open space land use scenarios. As there is no current UK GAC for lead or cyanide, the Category 4 Screening Level (C4SL) will be adopted for lead and the Dutch Intervention Value (DIV) for cyanide. In the absence of any UK published value, the detection limits have been adopted. Commercial GACs have been adopted based on the intended land use.

Table 20 is a comparison with the adopted GACs compared against the minimum and maximum site concentrations.

Table 20 – Comparison of Soil Laboratory Results with Adopted GACs (mg/kg)

Contaminant of Concern	No. of Samples	GAC	Source	Min	Max	No. Samples > GAC	Samples Exceeded
Asbestos	6	Absent	WDE	Absent	Absent	0	-
Total Phenols	6	760	LQM	BDL	BDL	0	-
Cyanide	6	50	DIV	BDL	BDL	0	-
Naphthalene	6	190	LQM	BDL	26	1	-
Acenaphthylene	6	83000	LQM	BDL	4.1	0	-
Acenaphthene	6	84000	LQM	BDL	71	0	-
Fluorene	6	63000	LQM	BDL	71	0	-
Phenanthrene	6	22000	LQM	BDL	1200	0	-
Anthracene	6	520000	LQM	BDL	430	0	-
Fluoranthene	6	23000	LQM	BDL	1200	0	-
Pyrene	6	54000	LQM	BDL	1200	0	-
Benzo(a)anthracene	6	170	LQM	BDL	400	1	BH3 @ 0.65m
Chrysene	6	350	LQM	BDL	390	1	BH3 @ 0.65m
Benzo(b)fluoranthene	6	44	LQM	BDL	340	1	BH3 @ 0.65m
Benzo(k)fluoranthene	6	1200	LQM	BDL	59	0	-
Benzo(a)pyrene	6	35	LQM	BDL	250	1	BH3 @ 0.65m
Indeno(1,2,3-cd)pyrene	6	500	LQM	BDL	72	0	-
Dibenz(a,h)anthracene	6	3.5	LQM	BDL	23	1	BH3 @ 0.65m
Benzo(ghi)perylene	6	3900	LQM	BDL	67	0	-
Arsenic	6	640	LQM	13	35	0	-
Boron	6	240000	LQM	BDL	1.9	0	-
Cadmium	6	190	LQM	BDL	0.20	0	-
Chromium	6	8600	LQM	5.8	27	0	-
Copper	6	68000	LQM	3.2	14	0	-
Lead	6	6600	C4SL	3.7	11	0	-
Mercury	6	1100	LQM	BDL	BDL	0	-
Nickel	6	980	LQM	4.7	26	0	-

<sup>3</sup> LQM/CIEH 2014. The LQM/CIEH S4ULs for Human Health Risk Assessment.



Selenium	6	12000	LQM	BDL	0.56	0	-
Vanadium	6	730000	LQM	9.9	120	0	-
Zinc	6	640	LQM	15	110	0	-
Benzene	6	27	LQM	BDL	BDL	0	-
Toluene	6	56000	LQM	BDL	BDL	0	-
Ethylbenzene	6	5700	LQM	BDL	BDL	0	-
Xylenes (sum)	6	5900	LQM	BDL	BDL	0	-
MTBE	6	DL	WDE	BDL	BDL	0	-
TPH - Aliphatic >C5 - C6	6	3200	LQM	BDL	BDL	0	-
TPH - Aliphatic >C6 - C8	6	7800	LQM	BDL	BDL	0	-
TPH - Aliphatic >C8 - C10	6	2000	LQM	BDL	BDL	0	-
TPH - Aliphatic >C10 - C12	6	9700	LQM	BDL	BDL	0	-
TPH - Aliphatic >C12 - C16	6	59000	LQM	BDL	10	0	-
TPH - Aliphatic >C16 - C21	6	1600000	LQM	BDL	69	0	-
TPH - Aliphatic >C21 - C35	6	1600000	LQM	BDL	150	0	-
TPH - Aromatic >C5 - C7	6	26000	LQM	BDL	BDL	0	-
TPH - Aromatic >C7 - C8	6	56000	LQM	BDL	BDL	0	-
TPH - Aromatic >C8 - C10	6	3500	LQM	BDL	BDL	0	-
TPH - Aromatic >C10 - C12	6	16000	LQM	BDL	BDL	0	-
TPH - Aromatic >C12 - C16	6	36000	LQM	BDL	42	0	-
TPH - Aromatic >C16 - C21	6	28000	LQM	BDL	380	0	-
TPH - Aromatic >C21 - C35	6	28000	LQM	BDL	1500	0	-
Total VOC's	6	DL	WDE	BDL	BDL	0	-

## 7.2 LEACHATE TESTING RESULTS

In the UK there are two published Environmental Assessment Levels (EALs) available for comparison with groundwater, the Water Framework Directive<sup>4</sup> and the Water Supply Regulations<sup>5</sup>, apart from TPH fractions, Ethylbenzene and Xylenes where the DWS and EQS values has been adopted, respectively. Detection Limit (DL) is used where a standard has not been derived. A comparison of the site concentrations with the appropriate target value is presented in Table 21 below, with the full results presented in Appendix G.

Table 21 – Comparison of WDE Leachate Laboratory Results with Target Values (mg/l)

Contaminant of Concern	No. of Samples	EAL	Source	Min	Max	No. Samples > EAL	Samples Exceeded
Total Phenols	1	0.0077	UK WFD	BDL	BDL	0	-
Cyanide	1	0.05	UK WSR	BDL	BDL	0	-
Naphthalene	1	0.002	UK WSR	BDL	BDL	0	-
Acenaphthylene	1	0.0001	UK WSR	BDL	BDL	0	-
Acenaphthene	1	0.0001	UK WSR	BDL	BDL	0	-
Fluorene	1	0.0001	UK WSR	BDL	BDL	0	-
Phenanthrene	1	0.0001	UK WSR	BDL	BDL	0	-
Anthracene	1	0.0001	UK WSR	BDL	BDL	0	-
Fluoranthene	1	0.0001	UK WSR	BDL	BDL	0	-

<sup>4</sup> The Water Framework Directive (Standards and Classifications) Directions (England and Wales). 2015.

<sup>5</sup> The Water Supply (Water Quality) Regulations. 2016.

Pyrene	1	0.0001	UK WSR	BDL	BDL	0	-
Benzo(a)anthracene	1	0.0001	UK WSR	BDL	BDL	0	-
Chrysene	1	0.0001	UK WSR	BDL	BDL	0	-
Benzo(b)fluoranthene	1	0.0001	UK WSR	BDL	BDL	0	-
Benzo(k)fluoranthene	1	0.0001	UK WSR	BDL	BDL	0	-
Benzo(a)pyrene	1	0.00001	UK WSR	BDL	BDL	0	-
Indeno(1,2,3-cd)pyrene	1	0.0001	UK WSR	BDL	BDL	0	-
Dibenz(a,h)anthracene	1	0.0001	UK WSR	BDL	BDL	0	-
Benzo(ghi)perylene	1	0.0001	UK WSR	BDL	BDL	0	-
Arsenic	1	0.01	UK WSR	BDL	0.00039	0	-
Boron	1	1	UK WSR	BDL	BDL	0	-
Cadmium	1	0.005	UK WSR	BDL	BDL	0	-
Chromium	1	0.05	UK WSR	BDL	0.0029	0	-
Copper	1	2	UK WSR	BDL	0.00073	0	-
Lead	1	0.01	UK WSR	BDL	BDL	0	-
Mercury	1	0.001	UK WSR	BDL	0.00028	0	-
Nickel	1	0.02	UK WSR	BDL	BDL	0	-
Selenium	1	0.01	UK WSR	BDL	BDL	0	-
Zinc	1	0.0123	UK WFD	BDL	BDL	0	-
Benzene	1	0.001	UK WSR	BDL	BDL	0	-
Toluene	1	0.074	UK WFD	BDL	BDL	0	-
Ethylbenzene	1	0.02	UK EQS	BDL	BDL	0	-
Xylenes (sum)	1	0.03	UK EQS	BDL	BDL	0	-
MTBE	1	DL	WDE	BDL	BDL	0	-
TPH - Aliphatic >C5 - C6	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic >C6 - C8	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic >C8 - C10	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic >C10 - C12	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic >C12 - C16	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic >C16 - C21	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic >C21 - C35	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic >C5 - C7	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic >C7 - C8	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic >C8 - C10	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic >C10 - C12	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic >C12 - C16	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic >C16 - C21	1	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic >C21 - C35	1	0.01	UK DWS	BDL	BDL	0	-

### 7.3 GROUNDWATER ANALYTICAL RESULTS

In the UK there are two published Environmental Assessment Levels (EALs) available for comparison with groundwater, the Water Framework Directive<sup>6</sup> and the Water Supply Regulations<sup>7</sup>, apart from TPH fractions, Ethylbenzene and Xylenes where the DWS and EQS values has been adopted respectively. Detection Limit (DL) is used where a standard has not been derived. A comparison of the river concentrations with the appropriate target value is presented in Table 22 below.

<sup>6</sup> The Water Framework Directive (Standards and Classifications) Directions (England and Wales) 2015

<sup>7</sup> The Water Supply (Water Quality) Regulations 2016

Table 22 – Comparison of Groundwater Results with Environmental Assessment Levels (EALs)  
(mg/l)

Contaminant of Concern	No. of Samples	EAL	Source	Min	Max	No. Samples > EAL	Samples Exceeded
Total Phenols	3	0.0077	UK WFD	BDL	BDL	0	-
Total Cyanide	3	0.05	UK WSR	BDL	BDL	0	-
Naphthalene	3	0.0001	UK WSR	BDL	BDL	0	-
Acenaphthylene	3	0.0001	UK WSR	BDL	BDL	0	-
Acenaphthene	3	0.0001	UK WSR	BDL	BDL	0	-
Fluorene	3	0.0001	UK WSR	BDL	BDL	0	-
Phenanthrene	3	0.0001	UK WSR	BDL	BDL	0	-
Anthracene	3	0.0001	UK WSR	BDL	BDL	0	-
Fluoranthene	3	0.0001	UK WSR	BDL	BDL	0	-
Pyrene	3	0.0001	UK WSR	BDL	BDL	0	-
Benzo(a)anthracene	3	0.0001	UK WSR	BDL	BDL	0	-
Chrysene	3	0.0001	UK WSR	BDL	BDL	0	-
Benzo(b)fluoranthene	3	0.0001	UK WSR	BDL	BDL	0	-
Benzo(k)fluoranthene	3	0.0001	UK WSR	BDL	BDL	0	-
Benzo(a)pyrene	3	0.00001	UK WSR	BDL	BDL	0	-
Indeno(1,2,3-cd)pyrene	3	0.0001	UK WSR	BDL	BDL	0	-
Dibenz(a,h)anthracene	3	0.0001	UK WSR	BDL	BDL	0	-
Benzo(ghi)perylene	3	0.0001	UK WSR	BDL	BDL	0	-
Arsenic	3	0.01	UK WSR	0.00057	0.0019	0	-
Boron	3	1	UK WSR	0.26	0.73	0	-
Cadmium	3	0.005	UK WSR	BDL	BDL	0	-
Chromium	3	0.05	UK WSR	0.00068	0.0042	0	-
Copper	3	2	UK WSR	0.0025	0.0066	0	-
Lead	3	0.01	UK WSR	BDL	BDL	0	-
Mercury	3	0.001	UK WSR	BDL	BDL	0	-
Nickel	3	0.02	UK WSR	0.0030	0.0042	0	-
Selenium	3	0.01	UK WSR	0.0013	0.0030	0	-
Zinc	3	3.0	UK WSR	BDL	0.0066	0	-
Benzene	3	0.001	UK WSR	BDL	BDL	0	-
Toluene	3	0.074	UK WFD	BDL	0.007	0	-
Ethylbenzene	3	0.02	UK EQS	BDL	BDL	0	-
Xylenes (sum)	3	0.03	UK EQS	BDL	0.0052	0	-
MTBE	3	DL	WDE	BDL	BDL	0	-
TPH - Aliphatic (>C5- C6)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic (>C6- C8)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic (>C8- C10)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic (>C10 - C12)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic (>C12 - C16)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic (>C16 - C21)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aliphatic (>C21 - C34)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic (>C5 – C7)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic (>C7 – C8)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic (>C8 –10)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic (>C10 – C12)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic (>C12 – C16)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic (>C16 - C21)	3	0.01	UK DWS	BDL	BDL	0	-
TPH - Aromatic (>C21 - C35)	3	0.01	UK DWS	BDL	BDL	0	-
Total VOC	3	DL	WDE	BDL	BDL	0	-

#### 7.4 WASTE CLASSIFICATION

Waste checkers have been performed on the encountered materials with the full results presented in Appendix G. Table 23 provides an overview of the likely waste classification for onsite materials.

Table 23 – Likely Waste Classification of Onsite Materials

Material	Waste Classification
Hydrocarbon Impacted Materials	Hazardous
Made Ground	Non-hazardous
Natural Soil Materials	Inert

The hydrocarbon impacted material in BH3 at 0.65m bgl is classified as hazardous material for offsite disposal. Further assessment in the form of WAC testing will be required to determine the type of landfill which can receive the waste.

Made ground will likely be classified as non-hazardous and natural soil materials will likely be classified as inert.

#### 7.5 COMPARISON WITH WATER UK THRESHOLD CONCENTRATION VALUES

The soil laboratory results from the upper 1.35m have been compared to the UKWIR thresholds for the selection of water supply pipes in Table 24 with full results presented in Appendix G.

Table 24 - Comparison of Soil Laboratory Results from the upper 1.35m with UKWIR (mg/kg)

Contaminant of Concern	No. of Samples	GAC	Source	Min	Max	No. Samples > GAC	Samples Exceeded
Total BTEX & MTBE	6	0.1	UKWIR	BDL	BDL	0	
Total SVOCs	6	2	UKWIR	BDL	BDL	0	
EC5-EC10 Aliphatics	6	2	UKWIR	BDL	BDL	0	
EC10-EC16 Aliphatics	6	10	UKWIR	BDL	10	1	BH4 @0.30m
EC16-EC40 Aliphatics	6	500	UKWIR	BDL	154	0	
EC5-EC10 Aromatics	6	2	UKWIR	BDL	BDL	0	
EC10-EC16 Aromatics	6	10	UKWIR	BDL	42	1	BH3 @0.65m
EC16-EC40 Aromatics	6	500	UKWIR	BDL	2130	1	BH3 @0.65m
Phenols	6	2	UKWIR	BDL	BDL	0	
Corrosive	6	Various	UKWIR	8.6	11.5	0	

There have been exceedances of the UKWIR threshold values in BH3 @0.65m bgl and in BH4 @0.30m bgl. Therefore, it is likely that additional mitigation measures in the form of protective pipe will be necessary. Further consultation should be sought with the water supply company.

## 7.6 CONCLUSIONS ON CONTAMINATION

The laboratory results from the soil samples retrieved during the investigation has identified several PAHs exceedances within BH3 at 0.65m (Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, and Dibenz(a,h)anthracene). There have been no exceedances within the groundwater or leachate analytical results. There are also identified TPH concentrations in BH3, which although are below the adopted GACs, indicate that there has been either been a surface spillage in the past in this area or that impacted materials have been brought onto site for use as a sub-base.

The elevated contaminants of concern are all of low volatility and are currently situated beneath concrete hard-standing. It is therefore considered unlikely that they will pose an unacceptable risk to sensitive receptors for the site in its current form and continued commercial use.

Should the site be redeveloped in the future, then additional actions may be required to ensure that this area is made suitable for the intended use. Future redevelopment is likely to require additional plume delineation around BH3, with additional investigation within the existing building footprint followed by a Remedial Strategy/Verification Plan.

A revised source-pathway-receptor assessment is presented in Table 25.

Table 25 – Summary of Revised Source-Pathway-Receptor Assessment

Sources	Potential Pathway	Potential Receptor	Risk Classification
Onsite Sources	Dermal contact, ingestion, outdoor and indoor inhalation	Human Health (Onsite Commercial)	Low/Moderate Risk
Onsite Sources	Vapour inhalation from dissolved phase groundwater migrating from site to neighbouring commercial properties	Human Health (Offsite Commercial)	Low Risk
Onsite Sources	Impacted soil leaching to groundwater within Secondary A Aquifer	Controlled Waters (Groundwater)	Low Risk
Onsite Sources	Impacted soil leaching to surface water	Controlled Waters (Surface water)	Low Risk
Offsite Source	Vapour inhalation from dissolved phase migration from offsite sources	Human Health (Onsite Commercial)	Low Risk
Made ground, bedrock geology	Source for ground gas and radon generation	Human Health (Onsite Commercial)	Low/Moderate Risk

## 8.0 GROUND ENGINEERING

### 8.1 FIELD TESTING RESULTS

An appraisal of the geotechnical field parameters of the encountered strata are summarised below in Table 26. The full results and graphs plotting the N-values are presented in Appendix H.

Table 26 – Field Geotechnical Results

Description	Average Depth To-From (m)	SPT N Value	Calculated N Value	Inferred Strength of Material
Gravelly Clay	0.70 – 2.20	6 - 50	2 - 50	Soft to stiff

### 8.2 GEOTECHNICAL TESTING

Particle size distribution (PSD), Moisture Content, Atterberg Limits and Triaxial Tests were carried out on representative soil samples collected during the intrusive investigation. A copy of the test results is presented in Appendix H and are summarised in Table 27.

Table 27 – Summary of Geotechnical Properties

Description	Average Depth To-From (m)	Moisture Content (%)	Modified Plasticity Index (%)	PSD's (%)			Undrained Shear Strength (cu kPa)
				Gravel	Sand	Fines	
Gravelly Clay	0.70 – 2.20	27 - 39	30 - 49	16 - 18	22 - 43	41 - 60	42 - 50

Testing of the clay materials returned high to very plasticity values. The modified plasticity index of 30 - 49% indicates a medium to high volume change potential (VCP). The undrained shear strength results indicate the clay is of medium strength (firm) between 0.70m and 2.20m.

Following laboratory testing of cohesive soils, the most commonly accepted method for determining the degree of desiccation<sup>8</sup> is that significant desiccation has occurred when the moisture content is less than 0.4 x the liquid limit. A summary of whether the materials are potentially desiccated is presented in Table 28. Values are calculated after soil particles with a nominal diameter greater than 425µm are removed in line with BS1377.

Table 28 – Potential for Desiccation of Soils

Borehole	Depth (m)	MC (%)	Modified LL (%)	0.4 x LL (%)	Significant Desiccation
BH1	2.60	34	66	26	No
BH2	1.20	30	53	21	No
BH3	2.40	38	70	28	No

<sup>8</sup> BRE 1996. Desiccation in clay soils. Digest 412.

BH4	1.10	27	90	36	Yes
BH5	1.20	27	76	30	Yes
BH6	2.10	39	76	30	No

Potential desiccation has been identified in BH4 at 1.10m bgl and in BH5 at 1.20m bgl, which are in close proximity to mature trees.

### 8.3 CONCRETE DESIGN PARAMETERS

A summary of the sulphate, pH and corresponding BRE concrete in aggressive ground parameters<sup>9</sup> for concrete design are presented in Table 29.

Table 29 – Summary of BRE Concrete in Aggressive Ground Parameters

Location	Concrete Parameters
pH (pH Units)	8.6-11.5
Water Soluble Sulphate as (2:1 Leachate Equivalent) (mg/l)	360
ACEC Classification	AC-1s
Design Sulphate Class	DS-1

Concentrations have been analysed in line with BRE Special Digest 1: 2005<sup>10</sup>

### 8.4 EXCAVATIONS, GROUNDWATER CONTROL AND SERVICES

Groundwater was encountered during the monitoring round between 0.49m and 2.02m and is suspected to be perched. Special precautions for dewatering perched water from shallow excavations may be required. Excavation walls are unlikely to require additional support within the upper 2.00m.

### 8.5 PRELIMINARY ROAD DESIGN PARAMETERS

CBR values obtained from the dynamic probe testing with the upper 2m of the proposed development within DP5 and DP6 are presented in full in Appendix H and can be calculated using the following equation:

$$\text{LogCBR}=2.628-1.273\log(\text{DCP})^{11}$$

Table 30 – Summary of CBR Values in the Upper 1.60m

Location	CBR %
DP5	1.21 – 2.92
DP6	0.00 – 2.92

<sup>9</sup> BRE 2005. Concrete in Aggressive Ground. Special Digest 1.

<sup>10</sup> Building Research Establishment (BRE) Special Digest 1: 2005 Third Edition, Concrete in aggressive Ground”

<sup>11</sup> Kley & Van Harden (1983)



The dynamic probes refused at 1.70m bgl in DP5 and 1.00m bgl in DP6, with calculated CBR% values of 175.

It is anticipated that the soils encountered at formation level will be a mixture of cohesive and incohesive materials and will be above the water table. The amount of loading is unknown for the roads and pavements, but for poor to good construction conditions<sup>12</sup>, a CBR design value of 2.5 to 3% is recommended for initial design.

Where the CBR is <2% it will be required to either increase the capping layer or to excavate out any soft spots.

#### 8.6 SOAKAGE POTENTIAL

The falling head test (BH2) indicates poor permeability ( $<10^{-6}$  m/sec) within the clay materials, indicating that traditional soakages to ground are unlikely to be feasible.

It is recommended a drainage engineer is consulted to formulate the drainage design of any new development.

#### 8.7 PRELIMINARY FOUNDATION DESIGN

It is understood that the land is undergoing acquisition and is to remain in its current configuration for continued commercial use.

For potential future developments, shallow foundations are likely to be appropriate, with strip or pad foundations adopted for two-storey design. Consideration will need to be given to the gravelly clay which has medium to very high-volume change potential and potential desiccation within BH4 and BH5 between 1.10m and 1.20m bgl. In line with NHBC guidance, foundations will need to extend a minimum of 300mm into the natural silty clay to a minimum depth of 1.00m bgl. An allowable bearing capacity of 100kN/m<sup>2</sup> can be adopted for founding into the gravelly clay.

Alternatively, a piled foundation design may be more appropriate for the proposed development loads. It is recommended that a structural engineer is consulted for the detailed foundation design on any future development.

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<sup>12</sup> TRRL 1984 Structure Design of Bituminous Roads. Report LR1132



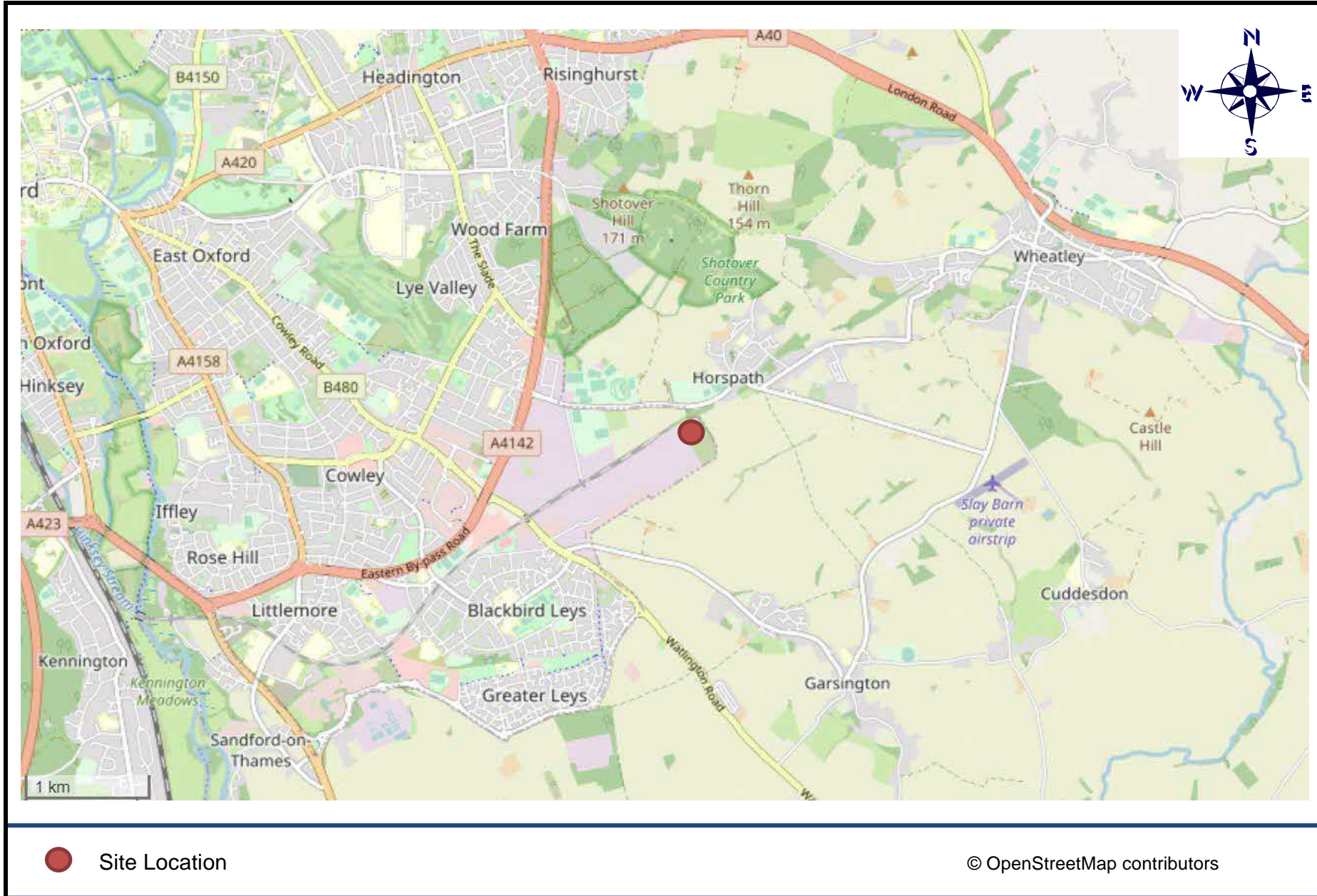
## 9.0 RECOMMENDATIONS

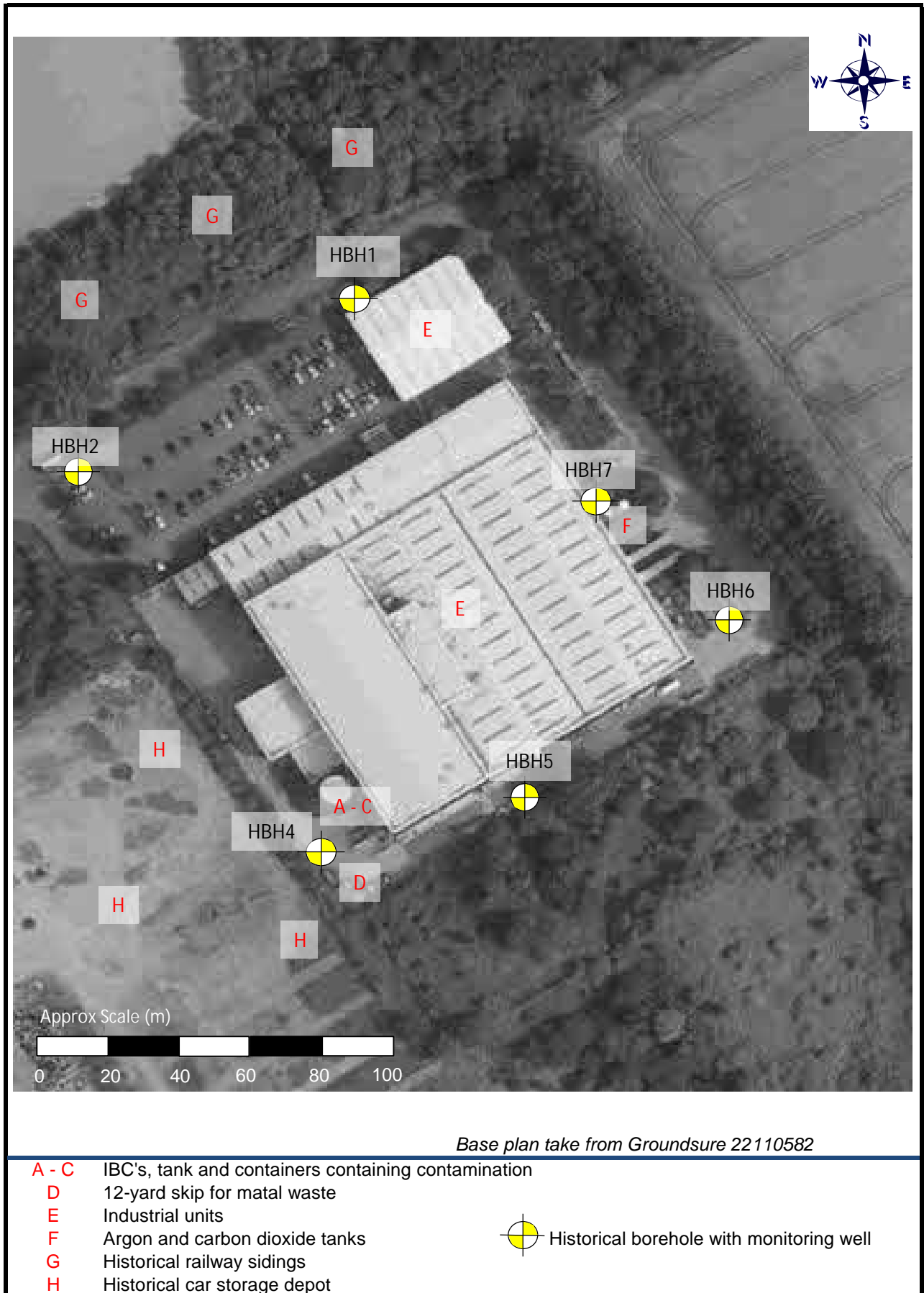
WDE recommends that the following actions are undertaken:

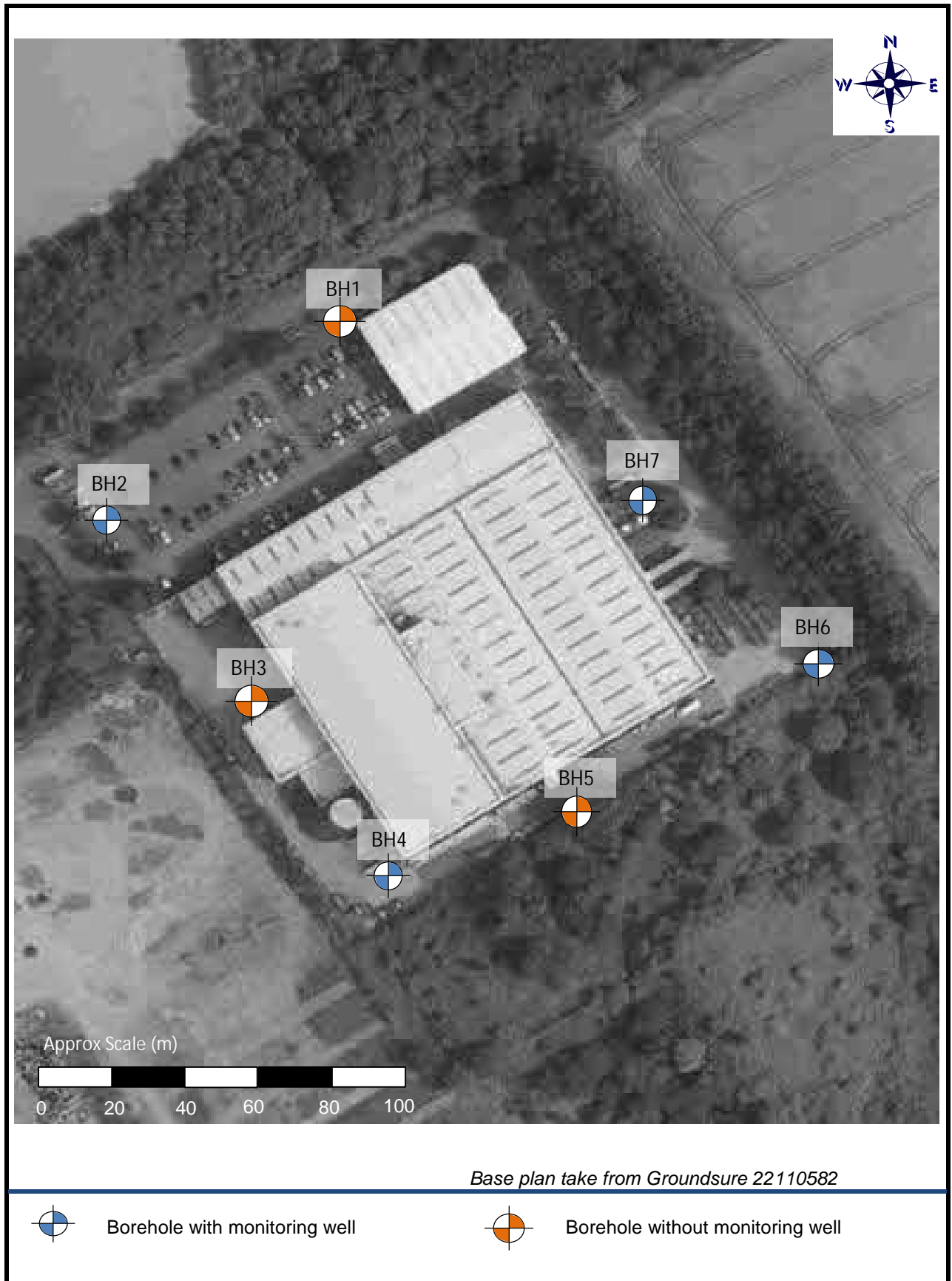
No further actions are considered to be required for the site in its current configuration for continued commercial use.

Future redevelopment of the site is likely to require additional intrusive investigations for plume delineation and within the building footprint, followed by a Remedial Strategy/Verification Plan

FIGURES







## APPENDIX A - LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

Charterhouse Investment Oxford Ltd (the client) has requested that a Geo-Environmental Site Assessment be performed for UYS Facility, Garsington Road to provide information to permit formulation of an opinion as to the potential for risks to human health & controlled waters posed by identified substances of concern.

The Geo-Environmental Site Assessment was conducted and this report has been prepared for the sole use and reliance of the Client. This report shall not be relied upon or transferred to any other parties without the express written authorisation of WDE Consulting Limited. If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this Geo-Environmental Site Assessment are based on information obtained from a variety of sources as detailed within this report, and which WDE Consulting Limited believes are reliable. Nevertheless, WDE Consulting Limited cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

The report represents the findings and opinions of experienced geo-environmental consultants. WDE Consulting Limited does not provide legal advice and the advice of lawyers may also be required.

The Client is advised that the conditions stated within reports supplied to WDE Consulting Limited are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance and may subsequently have become observable.

It is possible that WDE Consulting's research, while fully appropriate for a Geo-Environmental Site Assessment, failed to indicate the existence of important information sources. Assuming such sources actually exist, their information could not have been considered in the formulation of WDE Consulting's findings and opinions.

Certain indicators or evidence of hazardous substances may have been outside the very limited portion of the subsurface investigated or monitored, latent at the time of this work or only partially intercepted by the works and thus their full significance could not have been appreciated. Groundwater levels are particularly susceptible to variations due to seasonal or other effects. Any comments on groundwater conditions are based on observations and analyses made by third parties at the time the site work was carried out. Accordingly, it is possible that WDE Consulting's work, whilst fully appropriate for a Geo-Environmental Site Assessment failed to indicate the presence or significance of hazardous substances. Assuming such materials present a hazard, their presence could not have been considered in the formulation of WDE Consulting's findings and opinions. The subsurface geological profiles and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

Any interpretation of the results of the Geo-Environmental Site Assessment has been based on the proposed site usage and the findings are not valid should the proposed land use and/or the regulatory regime/guidance change. Where interpretation is based on public domain guidance/protocols/models/software/code, WDE Consulting Limited is not liable for errors in the guidance/protocols/models/software/code.

WDE Consulting Limited believes that providing information about limitations is essential to help the client identify and thereby manage their risks. These risks can be mitigated, but they cannot be eliminated, through additional research. WDE Consulting Limited will on request, advise the client of the additional research opportunities available, their impact on risk, and their cost.

In preparing this report, it has been assumed that all past and present occupants have provided all relevant and other information, especially relating to known or potential hazards. This report is not required to identify insufficiencies or mistakes in the information provided by the user/owner or from any other source, but has sought to compensate for these where obvious in the light of other information.

The work is also subject to WDE Consulting's standard terms and conditions.



## APPENDIX B - RELEVANT GUIDANCE AND LEGISLATION

WDE Consulting has duly taken account of the recommendation contained within relevant guidance documents and legislation during the preparation of this report.

### CONTAMINATION

Part IIa of the Environmental Protection Act 1990 defined contamination in relation to continued land use and introduced the “polluter pays” principle. The Groundwater Regulations 1998 defined List 1 and List 2 substances and the procedures for preventing them from entering groundwater. The Water Resources Act of 1991 introduced the term “controlled waters” and gave powers to the Environment Agency to require remediation where there was pollution of controlled waters.

The National Planning Policy Framework<sup>13</sup> requires the following:

The site is made suitable for its intended use, taking account of all ground conditions arising from natural and former activities, pollution arising from previous uses and proposals for mitigation including land remediation.

After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990.

Adequate site information, prepared by a competent person, is presented.

The methodology adopted for this report follows the Land Contamination Risk Management (LCRM) issued by the Environment Agency<sup>14</sup>. The LCRM process provides a reasoned and structured process to identify potential risk issues and, where necessary, provide a way forward to develop a robust risk management strategy to address potentially unacceptable risks in an appropriate manner. Contained within the LCRM Framework are the following stages:

1. Stage 1 Preliminary Risk Assessment (Conceptual Model)
2. Collection of appropriate Site Information
3. Stage 2 Comparison with Generic Criteria
4. Stage 3 Detailed Quantitative Risk Assessment
5. Preparation of Remedial Options Appraisal
6. Verification Plan

British Standards has issued guidance for the Investigation of Potentially Contaminated Sites<sup>15</sup> and for undertaking Site Investigations<sup>16</sup> which have duly been considered. An update to the potential human

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<sup>13</sup> Department of Communities and Local Government. March 2012

<sup>14</sup> Environment Agency. 2020. Land contamination risk management

<sup>15</sup> British Standards 2011. Investigation of Potentially Contaminated Sites-Codes of Practice. BS10175:2011

<sup>16</sup> British Standards. 2015. Code of Practice for Site Investigations. BS5930

health exposure pathways is provided in the Environment Agency Soil Science Report SR3<sup>17</sup>. In 2008 the Environment Agency and the National House-Building Council (NHBC), Chartered Institute of Environmental Health (CIEH) released a joint publication for the Safe Development of Housing on Land Affected by Contamination<sup>18</sup>. Guidance is provided in the CLR Report No 4 on sampling strategies for contaminated land<sup>19</sup>.

## WASTE MANAGEMENT

The EU Waste Framework Directive 2008 presents the legislative framework for the collection, transport, recovery and disposal of waste. This framework provides a five step hierarchical plan for managing waste comprising prevention, preparing for re-use, recycling, recovery and disposal, which have been made into UK law via the UK Waste Regulations 2011. This requires all businesses/organisations that either produces or handles waste to either prevent waste or to apply the waste hierarchy for the transfer of waste. The Environment Protection (Duty of Care) Regulations 1991 require that transfer notes are used to identify the type of waste, volume, source and intended destination along with the details of the licensed carrier.

The Agency have published guidance on the classification of Hazardous Waste<sup>20</sup>, which defines how man-made materials are classified as being hazardous by exceeding at least one of the fifteen hazardous properties (H1 to H15). Man Made materials can either be absolute hazardous, absolute non-hazardous or mirror and if mirror then an assessment needs to be made as whether the materials poses any of the hazardous properties before classifying the materials as being either hazardous or non-hazardous. The Agency has also published guidance on the Waste Acceptance at Landfills<sup>21</sup>. Landfills are classified as to whether they can accept hazardous, non-hazardous or inert materials. Waste Acceptance Criteria (WAC) thresholds have been set to determine the class of landfill that can accept the materials. Disposal of hazardous materials requires pre-treatment. WAC limits are not to be used for determining whether waste is hazardous.

The CL:AIRE CoP of the Definition of Waste<sup>22</sup> was developed to provide clarity on when the reuse of site won materials will cease to be the waste. It requires the development of Material Management Plan (MMP) that is specific to the site and the intended reuse of materials. The MMP will need to be based on a site specific Remedial Strategy/Design Statement that will demonstrate that the reuse of the site won materials will not pose an unacceptable risk to sensitive receptors. There will then need to be a requirement for verification that the proposed reuse has been carried out as was planned.

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<sup>17</sup> Environment Agency, August 2008, Updated technical background to the CLEA model, Science Report - SC050021/SR3

<sup>18</sup> Environment Agency, 2008. Guidance for the Safe Development of Housing on Land Affected by Contamination. R&D 66

<sup>19</sup> DOE. 1994. Sampling Strategies for Contaminated Land. CLR Report No 4

<sup>20</sup> Environment Agency, 2013. Interpretation of the Definition and Classification of Hazardous Waste. Technical Guidance WM2

<sup>21</sup> Environment Agency, 2010 Waste Acceptance at Landfills. Version 1.

<sup>22</sup> CL:AIRE 2001. The Definition of Waste: Development Industry Code of Practice. Version 2.



## GROUND GAS

The following relevant guidance will be used to assess the risks posed by ground gas:

CIRIA Assessing risks posed by hazardous ground gases to buildings<sup>23</sup>

NHBC, Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present<sup>24</sup>

The Building Regulations Site Preparation and resistance to contaminants and moisture. <sup>25</sup>

British Standard. Guidance on Investigations for Ground Gas<sup>26</sup>

The 2007 CIRIA guidance calculates a gas screening value to identify the protective measures required, as shown in Table B1

Table B1 – Summary of CIRIA 2007 Guidance

Characterisation Situation	Risk Classification	Gas Screening Value	Typical Factors	Protective Measure
1	Very Low	<0.07	Methane <1% or carbon dioxide <5%; otherwise increase to Situation 2	No special precautions (see recommendation)
2	Low	<0.7	Air Flow rate <70l/hr; otherwise increase to Situation 3	Block and beam with 2,000g, Cast in situ with 1,200g. All joints and penetrations sealed
3	Moderate	<3.5	-	As above but with gas resistant membranes and passively ventilated or positive pressured sub-floor void
4	Moderate to High	<15	QRA recommended	As above but with oversite capping, in-ground venting layer and in ground wells or barriers
5 – 6	High to Very High	<70		Not suitable unless gas regime is reduced first and QRA completed

## UK WATER SUPPLY PIPES

The following guidance has been followed for the selection of water supply pipes:

UKWIR Guidance for the selection of Water Supply Pipes<sup>27</sup>

Water UK Contaminated Land Assessment Guidance<sup>28</sup>

These mainly apply to brownfield sites, although may apply to Greenfield sites should the preliminary risk assessment identify there is a potential for contamination to be present.

<sup>23</sup> CIRIA 2007. Assessing Risks Posed by Hazardous Ground Gases to Buildings. C665

<sup>24</sup> NHBC 2007. Guidance on Evaluation of Development Proposals on Sites where methane and carbon dioxide are present

<sup>25</sup> Building Regulations 2004. Approved Document C, Site Preparation and resistance to contaminants and moisture.

<sup>26</sup> British Standards 2013. Guidance on Investigation for Ground Gas. BS8576. 2013

<sup>27</sup> UK Water Industry Research 2011. Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites. 10/WM/03/21

<sup>28</sup> Water UK 2014. Contaminated Land Assessment Guidance.

## GROUND ENGINEERING

In accordance with BS-EN-1997-1 2004 Geotechnical Design: General Rules, engineering parameters for use in geotechnical design have been assessed using a three-step process:

1. Compilation of test data to determine a range of values for each relevant engineering parameter either by using direct results, geotechnical theory/correlations or empiricism
2. Use of engineering judgement to determine a characteristic value for each parameter
3. Application of partial factors to give a design value for each parameter

Geotechnical site assessments were carried out in accordance where practical with the recommendations of BS EN 1997:2 2007 Eurocode 7 Geotechnical Design: Ground Investigation and Testing. This report has been written in line with the requirements of a Ground Investigation Report (GIR) as set out in BS EN 1997:2 and does not constitute a Geotechnical Design Report.

## SOAKAGE TESTING AND DESIGN

The following guidance has been followed during the soakage testing:

Falling Head Tests in boreholes – BS593016

The CIRIA publication<sup>29</sup> provides guidance as to the required distance of buildings from soakages to ground in chalk as follows:

- 20m distance of soakaways from buildings where dissolution features are known to be prevalent
- 10m distance of soakaways from buildings where chalk is low density or unknown
- 5m distance of soakaways from buildings where chalk is of medium to high density

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<sup>29</sup> CIRIA. 2002. Engineering in Chalk. C574.

APPENDIX C - SITE PHOTOS

Photo 1: Access to the UYS building, facing NE



Photo 2: View of the two industrial buildings and the carpark, facing NE





Photo 3: 6no. IBC containers, facing NW



Photo 4: Waste water/oil Above Ground Storage Tank



Photo 5: 5no. steel storage containers with IBC's and Storage tank, facing NW



Photo 6: Steel storage container for waste oil materials

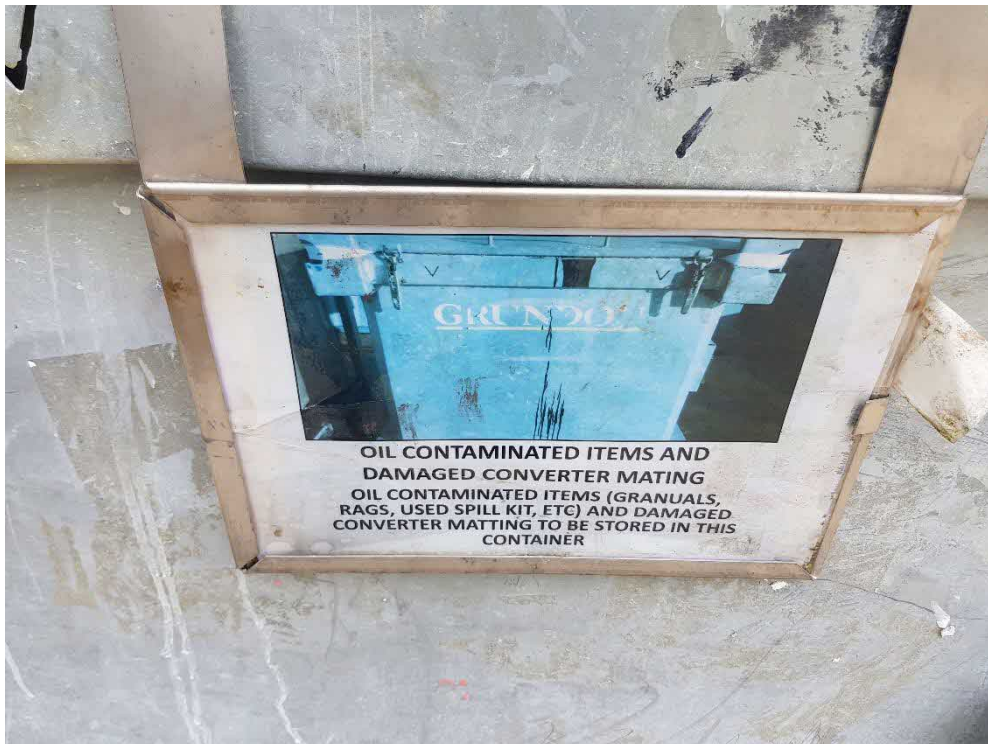




Photo 7: Steel storage container for empty aerosols



Photo 8: Steel storage container for lead acid batteries

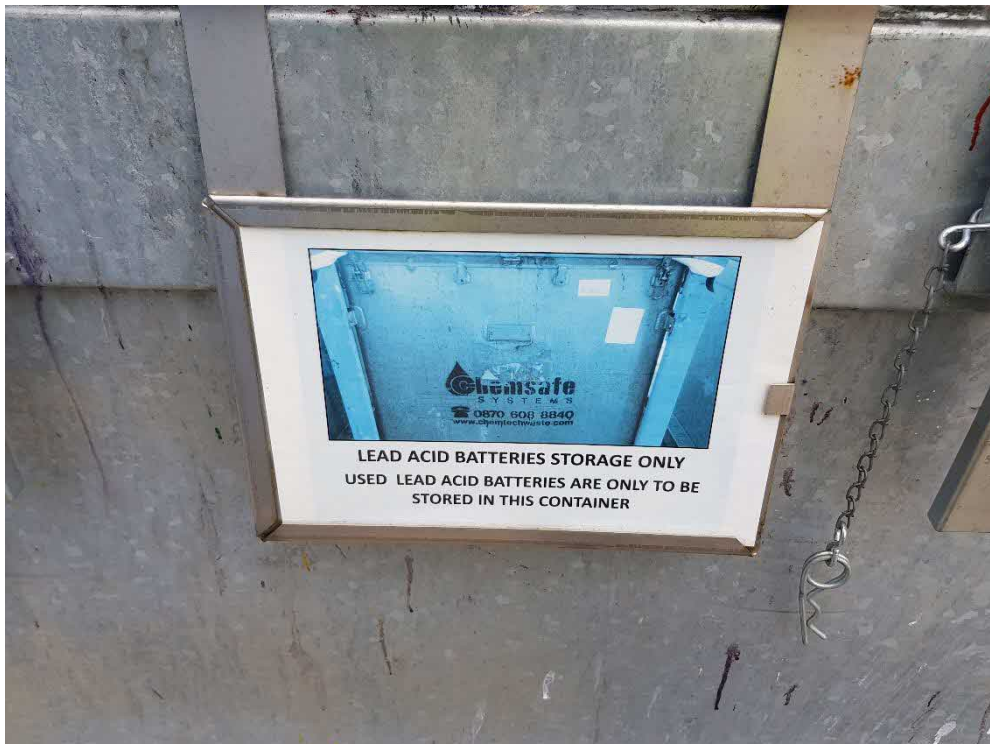


Photo 9: 2no 12-yard skips for metal waste



Photo 10: Liquid argon and carbon dioxide tanks, facing SE





Photo 11: Adjacent car storage depot



Photo 12: Window Sampler rig at BH4





APPENDIX D  
Environmental Database

Premise at Garsington Road, Cowley, Oxford, OX4 2BW

## Professional opinion

Written by: L Speller BSc (Hons) FGS  
Reviewed by: C Butler, MSc PIEMA



**Contaminated Land**

**Moderate:  
Acceptable Risk**

page 6



**Flood Risk**

**Moderate-High**

page 8

Consultant's guidance and recommendations inside.



**Operational Environmental Risk**

**Moderate**

page 6



**Ground Stability**

**Identified**

page 8



**Radon**

**Identified**

page 8



**Energy**

**Identified**

page 9



**Transportation**

**Identified**

page 10



**Planning Constraints**

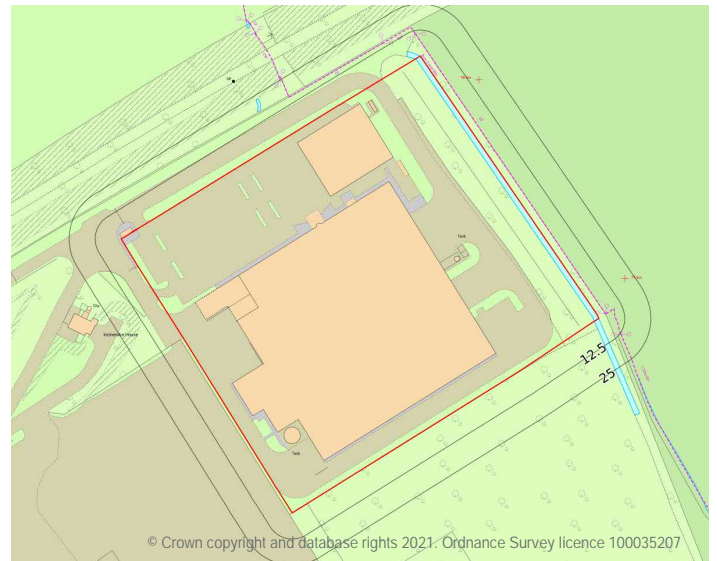
**Identified**

page 11



**Planning Applications**

Not selected



## Contaminated land liability

### Banking security

Is it likely that the property will represent acceptable banking security from a contaminated land perspective?

Yes

### Statutory or 3rd party action

Is there a risk of statutory (e.g. Part 2A EPA 1990) or third party action being taken against the site?

Unlikely

### Environmental liability

Is there a risk that the property value may be impacted due to contaminated land liability issues?

Unlikely

## Useful contacts

Oxford City Council:  
<http://www.oxford.gov.uk/>  
customerservices@oxford.gov.uk  
01865 249 811

Environment Agency National Customer  
Contact Centre (NCCC):  
enquiries@environment-agency.gov.uk  
03708 506 506

## Overview of findings and recommendations

To save you time when assessing the report, we only provide maps and data tables of features within the search radius that we have identified to be of note. These relate to environmental risks that may have liability implications, affect insurance premiums, property values and/or a lender's willingness to lend.

You can view the fully comprehensive library of information we have searched on **page 41**.



### Contaminated Land

Groundsure considers there to be an acceptable level of risk at the site from a contaminated land liability standpoint. However, some potentially contaminative land uses have been identified including the current land uses on site and in proximity. Potential issues associated with these activities could include: fuel storage; hazardous substance handling and/or storage; waste management; etc. Groundsure has assumed that in the absence of any information to the contrary, for the purposes of this assessment, that no significant operational environmental liabilities are associated with the site and it is run in an environmentally responsible manner.

If you require further advice with regards to this, please contact our customer services team on 08444 159 000 or e-mail at [info@groundsure.com](mailto:info@groundsure.com).



### Flood Risk

#### Flood risk

An elevated level of flood risk has been identified at the property.



## Next steps for consideration:

- investigate the insurance on offer for the property to ensure any implications on premiums are fully understood before completion
- the assessment in this report is based on the highest flood risk found within the site boundary. The detailed maps within the flood section clearly highlight which parts of the site are affected by flooding, allowing you to visualise whether flood risk affects the buildings or the associated land. If you would prefer an assessment that provides separate flood ratings for the main dwelling and the associated land, Groundsure can provide this for a fee of £35 plus VAT
- if the property has recently been constructed, the flood risk assessment contained within this report will not take into account any measures put in place by the developer to deal with flooding. You should seek further information from the developer on flood risk mitigation for the site
- investigate the various forms of flood resistance and resilience measures that will help protect your property in the event of a flood

## National Planning Policy Framework (NPPF)

A full flood risk assessment will be required at the site in the event that it will be developed/redeveloped. The NPPF states that the flood risk assessment should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account. Those proposing developments should take advice from the emergency services when producing an evacuation plan for the development as part of the flood risk assessment.



## Ground stability

The property is indicated to lie within an area that could be affected by natural ground subsidence. You should consider the following:

## Next steps for consideration:

- carry out a visual inspection of the property looking out for cracks and other signs of ground instability. This inspection should be carried out by a suitably qualified and experienced person
- if signs of instability are evident from the visual inspection, it would be prudent to carry out a Level 3 Building Survey to further clarify the extent to which the property is affected by the identified risk
- contact the relevant Local Authority departments (e.g Planning department, Building Regulations) to ask for records of the property and local area relating to subsidence
- remember that professional advice should be sought before altering the ground in any way at the property, including the planting of trees.

## Radon

The property is in an area where elevated radon levels are expected to be found in 1-3% of properties.

### Next steps for consideration:

- if the property is a new build, you can check compliance on radon protection with the developer
- if you are buying a currently occupied property, ask the present owner whether radon levels have been measured and, if so, whether the results were above the radon Action Level. If they were, ask what remedial measures were installed, were radon levels re-tested and did the re-testing confirm the measures have been effective
- if testing has not been carried out, it would be a sensible precaution to arrange for the property to be tested with radon detectors. If initial short-term radon screening tests are inconclusive, or the purchaser would prefer to carry out a full three-month test, it may be possible to arrange a 'radon bond'
- high levels of radon can be reduced through carrying out remedial works to the property
- No radon protection measures will be required to be installed in the event that any new buildings or extensions are added to the property.
- See <http://www.radonassociation.co.uk/guide-to-radon/information-for-employers/> for further information

## Other considerations

These are next steps associated with non-environmental search returns on matters of energy and transport infrastructure and planning constraints.

## Energy

### Wind

Existing or proposed wind installations have been identified within 5km.

### Next steps for consideration:

- use the details given in the report to find out more about the potential impacts on the property
- contact the operating company and the relevant Local Authority for further information
- visit the area in order to more accurately assess the impact this wind development would have on the property

## Solar

Existing or proposed solar installations have been identified within 5km of the property.

### Next steps for consideration:

- use the details given in the report to find out more about the potential impacts on the property by contacting the operating company and/or Local Authority
- visit the area in order to more accurately assess the impact this solar farm would have on the property

## Power stations

One or more Power Stations have been identified within 5km of the property.

### Next steps for consideration:

- visit the power station operator's website for further information. Many power stations have large amounts of information on their local impacts available on the operator's website
- additionally, you could contact the Air Quality team of the Local Authority which may hold additional information regarding any air quality impacts in the area
- if a nuclear installation has been identified, consider visiting <http://www.onr.org.uk/regulated-sites.htm> for further information on the site



## Transportation

### Railways

The property lies within 250m of an active railway.

### Next steps for consideration:

- consider visiting the property at different times of day and night in order to gauge relative noise and vibration levels that may result from normal operations. It may also be prudent to check the operational hours for the relevant line(s) and check whether structural surveys at the property have considered the potential for vibration from trains to have resulted in property damage



## Consultant's assessment



Environmental searches are designed to ensure that significant hazards and risks associated with this property are identified and considered alongside the investment in or purchase of a property. Please see **page 2** for further advice.



### Contaminated Land

The Contaminated Land assessment has been completed by a qualified environmental consultant and includes a manual review of our extensive collection of high detailed Ordnance Survey maps and environmental data. Please see **page 15** for details of the identified issues.

Past Land Use	Moderate
Waste and Landfill	Low
Current and Recent Industrial	Moderate
Operational environmental risk	Moderate

## Current and proposed land use

### Current land use

Groundsure has been advised by the client (or their advisers) that the property is currently used as a warehouse.

The site has been identified to comprise a unit across the centre and south west, with a tank in the south west, and a further unit in the north east. A drain and area of woodland are noted along the eastern perimeter and a further tank is located in the centre east. The remainder of the plot is occupied by hardstanding.

### Proposed land use

Groundsure has assumed that the property will remain in its current use.

### Site location

The site lies within an industrial area of Oxford.

### Surrounding area

**North:** An access road with woodland, drains and open land beyond.

**South:** Woodland.

**East:** Open land.

**West:** Commercial buildings and industrial hardstanding.

## Historical land use

### On-site

The site history, based on a review of Groundsure's high detailed historical mapping, is as follows:

- **1880** - The site comprised open land crossed by a drain from the centre north to the south west.



- **1880 - 1966** - No significant changes were observed.
- **1969** - Areas of worked ground were established in the north and north west.
- **1969 - 1975** - No significant changes were observed.
- **1993** - The drain had been diverted from the south west to the south east.
- **1993 - 1994** - No significant changes were observed.
- **2003** - (Aerial Photography). A unit had been built in the centre and south west, along with a tank in the south west and further tanks in the centre east.
- **2017** - (Aerial Photography). A further unit had been built in the north east, bringing the site to resemble its current layout.

## Surrounding area

In addition, we have identified the following points of interest in proximity to the study site:

- **1969 - Present** - A car storage depot adjacent to the west, noted as a depot since 1993.

## Environmental permits and register entries

No Environmental Permits of concern have been identified on site or in proximity to the property. No entries on the Local Authority's Contaminated Land Register have been identified within 250m of the site.

## Site setting and overall environmental sensitivity

The site is situated on underlying geology comprising superficial head deposits along with alluvium, underlain by bedrock layers of the Wheatley Limestone Member and the Ampthill Clay Formation. Groundwater mapping indicates the superficial deposits to be classified as Secondary A and Secondary Undifferentiated aquifers and bedrock layers to be classified as a Secondary A aquifer and an unproductive stratum.

Potentially vulnerable receptors have been identified including site users, several surface water features and the underlying aquifer. Additionally, an area of Green Belt is noted 4m to the north east. Groundsure considers that the property has a high environmental sensitivity.

## Operational environmental risk

Using recent mapping, aerial photography and the data in this report we consider the site to have a Moderate ongoing operational environmental risk.

As the site currently appears to be in industrial use, a prudent purchaser may wish to consider operational issues further to quantify any liabilities under the Environmental Damage Regulations. If you require an assessment of operational risk at the property, please contact Groundsure for further advice.

## Conclusion

Groundsure has identified that the subject site has the potential to be impacted by ground contamination as a result of historical and current land uses. However, the study site is considered unlikely to be subject to individual statutory investigation, given the continuation of the site's current use and assuming acceptable ongoing levels of environmental management. Groundsure therefore concludes the site represents an Acceptable Environmental Risk. Please refer to the Groundsure Risk Assessment Methodology contained within this report.



## Environmental summary



### Flood Risk

The property and area within the site outline is at risk from one or more kinds of flooding. Property's overall risk assessment for past flooding and river, coastal, surface water and groundwater flooding is moderate-high.

Please see [page 28](#) for details of the identified issues.

River and Coastal Flooding	Very Low
Groundwater Flooding	Low
Surface Water Flooding	Significant
FloodScore™ insurance rating	High
Past Flooding	Not identified
Flood Storage Areas	Not identified
NPPF Flood Risk Assessment required if site redeveloped?	Yes



### Ground stability

The property is assessed to have potential for natural or non-natural ground subsidence.

Please see [page 30](#) for details of the identified issues.

Natural Ground Stability	Moderate-High
Non-Natural Ground Stability	Not identified



### Radon

The property is in a radon affected area. This could mean that inhabitants are at risk from the harmful effects of radon. The percentage of homes estimated to be affected by radon in your local area is between 1% and 3%.

Please see [page 31](#) for details of the identified issues.

In a radon affected area



## Energy summary



### Oil and gas

No historical, active or planned wells or extraction areas have been identified near the property.

Oil and gas areas  
Oil and gas wells

Not identified  
Not identified



### Wind and Solar

Our search of existing and planned renewable wind and solar infrastructure has identified results.

Please see **page 2** for further advice. Additionally, see **page 32** for details of the identified issues.

Planned Multiple Wind  
Turbines

Not identified

Planned Single Wind Turbines

**Identified**

Existing Wind Turbines

Not identified

Proposed Solar Farms

**Identified**

Existing Solar Farms

**Identified**



### Energy

Our search of major energy transmission or generation infrastructure and nationally significant infrastructure projects has identified results.

Please see **page 2** for further advice. Additionally, see **page 35** for details of the identified issues.

Power stations

**Identified**

Energy Infrastructure

Not identified

Projects

Not identified



## Transportation summary



### HS2

No results for Phase 1 or Phase 2 of the HS2 project (including the 2016 amendments) have been identified within 5km of the property. However, HS2 routes are still under consultation and exact alignments may change in the future.

Visual assessments are only provided by Groundsure if the property is within 2km of Phase 1 and 2a. Other assessments may be available from HS2.

HS2 Route	Not identified
HS2 Safeguarding	Not identified
HS2 Stations	Not identified
HS2 Depots	Not identified
HS2 Noise	Not assessed
HS2 Visual impact	Not assessed

### Crossrail

The property is not within 250 metres of either the Crossrail 1 or Crossrail 2 project.

Crossrail 1 Route	Not identified
Crossrail 1 Stations	Not identified
Crossrail 1 Worksites	Not identified
Crossrail 2 Route	Not identified
Crossrail 2 Stations	Not identified
Crossrail 2 Worksites	Not identified
Crossrail 2 Safeguarding	Not identified
Crossrail 2 Headhouse	Not identified

### Other Railways

Our search indicates the property is within 250 metres of railways or railway stations, subway or DLR lines, active railways, historical railways or tunnels.

The Underground assessment includes London Underground, DLR, Tyne and Wear Metro, Merseyrail and Glasgow Subway.

Please see **page 2** for further advice. Additionally, see **page 37** for details of the identified issues.

Active Railways and Tunnels	Identified
Historical Railways and Tunnels	Identified
Railway and Tube Stations	Not identified
Underground	Not identified

## Planning summary



### Planning constraints

Protected areas have been identified within 250 metres of the property.

Please see **page 39** for details of the identified issues.

Environmental Protected Areas **Identified**  
Visual and Cultural Protected Areas **Not identified**



## Other environmental considerations



The following additional risks or issues are outside the scope of the opinion provided by this report. However, further consideration of these may be appropriate for the subject property.

### Asbestos

The Control of Asbestos Regulations 2012 require an Asbestos Management Plan to be maintained for all commercial property constructed prior to 2000 i.e. where asbestos may be contained within the building fabric. Refurbishment or demolition of site structures may require further Refurbishment and Demolition Asbestos Surveys.

### Site-specific features

This report has considered additional site specific information, where provided by the client, however it has not included a site inspection. Additional issues may exist at the property that cannot be reasonably identified by a desk based report like this one. Examples might include operational issues such as those linked to oil storage, waste management, materials handling and site drainage. Additional surveys and assessments may be required if these issues are considered to be a concern.

### Unexploded ordnance (UXO)

The UK has a history of military activity, including extensive military training sites, bombing during the First World War and sustained strategic bombing during the Second World War. A legacy of this military activity is the incidence of UXO across Britain. Construction increases the risk from UXO. If intrusive works are planned on site, an assessment of the likelihood of UXO risk should be carried out in compliance with the Construction (Design and Management) Regulations 2015.

### Environmental insurance

The ownership or possession of land and property is one of the most valuable assets an individual or organisation can have. In cases where we are unable to provide a low risk assessment with regards to contaminated land, environmental insurance should be considered. Environmental insurance can protect against regulatory and third party action, potential losses and additional costs in dealing with contamination. Independent, specialist brokers are able to access the entire environmental insurance market, providing bespoke environmental policies to address risk and transactional issues.

### Phase 1 environmental risk assessment

A Phase 1 environmental risk assessment (Contaminated Land) aims to clarify any identified environmental risks further or could support a planning application. It includes a site inspection, regulatory consultation and additional details of site context. Our expert analysis provides a detailed breakdown of each potential exposure pathway and suggested mitigation measures. For further information or to request a quote please e-mail us at [projects@groundsure.com](mailto:projects@groundsure.com). The reports start from £1245+VAT, which includes a discount for current reporting.

### Made ground and infilled land

Areas of made ground and infilled land can settle over time and could potentially cause subsidence. If the property is known to be located on made or infilled ground it would be prudent to contact a RICS accredited surveyor and/or geotechnical engineer to clarify any structural/subsidence risks and determine if possible what materials were used during the infilling process.

# Review

Premise at Garsington Road, Cowley,  
Oxford, OX4 2BW

Ref: 22110582  
Your ref: 22110582  
Grid ref: 456838 204303

## Recent aerial photograph



Capture Date: 05/07/2019

Site Area: 2.64ha



## Contaminated Land summary

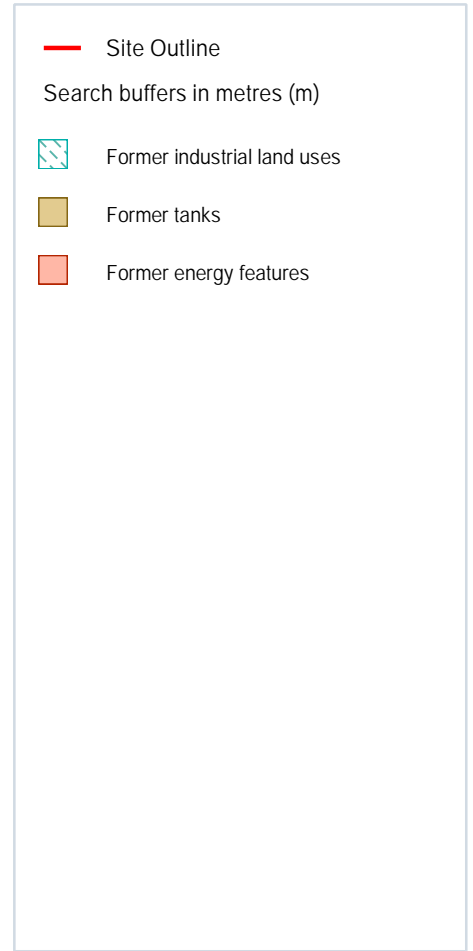


Past land use	On-Site	0-50m	50-250m
Former industrial land use (1:10,560 and 1:10,000 scale)	3	0	5
Former tanks	1	0	23
Former energy features	0	0	5
Former petrol stations	0	0	0
Former garages	0	0	0
Former military land	0	0	0
Waste and landfill	On-Site	0-50m	50-250m
Active or recent landfill	0	0	0
Former landfill (from Environment Agency Records)	0	0	0
Former landfill (from Local Authority and historical mapping records)	0	0	0
Waste site no longer in use	0	3	0
Active or recent licensed waste sites	0	0	0
Current and recent industrial	On-Site	0-50m	50-250m
Recent industrial land uses	1	2	4
Current or recent petrol stations	0	0	0
Historical licensed industrial activities	0	0	0
Current or recent licensed industrial activities	0	0	0
Local Authority licensed pollutant release	0	0	0
Pollutant release to surface waters	0	0	0
Pollutant release to public sewer	0	0	0
Dangerous industrial substances (D.S.I. List 1)	0	0	0
Dangerous industrial substances (D.S.I. List 2)	0	0	0
Dangerous or explosive sites	0	0	0
Hazardous substance storage/usage	0	0	0
Sites designated as Contaminated Land	0	0	0
Pollution incidents	0	0	0

## Contaminated Land



### Past land use



### Former industrial land use (1:10,560 and 1:10,000 scale)

These historical land uses have been identified from 1:10,560 and 1:10,000 scale Ordnance Survey maps dated from the mid to late 1800s to recent times. They have the potential to have caused ground contamination. Please see the Environmental Summary to find out how these could impact the site.

Please see **page 2** for further advice.

Distance	Direction	Use	Date
0	on site	Railway Sidings	1965
0	on site	Car Storage Depot	1974
0	on site	Railway Sidings	1974
55 m	NW	Sewage Works	1974



Distance	Direction	Use	Date
63 m	NW	Unspecified Tanks	1974
67 m	NW	Filter Beds	1974
114 m	SW	Railway Buildings	1974
197 m	SW	Unspecified Warehouse	1974

This data is sourced from Ordnance Survey/Groundsure.

## Former tanks

These tanks have been identified from high detailed historical Ordnance Survey maps dating from the mid-late 1800s to recent times. Tanks like this can sometimes store harmful waste, chemicals or oil, as well as more benign substances. Liquids stored in these tanks can leak when the tanks rust or become damaged over time, which could have caused contamination at this site.

Please see **page 2** for further advice.

Distance	Direction	Use	Date
0	on site	Unspecified Tank	1998
110 m	SW	Tanks	1994
111 m	SW	Tanks	1993
120 m	SW	Unspecified Tank	1968
120 m	SW	Unspecified Tank	1969
120 m	SW	Unspecified Tank	1994
120 m	SW	Unspecified Tank	1993
131 m	SW	Unspecified Tank	1994
131 m	SW	Unspecified Tank	1968
131 m	SW	Unspecified Tank	1969
132 m	SW	Unspecified Tank	1993
147 m	SW	Unspecified Tank	1968
147 m	SW	Unspecified Tank	1994
147 m	SW	Unspecified Tank	1998
148 m	SW	Unspecified Tank	1969
148 m	SW	Unspecified Tank	1993
150 m	SW	Unspecified Tank	1998

Distance	Direction	Use	Date
150 m	SW	Unspecified Tank	1994
171 m	SW	Tanks	1994
171 m	SW	Tanks	1998
172 m	SW	Tanks	1993
181 m	SW	Tanks	1998
181 m	SW	Unspecified Tank	1969
181 m	SW	Unspecified Tank	1968

This data is sourced from Ordnance Survey/Groundsure.

## Former energy features

Energy features such as substations, transformers or power stations have been identified from high detailed historical Ordnance Survey maps dating from the mid to late 1800s to recent times. Structures like this can sometimes cause soil or groundwater contamination.

Please see **page 2** for further advice.

Distance	Direction	Use	Date
181 m	SW	Electricity Substation	1994
181 m	SW	Electricity Substation	1998
182 m	SW	Electricity Substation	1969
182 m	SW	Electricity Substation	1968
183 m	SW	Electricity Substation	1993

This data is sourced from Ordnance Survey/Groundsure.

## Waste and landfill



— Site Outline

Search buffers in metres (m)

■ Waste site no longer in use

### Waste site no longer in use

These are records of former waste storage, treatment or transfer sites that have been identified from high detailed historical maps or Local Authority planning records. Depending on the nature of the waste that was handled and stored at these facilities, there may be a risk of ground contamination.

Please see [page 2](#) for further advice.

Distance	Direction	Details		
31 m	SW	Type of Site: Incinerator House Site Address: N/A	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon	Details: N/A Date: 1993
32 m	SW	Type of Site: Incinerator House Site Address: N/A	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon	Details: N/A Date: 1968

Distance	Direction	Details		
32 m	SW	Type of Site: Incinerator House Site Address: N/A	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon	Details: N/A Date: 1968

This data is sourced from Ordnance Survey/Groundsure/Local Authorities.

## Current and recent industrial



### Recent industrial land uses

These records show details of businesses that have recently operated, or are currently operating in the area. Depending on the type of activities taking place, some of these businesses could present a risk of contamination.

Please see [page 2](#) for further advice.

# Review

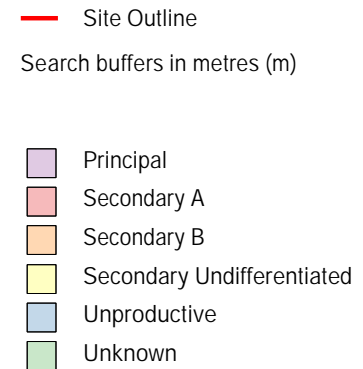
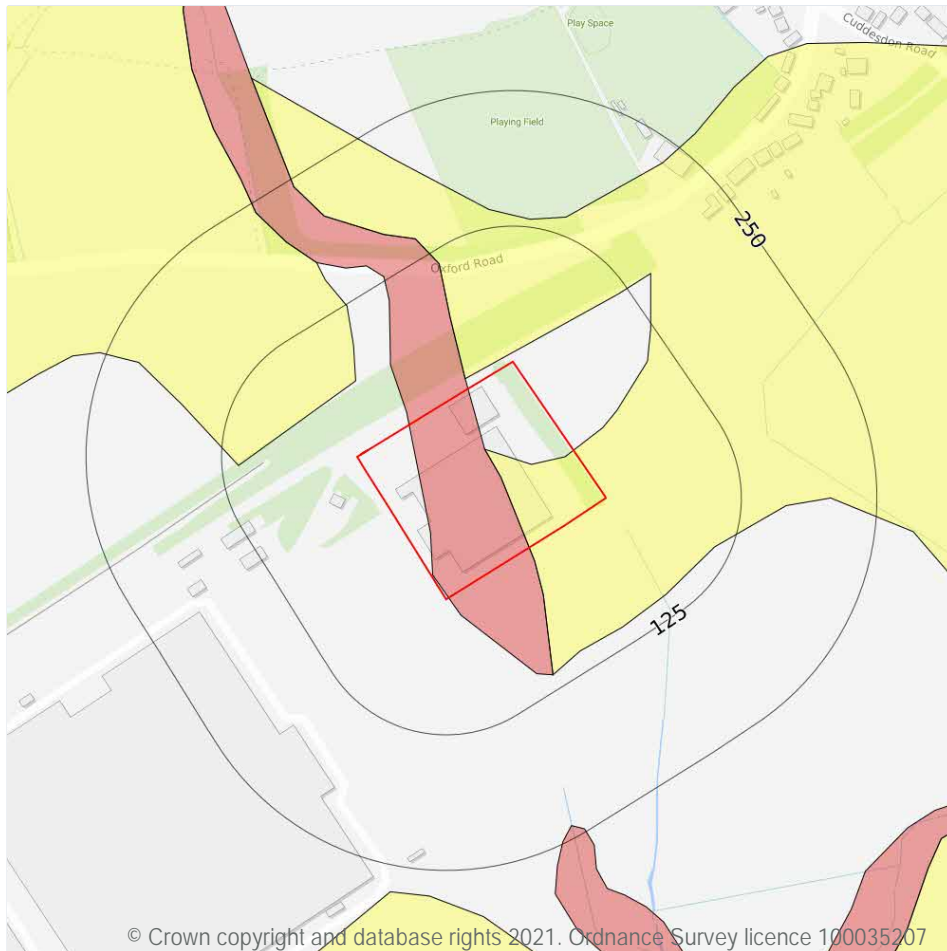
Premise at Garsington Road, Cowley,  
Oxford, OX4 2BW

Ref: 22110582  
Your ref: 22110582  
Grid ref: 456838 204303

ID	Distance	Direction	Company / Address	Activity	Category
1	0	on site	Tank - Oxfordshire, OX4	Tanks (Generic)	Industrial Features
2	25 m	SW	Incinerator House - Oxfordshire, OX4	Refuse Disposal Facilities	Infrastructure and Facilities
3	30 m	SW	Chimney - Oxfordshire, OX4	Chimneys	Industrial Features
4	66 m	S	Depot - Oxfordshire, OX4	Container and Storage	Transport, Storage and Delivery
5	175 m	SW	Tank - Oxfordshire, OX4	Tanks (Generic)	Industrial Features
6	182 m	SW	Tank - Oxfordshire, OX4	Tanks (Generic)	Industrial Features
7	188 m	SW	Electricity Sub Station - Oxfordshire, OX4	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

## Superficial hydrogeology



### Aquifers within superficial geology

The Environment Agency/Natural Resources Wales and the British Geological Survey have assigned designations or types to the aquifers that exist within superficial geology. These designations reflect the importance of aquifers in terms of groundwater as a resource (eg drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

**Principal** - These are layers of rock or superficial deposits that usually provide a high level of water storage.

**Secondary A** - Permeable layers capable of supporting water supplies at a local rather than strategic scale.

**Secondary B** - Predominantly lower permeability layers which may store and yield limited amounts of groundwater.

**Secondary Undifferentiated** - Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type.

**Unproductive** - These are rock layers with low permeability that have negligible significance for water supply.

**Unknown** - These are rock layers where it has not been possible to classify the water storage potential.

# Review

Premise at Garsington Road, Cowley,  
Oxford, OX4 2BW

Ref: 22110582  
Your ref: 22110582  
Grid ref: 456838 204303

Distance	Direction	Designation
0	on site	Secondary A
0	on site	Secondary Undifferentiated
58 m	NW	Secondary Undifferentiated
239 m	SE	Secondary A

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

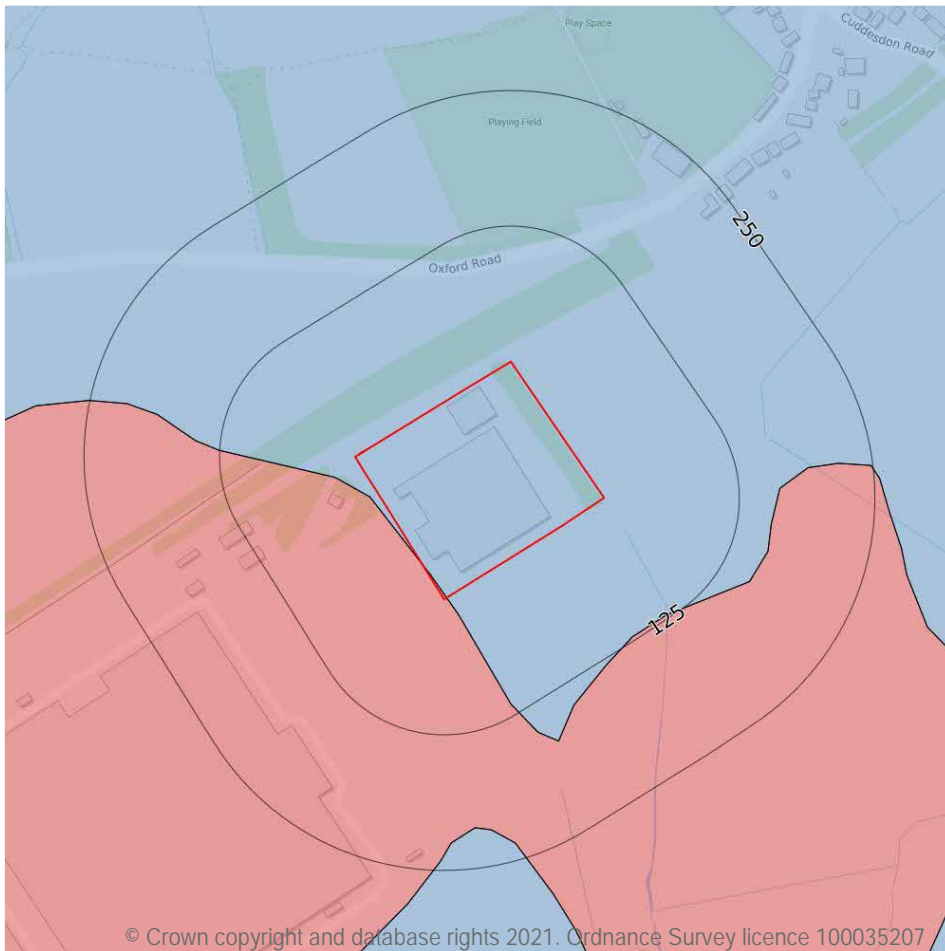
## Superficial geology

Superficial deposits are the youngest natural geological deposits formed during the most recent period of geological time. They rest on older deposits or rocks referred to as bedrock. This information comes from the BGS 1:50,000 Digital Geological Map of Great Britain, where available.

Description	BGS LEX Code	Rock Type
ALLUVIUM	ALV-XC ZSV	CLAY, SILT, SAND AND GRAVEL
HEAD	HEAD-XCZSV	CLAY, SILT, SAND AND GRAVEL

This data is sourced from British Geological Survey.

## Bedrock hydrogeology



- Site Outline
- Search buffers in metres (m)
- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)

### Aquifers within bedrock geology

The Environment Agency/Natural Resources Wales and the British Geological Survey have assigned designations or types to the aquifers that exist within bedrock geology. These designations reflect the importance of aquifers in terms of groundwater as a resource (eg drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

**Principal** - These are layers of rock or superficial deposits that usually provide a high level of water storage.

**Secondary A** - Permeable layers capable of supporting water supplies at a local rather than strategic scale.

**Secondary B** - Predominantly lower permeability layers which may store and yield limited amounts of groundwater.

**Secondary Undifferentiated** - Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type.

**Unproductive** - These are rock layers with low permeability that have negligible significance for water supply.



# Review

Premise at Garsington Road, Cowley,  
Oxford, OX4 2BW

Ref: 22110582  
Your ref: 22110582  
Grid ref: 456838 204303

Distance	Direction	Designation
0	on site	Secondary A
0	on site	Unproductive
213 m	S	Unproductive

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

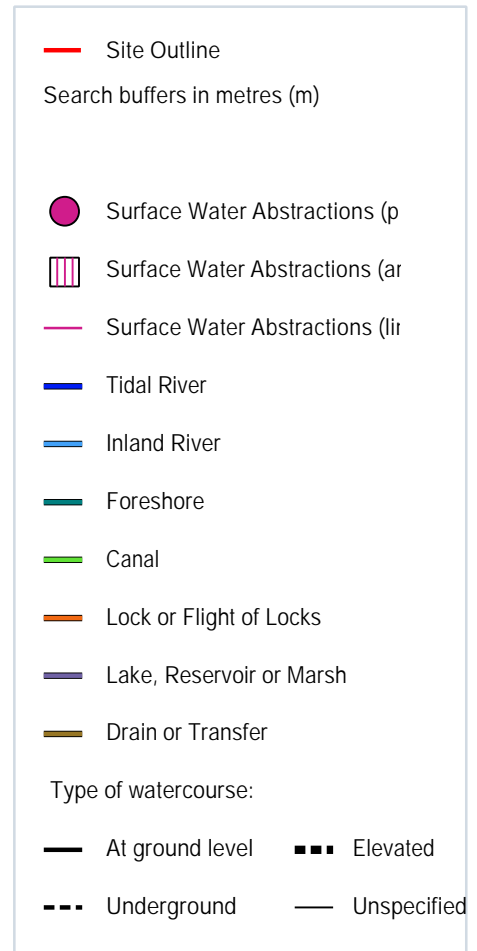
## Bedrock geology

Bedrock geology is a term used for the main mass of rocks forming the Earth and is present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water. This information comes from the BGS 1:50,000 Digital Geological Map of Great Britain, where available.

Description	BGS LEX Code	Rock Type
WHEATLEY LIMESTONE MEMBER	W YLS-LM ST	LIM ESTONE
AMPTHILL CLAY FORMATION	AMC-MDST	MUDSTONE

This data is sourced from British Geological Survey.

## Hydrology



### Water courses from Ordnance Survey

These are water features such as ponds, lakes, rivers and streams that have been identified by Ordnance Survey. These features may be sensitive to contamination.

Distance	Direction	Details
0	on site	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
4 m	NW	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)

# Review

Premise at Garsington Road, Cowley,  
Oxford, OX4 2BW

Ref: 22110582  
Your ref: 22110582  
Grid ref: 456838 204303

Distance	Direction	Details
34 m	SE	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
54 m	NW	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
57 m	NW	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
61 m	SE	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
66 m	NW	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
114 m	NW	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: Underground Permanence: Watercourse contains water year round (in normal circumstances)
124 m	NW	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
159 m	E	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
178 m	NE	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
181 m	NE	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)

# Review

Premise at Garsington Road, Cowley,  
Oxford, OX4 2BW

Ref: 22110582  
Your ref: 22110582  
Grid ref: 456838 204303

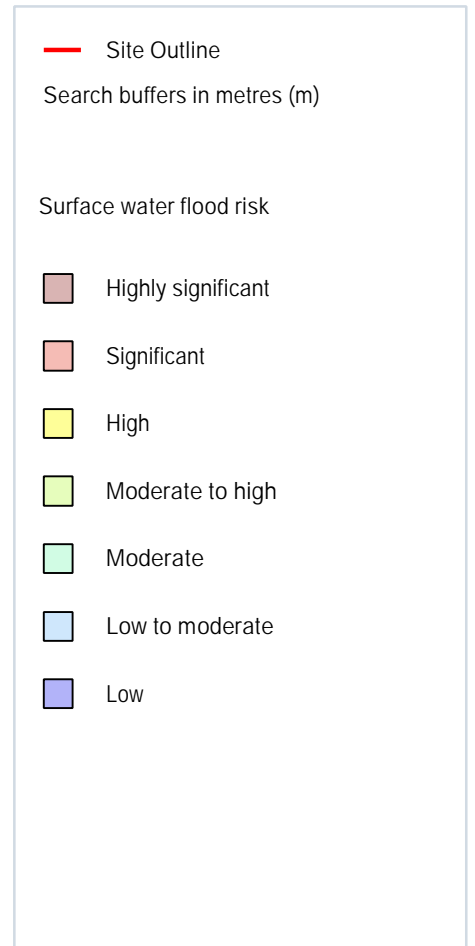
Distance	Direction	Details
186 m	NW	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: Underground Permanence: Watercourse contains water year round (in normal circumstances)
192 m	NW	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
200 m	SE	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)
204 m	SE	Name: Type of water feature: Inland river not influenced by normal tidal action. Ground level: On ground surface Permanence: Watercourse contains water year round (in normal circumstances)

This data is sourced from Ordnance Survey.

## Flood Risk



### Surface water flood risk



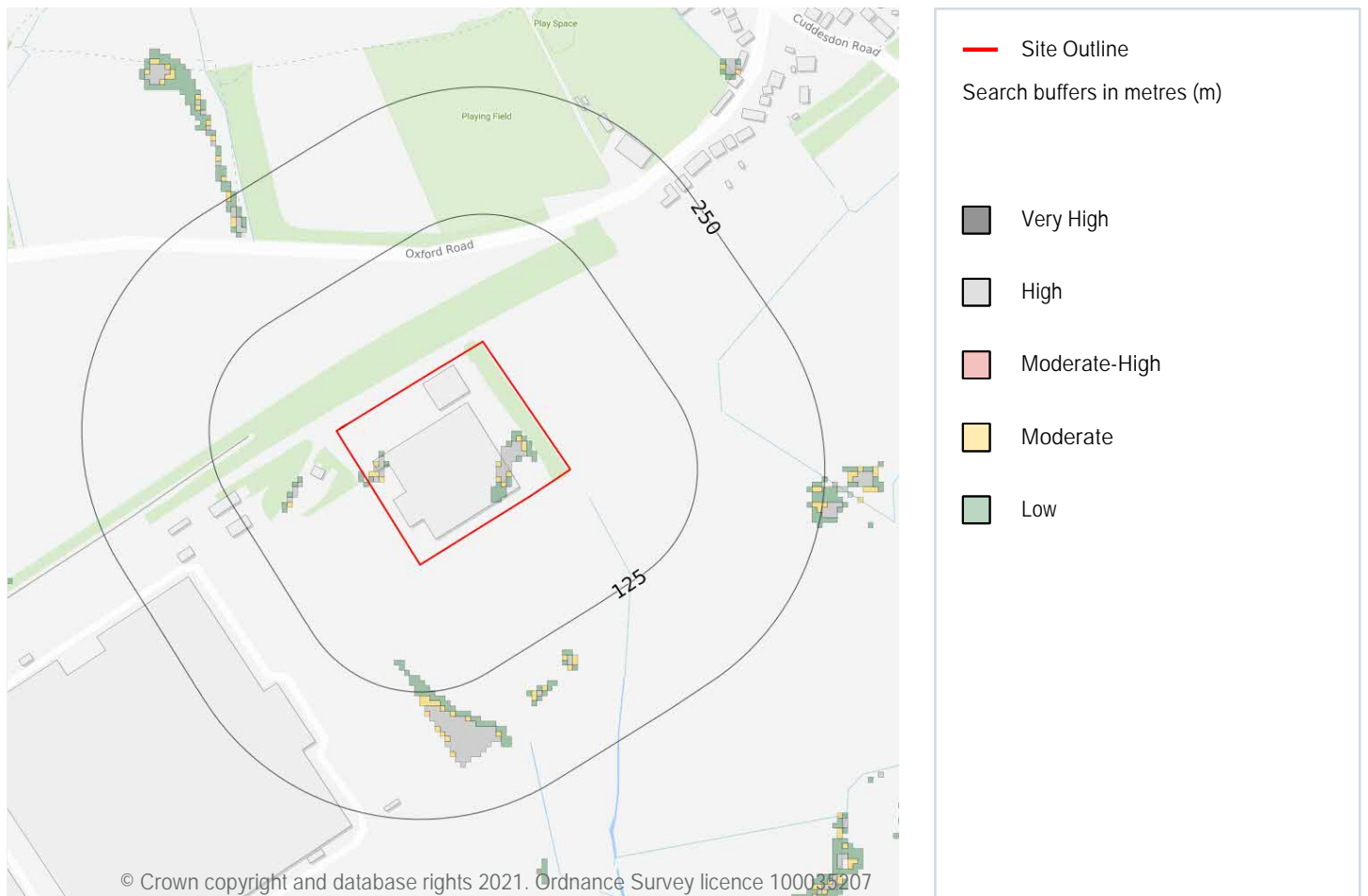
#### Surface water flood risk

The property is likely to be prone to flooding following extreme rainfall, which may have an impact on insuring the property against flood risk.

The area in which the property is located has been assessed to be at a Significant risk of surface water flooding. This area is considered to have a 1 in 30 probability of surface water flooding due to rainfall in a given year to a depth of between 0.3m and 1.0m. However, as is the case with probability statistics and predictions, this information should be used as a guideline only. The area may flood several years in a row, or not at all for many years. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

These risk calculations are based on Ambiantal Risk Analytics maps.

## Ambiental FloodScore™ insurance rating



The property has been rated as having a High level of flood hazard.

Ambiental's FloodScore™ insurance rating provides an indication of the likelihood of a property being flooded from river, coastal, groundwater and/or surface water flood. The FloodScore™ insurance rating information is based on a model and should not be relied upon as fact. It is only one of the many considerations reviewed as part of a commercial insurance policy.

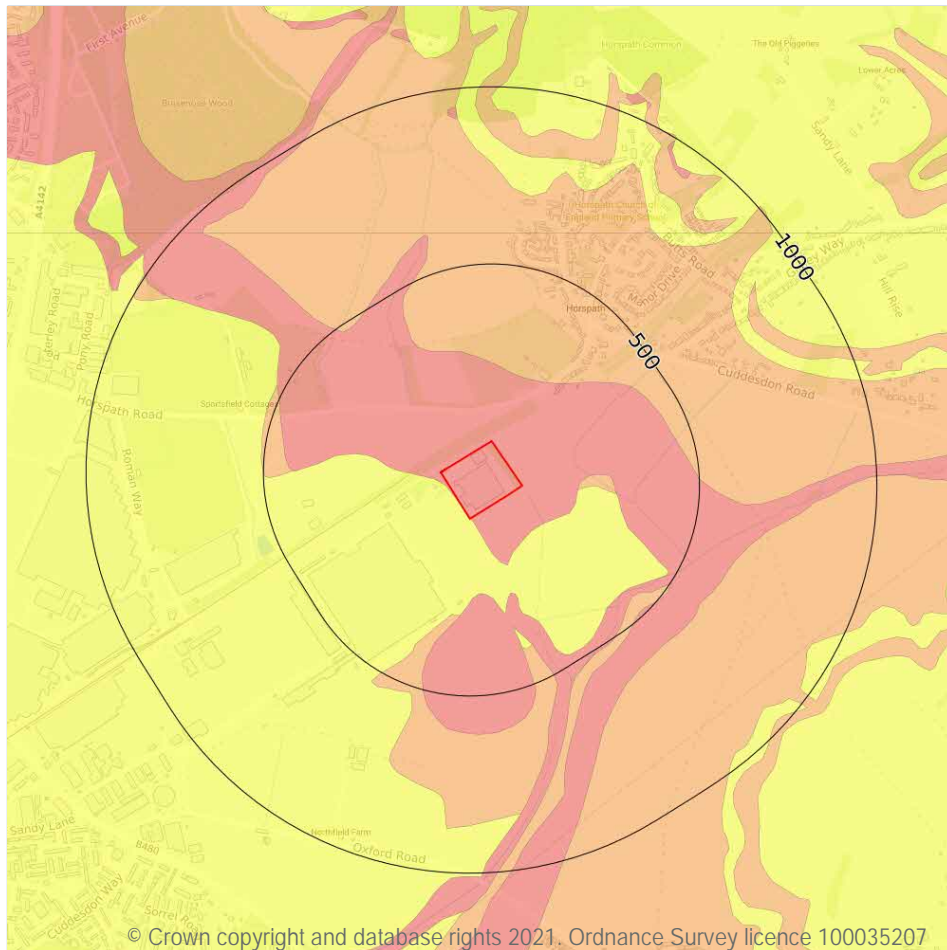
Other underwriting considerations may include whether the building has been raised, are the contents raised off the floor, the construction type, business type, whereabouts the flooding impacts the property and the likelihood of business interruption such as access restrictions due to flood waters. As a property owner, understanding the risk to your property is valuable and adding flood resilience measures to the property, where known to be at risk, may help getting insurance or reducing the premium or excess charged by an insurer.



## Ground stability



### Natural ground subsidence



— Site Outline  
Search buffers in metres (m)

- Moderate - high
- Low
- Negligible - very low

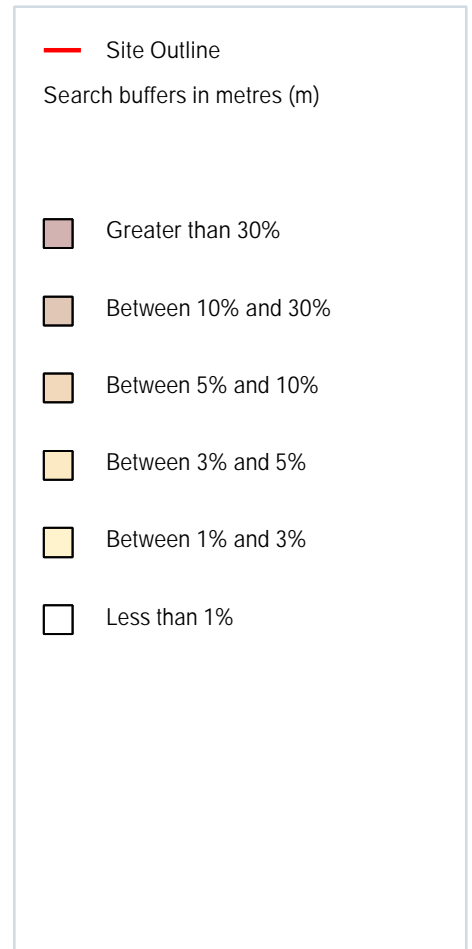
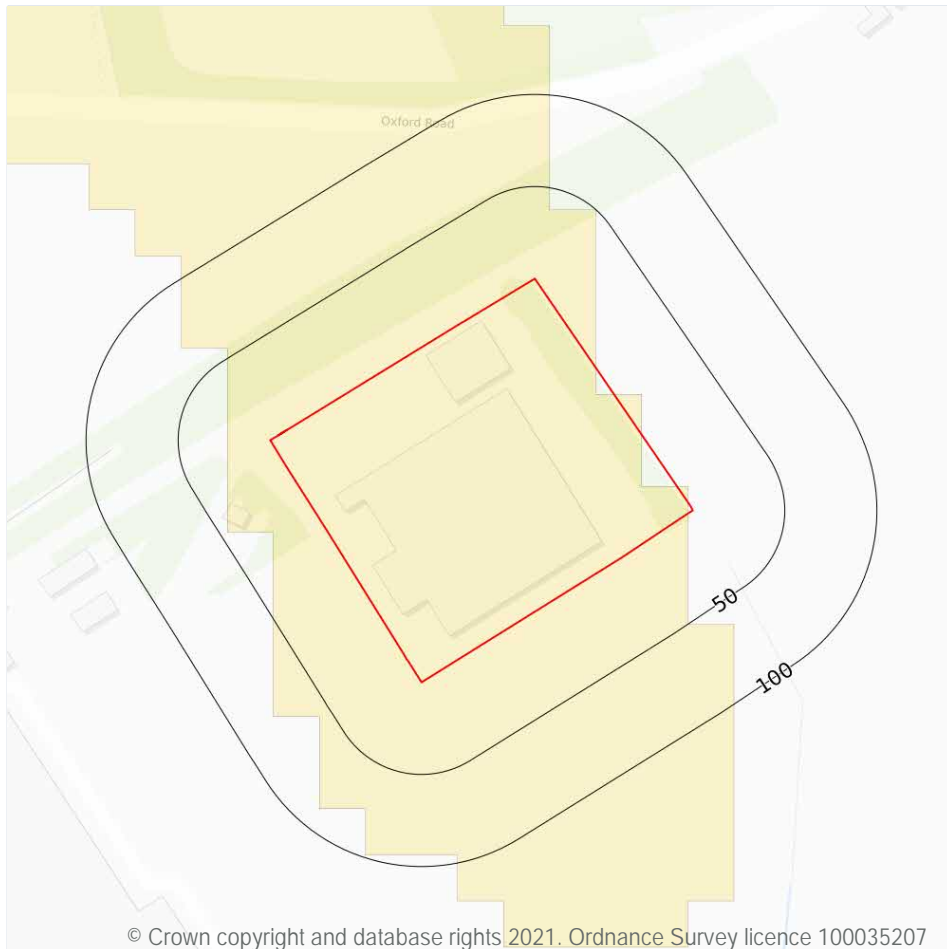
### Natural ground subsidence

The property, or an area within 50m of the property, has a moderate to high potential for natural ground subsidence. This rating is derived from the British Geological Survey's GeoSure database, and is based upon the natural qualities of the geology at the site rather than any historical subsidence claims or events. Additionally, this data does not take into account whether buildings on site have been designed to withstand any degree of subsidence hazard.

Please see **page 2** for further advice.

Surveyors are normally aware of local problem areas in relation to subsidence, however, this data provided by the British Geological Survey (BGS) can highlight areas where a significant potential for natural ground subsidence exists and whether it may need particular consideration. The term "Subsidence" refers to ground movement that could cause damage to foundations in domestic or other properties.

## Radon



The property is in a radon affected area, meaning there is an increased risk that properties will contain elevated levels of radon.

In order to determine if there is a problem at your property, a radon measurement in the building must be taken. Access to a testing service and further information on radon is available from Public Health England (PHE) or [www.ukradon.org](http://www.ukradon.org).

Radon is a colourless, odourless radioactive gas present in all areas of the United Kingdom, usually at levels that pose a negligible risk. However, the property is situated in an area where levels of radon can be much higher and pose a health risk. High levels of radon can cause lung cancer, particularly for smokers and ex-smokers. The higher the level and the longer the period of exposure, the greater the risk.

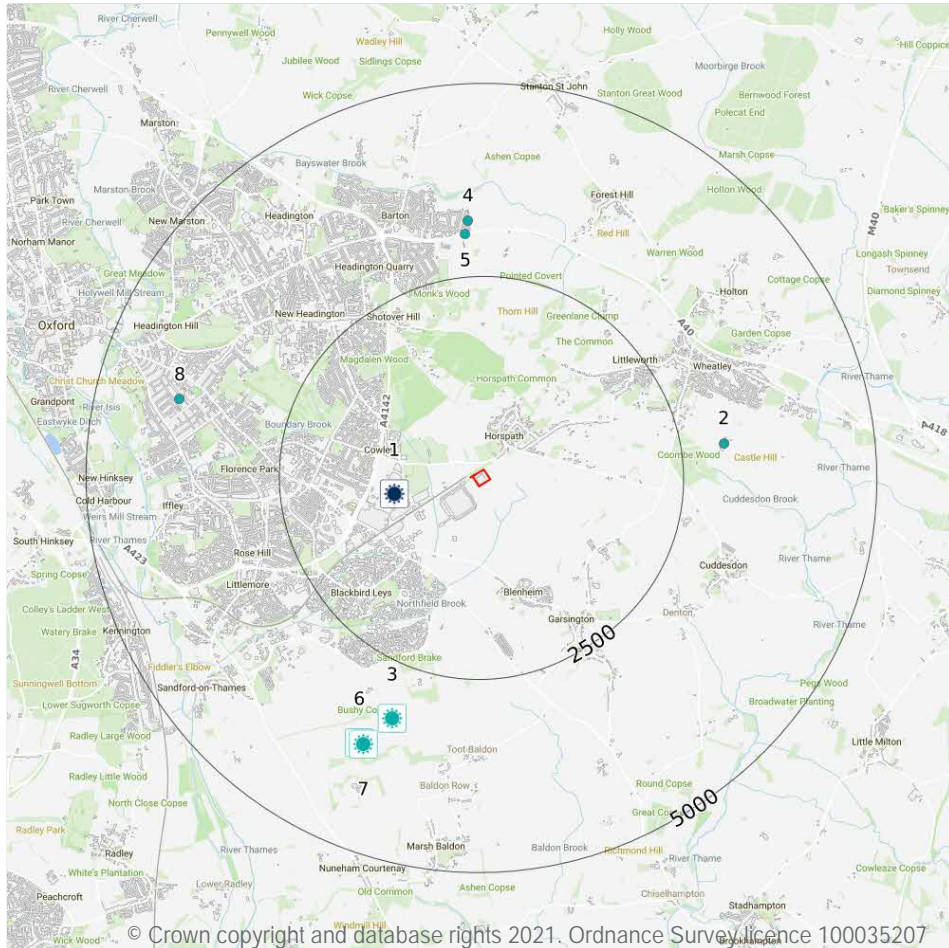
Please see **page 2** for further advice.

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

## Energy



### Wind and solar



- Site Outline
- Search buffers in metres (m)
- Wind farms
- Proposed wind farms
- Proposed wind turbines
- Existing and agreed solar installations
- Proposed solar installations

### Wind

#### Proposed wind turbines

Planning applications for individual wind turbines have been proposed within 5,000m of the property. See below for details of the operating company, number of turbines, project and turbine capacity.

Please note some planning applications identified as having been refused may have subsequently been granted on appeal without appearing as such within this report. Additionally, please be aware that as the identified records are taken from a planning record archive, the proposals identified may have already been undertaken.

ID	Distance	Direction	Details	
2	3-4 km	E	Site Name: Castle Hill Farm, Wheatley, Oxford, OX33 1JQ Planning Application Reference: P11/W2000 Type of Project: Wind Turbine	Application Date: 2012-01-27 Planning Stage: Early Planning Detail Plans Refused Project Details: Scheme comprises installation of one (1) 10 kw micro wind turbine on 25m open lattice mast and associated underground cable associated underground cables. Approximate Grid Reference: 459972, 204754
4	3-4 km	N	Site Name: Terrett Avenue, Headington, South Oxfordshire, Oxford, Oxfordshire, OX3 8FN Planning Application Reference: P06/W1121/CC Type of Project: Wind Turbine	Application Date: 2006-11-03 Planning Stage: Plans Approved Detail Plans Granted Project Details: Scheme comprises construction of a 12m high micro wind turbine (5 m blade diameter) in the south east corner of the school playaing field. Approximate Grid Reference: 456664, 207637
5	3-4 km	N	Site Name: Terrett Avenue, Headington, Oxford, Oxford, Oxfordshire, OX3 8FN Planning Application Reference: 06/00824/CC3 Type of Project: Wind Turbine	Application Date: 2006-03-24 Planning Stage: Plans Approved Detail Plans Granted Project Details: Scheme comprises installation of a 12m high micro wind turbine (5m blade diameter) in the south east corner of the school playing fields. Approximate Grid Reference: 456664, 207637
8	3-4 km	W	Site Name: 34 Leopold Street, Oxford, Oxford, Oxfordshire, OX4 1TW Planning Application Reference: 06/02371/FUL Type of Project: Wind Turbine	Application Date: 2006-11-16 Planning Stage: Early Planning Detail Plans Refused Project Details: Scheme comprises construction of wind turbine to side elevation. Approximate Grid Reference: 452936, 205322

This information is derived from planning data supplied by Glenigan, in some cases with further accuracy applied by Groundsure's experts. This search includes planning applications for single wind turbines only, within 5,000m of the property. This data is updated on a quarterly basis.

If the existence of a planning application, passed or refused, may have a material impact with regard to the decision to purchase the property, Groundsure recommends independent, thorough enquiries are made with the Local Authority. If any applications have been identified within this report, Groundsure have included the planning reference to enable further enquiries to be made.



## Solar

### Existing and agreed solar installations

There is an operational or planned solar photovoltaic farm or smaller installation located near the property. Please note this will not include small domestic solar installations. See below for details on installed capacity, operating company and the status of the project on a given date.

ID	Distance	Direction	Address	Details	
1	1-2 km	W	BMW UK Manufacturing Ltd, Bmw Uk Manufacturing Ltd, Garsington Road, Oxford, Oxfordshire, OX4 6NJ, OX4 6NJ	Contractor: Free Green Energy LPA Name: Oxford City Council Capacity (MW): 3	Application Date: - Pre Consent Status: Operational Post Consent Status: Operational Date Commenced: 05/11/2014

The solar installation data is supplied by the Department for Business, Energy & Industrial Strategy and is updated on a monthly basis.

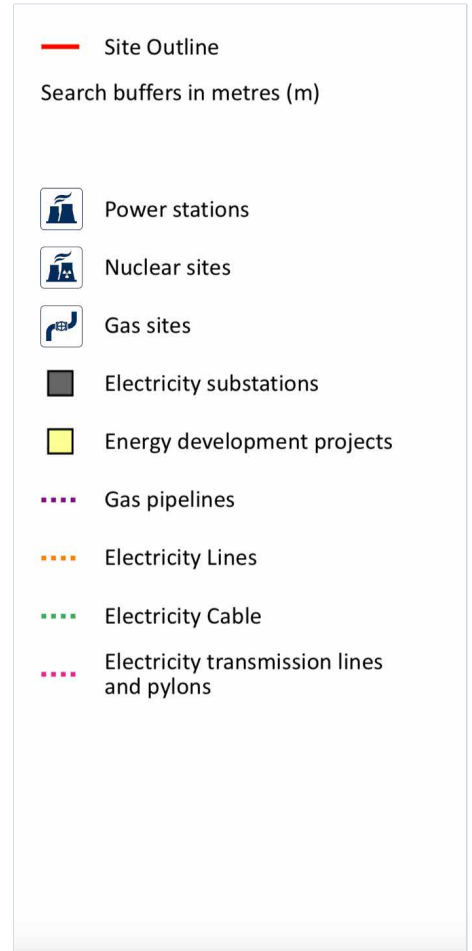
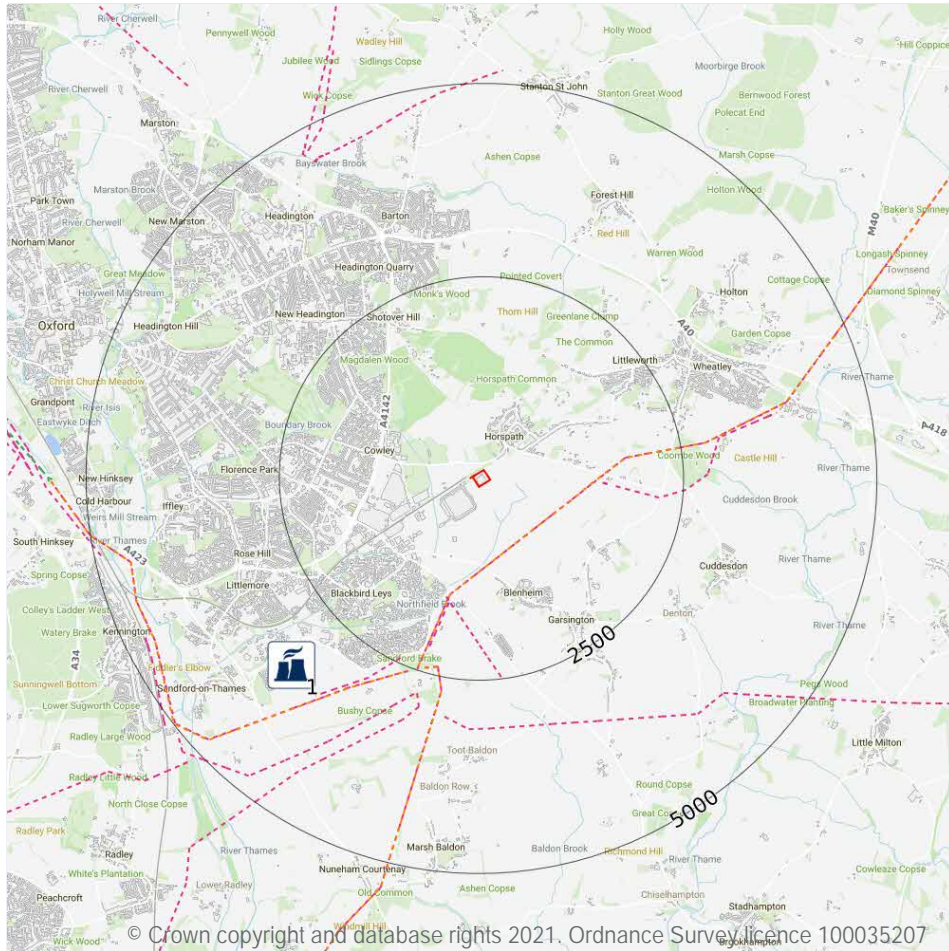
### Proposed solar installations

There is a planning permission application relating to a solar farm or smaller installation near to the property. Please note this will not include small domestic solar installations and that one site may have multiple applications for different aspects of their design and operation. Also note that the presence of an application for planning permission is not an indication of permission having been granted. Please be aware that as the identified records are taken from a planning record archive, the proposals identified may have already been undertaken. See below for details of the proposals.

ID	Distance	Direction	Address	Details
3	3-4 km	S	Land to South West of Cowley Substation, Nuneham, Courtenay, OX44 9PA	Applicant name: Mr Simon Wheeler Application Status: - Application Date: 16/11/2020 Application Number: P20/S4360/FUL
6	3-4 km	SW	Land South West of Cowley Substation, OX44 9PA	Applicant name: Aardvark Em Limited Application Status: Application registered Application Date: 15/06/2020 Application Number: P20/S2037/SCO
7	3-4 km	SW	Land South West of Cowley Substation, near Nuneham Courtenay, OX44 9PA	Applicant name: Cowley Baldon Green Limited Application Status: Application registered Application Date: 01/05/2020 Application Number: P20/S1525/SCR

The data is sourced from public registers of planning information and is updated every two weeks.

## Energy infrastructure



## Power stations

### Power stations

There is an active power station on or near to the property. Power stations can cause air pollution issues and may not be visually pleasing.

Power generation stations identified by these searches have a capacity of over 1 MW (Million Watt output) and will be one of the following types: Combined Cycle Gas Turbine (CCGT), Gas/Oil, Coal Gas, Diesel Gas, HP Oil, Poultry Litter, Coal/Oil, Coal/Gas, Meat and Bone, Pumped Storage Mine Gas, Rapeseed Oil, Straw/Gas Waste Combined Heat or Power Biomass.

Air pollution issues can be investigated further through the Air Quality team at the Local Authority. If the existence of any of a power generation station may have a material impact with regard to the decision to purchase the property, Groundsure recommends making independent enquiries with the operating company listed.



# Review

Premise at Garsington Road, Cowley,  
Oxford, OX4 2BW

Ref: 22110582  
Your ref: 22110582  
Grid ref: 456838 204303

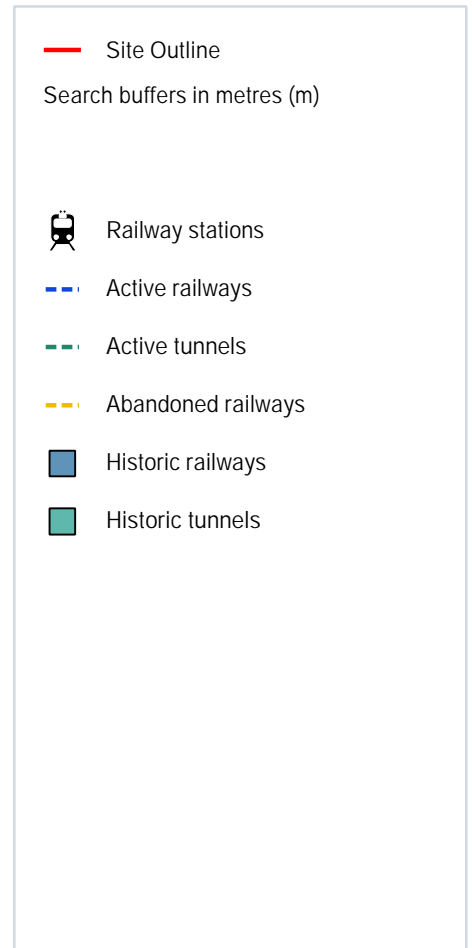
ID	Distance	Direction	Company name	Power station name	Type of power station	Total capacity (MW)	Operating since
1	3-4 km	SW	Thames Water Utilities Limited	Oxford STW	Combined Heat and Power	2	No Details

This data is sourced from the Digest of United Kingdom Energy Statistics (DUKES), a database from the Department for Business, Energy & Industrial Strategy.

## Transportation



### Railways and Underground



#### Active railways

The property is within 84 metres of an active railway line. Noise from railways varies significantly depending on the condition of the track, the conditions of the trains using the track and the speed of travel.

Groundsure suggests that you visit the property at different times of day in order to gauge the relative noise levels at and around the property. Defra noise maps may also offer an indication of general noise levels in the area, though cannot be used to assess the levels within an individual property. In the future, if you consider the property to be affected by railway noise from passenger trains, Network Rail may be able to assist in investigating this.

## Historical railway infrastructure

The property is situated within 250m of a railway or tunnel feature identified on historical mapping. Please note that many historical railways noted in this section will still be in use today.

Please note that for reasons of clarity only the closest record identified will be shown in the table below, though the full extent of records identified can be seen on the map.

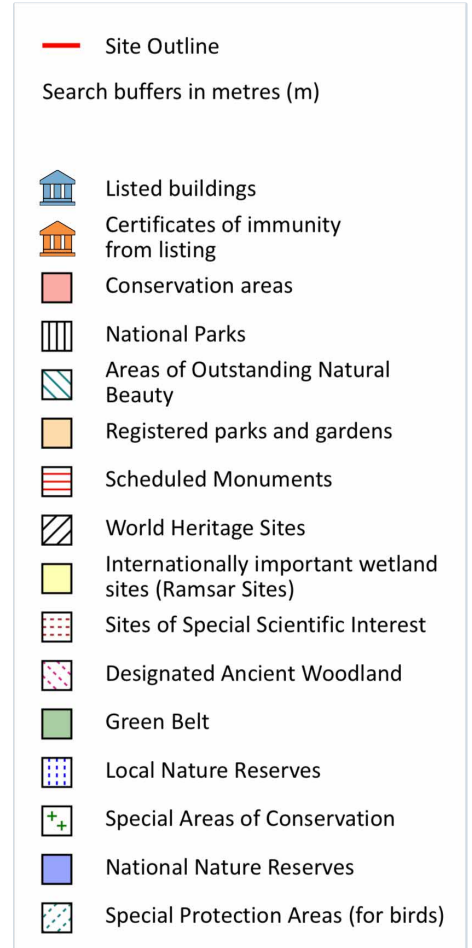
Distance	Direction	Feature	Year
0	on site	Railway Sidings	1974

## Abandoned railways

The property is situated within 250m of an abandoned railway. Abandoned railways have the potential to be reopened in the future, and abandoned tunnels can also pose ground stability issues if a property basement is to be developed.

Distance	Direction	Status
35 m	NW	Abandoned
223 m	NE	Razed

## Planning Constraints



## Environmental Designations

### Green Belt

Green Belts are intended to prevent inappropriate development by keeping certain areas of land open. The fundamental purpose of Green Belt is to prevent continued growth and merging of urban areas, hence the majority of Green Belt land being located on the fringe of large towns and cities, extending into the countryside. Whilst development can happen in the Green Belt, it should be subject to greater controls on the type and size of the development. However, the presence of a Green Belt designation is not in itself a complete barrier to development and the Local Plan should be consulted if a purchaser is concerned about any potential development in these areas.

Distance	Direction	Green Belt Name	Data Source
4 m	NE	Oxford	South Oxfordshire
55 m	NW	Oxford	Oxford

# Review

Premise at Garsington Road, Cowley,  
Oxford, OX4 2BW

Ref: 22110582  
Your ref: 22110582  
Grid ref: 456838 204303

This data is sourced from Local Authorities (Green Belt data contains Ordnance Survey data © Crown copyright and database right 2021). For more information please see <https://www.gov.uk/guidance/national-planning-policy-framework/9-protecting-green-belt-land>

## Datasets searched

This is a full list of the data searched in this report. If we have found results of note we will state "Identified". If no results of note are found, we will state "Not identified". Our intelligent filtering will hide "Not identified" sections to speed up your workflow.

<b>Contaminated Land</b>		<b>Contaminated Land</b>	
Former industrial land use (1:10,560 and 1:10,000 scale)	Identified	Dangerous industrial substances (D.S.I. List 1)	Not identified
Former tanks	Identified	Dangerous industrial substances (D.S.I. List 2)	Not identified
Former energy features	Identified	Pollution incidents	Not identified
Former petrol stations	Not identified	<b>Superficial hydrogeology</b>	
Former garages	Not identified	Aquifers within superficial geology	Identified
Former military land	Not identified	Superficial geology	Identified
Former landfill (from Local Authority and historical mapping records)	Not identified	<b>Bedrock hydrogeology</b>	
Waste site no longer in use	Identified	Aquifers within bedrock geology	Identified
Active or recent landfill	Not identified	Groundwater abstraction licences	Not identified
Former landfill (from Environment Agency Records)	Not identified	Bedrock geology	Identified
Active or recent licensed waste sites	Not identified	<b>Source Protection Zones and drinking water abstractions</b>	
Recent industrial land uses	Identified	Source Protection Zones	Not identified
Current or recent petrol stations	Not identified	Source Protection Zones in confined aquifer	Not identified
Dangerous or explosive sites	Not identified	Drinking water abstraction licences	Not identified
Hazardous substance storage/usage	Not identified	<b>Hydrology</b>	
Sites designated as Contaminated Land	Not identified	Water courses from Ordnance Survey	Identified
Historical licensed industrial activities	Not identified	Surface water abstractions	Not identified
Current or recent licensed industrial activities	Not identified	<b>Flood Risk</b>	
Local Authority licensed pollutant release	Not identified	Risk of flooding from rivers and the sea	Not identified
Pollutant release to surface waters	Not identified		
Pollutant release to public sewer	Not identified		



## Flood Risk

Flood storage areas: part of floodplain	Not identified
Historical flood areas	Not identified
Areas benefiting from flood defences	Not identified
Flood defences	Not identified
Proposed flood defences	Not identified

## Surface water flood risk **Identified**

Groundwater flooding	Not identified
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## Ground stability

### Natural ground subsidence **Identified**

Natural geological cavities	Not identified
Coal mining	Not identified
Non-coal mining	Not identified
Mining cavities	Not identified
Infilled land	Not identified

## Radon

### Radon **Identified**

## Oil and gas

Oil or gas drilling well	Not identified
Proposed oil or gas drilling well	Not identified
Licensed blocks	Not identified
Potential future exploration areas	Not identified

## Wind and solar

Wind farms	Not identified
Proposed wind farms	Not identified

### Proposed wind turbines **Identified**

### Existing and agreed solar installations **Identified**

## Wind and solar

### Proposed solar installations **Identified**

## Energy Infrastructure

Electricity transmission lines and pylons	Not identified
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National Grid energy infrastructure	Not identified
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### Power stations **Identified**

Nuclear installations	Not identified
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Large Energy Projects	Not identified
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## Transportation

HS2 route: nearest centre point of track	Not identified
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HS2 route: nearest overground section	Not identified
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HS2 surface safeguarding	Not identified
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HS2 subsurface safeguarding	Not identified
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HS2 Homeowner Payment Zone	Not identified
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HS2 Extended Homeowner Protection Zone	Not identified
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HS2 stations	Not identified
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HS2 depots	Not identified
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HS2 noise and visual assessment	Not identified
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Crossrail 1 route	Not identified
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Crossrail 1 stations	Not identified
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Crossrail 1 worksites	Not identified
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Crossrail 2 route	Not identified
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Crossrail 2 stations	Not identified
----------------------	----------------

Crossrail 2 worksites	Not identified
-----------------------	----------------

Crossrail 2 headhouses	Not identified
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Crossrail 2 safeguarding area	Not identified
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### Active railways **Identified**

Railway tunnels	Not identified
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## Transportation

Active railway stations	Not identified
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<b>Historical railway infrastructure</b>	<b>Identified</b>
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<b>Abandoned railways</b>	<b>Identified</b>
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London Underground and DLR lines	Not identified
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London Underground and DLR stations	Not identified
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Underground	Not identified
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Underground stations	Not identified
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## Planning constraints

Sites of Special Scientific Interest	Not identified
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Internationally important wetland sites (Ramsar Sites)	Not identified
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Special Areas of Conservation	Not identified
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Special Protection Areas (for birds)	Not identified
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National Nature Reserves	Not identified
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Local Nature Reserves	Not identified
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Designated Ancient Woodland	Not identified
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<b>Green Belt</b>	<b>Identified</b>
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World Heritage Sites	Not identified
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Areas of Outstanding Natural Beauty	Not identified
-------------------------------------	----------------

National Parks	Not identified
----------------	----------------

Conservation Areas	Not identified
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Listed Buildings	Not identified
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Certificates of Immunity from Listing	Not identified
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Scheduled Monuments	Not identified
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Registered Parks and Gardens	Not identified
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## Contaminated Land assessment methodology

### Environmental risk framework

This report is designed to provide a basic environmental liability risk assessment for the purposes of transaction due diligence, financing arrangements and similar circumstances. The report comprises a basic risk assessment within the general principles of the contaminant-pathway-receptor pollutant linkage model and with due regard for relevant publications issued by the Department of Environment, Food and Rural Affairs (and predecessor government departments) the British Standards Institute and the European Union.

Explicit opinion is provided with regard to potential liability for the property to be identified as Contaminated Land in accordance with the meaning set out in Part 2A of the Environmental Protection Act 1990.

Consideration and due regard is also made of associated legislation that may lead to related statutory or third party environmental liability, including but not limited to the Water Resources Act 1991, the Water Act 2014, the Contaminated Land Regulations 2006, Environmental Permitting Regulations 2010, the Environmental Damage (Prevention and Remediation) (England) (Amendment) Regulations 2015 in England and the Environmental Damage (Prevention and Remediation) (Amendment) (Wales) Regulations 2015 in Wales.

This report does not contain a detailed Conceptual Site Model as required in the National Planning Policy Framework, however, it may prove highly effective in determining whether such further assessment is appropriate.

The report is based upon the information contained in subsequent dataset sections. Some datasets have been generated by and are unique to Groundsure, whilst others are provided by recognised bodies including Environment Agency/Natural Resources Wales, British Geological Survey, Public Health England, Local Authorities, etc. Groundsure may also have been provided with further details regarding the site by the client and / or their advisers. In the absence of such, Groundsure has made a best estimation regarding current and proposed land use. This report and the risk assessment presented is based purely upon this information.

In undertaking this report Groundsure has not, unless explicitly stated to the contrary, undertaken a site inspection, site investigation, consulted directly with the Local Authority with specific regard to the subject property or reviewed existing environmental reports. Whilst every effort is made to consider likely environmental liabilities on the basis of the information assessed, certain issues may only be readily discernible from physical site inspection and / or investigation.

### Contaminant source - Pathway - Receptor definitions

Contaminant sources include (but are not limited to):

- Historical on-site and historical off-site sources (works, factories, oil tanks, landfill sites)
- Current on-site and current off-site sources (petrol stations, industrial facilities)

Pathways comprise:

- Any mechanisms facilitating 'receptor' exposure to contaminative 'sources'

Receptors include:

- Human health i.e. site users or occupiers, adjacent site users or occupiers

- Controlled Waters i.e. groundwater, surface water (rivers and streams etc)
- Habitats and biodiversity (in particular nature reserves or other designated sensitive habitats)
- Property, buildings and infrastructure

## Environmental risk assessment definitions

A risk rating will be provided on the front page of the report depending on the level of environmental liability that there has been assessed to be at the site. The ratings are defined as follows:

**Low** : There are unlikely to be significant environmental liabilities associated with the property.

**Low to Moderate**: There are unlikely to be significant environmental liabilities associated with the property with regard to the proposed use. However, minor issues may require further consideration and assessment under certain circumstances e.g. redevelopment.

**Moderate**: Some potential environmental liabilities are likely to reside with the property as a result of historical and / or current use. Whilst unlikely to represent an immediate significant issue, if left unchecked this position may change with time. A prudent purchaser may wish to make further enquiries of the vendor / undertake limited further due diligence / seek environmental improvements. Redevelopment of the site will likely require further, more detailed assessment.

**Moderate to High**: Some potential significant environmental liability issues have been identified at the property requiring further assessment. Should further information be available it may be possible to re-assess the risk. In the absence of sufficient further information, further assessment might comprise consultation with the environmental regulators / review of existing environmental reports / commissioning new environmental reports / consideration of environmental insurance.

**High** : Significant potential environmental liabilities have been identified at the property. Further detailed environmental due diligence will likely be required and may include review of existing environmental reports / commissioning new environmental reports including site investigations / consideration of environmental insurance / transaction restructuring.

## Is there a risk of statutory (e.g. Part 2A EPA 1990) or third party action being taken against the site?

This response considers the risk of legal liability arising through ownership or occupation and use of the property through statutory or other third party claims.

## Does the property represent Acceptable Banking Security from an environmental risk perspective?

Consideration is given to the suitability of the property as robust financial security for the purposes of secured lending facilities. An assumption is made here that the subject property is being considered in isolation and that normal commercial lending loan to value ratios are being considered.

Groundsure may in certain circumstances be able to make a specific lender liability assessment based on a full view of financial arrangements and hence the commercial context of the environmental risks.

## Is there a risk that the property value may be impacted due to environmental liability issues?

This response sets out to advise whether environmental liabilities are likely to materially impact upon a standard Royal Institution of Chartered Surveyors valuation of the property necessitating further assessment.

## Environmental Damage (Prevention and Remediation) Regulations 2015

The Environmental Damage (Prevention and Remediation) (England) (Amendment) Regulations 2015, the Environmental Damage (Prevention and Remediation) (Amendment) (Wales) Regulations 2015 and the Environmental Liability (Scotland) Amendment Regulations 2015 came into force on 19th July 2015, and amend the Environmental Damage (Prevention and Remediation) Regulations 2009, which came into force in

England on 1st March 2009, in Wales on 6th May 2009 and in Scotland on 24th June 2009. These regulations implement the European Directive on Environmental Liability (2004/35/EC) and are aimed at ensuring responsible parties prevent and remedy environmental damage to the following receptors:

- Sites of Special Scientific Interest (SSSIs), other protected habitats and protected species
- Surface waters
- Groundwater
- Land, if contamination of the land results in significant risk of adverse effects on human health

The regulations are based on the 'polluter pays' principle and ensures that those responsible for causing environmental damage are those responsible for paying to prevent and remedy such damage. 'Environmental Damage' has a specific meaning within the Regulations, and covers only the most serious cases. For damage to SSSIs, EU protected species and habitats and damage to water, primary remediation, complementary remediation and compensatory remediation may be required by the enforcing authorities (Environment Agency/Natural Resources Wales, Scottish Environment Protection Agency (SEPA), Local Authorities, the Marine Fisheries Agency, Marine Scotland, Welsh Ministers and Natural England/Natural Resources Wales/Scottish Natural Heritage).

The regulations apply on land in England, Wales and Scotland, 1 nautical mile seaward from the baseline (in relation to water damage), on the seabed around the UK up to the limits set out in the Continental Shelf Act 1964, and to waters in the Renewable Energy Zone, which extends approximately 200 miles out to sea (in relation to protected species and natural habitats). These regulations are designed to work in tandem with Part 2A of the Environmental Protection Act, and only apply to environmental damage caused after the Regulations came into force. Groundsure's assessment of the site is not an assessment of the potential for Environmental Damage to occur at the site, but is an assessment of the sensitivity of the site in relation to relevant receptors.

## Flood information

The Flood Risk Assessment section is based on datasets covering a variety of different flooding types. No inspection of the property or of the surrounding area has been undertaken by Groundsure or the data providers. The modelling of flood hazards is extremely complex and in creating a national dataset certain assumptions have been made and all such datasets will have limitations. These datasets should be used to give an indication of relative flood risk rather than a definitive answer. Local actions and minor variations, such as blocked drains or streams etc. can greatly alter the effect of flooding. A low or negligible modelled flood risk does not guarantee that flooding will not occur. Nor will a high risk mean that flooding definitely will occur. Groundsure's overall flood risk assessment takes account of the cumulative risk of river and coastal data, historic flood events and areas benefiting from flood defences provided by the Environment Agency/Natural Resources Wales (in England and Wales) and surface water (pluvial) and groundwater flooding provided by Ambiantal Risk Analytics. In Scotland the river and coastal flood models are also provided by Ambiantal Risk Analytics.

### Risk of flooding from rivers and the sea

This is an assessment of flood risk for England and Wales produced using local data and expertise, provided by Environment Agency. It shows the chance of flooding from rivers or the sea presented in categories taking account of flood defences and the condition those defences are in. The model uses local water level and flood defence data to model flood risk.

### Historic flood events

Over 86,000 events are recorded within this database. This data is used to understand where flooding has occurred in the past and provides details as available. Absence of a historic flood event for an area does not mean that the area has never flooded, but only that Environment Agency/Natural Resources Wales do not currently have records of flooding within the area. Equally, a record of a flood footprint in previous years does not mean that an area will flood again, and this information does not take account of flood management schemes and improved flood defences.

### Surface water flooding

Ambiantal Risk Analytics surface water flood map identifies areas likely to flood following extreme rainfall events, i.e. land naturally vulnerable to surface water or "pluvial" flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though older ones may even flood in a 1 in 5 year rainstorm event.

### Proposed flood defences

The data includes all Environment Agency/Natural Resources Wales's projects over £100K that will change or sustain the standards of flood defence in England and Wales over the next 5 years. It also includes the equivalent schemes for all Local Authority and Internal Drainage Boards.

### Flood storage areas

Flood Storage Areas may also act as flood defences. A flood storage area may also be referred to as a balancing reservoir, storage basin or balancing pond. Its purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval. These areas are also referred to as Zone 3b or 'the functional floodplain' and has a 5% or greater chance of flooding in any given year, or is designed to flood in the event of



an extreme (0.1%) flood or another probability which may be agreed between the Local Planning Authority and Environment Agency/Natural Resources Wales, including water conveyance routes. Development within Flood Storage Areas is severely restricted.

## Groundwater flooding

Groundwater flooding is flooding caused by unusually high groundwater levels. It occurs as excess water emerging at the ground surface or within underground structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and it can result in significant damage to property. This risk assessment is based on a 5m Digital Terrain Model (DTM) and 1 in 100 year and 1 in 250 year return periods.

## Conservation Area data limitations

Please note the Conservation Area data is provided by Historic England and may be incomplete. We recommend reviewing your local search for confirmation.

## Underground data limitations

This database was created by Groundsure using publicly available open data and data from OpenStreetMap. The data is not provided by or endorsed by Transport for London (TfL) and minor differences between TfL's official data and Groundsure's data may occur in relation to the London Underground. Please note that the London Underground, Merseyrail, and Tyne and Wear Metro operate both underground and above ground.

## Subsidence data limitations

The natural ground subsidence assessment is based on the British Geological Survey's GeoSure data. GeoSure is a natural ground stability hazard susceptibility dataset, based on the characteristics of the underlying geology, rather than an assessment of risk. A hazard is defined as a potentially damaging event or phenomenon, whereas a risk is defined as the likelihood of the hazard impacting people, property or capital. The GeoSure dataset consists of six data layers for each type of natural ground subsidence hazard. These are shrink-swell clay, landslide, compressible ground, collapsible ground, dissolution of soluble rock and running sand. Each hazard is then provided with a rating on its potential to cause natural ground subsidence. This rating goes from A-E, with A being the lowest hazard, E being the highest. This is then represented within Groundsure reports as either Negligible-Very Low (A&B ratings), Low (C ratings) or Moderate-High (D&E ratings). The GeoSure data only takes into account the geological characteristics at a site. It does not take into account any additional factors such as the characteristics of buildings, local vegetation including trees or seasonal changes in the soil moisture content which can be related to local factors such as rainfall and local drainage. These factors should be considered as part of a structural survey of the property carried out by a competent structural surveyor. For more information on the "typical safe distance" trees should be from a property please see this guide:

<https://www.abi.org.uk/globalassets/sitecore/files/documents/publications/public/migrated/home/protecting-your-home-from-subsidence-damage.pdf>

## Conveyancing Information Executive and our terms & conditions

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- Conveyancing Information Executive Members will promote the benefits of and deliver the Search to the agreed standards and in the best interests of the customer and associated parties.

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If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Standards.

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- acknowledge it within 5 working days of receipt
- normally deal with it fully and provide a final response, in writing, within 20 working days of receipt
- liaise, at your request, with anyone acting formally on your behalf

Complaints should be sent to:

Operations Director, Groundsure Ltd, Sovereign House, Church Street, Brighton, BN1 1UJ. Tel: 08444 159 000. Email: [info@groundsure.com](mailto:info@groundsure.com) If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: [admin@tpos.co.uk](mailto:admin@tpos.co.uk) We will co-operate fully with the Ombudsman during an investigation and comply with their final decision.

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

## Important consumer protection information







All of the advice and reports that Groundsure produces are covered by a comprehensive Remediation Contribution policy to ensure customers are protected, see <https://www.groundsure.com/remediation> for full details.

## Data providers

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

APPENDIX E  
Borehole Logs  
Dynamic Probe Logs

<b>Excavation Method</b> Drive-in Window Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b>	<b>Client</b> Charterhouse Property Group	<b>Job Number</b> 21069
	<b>Location</b>	<b>Dates</b> 28/06/2021	<b>Engineer</b> Andy Evans	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.30	D1		PID=0.0ppm		0.05 (0.45)	BITUMINOUS PAVING. MADE GROUND: Orange/brown sandy gravelly fill.	
0.70	D2		PID=0.0ppm		0.50	Soft slightly sandy light brown CLAY.	
1.00-1.45 1.00-2.00	SPT N=9 B1		1,2/2,2,3,2				
1.50	D3		Water strike(1) at 1.50m.		(2.10)		
2.00-2.45	CPT N=50		1/50				
2.60	D4				2.60	...Refusal at 2.60m bgl on hard or dense material. Complete at 2.60m	

<b>Remarks</b> Window sampler refused at 2.60m bgl.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	AE
	<b>Figure No.</b> 21069.BH1	



<b>Excavation Method</b> Drive-in Window Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b>	<b>Client</b> Charterhouse Property Group	<b>Job Number</b> 21069
	<b>Location</b>	<b>Dates</b> 28/06/2021	<b>Engineer</b> Andy Evans	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.40	D1		PID=0.0ppm		(0.30)	REINFORCED CONCRETE.	
0.65	D2		PID=0.0ppm		0.30 0.45 (0.20)	MADE GROUND: Orange/brown sandy gravelly fill.	
1.00-1.45 1.00-2.00 1.20	SPT N=9 C1 D3		2,2/2,2,2,3 PID=0.0ppm		0.65 0.75 (0.10)	MADE GROUND: Reworked light brown clayey gravel with concrete fragments.	
2.00-2.45	CPT N=79		1,1/2,27,50		(1.75)	MADE GROUND: Black slightly silty gravel.	
2.40	D4		Water strike(1) at 2.30m.		2.50	Soft to firm brown gravelly CLAY.	
						...Refusal at 2.50m bgl on hard or dense material. Complete at 2.50m	

<b>Remarks</b> Window sampler refused at 2.50m bgl.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	AE
	<b>Figure No.</b> 21069.BH3	







<b>Excavation Method</b> Drive-in Window Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b>	<b>Client</b> Charterhouse Property Group	<b>Job Number</b> 21069
	<b>Location</b>	<b>Dates</b> 28/06/2021	<b>Engineer</b> Andy Evans	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.30	D1		PID=0.0ppm		(0.25) 0.25 0.35	REINFORCED CONCRETE. MADE GROUND: Orange/brown sandy gravelly fill.	
1.00-1.45 1.00-2.00 1.10 1.30	SPT N=6 C1 D2 D3		1,1/1,1,2,2 PID=0.0ppm		(0.60) 0.95	MADE GROUND: Reworked light brown clayey gravel with concrete fragments. Firm dark brown slightly gravelly silty CLAY. Gravels are fine subrounded to rounded.	
2.00-2.70 2.00-2.45 2.30	C2 SPT N=54 D4		Water strike(1) at 2.00m. 3,5/6,9,15,24		(1.75)		
2.70-3.15	CPT N=50		21/50		2.70	...Refusal at 2.70m bgl on hard or dense material. Complete at 2.70m	





<b>Remarks</b> Window sampler refused at 2.70m bgl	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	AE
	<b>Figure No.</b> 21069.BH4	

<b>Excavation Method</b> Drive-in Window Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b>	<b>Client</b> Charterhouse Property Group	<b>Job Number</b> 21069
	<b>Location</b>	<b>Dates</b> 29/06/2021	<b>Engineer</b> Andy Evans	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.15	D1		PID=0.0ppm		0.15	TOPSOIL: Dark brown silty clay with rootlets.	
0.65	D2		PID=0.0ppm		(0.55)	MADE GROUND: Reworked light brown clayey gravel with concrete fragments.	
0.80	D3		PID=0.0ppm		0.70	Stiff light grey CLAY.	
			Water strike(1) at 0.90m.		(1.00)		
1.20	D4				1.70	...Refusal at 1.70m bgl on hard or dense material. Complete at 1.70m	

<b>Remarks</b> Window sampler refused at 1.70m bgl.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	AE
	<b>Figure No.</b> 21069.BH5	

<b>Excavation Method</b> Drive-in Window Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b>	<b>Client</b> Charterhouse Property Group	<b>Job Number</b> 21069
	<b>Location</b>	<b>Dates</b> 29/06/2021	<b>Engineer</b> Andy Evans	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.15	D1		PID=0.0ppm		0.10 (0.40)	TOPSOIL: Dark brown silty clay with rootlets.	
0.50	D2		PID=0.0ppm		0.50	MADE GROUND: Reworked light brown clayey gravel with concrete fragments.	
1.00	D3		Water strike(1) at 1.00m.		(1.70)	Soft to firm brown slightly gravelly CLAY. Gravels are fine rounded.	
2.10	D4				2.20	...Refusal at 2.20m bgl on hard or dense material. Complete at 2.20m	

<b>Remarks</b> Window sampler refused at 2.20m bgl.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	AE
	<b>Figure No.</b> 21069.BH6	

<b>Excavation Method</b> Drive-in Window Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b>	<b>Client</b> Charterhouse Property Group	<b>Job Number</b> 21069
	<b>Location</b>	<b>Dates</b> 29/06/2021	<b>Engineer</b> Andy Evans	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
0.30	D1		PID=0.0ppm		(0.25) 0.25 0.35	REINFORCED CONCRETE. MADE GROUND: Orange/brown sandy gravelly fill.	
0.70	D2		PID=0.0ppm		(0.65)	MADE GROUND: Reworked light brown clayey gravel with concrete fragments.	
1.00-1.45	SPT N=7		2,2/2,2,2,1		1.00 (0.65)	Soft to firm brown gravelly CLAY. ...Poor recovery between 1.00m and 1.70m bgl.	
1.70-1.70 1.70	CPT 50*0 D3	50/			1.65 1.70 (0.05)	Very strong light grey SILTSTONE. ...Refusal at 1.70m bgl on hard or dense material. Complete at 1.70m	

<b>Remarks</b> No groundwater encountered. Window sampler refused at 1.70m bgl.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	AE
	<b>Figure No.</b> 21069.BH7	





62a Western Road  
 Tring, Hertfordshire  
 HP23 4BB  
 Tel: 01442 825570  
 Fax: 01442 891410

**Site**  
 Garsington Road, Cowley

**Probe Number**  
**DP6**

<b>Method</b> Dynamic Probe	<b>Cone Dimensions</b>	<b>Ground Level (mOD)</b>	<b>Client</b> Charterhouse Property Group	<b>Job Number</b> 21069
	<b>Location</b>	<b>Dates</b> 29/06/2021	<b>Engineer</b> Andy Evans	<b>Sheet</b> 1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)	Blows for Depth Increment																	
					0	5	10	15	20	25	30	35	40	45	50							
0.00-0.10	1			0.00																		
0.10-0.20	2																					
0.20-0.30	1																					
0.30-0.40	1																					
0.40-0.50	1																					
0.50-0.60	0			0.50																		
0.60-0.70	0																					
0.70-0.80	1																					
0.80-0.90	2																					
0.90-1.00	50			1.00																		
				1.50																		
				2.00																		
				2.50																		
				3.00																		
				3.50																		
				4.00																		
				4.50																		
				5.00																		

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	AE
	<b>Figure No.</b> 21069.DP6	



APPENDIX F  
Ground Gas Sheets  
Permeability Sheets

# Ground Gas Monitoring

Visit Date:

30/06/2021

Visit Number:

1

Air Temperature:

11 °C

Borehole Number	HBH1			BH2		
	0 mins	5 mins	10 mins	0 mins	5 mins	10 mins
Combustible gas (CH4) %LEL	001	001	001	002	002	002
Combustible gas (CH4) % vol	0.1	0.1	0.1	0.1	0.1	0.1
Combustible gas (CH4) Peak	0.1	0.1	0.1	0.1	0.1	0.1
Carbon dioxide % vol	3.6	3.7	3.7	0.3	0.2	0.2
Oxygen % vol	18.7	18.5	18.5	21.1	21.0	21.0
Carbon monoxide ppm	0	0	0	0	0	0
Hydrogen sulfide ppm	0	0	0	0	0	0
Flow Rate (l/hr)	+0.0			+0.1		
Barometric Pressure (mB)	1009			1009		
Relative Downhole Pressure (mB)	-0.1			-0.11		
Depth to Groundwater (m)	0.735			0.485		
Depth to Base of Borehole (m)	2.020			1.800		
Condition of Standpipe	Good			Good		
Borehole Number	BH4			HBH5		
	0 mins	5 mins	10 mins	0 mins	5 mins	10 mins
Combustible gas (CH4) %LEL	002	002	0002	001	001	001
Combustible gas (CH4) % vol	0.1	0.1	0.1	0.1	0.1	0.1
Combustible gas (CH4) Peak	0.1	0.1	0.1	0.1	0.1	0.1
Carbon dioxide % vol	0.1	0.1	0.1	1.8	0.6	0.6
Oxygen % vol	19.2	19.2	19.2	18.2	20.4	20.4
Carbon monoxide ppm	0	0	0	0	0	0
Hydrogen sulfide ppm	0	0	0	0	0	0
Flow Rate (l/hr)	-0.0			+0.1		
Barometric Pressure (mB)	1009			1010		
Relative Downhole Pressure (mB)	-0.09			-0.08		
Depth to Groundwater (m)	2.022			0.730		
Depth to Base of Borehole (m)	2.575			1.510		
Condition of Standpipe	Good			Good		

# Ground Gas Monitoring

Visit Date:

30/06/2021

Visit Number:

1

Air Temperature:

11 °C

Borehole Number	BH6			BH7		
	0 mins	5 mins	10 mins	0 mins	5 mins	10 mins
Combustible gas (CH4) %LEL	001	002	002	001	002	002
Combustible gas (CH4) % vol	0.1	0.1	0.1	0.1	0.1	0.1
Combustible gas (CH4) Peak	0.1	0.1	0.1	0.1	0.1	0.1
Carbon dioxide % vol	0.4	0.3	0.3	0.8	0.8	0.9
Oxygen % vol	20.1	19.9	19.9	18.7	18.3	18.3
Carbon monoxide ppm	0	0	0	0	0	0
Hydrogen sulfide ppm	0	0	0	0	0	0
Flow Rate (l/hr)	+0.1			+0.0		
Barometric Pressure (mB)	1010			1009		
Relative Downhole Pressure (mB)	-0.1			-0.09		
Depth to Groundwater (m)	1.060			Dry		
Depth to Base of Borehole (m)	1.920			1.330		
Condition of Standpipe	Good			Good		
Borehole Number	HBH7					
	0 mins	5 mins	10 mins	0 mins	5 mins	10 mins
Combustible gas (CH4) %LEL	001	002	002			
Combustible gas (CH4) % vol	0.1	0.1	0.1			
Combustible gas (CH4) Peak	0.1	0.1	0.1			
Carbon dioxide % vol	2.0	2.1	2.3			
Oxygen % vol	16.3	15.5	14.7			
Carbon monoxide ppm	0	0	0			
Hydrogen sulfide ppm	0	0	0			
Flow Rate (l/hr)	+0.0					
Barometric Pressure (mB)	1009					
Relative Downhole Pressure (mB)	-0.08					
Depth to Groundwater (m)	1.200					
Depth to Base of Borehole (m)	1.610					
Condition of Standpipe	Flooded					



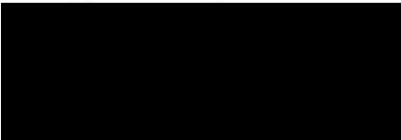
APPENDIX G  
Laboratory Test Results  
Waste Checker Sheets



# Final Report

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**Report No.:** 21-23143-1  
**Initial Date of Issue:** 12-Jul-2021  
**Client:** WDE Consulting Ltd  
**Client Address:** 62a Western Road  
Tring  
Herts  
HP23 4BB  
**Contact(s):** Results  
Andy Evans  
**Project:** 21069 Garsington Road, Cowley  
**Quotation No.:** **Date Received:** 06-Jul-2021  
**Order No.:** 21-293 **Date Instructed:** 06-Jul-2021  
**No. of Samples:** 6  
**Turnaround (Wkdays):** 5 **Results Due:** 12-Jul-2021  
**Date Approved:** 12-Jul-2021  
**Approved By:**



**Details:** Glynn Harvey, Technical Manager

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## Results - Soil

**Project: 21069 Garsington Road, Cowley**

Client: WDE Consulting Ltd		Chemtest Job No.:		21-23143	21-23143	21-23143	21-23143	21-23143	21-23143	
Quotation No.:		Chemtest Sample ID.:		1235092	1235093	1235094	1235095	1235096	1235097	
Order No.: 21-293		Client Sample Ref.:		D2	D1	D2	D1	D1	D2	
		Sample Location:		BH1	BH2	BH3	BH4	BH5	BH7	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		0.7	0.2	0.65	0.3	0.15	0.7	
		Date Sampled:		28-Jun-2021	28-Jun-2021	28-Jun-2021	28-Jun-2021	29-Jun-2021	29-Jun-2021	
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	
Determinand	Accred.	SOP	Units	LOD						
Moisture	N	2030	%	0.020	18	8.2	4.4	4.1	10	5.9
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Type	U	2192		N/A	-	-	-	-	-	-
pH	U	2010		4.0	8.6	9.2	8.8	11.5	9.4	9.1
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.012	0.087	0.18	0.14	0.065	0.10
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	0.36	0.12	< 0.010	0.046
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	0.63	0.71	5.9	1.5	0.98	1.6
Total Organic Carbon	U	2625	%	0.20	4.7	3.2	0.96	4.0	0.22	1.2
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	1.0	26	0.82	1.9	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	4.1	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	71	1.1	0.17	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	71	1.3	0.16	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	0.24	1200	10	1.5	0.54
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	430	3.9	0.56	0.11
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	0.46	1200	13	5.3	1.0
Pyrene	U	2700	mg/kg	0.10	< 0.10	0.34	1200	12	5.6	1.2
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	400	3.6	2.6	0.42
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	390	4.4	3.2	0.72
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	340	5.0	3.3	0.78
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	59	1.9	1.7	0.50
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	250	3.6	2.4	0.45
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	72	3.5	2.2	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	23	0.91	0.77	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	67	1.3	2.6	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	2.0	5800	66	34	5.7
Arsenic	U	2450	mg/kg	1.0	21	13	18	35	20	20
Beryllium	U	2450	mg/kg	1.0	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40	< 0.40	1.9	< 0.40	< 0.40
Cadmium	U	2450	mg/kg	0.10	0.14	0.12	0.20	0.18	0.17	< 0.10
Chromium	U	2450	mg/kg	1.0	27	5.8	6.4	9.0	21	8.8
Copper	U	2450	mg/kg	0.50	10	4.4	14	3.3	4.7	3.2
Lead	U	2450	mg/kg	0.50	11	3.7	6.7	4.9	8.1	4.9
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	26	4.7	7.1	7.0	13	7.9
Selenium	U	2450	mg/kg	0.20	0.56	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20



## Results - Soil

**Project: 21069 Garsington Road, Cowley**

Client: WDE Consulting Ltd		Chemtest Job No.:		21-23143	21-23143	21-23143	21-23143	21-23143	21-23143	
Quotation No.:		Chemtest Sample ID.:		1235092	1235093	1235094	1235095	1235096	1235097	
Order No.: 21-293		Client Sample Ref.:		D2	D1	D2	D1	D1	D2	
		Sample Location:		BH1	BH2	BH3	BH4	BH5	BH7	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		0.7	0.2	0.65	0.3	0.15	0.7	
		Date Sampled:		28-Jun-2021	28-Jun-2021	28-Jun-2021	28-Jun-2021	29-Jun-2021	29-Jun-2021	
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	
Determinand	Accred.	SOP	Units	LOD						
Vanadium	U	2450	mg/kg	5.0	54	9.9	25	16	120	39
Zinc	U	2450	mg/kg	0.50	41	15	46	20	110	15
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	2300	170	100	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	10	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	69	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	150	85	79	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	150	160	79	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	42	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	380	< 1.0	4.4	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	1500	4.6	21	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	250	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	2100	< 5.0	26	< 5.0
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	2760	µg/kg	20	< 20	< 20	< 20	< 20	< 20	< 20
Chloroethane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

## Results - Soil

Project: 21069 Garsington Road, Cowley

Client: WDE Consulting Ltd		Chemtest Job No.:		21-23143	21-23143	21-23143	21-23143	21-23143	21-23143
Quotation No.:		Chemtest Sample ID.:		1235092	1235093	1235094	1235095	1235096	1235097
Order No.: 21-293		Client Sample Ref.:		D2	D1	D2	D1	D1	D2
		Sample Location:		BH1	BH2	BH3	BH4	BH5	BH7
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.7	0.2	0.65	0.3	0.15	0.7
		Date Sampled:		28-Jun-2021	28-Jun-2021	28-Jun-2021	28-Jun-2021	29-Jun-2021	29-Jun-2021
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD					
Trichloromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	U	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

## Results - Soil

**Project: 21069 Garsington Road, Cowley**

<b>Client: WDE Consulting Ltd</b>	<b>Chemtest Job No.:</b>		21-23143	21-23143	21-23143	21-23143	21-23143	21-23143
Quotation No.:	<b>Chemtest Sample ID.:</b>		1235092	1235093	1235094	1235095	1235096	1235097
Order No.: 21-293	Client Sample Ref.:		D2	D1	D2	D1	D1	D2
	Sample Location:		BH1	BH2	BH3	BH4	BH5	BH7
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		0.7	0.2	0.65	0.3	0.15	0.7
	Date Sampled:		28-Jun-2021	28-Jun-2021	28-Jun-2021	28-Jun-2021	29-Jun-2021	29-Jun-2021
	Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
<b>Determinand</b>	<b>Accred.</b>	<b>SOP</b>	<b>Units</b>	<b>LOD</b>				
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0

## Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

## **Report Information**

### **Key**

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U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

### **Sample Deviation Codes**

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A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.com](mailto:customerservices@chemtest.com)



# Final Report

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**Report No.:** 21-23152-1  
**Initial Date of Issue:** 12-Jul-2021  
**Client:** WDE Consulting Ltd  
**Client Address:** 62a Western Road  
Tring  
Herts  
HP23 4BB  
**Contact(s):** Results  
Andy Evans  
**Project:** 21069 Garsington Road, Cowley  
**Quotation No.:** **Date Received:** 06-Jul-2021  
**Order No.:** 21-292 **Date Instructed:** 06-Jul-2021  
**No. of Samples:** 4  
**Turnaround (Wkdays):** 5 **Results Due:** 12-Jul-2021  
**Date Approved:** 12-Jul-2021

**Approved By:**



**Details:** Glynn Harvey, Technical Manager

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## Results - Leachate

**Project: 21069 Garsington Road, Cowley**

Client: WDE Consulting Ltd		Chemtest Job No.:		21-23152		
Quotation No.:		Chemtest Sample ID.:		1235134		
Order No.: 21-292		Client Sample Ref.:		D1		
		Sample Location:		BH7		
		Sample Type:		SOIL		
		Top Depth (m):		0.3		
		Date Sampled:		29-Jul-2021		
Determinand	Accred.	SOP	Type	Units	LOD	
pH	U	1010	10:1		N/A	9.6
Cyanide (Total)	U	1300	10:1	mg/l	0.050	< 0.050
Sulphide	U	1325	10:1	mg/l	0.050	< 0.050
Total Organic Carbon	U	1610	10:1	mg/l	2.0	18
Total Phenols	U	1920	10:1	mg/l	0.030	< 0.030
Naphthalene	U	1700	10:1	µg/l	0.10	< 0.10
Acenaphthylene	U	1700	10:1	µg/l	0.10	< 0.10
Acenaphthene	U	1700	10:1	µg/l	0.10	< 0.10
Fluorene	U	1700	10:1	µg/l	0.10	< 0.10
Phenanthrene	U	1700	10:1	µg/l	0.10	< 0.10
Anthracene	U	1700	10:1	µg/l	0.10	< 0.10
Fluoranthene	U	1700	10:1	µg/l	0.10	< 0.10
Pyrene	U	1700	10:1	µg/l	0.10	< 0.10
Benzo[a]anthracene	U	1700	10:1	µg/l	0.10	< 0.10
Chrysene	N	1700	10:1	µg/l	0.10	< 0.10
Benzo[b]fluoranthene	U	1700	10:1	µg/l	0.10	< 0.10
Benzo[k]fluoranthene	U	1700	10:1	µg/l	0.10	< 0.10
Benzo[a]pyrene	U	1700	10:1	µg/l	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	10:1	µg/l	0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	10:1	µg/l	0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	10:1	µg/l	0.10	< 0.10
Total Of 16 PAH's	N	1700	10:1	µg/l	2.0	< 2.0
Benzene	U	1760	10:1	µg/l	1.0	[C] < 1.0
Toluene	U	1760	10:1	µg/l	1.0	[C] < 1.0
Ethylbenzene	U	1760	10:1	µg/l	1.0	[C] < 1.0
m & p-Xylene	U	1760	10:1	µg/l	1.0	[C] < 1.0
o-Xylene	U	1760	10:1	µg/l	1.0	[C] < 1.0
Methyl Tert-Butyl Ether	N	1760	10:1	µg/l	1.0	[C] < 1.0
Total Petroleum Hydrocarbons	N	1675	10:1	µg/l	10	[C] < 10
Aliphatic TPH >C5-C6	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aliphatic TPH >C6-C8	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aliphatic TPH >C8-C10	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aliphatic TPH >C10-C12	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aliphatic TPH >C12-C16	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aliphatic TPH >C16-C21	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aliphatic TPH >C21-C35	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aliphatic TPH >C35-C44	N	1675	10:1	µg/l	0.10	[C] < 0.10
Total Aliphatic Hydrocarbons	N	1675	10:1	µg/l	5.0	[C] < 5.0
Aromatic TPH >C5-C7	N	1675	10:1	µg/l	0.10	[C] < 0.10



## Results - Leachate

**Project: 21069 Garsington Road, Cowley**

<b>Client: WDE Consulting Ltd</b>		<b>Chemtest Job No.:</b>		21-23152		
Quotation No.:		<b>Chemtest Sample ID.:</b>		1235134		
Order No.: 21-292		Client Sample Ref.:		D1		
		Sample Location:		BH7		
		Sample Type:		SOIL		
		Top Depth (m):		0.3		
		Date Sampled:		29-Jul-2021		
Determinand	Accred.	SOP	Type	Units	LOD	
Aromatic TPH >C7-C8	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aromatic TPH >C8-C10	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aromatic TPH >C10-C12	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aromatic TPH >C12-C16	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aromatic TPH >C16-C21	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aromatic TPH >C21-C35	N	1675	10:1	µg/l	0.10	[C] < 0.10
Aromatic TPH >C35-C44	N	1675	10:1	µg/l	0.10	[C] < 0.10
Total Aromatic Hydrocarbons	N	1675	10:1	µg/l	5.0	[C] < 5.0
Sulphate	U	1220	10:1	mg/l	1.0	13
Arsenic (Dissolved)	U	1455	10:1	µg/l	0.20	0.39
Boron (Dissolved)	U	1455	10:1	µg/l	10.0	< 10
Beryllium (Dissolved)	U	1455	10:1	µg/l	1.00	< 1.0
Cadmium (Dissolved)	U	1455	10:1	µg/l	0.11	< 0.11
Chromium (Dissolved)	U	1455	10:1	µg/l	0.50	2.9
Copper (Dissolved)	U	1455	10:1	µg/l	0.50	0.73
Mercury (Dissolved)	U	1455	10:1	µg/l	0.05	0.28
Nickel (Dissolved)	U	1455	10:1	µg/l	0.50	< 0.50
Lead (Dissolved)	U	1455	10:1	µg/l	0.50	< 0.50
Selenium (Dissolved)	U	1455	10:1	µg/l	0.50	< 0.50
Vanadium (Dissolved)	U	1455	10:1	µg/l	0.50	3.9
Zinc (Dissolved)	U	1455	10:1	µg/l	2.5	< 2.5

## Results - Water

Project: 21069 Garsington Road, Cowley

Client: WDE Consulting Ltd		Chemtest Job No.:		21-23152	21-23152	21-23152	
Quotation No.:		Chemtest Sample ID.:		1235131	1235132	1235133	
		Sample Location:		BH2	BH4	BH6	
		Sample Type:		WATER	WATER	WATER	
		Date Sampled:		30-Jul-2021	30-Jul-2021	30-Jul-2021	
Determinand	Accred.	SOP	Units	LOD			
pH	U	1010		N/A	7.8	11.2	8.6
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Sulphide	U	1325	mg/l	0.050	< 0.050	0.099	< 0.050
Total Organic Carbon	U	1610	mg/l	2.0	3.5	11	22
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	1760	µg/l	1.0	< 1.0	7.0	< 1.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	3.5	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	1.7	< 1.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10

## Results - Water

**Project: 21069 Garsington Road, Cowley**

Client: WDE Consulting Ltd		Chemtest Job No.:		21-23152	21-23152	21-23152
Quotation No.:		Chemtest Sample ID.:		1235131	1235132	1235133
		Sample Location:		BH2	BH4	BH6
		Sample Type:		WATER	WATER	WATER
		Date Sampled:		30-Jul-2021	30-Jul-2021	30-Jul-2021
Determinand	Accred.	SOP	Units	LOD		
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0
Sulphate	U	1220	mg/l	1.0	100	99
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.57	1.9
Boron (Dissolved)	U	1455	µg/l	10.0	610	730
Beryllium (Dissolved)	U	1455	µg/l	1.00	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	6.8	34
Copper (Dissolved)	U	1455	µg/l	0.50	3.8	6.6
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	µg/l	0.50	4.2	3.1
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	3.0	1.7
Vanadium (Dissolved)	U	1455	µg/l	0.50	0.55	3.1
Zinc (Dissolved)	U	1455	µg/l	2.5	6.6	< 2.5
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10

## Results - Water

Project: 21069 Garsington Road, Cowley

Client: WDE Consulting Ltd		Chemtest Job No.:		21-23152	21-23152	21-23152
Quotation No.:		Chemtest Sample ID.:		1235131	1235132	1235133
		Sample Location:		BH2	BH4	BH6
		Sample Type:		WATER	WATER	WATER
		Date Sampled:		30-Jul-2021	30-Jul-2021	30-Jul-2021
Determinand	Accred.	SOP	Units	LOD		
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0
4-Nitrophenol	N	1790	µg/l	0.50	< 0.50	< 0.50

## Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

<b>Sample:</b>	<b>Sample Ref:</b>	<b>Sample ID:</b>	<b>Sample Location:</b>	<b>Sampled Date:</b>	<b>Deviation Code(s):</b>	<b>Containers Received:</b>
1235134	D1		BH7	29-Jul-2021	C	Plastic Tub 500g

## Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N-dimethyl-pphenylenediamine.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5-C6, >C6-C8, >C8- C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

## **Report Information**

### **Key**

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U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

### **Sample Deviation Codes**

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A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.com](mailto:customerservices@chemtest.com)



Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	C	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	R35	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H8	H10		H11	H14	H14
Naphthalene				0.0026					0.0026					0.0026	0.0026
Acenaphthylene	0.00041			0.00041											
Acenaphthene	0.0071														
Fluorene															
Phenanthrene	0.12			0.12					0.12						
Anthracene	0.043													0.043	0.043
Fluoranthene	0.12			0.12					0.12						
Pyrene	0.12			0.12											
Benzo(a)anthracene															
Chrysene				0.039			0.039						0.039		
Benzo(b)fluoranthene							0.034							0.034	0.034
Benzo(k)fluoranthene				0.0059			0.0059								
Benzo(a)pyrene							0.025				0.025		0.025	0.025	0.025
Indeno(1,2,3-cd)pyrene															
Dibenzo(a,h)anthracene							0.0023							0.0023	0.0023
Benzo(ghi)perylene														0.0067	0.0067
Arsenic			0.0018		0.0018									0.0018	0.0018
Boron	0.00004			0.00004											
Cadmium	0.00002	0.00002	0.00002		0.00002	0.00002	0.00002								
Chromium										0.00064			0.00064		
Copper				0.0014										0.0014	0.0014
Lead				0.00067					0.00067		0.00067	0.00067		0.00067	0.00067
Mercury		0.00001				0.00001								0.00001	0.00001
Nickel							0.00071	0.00071	0.00071						
Selenium			0.00002		0.00002										0.00002
Zinc	0.0046			0.0046											
Benzene	0.0001		0.0001		0.0001		0.0001								
Toluene				0.0001								0.0001			
Ethylbenzene				0.0001	0.0001							0.0001			
p & m-xylene	0.0001			0.0001											
o-xylene	0.0001			0.0001											
MTBE (Methyl Tertiary Butyl Eth)	0.0001														
PRO C6-C10				0.0006			0.0006							0.0006	0.0006
DRO C10-C25				0.2076					0.2076					0.2076	0.2076
Total (or greatest)	0.4156	0.00003	0.0019	0.6233	0.0019	0.00003	0.0390	0.0007	0.2076	0.0006	0.0250	0.0007	0.0390	0.3257	0.3257
Threshold (%)	20.0	0.1	3	25.0	3.0	0.1	0.1	0.1	1.0	1.0	0.5	5.0	0.1	25.00	25.00
Exceeded? (y/n)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	C	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	R35	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H8	H10		H11	H14	H14
Benzo(a)pyrene							0.025						0.025		
BaP Concentration in TPH							0.00005625						0.00005625		
BaP Exceeded (y/n)							Y						Y		
TPH (EC5 - EC35)				0.225			0.225				0.225		0.225	0.225	0.225
Threshold (%)				25.0			0.1				5.0		0.1	2.50	2.50
Hazardous Properties				N			Y				N		Y	N	N

Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	Car. Cat 1a	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	RE1	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H350	H10		H11	H14	H14
Asbestos										0					
Threshold (%)										0.1					
Hazardous Properties										N					

Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	C	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	R35	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H8	H10		H11	H14	H14
Naphthalene				0.00019					0.00019					0.00019	0.00019
Acenaphthylene	0.00001			0.00001											
Acenaphthene	0.00011														
Fluorene															
Phenanthrene	0.001			0.001					0.001						
Anthracene	0.00039													0.00039	0.00039
Fluoranthene	0.0013			0.0013					0.0013						
Pyrene	0.0012			0.0012											
Benzo(a)anthracene															
Chrysene				0.00044			0.00044						0.00044		
Benzo(b)fluoranthene							0.0005							0.0005	0.0005
Benzo(k)fluoranthene				0.00019			0.00019								
Benzo(a)pyrene							0.00036				0.00036		0.00036	0.00036	0.00036
Indeno(1,2,3-cd)pyrene															
Dibenzo(a,h)anthracene							0.000091							0.000091	0.000091
Benzo(ghi)perylene														0.00036	0.00036
Arsenic			0.0035		0.0035									0.0035	0.0035
Boron	0.00019			0.00019											
Cadmium	0.000018	0.000018	0.000018		0.000018	0.000018	0.000018								
Chromium										0.0021			0.0021		
Copper				0.00047										0.00047	0.00047
Lead				0.00081						0.00081		0.00081		0.00081	0.00081
Mercury		0.00001				0.00001								0.00001	0.00001
Nickel							0.0013	0.0013	0.0013						
Selenium			0.00002		0.00002										0.00002
Zinc	0.011			0.011											
Benzene	0.0001		0.0001				0.0001								
Toluene				0.0001								0.0001			
Ethylbenzene				0.0001	0.0001							0.0001			
p & m-xylene	0.0001			0.0001											
o-xylene	0.0001			0.0001											
MTBE (Methyl Tertiary Butyl Eth)	0.0001														
PRO C6-C10				0.0006			0.0006							0.0006	0.0006
DRO C10-C25				0.01924					0.01924					0.01924	0.01924
Total (or greatest)	0.0156	0.000028	0.0036	0.0371	0.0036	0.000028	0.0013	0.0013	0.0192	0.0021	0.0008	0.0008	0.0021	0.0264	0.0264
Threshold (%)	20.0	0.1	3	25.0	3.0	0.1	0.1	0.1	1.0	1.0	0.5	5.0	0.1	25.00	25.00
Exceeded? (y/n)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	C	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	R35	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H8	H10		H11	H14	H14
Benzo(a)pyrene							0.00036						0.00036		
BaP Concentration in TPH							6.696E-08						6.696E-08		
BaP Exceeded (y/n)							N						N		
TPH (EC5 - EC35)				0.0186			0.0186				0.0186		0.0186	0.0186	0.0186
Threshold (%)				25.0			0.1				5.0		0.1	2.50	2.50
Hazardous Properties				N			N				N		N	N	N

Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	Car. Cat 1a	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	RE1	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H350	H10		H11	H14	H14
Asbestos										0					
Threshold (%)										0.1					
Hazardous Properties									N						

Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	C	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	R35	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H8	H10		H11	H14	H14
Naphthalene				0.00001					0.00001					0.00001	0.00001
Acenaphthylene	0.00001			0.00001											
Acenaphthene	0.00001														
Fluorene															
Phenanthrene	0.00001			0.00001					0.00001						
Anthracene	0.00001													0.00001	0.00001
Fluoranthene	0.00001			0.00001					0.00001						
Pyrene	0.00001			0.00001											
Benzo(a)anthracene															
Chrysene				0.00001			0.00001						0.00001		
Benzo(b)fluoranthene							0.00001							0.00001	0.00001
Benzo(k)fluoranthene				0.00001			0.00001								
Benzo(a)pyrene							0.00001				0.00001		0.00001	0.00001	0.00001
Indeno(1,2,3-cd)pyrene															
Dibenz(a,h)anthracene							0.00001							0.00001	0.00001
Benzo(ghi)perylene														0.00001	0.00001
Arsenic			0.0021		0.0021									0.0021	0.0021
Boron	0.00004			0.00004											
Cadmium	0.000014	0.000014	0.000014		0.000014	0.000014	0.000014								
Chromium										0.0027			0.0027		
Copper				0.001										0.001	0.001
Lead				0.0011					0.0011		0.0011	0.0011		0.0011	0.0011
Mercury		0.00001				0.00001								0.00001	0.00001
Nickel							0.0026	0.0026	0.0026						
Selenium			0.000056		0.000056										0.000056
Zinc	0.0041			0.0041											
Benzene	0.0001		0.0001		0.0001		0.0001								
Toluene				0.0001								0.0001			
Ethylbenzene				0.0001	0.0001							0.0001			
p & m-xylene	0.0001			0.0001											
o-xylene	0.0001			0.0001											
MTBE (Methyl Tertiary Butyl Eth)	0.0001														
PRO C6-C10				0.0006			0.0006							0.0006	0.0006
DRO C10-C25				0.0008					0.0008					0.0008	0.0008
Total (or greatest)	0.0046	0.000024	0.0023	0.0082	0.0023	0.000024	0.0026	0.0026	0.0026	0.0027	0.0011	0.0011	0.0027	0.0057	0.0057
Threshold (%)	20.0	0.1	3	25.0	3.0	0.1	0.1	0.1	1.0	1.0	0.5	5.0	0.1	25.00	25.00
Exceeded? (y/n)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	C	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	R35	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H8	H10		H11	H14	H14
Benzo(a)pyrene							0.00001						0.00001		
BaP Concentration in TPH							2E-11								
BaP Exceeded (y/n)							N						N		
TPH (ECS - EC35)				0.0002			0.0002				0.0002		0.0002	0.0002	0.0002
Threshold (%)				25.0			0.1				5.0		0.1	2.50	2.50
Hazardous Properties				N			N				N		N	N	N

Category or Danger	Xi	T+	T	Xn	T	T+	Car. Cat 1 / 2	Carc. Cat 3	Car. Cat 1a	Repr. Cat 1 / 2	Muta. Cat 1 / 2	N			
Substance	Irritant	Harmful			Toxic		Carcinogenic			Corrosive	Teratogenic	Mutagenic	Ecotoxic		
Risk Phase	R36-38	R26-28, R39	R23-25, R39, R48	R20-22, 48,65,68	R23-25, R39, R48	R26-28, R39	R45	R49	R40	RE1	R60 / R61	R62 / R63	R46	R50	R53
Hazard	H4	H5	H5	H5	H6	H6	H7			H350	H10		H11	H14	H14
Asbestos										0					
Threshold (%)										0.1					
Hazardous Properties									N						

APPENDIX H

Geotechnical Laboratory Test Results

SPT Variation Graphs

CBR Variation Graphs



# TEST CERTIFICATE

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



## Liquid and Plastic Limits

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 08/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

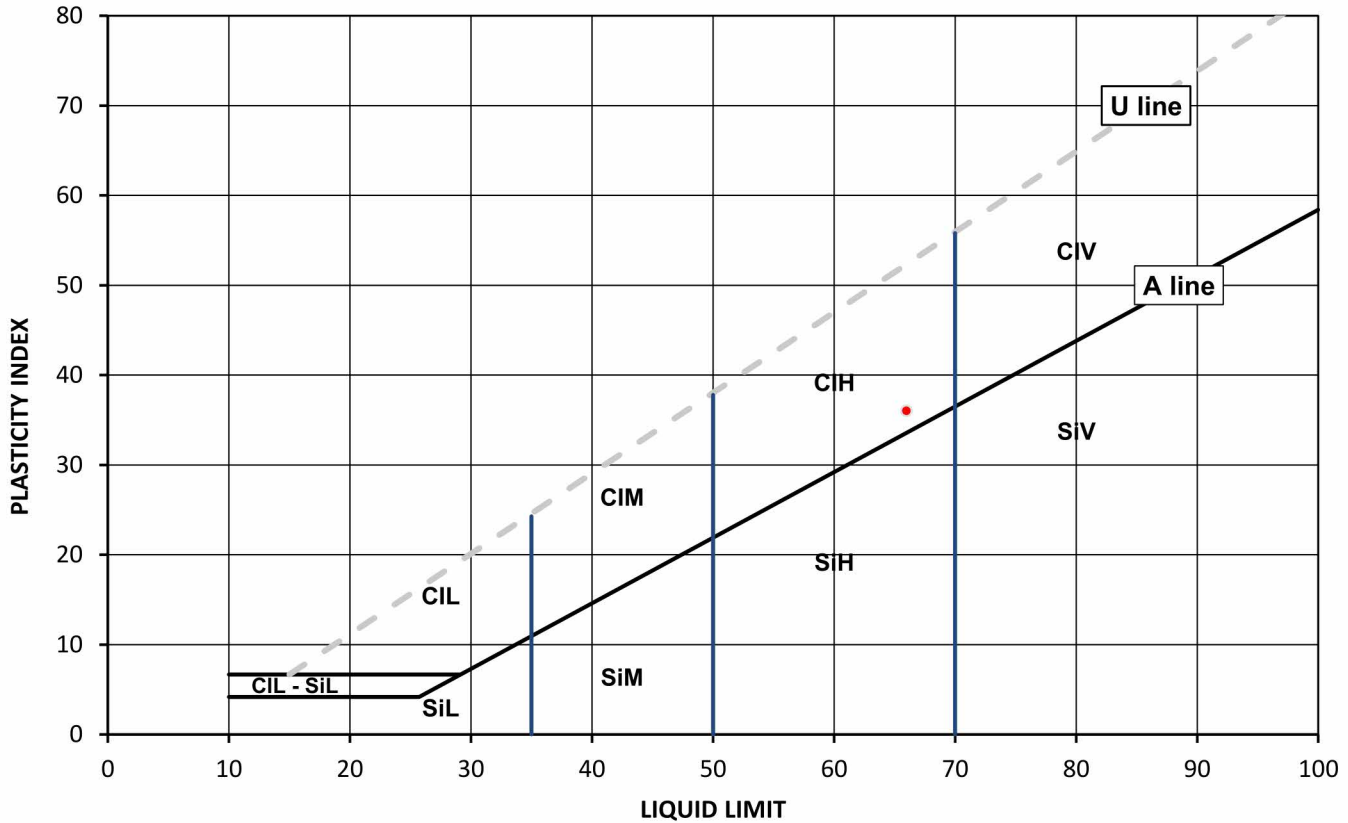
### Test Results:

Laboratory Reference: 1926934  
Hole No.: BH1  
Sample Reference: Not Given  
Soil Description: Brown CLAY

Depth Top [m]: 2.60  
Depth Base [m]: Not Given  
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Moisture Content [ W ] %	Liquid Limit [ WL ] %	Plastic Limit [ Wp ] %	Plasticity Index [ Ip ] %	% Passing 425µm BS Test Sieve
34	66	30	36	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	Liquid Limit
Si	Silt	L	below 35
		M	35 to 50
		H	50 to 70
		V	exceeding 70
		O	append to classification for organic material ( eg CIHO )

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Szczepan Białowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd

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# TEST CERTIFICATE

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



## Liquid and Plastic Limits

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 08/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

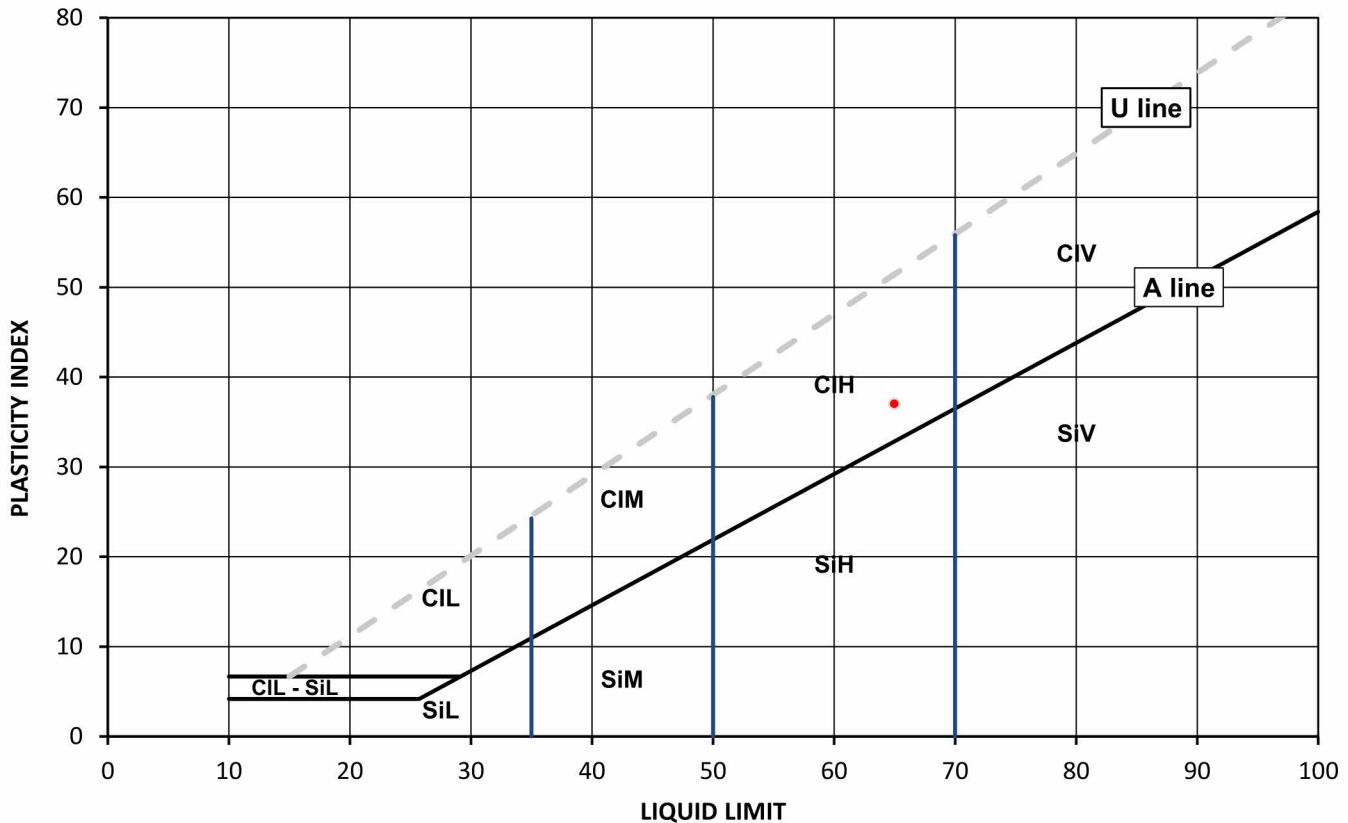
### Test Results:

Laboratory Reference: 1926935  
Hole No.: BH2  
Sample Reference: Not Given  
Soil Description: Brown slightly gravelly CLAY

Depth Top [m]: 1.20  
Depth Base [m]: Not Given  
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Moisture Content [ W ] %	Liquid Limit [ WL ] %	Plastic Limit [ Wp ] %	Plasticity Index [ Ip ] %	% Passing 425µm BS Test Sieve
30	65	28	37	82



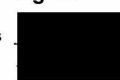
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material ( eg CIHO )

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Szczepan Białowicz  
PL Deputy Head of Geotechnical Section  
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# TEST CERTIFICATE

## Liquid and Plastic Limits

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



Environmental Science

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 08/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

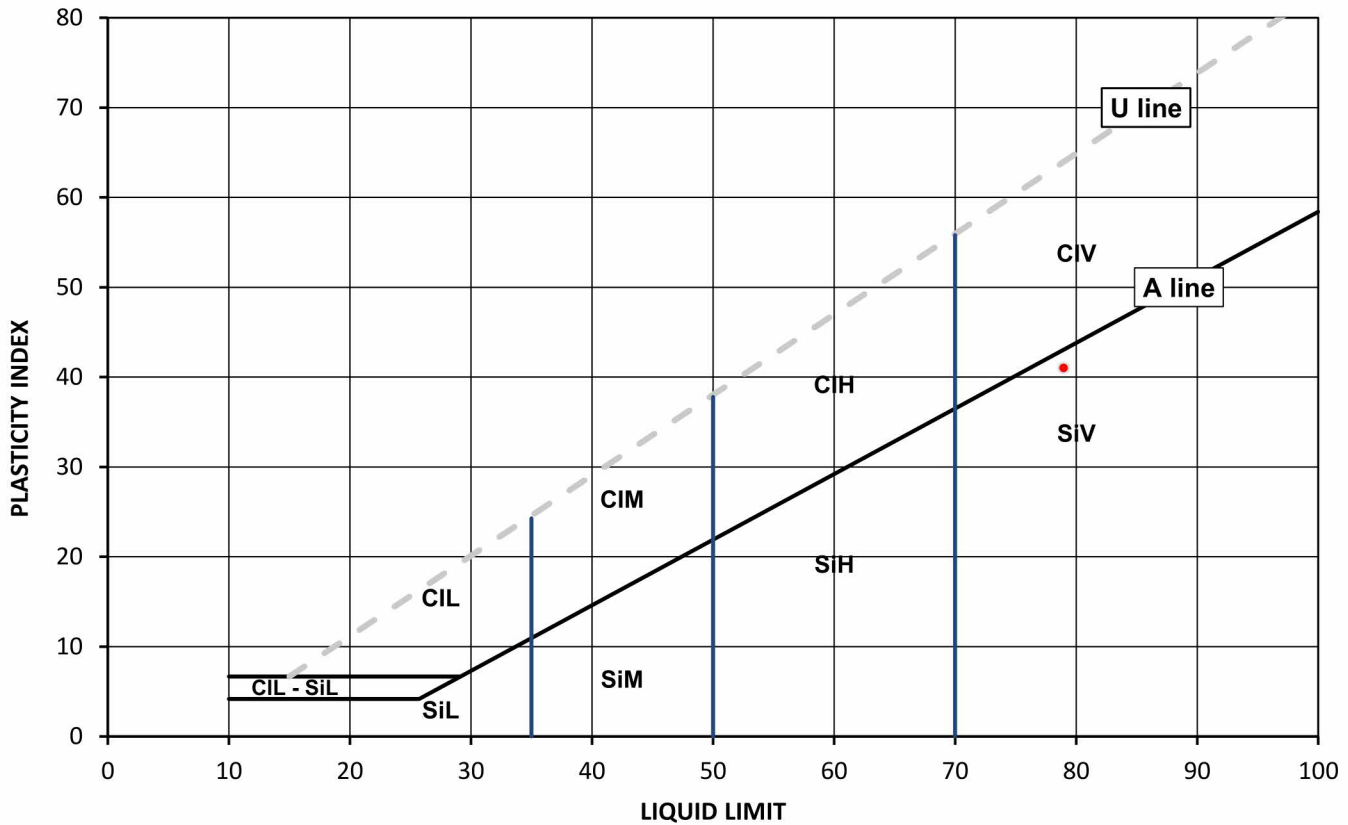
### Test Results:

Laboratory Reference: 1926937  
Hole No.: BH3  
Sample Reference: Not Given  
Soil Description: Brown slightly gravelly CLAY

Depth Top [m]: 2.40  
Depth Base [m]: Not Given  
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Moisture Content [ W ] %	Liquid Limit [ WL ] %	Plastic Limit [ Wp ] %	Plasticity Index [ Ip ] %	% Passing 425µm BS Test Sieve
38	79	38	41	89



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material ( eg CIHO )

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Szczepan Białowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd

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# TEST CERTIFICATE

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



## Liquid and Plastic Limits

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 08/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

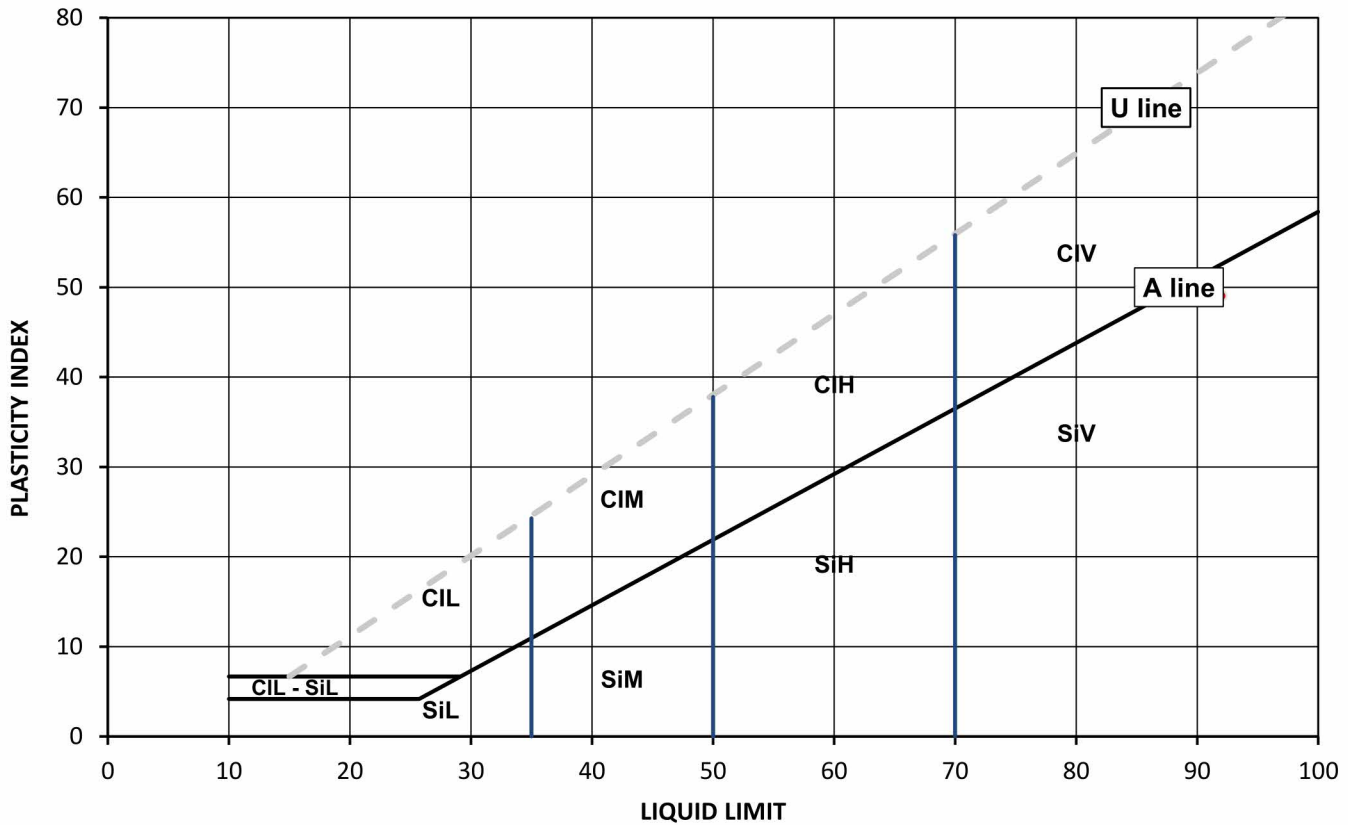
### Test Results:

Laboratory Reference: 1926939  
Hole No.: BH4  
Sample Reference: Not Given  
Soil Description: Brown slightly gravelly CLAY

Depth Top [m]: 1.10  
Depth Base [m]: Not Given  
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Moisture Content [ W ] %	Liquid Limit [ WL ] %	Plastic Limit [ Wp ] %	Plasticity Index [ Ip ] %	% Passing 425µm BS Test Sieve
27	92	43	49	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material ( eg CIHO )

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Szczepan Białowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd

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# TEST CERTIFICATE

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



## Liquid and Plastic Limits

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 08/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

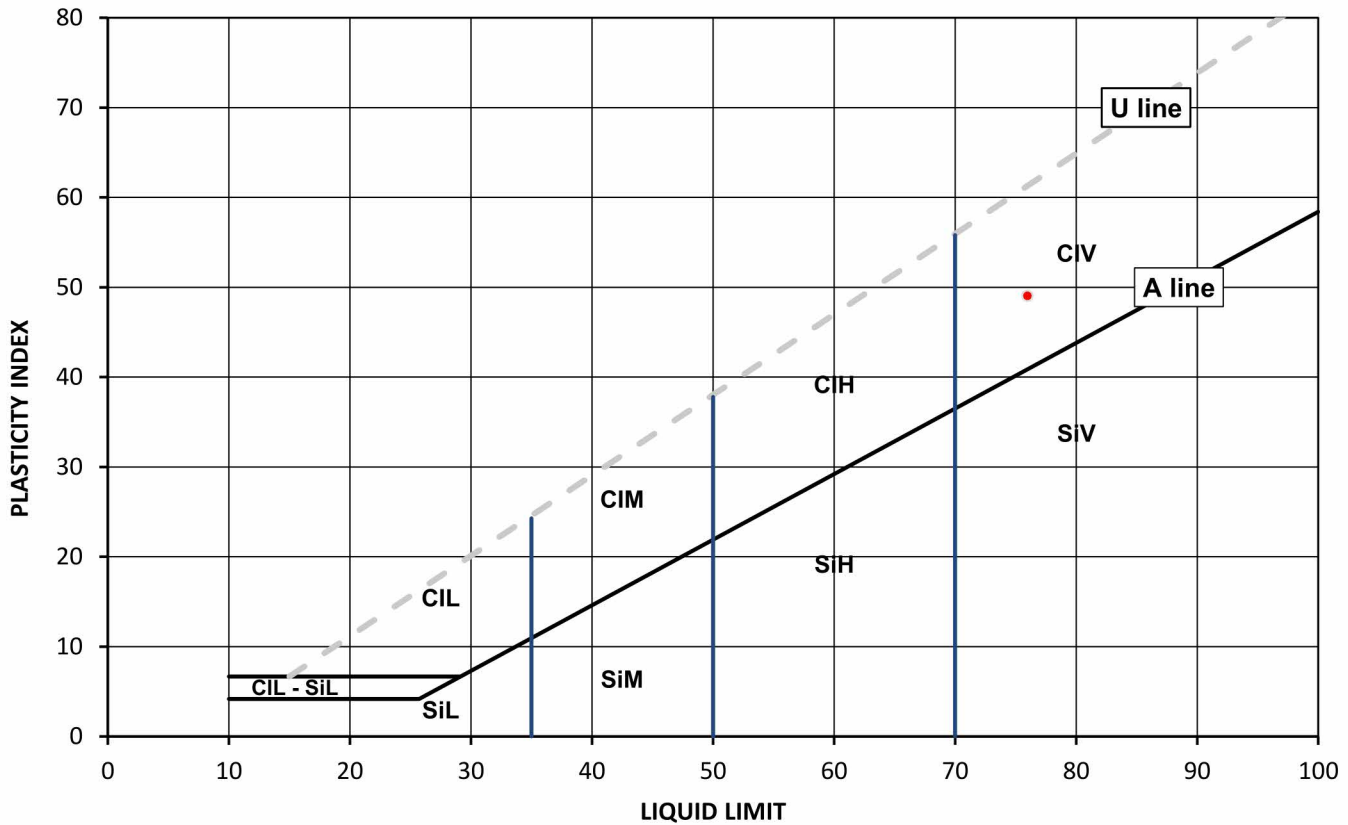
### Test Results:

Laboratory Reference: 1926942  
Hole No.: BH5  
Sample Reference: Not Given  
Soil Description: Brown CLAY

Depth Top [m]: 1.20  
Depth Base [m]: Not Given  
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Moisture Content [ W ] %	Liquid Limit [ WL ] %	Plastic Limit [ Wp ] %	Plasticity Index [ Ip ] %	% Passing 425µm BS Test Sieve
27	76	27	49	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	Liquid Limit
Si	Silt	L	Low
		M	Medium
		H	High
		V	Very high
		O	Organic
			append to classification for organic material ( eg CIHO )

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Szczepan Białowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd

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Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



## Liquid and Plastic Limits

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 08/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

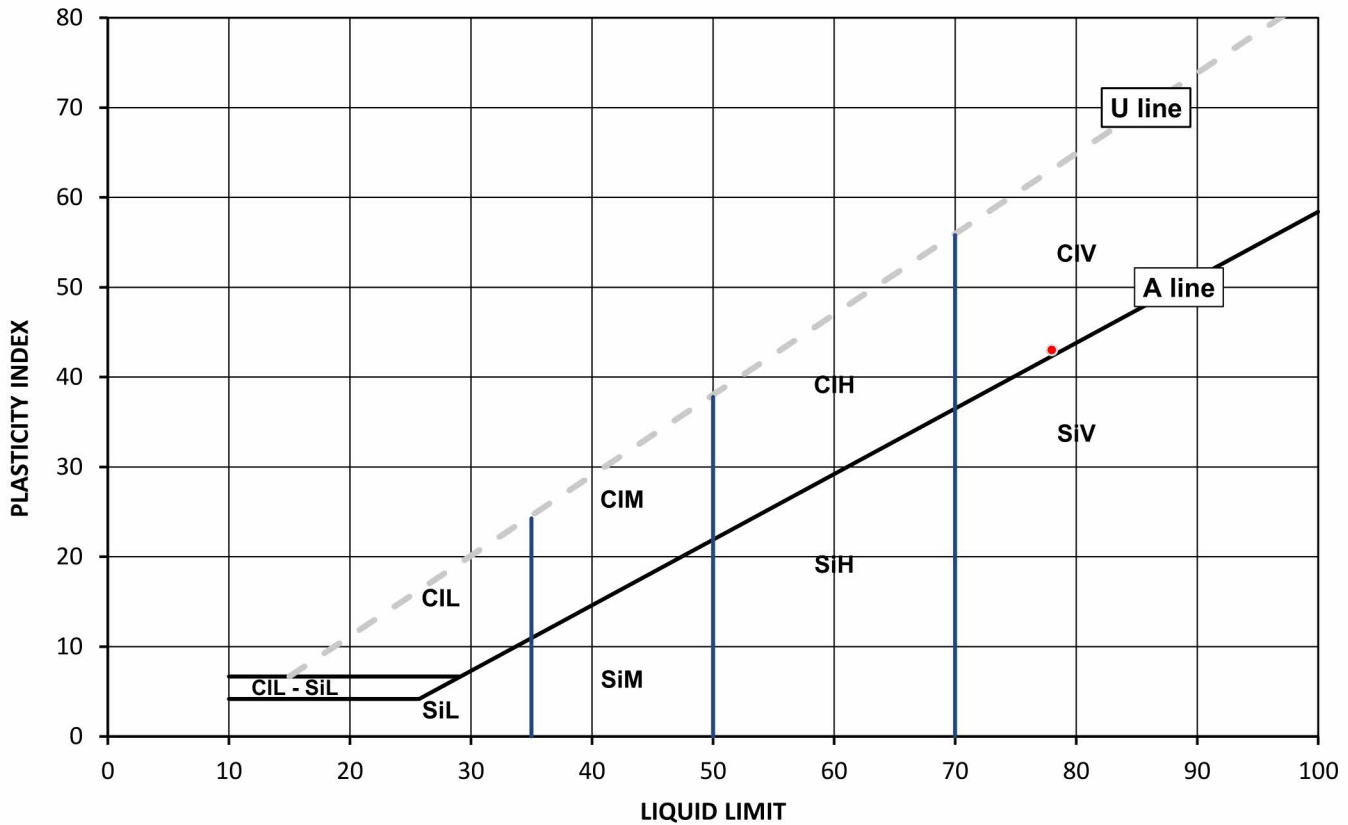
### Test Results:

Laboratory Reference: 1926944  
Hole No.: BH6  
Sample Reference: Not Given  
Soil Description: Brown slightly gravelly CLAY

Depth Top [m]: 2.10  
Depth Base [m]: Not Given  
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Moisture Content [ W ] %	Liquid Limit [ WL ] %	Plastic Limit [ Wp ] %	Plasticity Index [ Ip ] %	% Passing 425µm BS Test Sieve
39	78	35	43	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material ( eg CIHO )

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Białowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd

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4041

Client: WDE Consulting Ltd  
 Client Address: 62a Western Road, Tring, Hertfordshire, HP23 4BB

Contact: Results  
 Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

# SUMMARY REPORT

## Summary of Classification Test Results

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

i2 Analytical Ltd  
 Unit 8 Harrowden Road  
 Brackmills Industrial Estate  
 Northampton NN4 7EB



Environmental Science

Client Reference: 21069  
 Job Number: 21-84999  
 Date Sampled: Not Given  
 Date Received: 01/07/2021  
 Date Tested: 08/07/2021  
 Sampled By: Client

### Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [ W ]	Water Content [ W ]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	WL	Wp	Ip	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
1926934	BH1	Not Given	2.60	Not Given	D	Brown CLAY	Atterberg 1 Point	34		100	66	30	36						
1926935	BH2	Not Given	1.20	Not Given	D	Brown slightly gravelly CLAY	Atterberg 1 Point	30		82	65	28	37						
1926937	BH3	Not Given	2.40	Not Given	D	Brown slightly gravelly CLAY	Atterberg 1 Point	38		89	79	38	41						
1926939	BH4	Not Given	1.10	Not Given	D	Brown slightly gravelly CLAY	Atterberg 1 Point	27		98	92	43	49						
1926942	BH5	Not Given	1.20	Not Given	D	Brown CLAY	Atterberg 1 Point	27		100	76	27	49						
1926944	BH6	Not Given	2.10	Not Given	D	Brown slightly gravelly CLAY	Atterberg 1 Point	39		98	78	35	43						
1926945	BH7	Not Given	1.70	Not Given	D	Cream colour LIMESTONE		3.0											

Note: # Non accredited; NP - Non plastic

Comments:

Signed:



Szczepan Bielatowicz  
 PL Deputy Head of Geotechnical Section  
 for and on behalf of i2 Analytical Ltd

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# TEST CERTIFICATE

## Particle Size Distribution

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



Tested in Accordance with: BS 1377-2: 1990

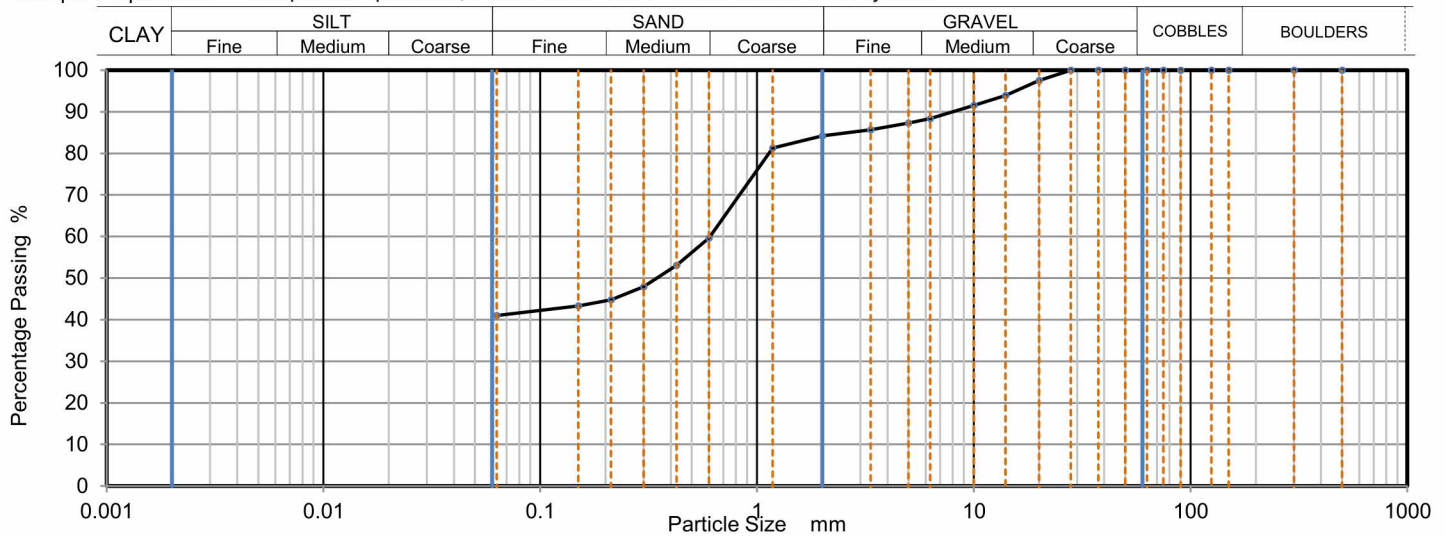
Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 09/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley  
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

### Test Results:

Laboratory Reference: 1926936  
Hole No.: BH2  
Sample Reference: Not Given  
Sample Description: Yellowish brown gravelly very clayey SAND with fragments of shell  
Sample Preparation: Sample was quartered, oven dried at 106.1 °C and broken down by hand.  
Depth Top [m]: 1.00  
Depth Base [m]: 2.00  
Sample Type: C



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	98		
14	94		
10	92		
6.3	88		
5	87		
3.35	86		
2	84		
1.18	81		
0.6	60		
0.425	53		
0.3	48		
0.212	45		
0.15	43		
0.063	41		

Sample Proportions	% dry mass
Very coarse	0
Gravel	16
Sand	43
Fines <0.063mm	41

Grading Analysis		
D100	mm	28
D60	mm	0.608
D30	mm	
D10	mm	
Uniformity Coefficient		> 9.7
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:



Szczepan Bielatowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd

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# TEST CERTIFICATE

## Particle Size Distribution

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



Tested in Accordance with: BS 1377-2: 1990

Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

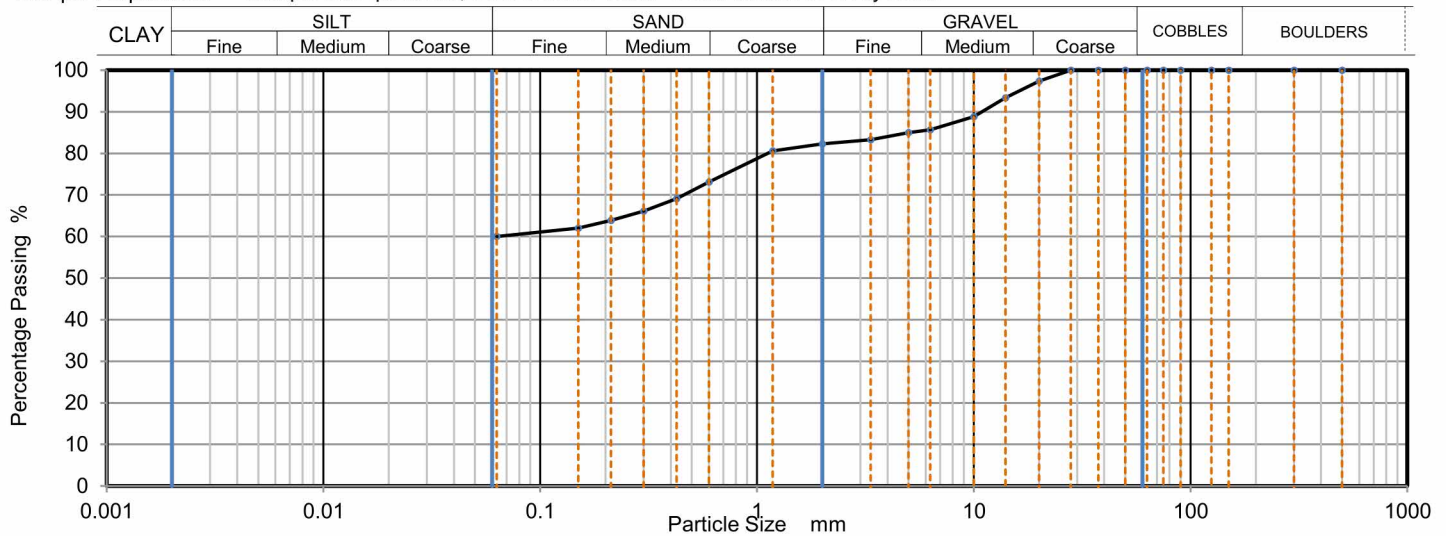
Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 09/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley  
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

### Test Results:

Laboratory Reference: 1926941  
Hole No.: BH5  
Sample Reference: Not Given  
Sample Description: Yellowish brown gravelly sandy CLAY with fragments of shell  
Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 1.00  
Depth Base [m]: 1.70  
Sample Type: C



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	93		
10	89		
6.3	86		
5	85		
3.35	83		
2	82		
1.18	81		
0.6	73		
0.425	69		
0.3	66		
0.212	64		
0.15	62		
0.063	60		

Sample Proportions	% dry mass
Very coarse	0
Gravel	18
Sand	22
Fines <0.063mm	60

Grading Analysis		
D100	mm	28
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		N/A
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:



Szczepan Bielatowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd

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# TEST CERTIFICATE

## Unconsolidated Undrained

### Triaxial Compression

Tested in Accordance with:  
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



Environmental Science

Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 09/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

#### Test Results:

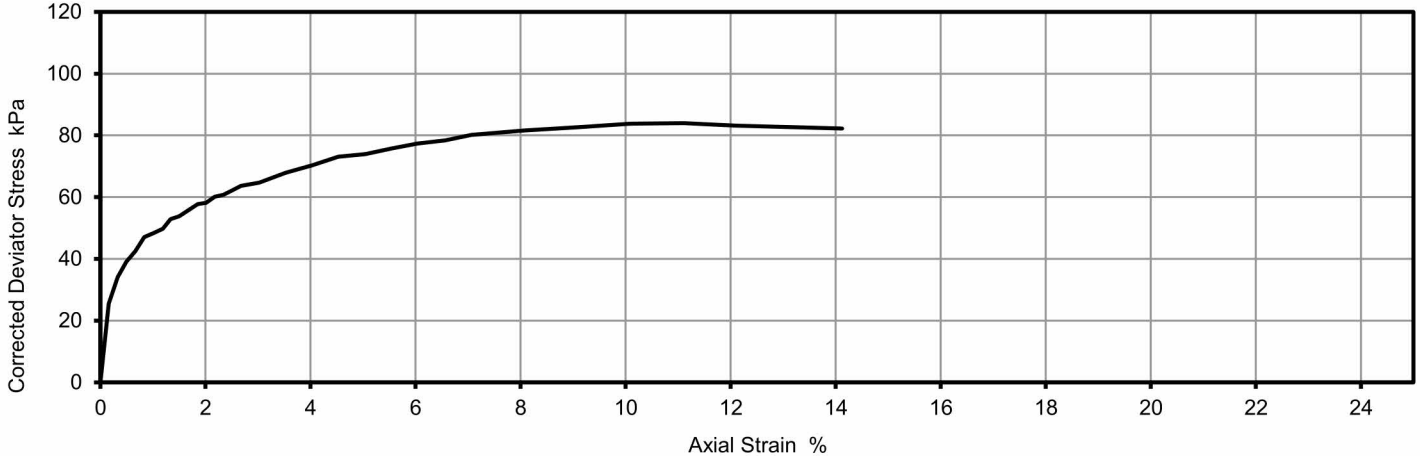
Laboratory Reference: 1926936  
Hole No.: BH2  
Sample Reference: Not Given  
Sample Description: Yellowish brown gravelly very clayey SAND with fragments of shell

Depth Top [m]: 1.00  
Depth Base [m]: 2.00  
Sample Type: C

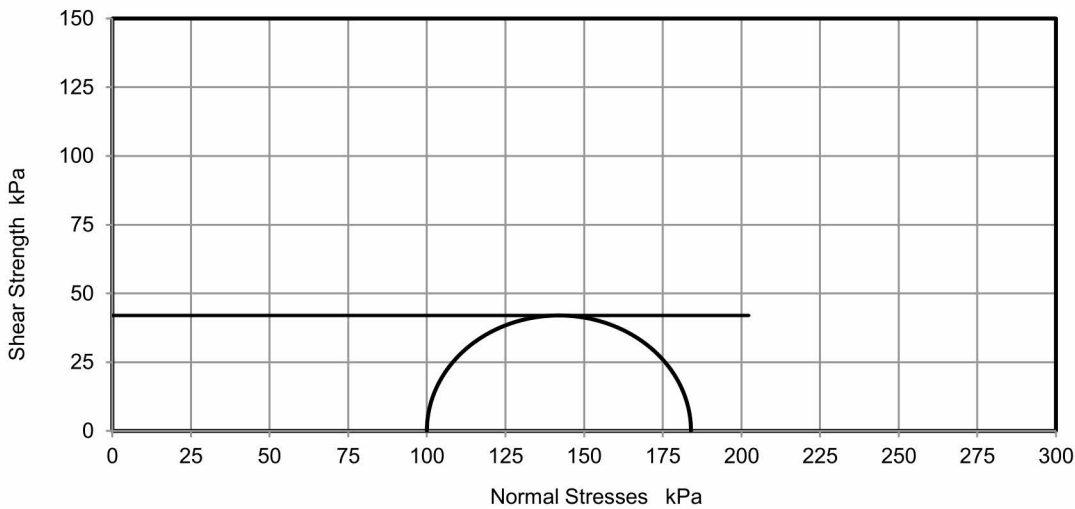
Test Number	1
Length	140.62 mm
Diameter	69.21 mm
Bulk Density	2.03 Mg/m <sup>3</sup>
Moisture Content	31 %
Dry Density	1.55 Mg/m <sup>3</sup>
Membrane Correction	0.87 kPa

Rate of Strain	2.00 %/min
Cell Pressure	100 kPa
Axial Strain at failure	11.1 %
Deviator Stress, ( $\sigma_1 - \sigma_3$ ) <sub>f</sub>	84 kPa
Undrained Shear Strength, $c_u$	42 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound
Membrane thickness	0.25 mm

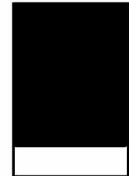
#### Deviator Stress v Axial Strain



#### Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

#### Remarks:

#### Signed:



Szczepan Bielatowicz  
PL Deputy Head of Geotechnical Section  
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# TEST CERTIFICATE

## Unconsolidated Undrained

### Triaxial Compression

Tested in Accordance with:  
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 09/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

#### Test Results:

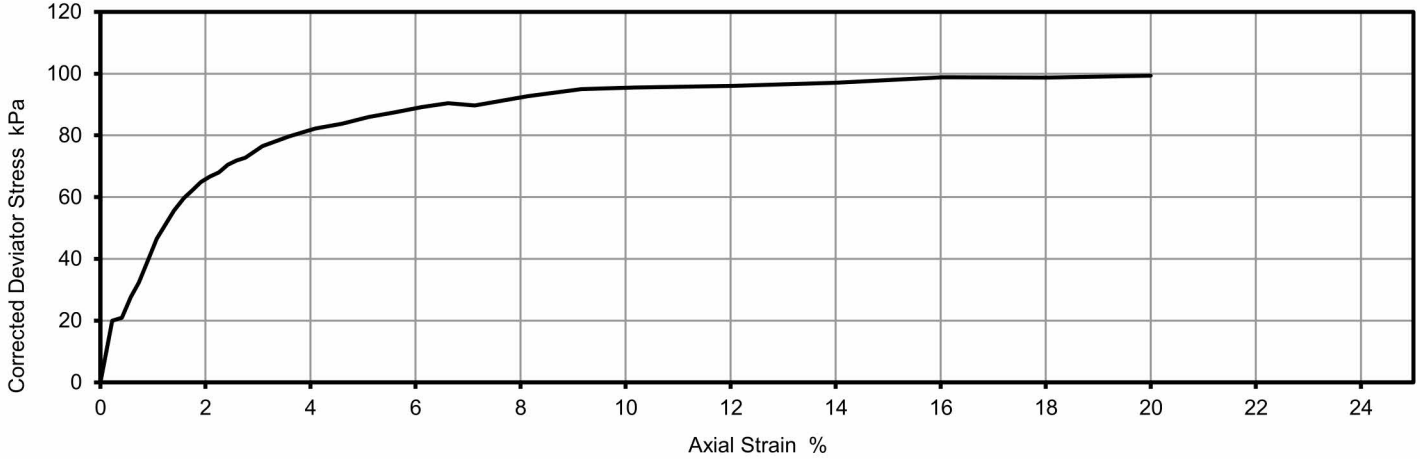
Laboratory Reference: 1926938  
Hole No.: BH3  
Sample Reference: Not Given  
Sample Description: Yellowish brown slightly sandy gravelly CLAY

Depth Top [m]: 1.00  
Depth Base [m]: 2.00  
Sample Type: C

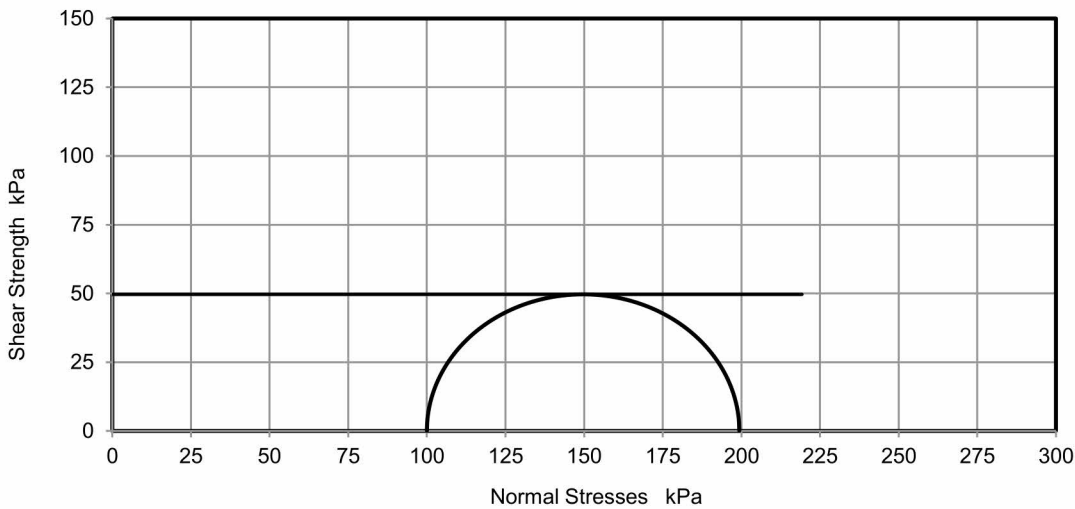
Test Number	1
Length	140.57 mm
Diameter	69.51 mm
Bulk Density	1.99 Mg/m <sup>3</sup>
Moisture Content	41 %
Dry Density	1.41 Mg/m <sup>3</sup>
Membrane Correction	1.44 kPa

Rate of Strain	2.00 %/min
Cell Pressure	100 kPa
Axial Strain at failure	20.0 %
Deviator Stress, (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>	99 kPa
Undrained Shear Strength, c <sub>u</sub>	50 kPa ½(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>
Mode of Failure	Compound
Membrane thickness	0.26 mm

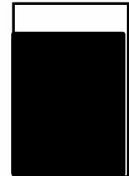
#### Deviator Stress v Axial Strain



#### Mohr Circles



Position within sample

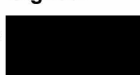


Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

#### Remarks:

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#### Signed:



Szczepan Bielatowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd



# TEST CERTIFICATE

## Unconsolidated Undrained

### Triaxial Compression

Tested in Accordance with:  
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd  
Unit 8 Harrowden Road  
Brackmills Industrial Estate  
Northampton NN4 7EB



Client: WDE Consulting Ltd  
Client Address: 62a Western Road, Tring,  
Hertfordshire, HP23 4BB

Client Reference: 21069  
Job Number: 21-84999  
Date Sampled: Not Given  
Date Received: 01/07/2021  
Date Tested: 09/07/2021  
Sampled By: Client

Contact: Results  
Site Address: Garsington Road, Cowley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

#### Test Results:

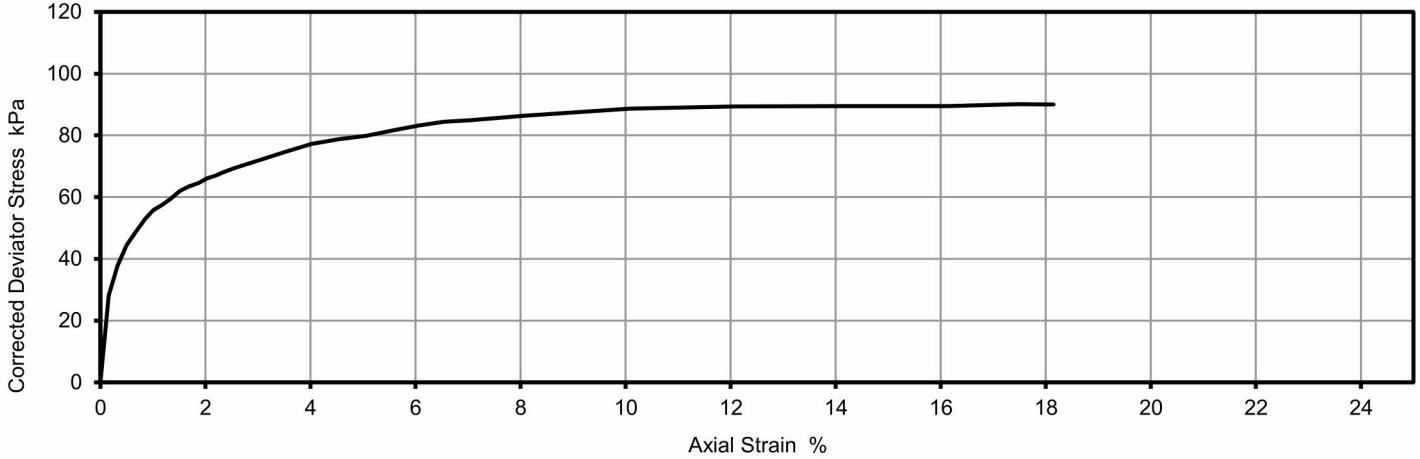
Laboratory Reference: 1926943  
Hole No.: BH6  
Sample Reference: Not Given  
Sample Description: Greyish brown sandy gravelly CLAY

Depth Top [m]: 1.00  
Depth Base [m]: 2.00  
Sample Type: C

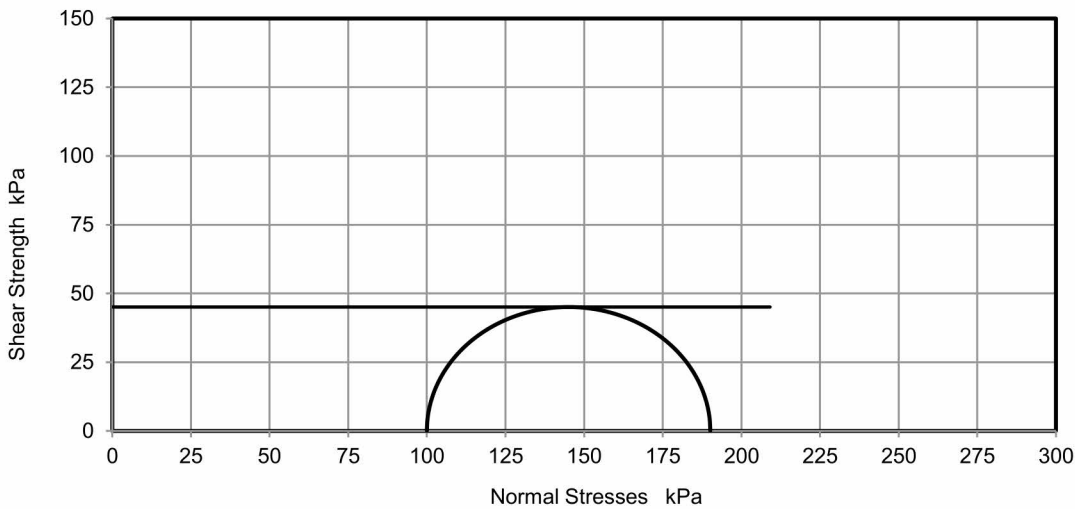
Test Number	1
Length	140.88 mm
Diameter	69.17 mm
Bulk Density	1.92 Mg/m <sup>3</sup>
Moisture Content	32 %
Dry Density	1.45 Mg/m <sup>3</sup>
Membrane Correction	1.24 kPa

Rate of Strain	2.00 %/min
Cell Pressure	100 kPa
Axial Strain at failure	17.5 %
Deviator Stress, (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>	90 kPa
Undrained Shear Strength, c <sub>u</sub>	45 kPa ½(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>
Mode of Failure	Compound
Membrane thickness	0.25 mm

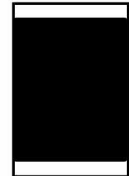
#### Deviator Stress v Axial Strain



#### Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

#### Remarks:

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#### Signed:

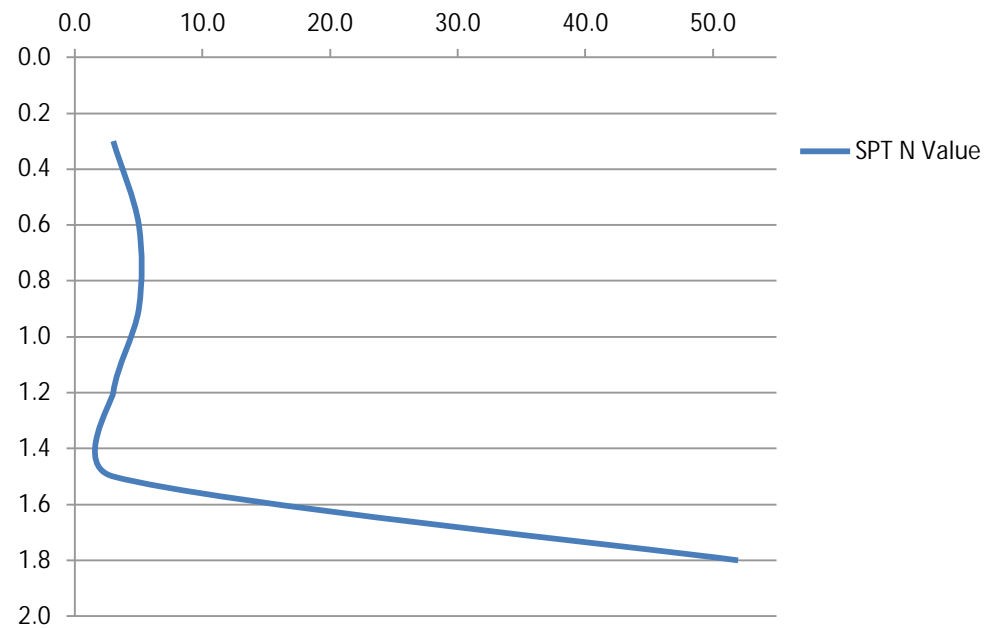


Szczepan Bielatowicz  
PL Deputy Head of Geotechnical Section  
for and on behalf of i2 Analytical Ltd

**Date of Test** 29/07/2021  
**Completed by** AE  
**Site Name** Garsington Road, Cowley  
**Hole number** DP5

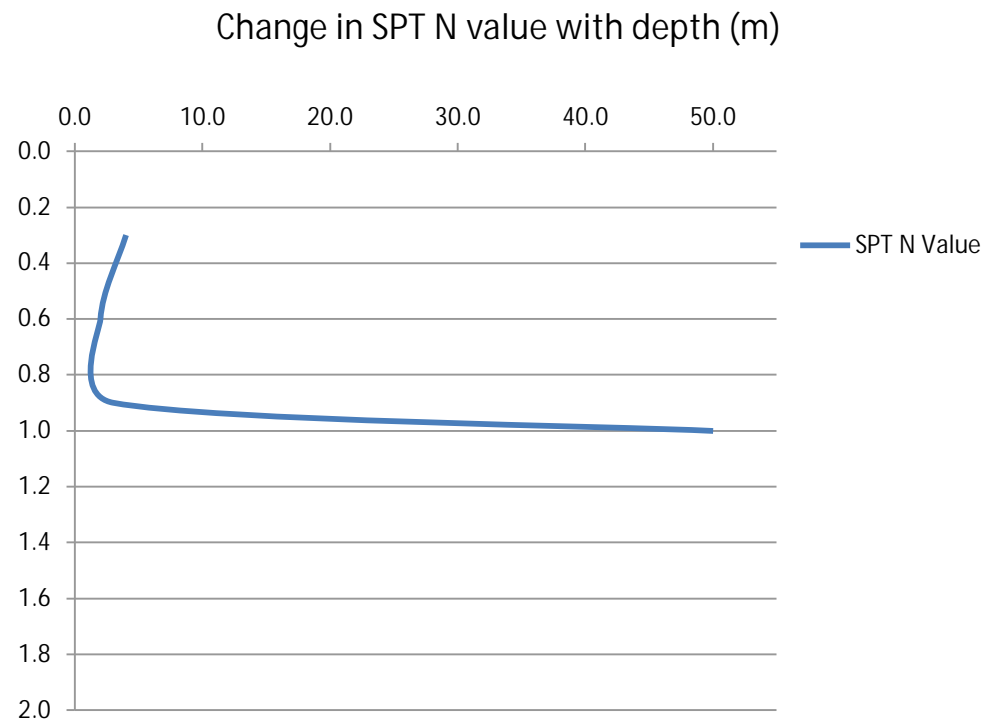
Depth (m)	SPT N Value
0.3	3.0
0.6	5.0
0.9	5.0
1.2	3.0
1.5	3.0
1.8	52.0

Change in SPT N value with depth (m)



Date of Test 29/07/2021  
Completed by AE  
Site Name Garsington Road, Cowley  
Hole number DP6

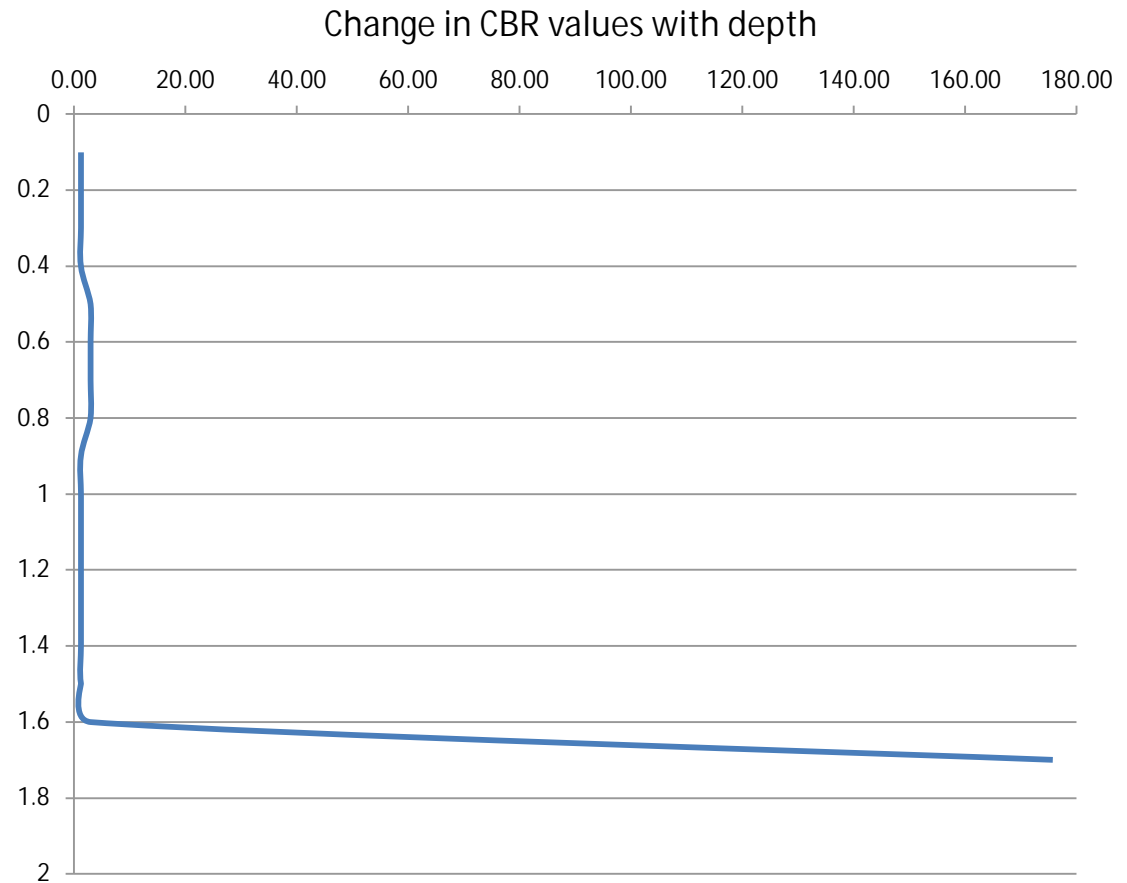
Depth (m)	SPT N Value
0.3	4.0
0.6	2.0
0.9	3.0
1.0	50.0



Date of Test 29/06/2021  
 Completed by AE  
 Site Name Garsington road, Cowley  
 Hole number DP5

Values calculated using Kleyn & Van Harden (1983) conversion.  
**CBR Conversion calculation**  $\log CBR = 2.628 - 1.273 \log(DCP)$

Depth (m)	CBR (%)
0.1	1.21
0.2	1.21
0.3	1.21
0.4	1.21
0.5	2.92
0.6	2.92
0.7	2.92
0.8	2.92
0.9	1.21
1.0	1.21
1.1	1.21
1.2	1.21
1.3	1.21
1.4	1.21
1.5	1.21
1.6	2.92
1.7	175.71



Date of Test 29/06/2021  
 Completed by AE  
 Site Name Garsington road, Cowley  
 Hole number DP6

Values calculated using Kleyn & Van Harden (1983) conversion.  
**CBR Conversion calculation**  $\log CBR = 2.628 - 1.273 \log(DCP)$

Depth (m)	CBR (%)
0.1	1.21
0.2	2.92
0.3	1.21
0.4	1.21
0.5	1.21
0.6	0.00
0.7	0.00
0.8	1.21
0.9	2.92
1.0	175.71

