



# Phase II Site Appraisal Rev1 Elmsleigh Road, Staines for

# **Inland Homes PLC**

Revision	Date of issue	Comments	Prepared By	Checked By
0	30/04/2020	Draft Issue	HA	CIK / CRS
1	23/09/2020	Updated to include new layout and final gas risk assessment	CRS	CRS

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Summary of Recommendations				
	for Elmsleigh Road, Staines			
Risk to End-Users	Exceedances have been recorded across the site. Significant remediation is not required, however, 300mm clean capping is required in areas soft landscaping.			
Risk to Controlled Waters	Moderate risk to controlled waters. Further assessment will be made on receipt of groundwater laboratory data.			
Ground Gases	Gas protection measures are required for the communal areas on the ground floor, no protection measures required below ground floor parking areas.			
Concrete Specification	FND2 concrete should be suitable for the proposed development.			
Water Pipe Specification	Standard PVC (not PE) water pipes should be suitable for the proposed development, subject to confirmation from the utility provider.			
Engineering Ground Treatment	Not required.			
Likely Foundation Types	Piled foundation solution will be required for the proposed development.			
Likely Foundation Depths	Piled foundations.			
Bearing Strata	Stiff London Clay Formation (piles).			
Allowable Bearing Pressure	85N/m <sup>2</sup> - Langley Silt and 100kN/m <sup>2</sup> - Shepperton Gravel for strip and pad foundations respectively. Targeted investigation recommended to confirm ground and groundwater conditions.			
Volume Change Potential	Low volume change potential. (Shallow cohesive soils), High Volume change potential (London Clay).			
Tree Influence	Localised deepening for trees and heave precautions may be required subject to completion of tree survey and within the influence of shrinkable soils.			
Floor Slabs	Suspended floors required.			
Slope Stability Risk	None.			
Retaining Walls	Will be required in areas of subsurface construction and areas where levels are being raised.			
SUDs	High groundwater, deep made ground and location within Flood risk zone preclude the use of traditional soakaway drainage.			
Roads	Variable CBRs 2.6% to 39% in the made ground suggested by the laboratory testing. CBRs should be confirmed by in-situ testing.			
Likely Waste Classification	Likely to be non-hazardous subject to confirmation from the receiving landfill. Natural soils likely to be inert.			
Other Comments	None			

The above summary should not be used in isolation and reference should be made the full report which provides a detailed assessment of the risks affecting the development.



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#### 1.0 Introduction

#### 1.1 Commission

Patrick Parsons (PP) have been appointed by Inland Homes PLC (client) to produce a Phase II Site Appraisal for a site known as Elmsleigh Road, Staines. The proposed development area (hereby referred to as 'the site') extends to an area of approximately 0.53 hectares and presently comprises a mix of surface car parking, a former Masonic hall and an area of undeveloped land to the north and east. A site location plan is presented in Appendix A.

#### 1.2 Proposed Development

Current development proposals indicate that the site is to be redeveloped with two twelve to fourteen storey residential apartment blocks with areas of public open space, soft landscaping, private car parking and an access road. A proposed development layout plan is presented in Appendix A.

#### 1.3 Limitations

This report has been prepared for the client and their appointed agents only and should not be relied upon by any third party without the written permission of PP.

If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors do not owe them any Duty of Care or Skill. It is based on and limited to an assessment of the information and ground conditions identified here. PP is not responsible for ground conditions not revealed during investigations or undertaken by third parties and have reviewed any information presented in good faith.

#### 1.4 Aim of Phase II Site Appraisal

The client's specific requirements were to undertake a Phase II Site Appraisal. The principal objectives are as follows:

- Obtain information about the soil and groundwater conditions within the area of the site.
- Determine the ground related geotechnical and contamination hazards within the site boundaries that may affect the proposed development.
- Define the Phase I conceptual model (from a previous desk study see 1.5) and refine to form a Phase II conceptual model.
- Provide development recommendations.
- Provide advice on further works if required.

#### 1.5 Information Sources

This Phase II Site Appraisal is based on the findings of the investigation, chemical analysis and geotechnical testing undertaken during the course of the assessment. The results have been used to refine the conceptual model and initial recommendations outlined in the Phase I Geoenvironmental Desk Study report undertaken by Mott MacDonald in May 2014. The



information included within the report helped to form the rationale for the design of this investigation.

- 1.5.1 The following reports have been reviewed as part of this report:
  - Phase 1 Geoenvironmental Desk Study Thames Street Quarter, Staines-Upon-Thames by Mott MacDonald. Ref. 330508/EVT/01/B. Dated May 2014



# 2.0 Summary of Phase I Site Appraisal

The following is a summary of the findings of the Phase I Geoenvironmental Desk Study completed by Mott MacDonald in May 2014 and should not be read in isolation. For full details reference should be made to the report outlined in section 1.5.2. In summary, the Phase I Desk Study highlighted the following:

- The site is roughly triangular in shape and covers an area of approximately 0.3 hectares. The OS grid reference for the site is 503623 171513. The site is in the area of postcode TW18 4PN. The principal access to the site is off Elmsleigh Road.
- The site lies in an urban area surrounded mostly by commercial properties. The site
  comprises a Masonic hall with associated car park to the south of the site. At the time of
  desk study report (2014) a telephone exchange building, car park and service yard in the
  north and east of the site (not present by time of this report). Use of the buildings was
  primarily for commercial purposes.
- The site topography was generally noted to be flat lying with levels varying no more than two metres across the site.
- The earliest historical mapping reviewed (1880) shows the site was occupied by number of buildings in the centre, the south west and the north of the site. From 1895 to 1899 a large building is present in the south of the site and another building in the south west. By 1914 to 1915 a large building is present in the south west corner of the site. From 1934 to 1935 small buildings are present within the footprint of the former building in the south west, a large building (telephone exchange) is present in the north east of the site and another building is present in the north. By 1963 a works building is present in the south eastern corner of the site. Between 1970 and 1978 the building in the south west corner and the works building in the south east corner no longer appear. Between 1979 and 1987 there is a road alongside the western boundary. From 1987 to 2014 no further changes are noted.
- Based on the earliest available maps, dated 1880, the surrounding land was largely woodlands to the south and the east of the site, with a residential area to the north and west. By 1895 to 1899 a new railway junction is built~200m to the east of the site. 1914 to 1915 mapping shows an industrial estate is present to the north of the site. From 1934 to 1935 residential houses, industrial works, bowling green and tennis court are present to the south of the site. An industrial building is noted to the north west of the site. By 1963 a car park is present directly to the west of the site, additionally there are further industrial developments to the east and the south of the site. Between 1970 and 1978 car parks replace the residential buildings and industrial works to the south west, south and east of the site. In 1979 1987 Elmsleigh Road is built alongside the southern and eastern boundaries of the site. An electrical substation is built approximately 15m to the east of the site. The Elmsleigh centre appears to the east of the site as well as a car park. By 2006 a small building is built to the west of the site. No further significant changes have been identified in the subsequent mapping.
- The site is recorded to be underlain by shallow superficial deposits of Langley Silt (Clay and Silt) overlying Shepperton Gravel Formation (Sand and Gravel). The underlying bedrock geology is recorded to be the London Clay Formation comprising blue grey clay weathering to a brown colour near surface when oxidised.



- Made ground is likely to be present across the site associated materials generated from previous building construction and demolition.
- The site does not lie within or in close proximity to a Coal Authority coal mining reporting area. However, one recorded mineral site is located 900m to the south of the site associated with the extraction of sand and gravel from the Shepperton Gravel Formation.
- A preliminary UXO risk assessment desk study has been obtained and the site is recorded to be within an area designated as a low risk for unexploded ordnance.
- The site is not recorded to be within a radon affected area and no radon protection measures are required for new development.
- The superficial geology of the Shepperton Gravel Formation is recorded as a Principal Aquifer, there are four recorded abstraction licences recorded within 1000m of the site the closest being 772m to the north west. The Langley Silt and the solid bedrock geology of the London Clay Formation are recorded to be unproductive strata.
- The site is recorded to be within a Source Protection Zone III. There are four abstraction wells within 1000m of the site the closest being 772m north west.
- The nearest surface water feature is the River Thames which is approx. 150m south west of the site.
- There are no surface water abstraction licences within 500m of the site.
- There are eight recorded licensed discharge consents within 500m of the site, these
  consents are to discharge sewage effluent, trade effluent and other matters to
  freshwater stream.
- The site is recorded to be within a flood plain and is located within a flood zone 3.
- There is one reported current or historic landfill sites within 250m of the site. This landfill site is recorded to lie 165m to the south east and was noted to have received inert waste from March 1980 to December 1980.
- There is one recorded substantiated pollution incident located 442m to the south east of the site. This incident was designated as category 2 (significant to water), category 4 (no impact to air) and category 3 (minor to land), the pollutant was not identified.
- The site is located within an Area of High Archaeological Potential (A24). Based upon this classification, a full archaeological investigation and recording of the site and subsequent publication of the results is likely to be required by the Borough Council. It is considered the possibility of archaeological features located under the existing and former building as well as hard standing could be high. If any are found, a full archaeological excavation of at least one metre below existing made ground level could be required.

It is considered that limited extents and thicknesses of made ground will be present at the site associated with the construction and demolition of the current and former onsite buildings. Contaminants of concern are likely to include heavy metals, PAHs, hydrocarbons and asbestos.



# 3.0 Phase I Conceptual Model

The preceding information has been assessed and a conceptual model produced following current relevant guidance. The site is being considered for residential development with no private garden areas and limited soft landscaping, as such a future residential without plant uptake end-use is considered appropriate. The site has predominantly been used for various commercial land uses including a telephone exchange and Masonic hall as recorded from the available historical mapping. It is therefore considered that the risk of potential contamination is low to moderate and deposits of made ground are likely, associated with the construction and demolition of the existing and former onsite buildings. The contaminants of concern are considered to be heavy metals, polyaromatic hydrocarbons (PAHs), TPHs and asbestos associated with any site derived or imported made ground materials.

In terms of human health, the primary receptors are end-users of the site and construction workers, the pathways include direct contact with contaminated soil and soil dust, ingestion of contaminated soil and dust and the indoor/outdoor inhalation of soil vapour. Given the site history, the features noted and the proposed end use, it is considered that soil contamination at the site poses a low risk to end users and to construction workers.

In terms of risk to human health associated with ground gases, the primary receptors are the end users, the main pathway is inhalation. It is likely that thicknesses of made ground will be present on site associated with the construction and demolition of onsite former and existing buildings and will represent a limited source of ground gas. The proposed development is residential and includes two twelve to fourteen storey apartment blocks with under croft parking and as such the risk to end users will be very low.

In terms of controlled waters, the site is located within a source protection zone with four abstraction licences located within 1000m of the site. The Shepperton Gravel Formation underlying the site is recorded as a Principal Aquifer and the nearest water course, the River Thames, is located approximately 150m to the south west. As such the risk to controlled waters is considered to be moderate. The Phase I conceptual model is illustrated below.

Human Health				
Source	Receptor			
Made ground: Contaminants of concern include; hydrocarbons, heavy metals, PAHs and asbestos	Indoor and outdoor inhalation of soil vapours, the ingestion of contaminated soil and soil dust, and direct contact with contaminated soil and soil dust	End users of the completed residential development		
Made ground: Contaminants of concern include; hydrocarbons, heavy metals, PAHs and asbestos	Indoor and outdoor inhalation of ground gas and soil vapours, the ingestion of contaminated soil and soil dust and direct contact with contaminated soil and soil dust	Construction workers		
Ground gas associated with onsite made ground.	Inhalation	End users of the completed residential development		
	Controlled Waters			
Made ground: Contaminants of concern include; hydrocarbons, heavy metals and PAHs.	Leaching and lateral migration, vertical migration and surface run off	Principal Aquifer (Shepperton Gravel Formation) Surface Water (River Thames)		



### 4.0 Phase II Ground Investigation

#### 4.1 Fieldwork

The ground investigation (including fieldwork, sampling and laboratory analysis) has been designed to identify and assess potential ground related problems and to allow cost-effective solutions to be advised. It has been planned on the basis of the desk study and site inspection. All fieldwork and soil descriptions were carried out in general accordance with relevant British Standards.

The exploratory holes have been positioned to determine the general ground/groundwater conditions across the proposed development area. Representative samples have been obtained for geotechnical and environmental laboratory analysis. The resultant exploratory hole density is considered to be commensurate with the complexity of the site conditions revealed in the desk study and detail of information required for this phase of the investigation.

The ground investigation was undertaken between 10<sup>th</sup> March 2020 and 18<sup>th</sup> March 2020. The investigation comprised a two cable percussion boreholes to a maximum depth of 35.00m begl (below existing ground level) (BH01 and BH03), one cable percussion borehole to a maximum depth of 25.00m begl (BH02), six window sample boreholes to a maximum depth of 4.00m begl (WS02, WS03 and WS05) and two hand-dug foundation pits. Boreholes WS01 and WS03A were discontinued due to buried obstructions (concrete) encountered at a depth of 2.30m begl and 0.65m begl respectively. The exploratory hole location plan and exploratory hole logs are presented in Appendix B.

#### 4.2 Ground Conditions

Concrete obstructions were recorded at the locations of WS01 and WS03A to a maximum depth of 2.30m begl (WS01). The buried obstruction encountered within WS01 is assumed to be the basement floor of the former BT exchange building.

Exploratory holes generally encountered a surface cover of tarmac, concrete or rough ground over made ground.

Made ground was generally recorded to maximum depths of up to 2.80m begl (BH03) . Made ground was typically recorded as either dark grey slightly clayey slightly gravelly sand of concrete, red brick and quartzite or dark grey slightly sandy slightly gravelly clay with concrete and quartzite. The majority of the site recorded the granular made ground material.

Superficial soils underlying the made ground included the Langley Silt and Shepperton Gravel Formation.

The Langley Silt, comprising pale brown sandy silty clay or gravelly silty sand was recorded to a maximum depth of 4.00m begl (WS05) and was also encountered in BH01, WS03 and WS05.

The Shepperton Gravel Formation was encountered underlying the made ground or Langley Silt and was typically recorded as pale greyish yellow sand and gravel, gravelly sand or sandy



gravel of fine to coarse subangular flint and quartzite to a maximum depth of 7.90m begl (BH01). The maximum depth of the Shepperton Gravel was not proven in the window sample boreholes.

Firm to stiff soils of the London Clay Formation were encountered from a minimum depths of 6.80m begl (BH02) and a maximum proven depth of 35.00m begl (BH01 and BH03) becoming very stiff at depths of between 9.50m begl (BH01) and 10.50m begl (BH02 and BH03) to the base of all deep exploratory holes (BH01-BH03).

Corrected SPT N60 values within the made ground ranged from 0 to 27 at 1m begl and 16 at 2m begl. A refusal was also recorded at 2.0m begl in WS01.

Corrected SPT N60 values within the Langley Silt ranged from 6 to 7 at 1m begl; 0 to 11 at 2m begl; 10 to 21 at 3m begl and 16 at 4m begl.

Corrected SPT N60 values within the Shepperton Gravel ranged from 11 to 29 at 3m begl; 16 to 38 at 4m begl; 16 to 26 at 5m begl; 21 to 25 at 6m begl and 12 at 7m begl. A loose horizon was recorded at depths between 5.4m begl and 7.3m begl within BH03 where SPT N60 values of 5 and 7 were recorded.

Corrected SPT N60 values within the London Clay generally ranged from 24 to 49 in the depth range 7m begl and 21m begl to 28m begl and a general trend of increasing SPT N60 was observed with depth. A corrected SPT N60 value of 10 was recorded in the London Clay at a depth of 8.5m begl in BH01. Refusals were recorded in all cable percussion boreholes at depths of 31.5m begl and 35m begl (BH01); at 25m begl (BH02 and at 27.5m begl, 29.5m begl and 35m begl (BH03).

Existing Building Foundation Depth and Design

Foundation Pit Location	Observed Foundation Width (m)	Foundation Maximum Depth (m)	Comments
TP01	0.40	0.60	None
TP02	0.35	0.75	None

Foundation cross sections have been included in Appendix B for reference.

#### 4.3 Groundwater

Groundwater was encountered in all boreholes at depths of between 2.3m begl and 2.8m begl, with the exception of WS01 and WS03a, which were terminated at depths of 2.3m begl and 0.65m begl respectively. Subsequent monitoring of the wells installed in BH01, BH02, WS02, WS03 and WS04 recorded groundwater levels at between 2m begl and 2.54m begl.

#### 4.4 Contamination Observations

No visual or olfactory evidence of potential contamination was recorded on-site during the investigation.



#### 4.5 Chemical Analysis

Chemical laboratory analyses were selected to provide the parameters necessary to make an assessment of the suitability for the re-use of soils on the site as well as to inform risk assessment for end users and controlled waters. The choice of contamination testing was based on commonly occurring potential contaminants and on-site visual observations of contaminated soils. The chemical analysis results are presented in Appendix D. In summary the following testing has been completed:

- 10no. samples of made ground and natural soils for a general suite of contaminants metals, inorganics, PAH and asbestos.
- 10no. samples for speciated TPH testing.
- 6no sample of made ground and natural soils for leachate testing.

#### 4.6 Geotechnical Testing

Geotechnical soils testing has been undertaken as part of the ground investigation to provide the parameters necessary for the budgetary design of the development. The geotechnical test results are presented in Appendix E. In summary the following testing has been completed:

- 7no. samples for BRE SD1 tests (pH and water-soluble sulphates).
- 8no. samples for Atterberg Limit tests.
- 9no. samples for Quick Undrained Triaxial Tests.
- 5no. samples for Hand Shear Vane testing.
- 2no. samples for Remoulded Laboratory CBR Tests.



# 5.0 Human Health Risk Assessment (Ground Gas)

#### 5.1 Introduction

Five gas/groundwater monitoring standpipes have been installed across the site (BH01, BH02, WS02, WS03 and WS04). The response zones have been designed to target both made ground and natural strata.

The monitoring programme comprised four visits over a minimum two-month period using a GA5000 Multi-Function Gas Analyser; the results of this visit are presented in Appendix C.

The monitoring has recorded a maximum and steady carbon dioxide concentration of 11.90% v/v, a minimum oxygen concentration of 1.90% v/v and a maximum methane concentration of 0.70%. Traces of carbon monoxide up to 3ppm were detected but no hydrogen sulphide was recorded during the monitoring. A maximum flow rate of 0.2l/hr was recorded.

In accordance with BS 8485:2019 the Gas Screening Values (GSV) for the site has been calculated. Using the maximum steady flow rate of 0.1 l/hr, maximum steady carbon dioxide concentration of 11.90% v/v and a methane concentration of 0.7% v/v the GSVs of 0.0238 l/hr for carbon dioxide and 0.0021 l/hr for methane have been calculated. This equates to Characteristic Situation 1 (CS1). However, as the maximum carbon dioxide level is >5% the guidance states that consideration has to be given to increasing the gas classification; the 5% threshold has been breached in multiple standpipes on at least three occasions, this along with the fact that the maximum concentration recorded is 11.90% is sufficient cause to raise the gas classification for the site to CS2. The required gas protection measures are outlined in section 10.2.

The gas monitoring results to date are presented in Appendix C.



# 6.0 Human Health Risk Assessment (Soil)

#### 6.1 Introduction

Current development proposals indicate that the site is to be redeveloped with two twelve to fourteen storey residential apartment blocks with very limited areas of public open space, soft landscaping, car parking (under croft) and access roads.

The Phase II investigation works has revealed the presence of thicknesses of made ground across the site. It is considered that this may pose a potential, but low risk of contamination to end users of the proposed development and construction workers and a moderate risk to controlled waters.

Representative samples of all strata encountered were collected for further examination and/or potential testing.

The Generic Assessment Criteria (GAC) used by Patrick Parsons are presented in Appendix F. For this site the chemical analysis results are being compared against the GAC for residential end-use without plant uptake with a soil organic matter (SOM) content of 1%, this is considered to be the most appropriate GAC based on the most sensitive end-use for the proposed development.

#### 6.2 Risk to End-Users

The chemical analyses of the made ground and natural soils show the following exceedances compared against the GAC for a residential without plant uptake end-use. No other samples have displayed exceedances of GAC values for any of the determinands analysed. The exceedances to the relevant GACs and their respective locations are tabulated below.

Determinand	GAC (mg/kg)	Exceedance (mg/kg)	Location (Exploratory Hole)	
Asbestos Fibres	Presence	0.040 (%)	WS03 – 0.60m	
Asbestos Fibres	Presence	0.005 (%)	BH01 – 0.50m	
Asbestos Fibres	Presence	0.001 (%)	WS03A – 0.50m	
Lead	310	350	WS02 – 0.60m	
Dibenz (a,h) anthracene	0.31	0.43	WS03 – 0.60m	
Dibenz (a,h) anthracene	0.31	0.34	WS03A – 0.50m	

The chemical analyses have recorded exceedances of a single PAH species in the locations of WS03 and WS03A, as well as an exceedance of Lead in WS02 at 0.60m begl when compared to the relevant screening values. The chemical analysis has not identified exceedances at any other locations tested when compared against the GAC. None of the natural soils tested exceeded even the most stringent GAC values for a residential with plant uptake end use. Three locations (WS03, WS03A and BH01) recorded a presence of Asbestos fibres (Chrysotile and Amosite), quantification testing was undertaken on confirmation of fibres with a maximum quantity of 0.040% within WS03 at 0.60m begl.



Whilst the chemical analysis has identified a number of areas where GAC values are exceeded, it is considered that due to the nature of the proposed development, comprising primarily hard standing areas with minimal areas of soft landscaped public open space that the source-pathway-receptor model is broken in areas of hard standing and the building footprint and remediation will not be required in these areas.

In soft landscaping areas, it is considered that a pathway will still exist between source and receptor (end user) and therefore all soft landscaping areas will likely require remediation in the form of 300mm clean capping (see section 10 for details).

Full results of chemical analysis are presented in Appendix D.

#### 6.3 Risk to Construction Workers

Construction workers have a much shorter exposure time and as such the GAC used to assess the long-term exposure risk to end users are considered unnecessarily conservative. Although minimal risk from asbestos fibres is present on site the presence of asbestos fibres should be included in the groundworkers risk assessment and method statement.

Low oxygen concentrations were encountered during the gas monitoring in all monitoring wells (BH01, BH02, WS02, WS03 and WS04) and consideration should be given to enclosed space working in the ground workers risk assessments.

A preliminary UXO risk assessment has been undertaken by First line dated December 2019. The risk assessment determined that the risk to the site posed by UXO is low.



#### 7.0 Controlled Waters Risk Assessment

#### 7.1 Introduction

The soil leachate chemical analysis identified exceedances of Arsenic and Lead in two locations (WS02 and WS03) across the site within the made ground.

A Principal Aquifer has been identified in the underlying Shepperton Gravel formation, with four recorded extractions listed within 1km of the site, the site area is listed as a Groundwater source protection zone III.

Testing conducted on groundwater samples obtained from the monitoring wells during the most recent visit are currently being analysed, results of this testing will be reported in a revised report.

Based on the presence of a potential source within the onsite soils, a credible migratory pathway and a sensitive receptor at shallow depth within the Shepperton Gravel Formation the site at this present time does pose a moderate risk to controlled waters. The impact on the controlled waters receptor will be assessed on receipt of the groundwater test results.



### 8.0 Construction Materials Risk Assessment

#### 8.1 Water Supply Pipes

The chemical analysis results have been compared against UK Water Industry Research (UKWIR) Contamination Thresholds for sub-surface water pipes.

Based on the site history and the chemical analysis completed, it considered that the site will be suitable for standard PVC, not PE water pipes. Confirmation from the utility provider will be required.

#### 8.2 Buried Concrete

Based on the maximum recorded water-soluble sulphate (between 0-1400g/l) and pH (>6.5) the made ground and natural soils below the site (assuming mobile groundwater conditions) may be assumed as DS-2 and the ACEC Class as AC-2 (in accordance with BRE Special Digest 1 (2005)). This equates to a DC-2 classification and as such in accordance with BS 8500 FND2 concrete would be suitable for unreinforced and reinforced concrete.



# 9.0 Phase II Conceptual Model

The preceding information has been used to revise the conceptual model.

The chemical analysis has identified elevated levels of PAHs, Lead and Asbestos fibres within the shallow made ground compared to GAC values for a residential without plant uptake land use. The elevated levels of contaminants has been identified in areas of the proposed building hardstanding and limited areas of soft landscaped public open space. In areas of proposed hard standing and the building footprints remediation will not be required since the pathway to the receptor will be broken. However, in areas of soft landscaping it is considered that remediation to protect end-users will be required. Full results of the chemical analysis are presented in Appendix D.

Based on the results of the first ground gas monitoring visit it is considered that the site does not require ground gas precautions; however, confirmed recommendations will not be provided until the completion of the ground gas monitoring programme. A final gas risk assessment will be compiled on completion of the four monitoring visits.

There is no requirement for radon precautions.

In terms of controlled waters, the site has recorded a limited number of potential sources within the made ground as identified within the chemical analysis. Potential receptors have also been recognised within the Shepperton Gravel Formation being a designated Principal Aquifer and the site is also within a Source Protection Zone 3. Additionally, leachate testing has indicated that contamination has the potential to leach from the onsite soils. Results from the water monitoring visits have not been received to date but analysis of whether the elevated contaminants are migrating into the underlying principal aquifer will be assessed on receipt of these results. Thus, at this stage there is low but demonstrable risk to controlled waters posed from the site.

The Phase II conceptual model is illustrated below.

Human Health					
Source	Pathway	Receptor			
Made ground: elevated PAHs, Lead and Asbestos	Indoor and outdoor inhalation of soil vapours, the ingestion of contaminated soil and soil dust, and direct contact with contaminated soil and soil dust	End users of the completed residential development			
Made ground: elevated PAHs, Lead and Asbestos. Depleted concentrations of oxygen	Indoor and outdoor inhalation of ground gas and soil vapours, the ingestion of contaminated soil and soil dust and direct contact with contaminated soil and soil dust	Construction workers			
Ground gases	Inhalation	End users of the completed residential development			
	Controlled Waters				
Elevated concentrations of Lead and Arsenic in Made Ground Leachate testing	Vertical migration  Lateral migration	Principal Aquifer (Shepperton Gravel Member) Surface Water (River Thames)			



#### 10.0 Remediation

#### 10.1 Protection of End-Users

The chemical analysis has revealed exceedances of PAHs within the made ground encountered WS03 and WS03A as well as an exceedance of Lead in the made ground in WS02 when compared against the GAC for residential end-use without plant uptake. Asbestos fibres (chrysotile and amosite) were detected in WS03, WS03A and BH01. It is considered that due to the nature of the proposed development, comprising primarily hard standing and apartment blocks with no private garden areas, there is limited risk to the end user and widespread remediation is not required. However, in areas of soft landscaped public open space the use of 300mm clean topsoil / sub soil capping should be adopted to ensure the potential linkages between source and receptor are broken as a precautionary approach. Additionally, a watching brief to identify any visible potential Asbestos material is advised during any intrusive groundwork activities.

Made ground arisings may be re-used on the site as general non-structural fill material provided that they are capped by hard standing, buildings or 300mm of clean soils capping. Natural ground arisings may be re-used on site as clean soils capping. Subject to additional assessment the natural gravels may be suitable for use as a compacted fill beneath pathways and parking areas. Made ground and natural soil arisings should be segregated for this purpose if required.

Should additional topsoil be required for any areas of proposed soft landscaping this will need to be imported. Imported topsoil will need to be chemically validated to ensure it is suitable for a residential with plant uptake end-use. All imported soils should be chemically validated at the rates shown in the table below:

Source and Validation			
Rate	General Soil Suite	Asbestos	Hydrocarbons (TPHCWG)
Greenfield Source 1 per 150m³	✓		
Brownfield Source 1 per 100m³	✓	✓	<b>✓</b>
Generated Soil 1 per 50m³	✓	✓	✓

The results of the chemical validation should be compared to the GACs for a residential with plant uptake end-use as included in Appendix F and should comply with BS3882 specification for topsoil.

#### 10.2 Human Health - Ground Gas

The ground gas monitoring programme comprised four visits over a five-month period, during varying atmospheric conditions. Whilst the calculated GSVs suggest a CS1 gas classification it is considered that due to consistently elevated levels of carbon dioxide that as CS2 classification is adopted.



As the proposed development comprises a residential apartment block with only car parking and communal areas on the ground floor it is considered that the development comprises 'Type C' in accordance with table 3 of BS8485:2015 and as such set out in table 4 of the same document a gas protection score of 2.5 will need to be achieved; this will only apply to the communal areas on the ground floor, the areas of car parking will not gas protection measures due to the high levels of ventilation required to vent car exhaust fumes.

To achieve the 2.5 points for the communal areas the following measures are recommended:

Gas Protection Element	Score
Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations	1 - 1.5
Gas resistant membrane meeting all of the following criteria:	
• sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m2/atm (average) for sheet and joints (tested in accordance with BS ISO 15105-1 manometric method);	
• sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;	
• sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab);	2
• sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc);	
• capable, after installation, of providing a complete barrier to the entry of the relevant gas; and	
verified in accordance with CIRIA C735 [N1]	
Total	3 – 3.5

It should be noted that achieve the 1.5 points for the ground floor slab it would need to be suitably reinforced to prevent cracking. Also to achieve the 2 points for the membrane it will need to be validated by an independent 3<sup>rd</sup> party.

Radon precautions are not required.

The above recommendations are subject to approval from the Local Authority.

#### 10.3 Protection of Construction Workers

Specific remediation to protect construction workers with regard to soil contamination is not required. However, as standard, suitable personal protective equipment (PPE) in line with the ground workers risk assessment should be adopted, additionally the potential presence of asbestos fibres on site should be included in the groundworkers risk assessment and method statement, these recommendations should account for the results of the soils contamination testing.



The risk to the site from UXO is considered to be low and as such, no further actions need to be taken.

The monitoring has recorded depleted oxygen concentrations and as such this should be considered in the risk assessment for any excavation where person-entry is required or relevant enclosed space working.

#### 10.4 Protection of Controlled Waters

The site is considered to pose a potential moderate risk to controlled waters. Recommendations on whether any further actions will need to be taken will be finalised on receipt of the groundwater laboratory test results.

#### 10.5 Protection of Construction Materials

It is anticipated that PVC (not PE) pipework for domestic water supply will be required, subject to approval from the utility provider. In accordance with BS 8500:2016 FND2 concrete would be suitable for unreinforced and reinforced concrete respectively.

#### 10.6 Waste Disposal Classification

At this stage, based on the results of the chemical analysis it is considered that should any material, excluding tarmac surfacing, require removal from site it likely be suitable for disposal as non-hazardous subject to confirmation by the receiving landfill site. Natural soils are likely to be suitable for disposal as inert and therefore segregation of the natural and made ground soils is recommended.



# 11.0 Geotechnical Appraisal

#### 11.1 Introduction

Current development proposals indicate that the site is to be redeveloped with two twelve to fourteen storey residential apartment blocks with areas of soft landscaping, car parking and access roads.

#### 11.2 Excavation conditions

Excavation of the soils encountered during the ground investigation should be easily achieved using conventional hydraulic equipment. Concrete obstructions were encountered in two of the shallow window sample boreholes and breaking out of sub surface concrete may be required. Trench support will be required in areas where made ground or shallow granular soils are encountered. Full support should be provided to any excavation where person entry is required.

Based on monitoring to date groundwater is expected to be encountered at shallow depth at between 2.00 and 2.80m begl. Should water be encountered during the excavation of material, de-watering via sump pumping will be required to control any ingress within excavations and depress the groundwater to below the base of excavations.

Where excavations are deeper and significant de-watering could be required, consideration needs to be given to the stability of adjacent structures.

#### 11.3 Subsurface Structures

Buried concrete obstructions were recorded in the locations of WS01 and WS03A, encountered at a depth of 2.30m and 0.65m begl respectively. It is likely that these obstructions relate to the presence of previous foundations or slabs from historic structures or former basement structures.

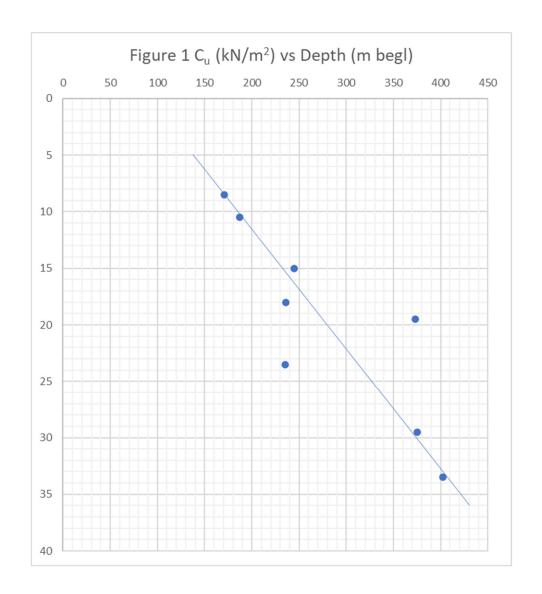
A piled foundation solution will be required for all the proposed structures due to the height and expected loadings. Piled foundations must be progressed into the Stiff London Clay Formation underlying the Shepperton Gravel Formation natural strata .

The laboratory test results have confirmed that the cohesive soils at shallow depth are of low-volume change potential and soils of the deeper London clay are of high-volume change potential, as such, in accordance with NHBC Chapter 4.2 localised deepening of foundations due to tree influence may be required, however, low volume change soils may be assumed.

Pile type and depth should be confirmed by a specialist piling contractor; however, preliminary calculations using published methods indicate the following capacities for CFA piles:



Pile Diameter Pile Depth	450mm	600mm	750mm
10m	190kN	431kN	598kN
15m	484kN	703kN	952kN
20m	840kN	1190kN	1578kN
25m	1246kN	1744kN	2284kN
30m	1726kN	2397kN	3116kN





The above have been calculated assuming average shear strengths along the length of the pile embedded within the London Clay and undrained shear strength at the base of the pile based on the trendline of the shear strengths and shear strengths determined from N60 values vs depth presented in the graph, figure 1. Skin friction from the made ground and Langley Silt has been ignored and potential negative skin friction has not been included in the calculations, the skin friction from the Shepperton Gravels has been added. Limiting factors associated with the material strength of the piles have not been taken into account.

It should be noted that the above figures only give a rough estimation of pile capacities and prior to any detailed design of foundations or sub-structures likely pile capacities should be confirmed by a specialist piling contractor as their in-house design methods in most cases can provide higher safe working loads than can be calculated using published methods.

Even where piles and ground beams are adopted potential heave associated with existing trees will need be considered during foundation and floor slab design. Where new substructures are within the potential heave zone associated with existing trees heave protection will be required under floor slabs, under all ground beams and on the inside face of external ground beams.

Shallow traditional spread footings should not be founded within the made ground. Allowable bearing capacities of 85kN/m² should be assumed for pads or strip footings founded within the Langley Silt. Allowable bearing capacities of 100kN/m² should be assumed for strip or pad footings bearing onto the Shepperton Gravels. However, the depth to Langley Silts and Shepperton Gravels is variable across the site and groundwater level relatively shallow. Also localised very loose conditions exist which would result in unacceptable differential settlements. It is recommended that specific ground investigation is carried out once any areas that require shallow spread footings have been finalised to confirm the ground conditions and bearing capacities.

Foundations, including piles and ground beams, as well as floor slabs, should be designed to account for tree influence and potential heave associated with existing trees.

If proposed structures have basements these features should be designed to resist potential uplift forces (heave) associated with removal of surcharge loading provided by the removed soil. As ground water levels are relatively shallow below the site any basement structures would need to consider potential buoyancy.

#### 11.4 Floor slabs

Based on the recorded thicknesses of made ground it is considered the use of ground bearing floor slabs for the proposed development will be precluded.

#### 11.5 New Access Roads and Car Parking

The proposed development includes parking areas and access roads. The near-surface made ground was subject to laboratory CBR testing. The results suggest variable CBRs within the made ground, ranging from 2.6% to 39%. Areas of soft/loose made ground were encountered during the investigation and these may require proof rolling to identify and remove soft spots if they are not improved by rolling.



#### 11.6 Soakaway Drainage

Based on the presence of shallow ground water recorded within the boreholes, the thickness of made ground and the site locality within a zone 3 Groundwater flood risk zone the site is unsuitable for traditional soakaway drainage.

#### 11.7 Slope Stability

Based on the current site gradients it is considered unlikely that the site will present any slope stability issues.

#### 11.8 Retaining Structures

Given the existing topography in the areas of proposed development it is considered that no significant retaining structures are likely to be required. Retaining structures will be required in areas of proposed subsurface development and parking areas. Retaining structures for any subsurface structures or changes in site levels across the site should be Engineer designed.



# 12.0 Further Investigation

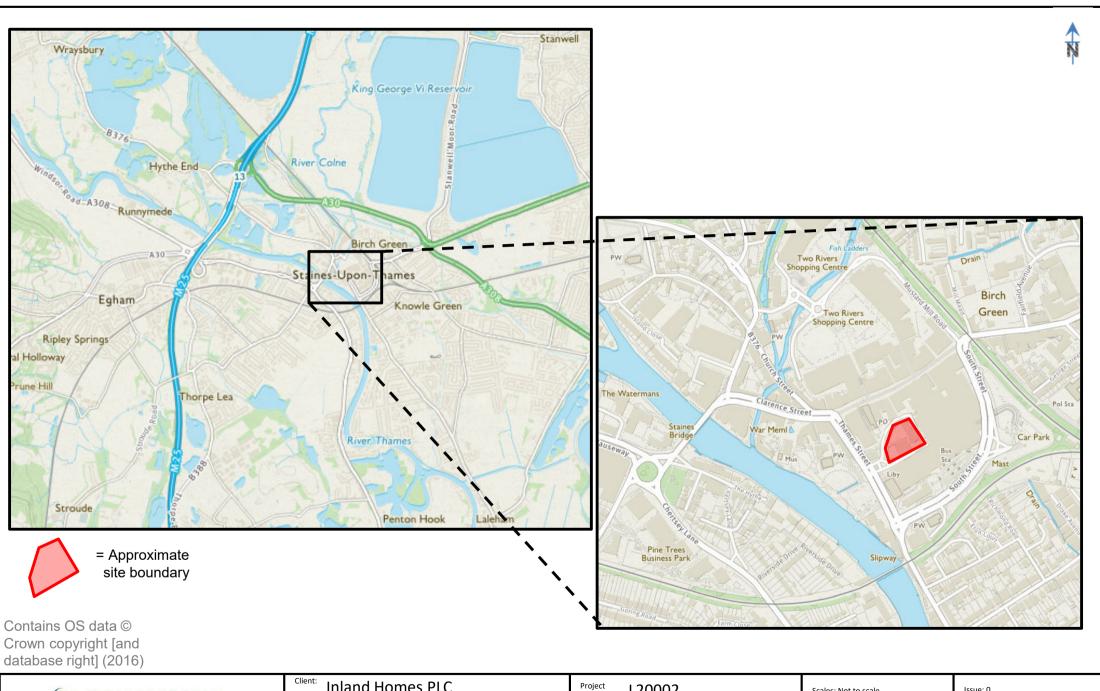
Based on the ground conditions encountered in the site investigation it is considered that following further works are required:

 Targeted investigation to determine local bearing capacities for shallow spread foundations if required.

Following review of this report a copy of it should be submitted to the Local Authority planning department prior to any development works as this is often a condition of planning.



Appendix A Figures



<b>PAT</b>	RICK	PARS	ONS
------------	------	------	-----

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**Inland Homes PLC** Project: Elmsleigh Road, Staines L20002

No.: Title:

Scales: Not to scale

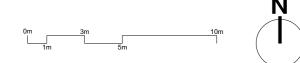
Issue: 0

Site Location Plan

Design/drawn: HA Checked: JPB

Rev. 0 Drawing no: L20002-701





- To be read in conjunction with Design and Access Statement and consultant reports.
   Site ownership taken from relevant title deed plans. Context taken from OS data.
  All layouts to suit design brief.
- Private and balcony provision as per design brief.
  Spatial requirements to suit relevant nationally described
- housing standards.

  External landscape design by others. All structure, external and internal walls shown in black.
- Refer to compliance plans for furniture and flat layouts. To suit relevant Part M requirements.

  • Structure indicative only and subject to change

# P=Preliminary C=Contract © 2019 Assael Architecture Limited

Revision Status:

General notes

All setting out must be checked on site All levels must be checked on site and refer to

This drawing must not be scaled

Definition of Areas for Schedule of Areas

Ordnance Datum Newlyn unless alternative Datum given All fixings and weatherings must be checked on site All dimensions must be checked on site

This drawing must be read in conjunction with all other relevant drawings, specification clauses and current design risk

register
This drawing must not be used for land transfer purposes
Calculated areas in accordance with Assael Architecture's

This drawing must not be used on site unless issued for

Subject to survey, consultation and approval from all statutory

Assael Architecture Limited has prepared this document in accordance with the instructions of the Client under the agreed Terms of Appointment. This document is for the sole and specific use of the Client and Assael Architecture shall not be responsible for any use of its contents for any purpose other than that for which it was prepared and provided. Should the Client require to pass electronic copies of the document to other parties, this should be for co-ordination purposes only, the whole of the file should be so copied, but no professional liability or warranty shall be extended to other parties by Assael Architecture in this connection without the explicit written agreement thereto by Assael Architecture Limited. Drawing notes

Electronic file reference

AA A3445 200 Plans

Date DRN CHK CDM Status R: Revision 9 Design Freeze 21/08/2020 DS MR

11 Application boundary 15/09/2020 MR JL

10 Issued for Design 28/08/2020 DS MR

Site Boundary

Application Boundary

**Boundary Key** 

Purpose of information

The purpose of the information on this drawing is for:

Construction

All information on this drawing is not for construction unless it is marked for construction.

# **Inland Homes**

A3445 - Elmsleigh Road Staines-Upon-Thames

Drawing title

**Ground Floor Proposed** 

Scale @ A1 size

Jan '20 1:200

Drawing N°

ERS-ASA-ALL-00-DR-A-0200

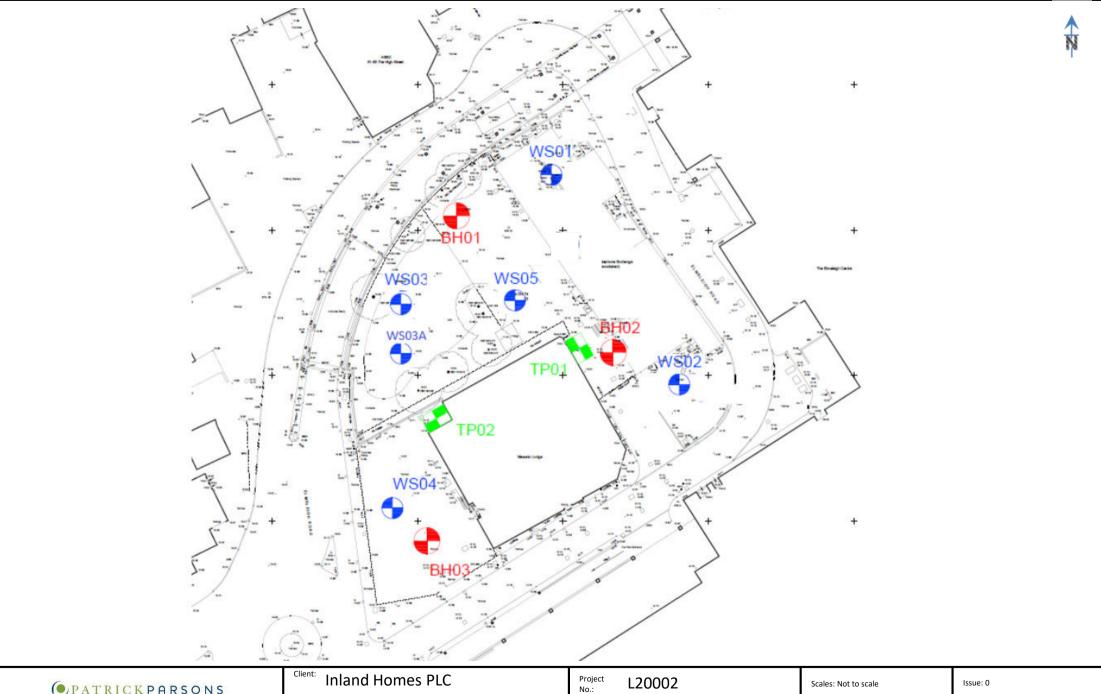
Status & Revision

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Inland Homes PLC	Project No.:	L20002	1
Project: Elmsleigh Road, Staines	Title:	Exploratory Hole	
		Location Dlan	_

Design/drawn: HA Checked: JPB Location Plan Drawing no: L20002-704 Rev. 0



# Appendix B Exploratory Hole Logs and Field Data

						Borehole No.				
PATRICKPARSONS					Cable Percussive				BH01	
				Boreno			ole Log	Sheet 1 of 4		
			Project No. L20002		Co-ords:		Hole Type CP			
Location:		Elmsleigh Road, Staines					Level:		Scale 1:50	
Client: Inland Homes PLC		PLC			Dates: 11/03/2020		Logged By HA			
Well Water		Sample and In Situ Testing			Depth Level		Legend	d Stratum Description		
	Strikes	Depth (m)	Туре	Results	(m)	(m)	***********	MADE GROUND: Pale grey slightly silty sandy gravel.		
<b>©</b>					0.30 0.50			Gravel is fine to coarse subangular cor and quartzite.  MADE GROUND: Pale grey sandy gra fine to medium subangular compacted MADE GROUND: Pale brown slightly s gravelly clay. Gravel is fine to coarse si concrete, red brick and quartzite.	vel. Gravel is concrete.	1 —
		1.50	D	N-7 (4 0/4 2 2 2)	1.50			MADE GROUND: Brown slightly silty s	lightly sandy	
		1.50	SPT	N=7 (1,0/1,2,2,2)	1.80			reworked CLAY. Light brown sandy silty CLAY.		
		2.00 2.00	B D				×_×_× ×_×_×	Light blown earley only 62 to		2 -
		2.50 2.50	D SPT	N=7 (1,0/0,3,2,2)			<u> </u>			
		3.00	D				XXX			3 -
	1	3.50 3.50	D SPT	N=12 (2,3/3,3,3,3)	3.60		× × ×	Medium dense brown SAND and GRA' fine to coarse subangular flint and quar		
		4.00	В							4 -
		4.50 4.50	B SPT	N=33 (1,2/4,9,9,11	)					=
		5.00	D							5 -
		5.50 5.50	B SPT	N=15 (2,1/2,3,4,6)	)					
		6.00	D							6 —
		6.50 6.50	B SPT	N=20 (2,3/4,4,5,7)	)					
		7.00 7.00	B D							7 —
		7.50 7.50	D SPT	N=11 (2,3/2,2,3,4)	7.90					
		8.00	В		7.50		× × ×	Firm to stiff grey slightly silty CLAY.		8 –
		8.50 8.50	D SPT	N=9 (1,2/2,2,2,3)			×			
		9.00	D				<u>×</u> <u>×</u> <u>×</u>			9 -
		9.50 9.50	D SPT	N=31 (4,6/7,7,8,9)	)		× × ×	below 9.50m begl becomes very stif	f.	
		10.00	D				<u>×</u>	Continued on Next Sheet		10 —
						_	_			



						Borehole No.				
PATRICKPARSONS					Cable Percussive				BH01	
					Boreho			ole Log	Sheet 2 of 4	
Projec	t Name:	Elmsleigh Road, Staines			Project No. L20002		Co-ords:		Hole Type CP	
Location:		Elmsleigh Road, Staines			•		Level:		Scale 1:50	
Client:		Inland Homes PLC					Dates: 11/03/2020		Logged By	
Well Water Strikes									HA	
		Depth (m)	Type	n Situ Testing Results	Depth (m)	Level (m)	Legend	Stratum Description		
		Bopar (III)	1,700	Trocure			XX			
		10.50	11400	l lblow=65			××			
		10.50	U100	Ublow=65			X-X			
		11.00	D				×			11 —
		11.00					×			'' =
							× ×			3
							× ×			_
		12.00	D				× ×			12 —
		12.00	SPT	N=31 (5,5/6,7,9,9	))		× × ×			'-
							× × ×			$\exists$
							× × ×			
		13.00	D				× × ×			13
		10.00					× × ×			"
		13.50	D				× ×			]
		13.50	SPT	N=30 (4,5/6,7,8,9	))		× × ×			
		14.00	D				× × ×			14 —
							× × ×			`
							× × ×			
							× ×			
		15.00	U100	Ublow=85			×_×_×			15 —
							×_×_×			]
		15.50	D				<u>×</u> _ <u>×</u>			_
							<u>×_×</u>			
		16.00	D				<u>×_×</u> _×			16 —
							××			1 3
		16.50	D				<u>×_×</u>			
		16.50	SPT	N=33 (5,6/9,7,8,9	))		<u>×</u> _ <u>×</u>			]
		17.00	В				X-Ĵ-X*			17 —
							××			
							×			1 3
							×			
		18.00	D	N 05 (0 0/0 0 0 0			× ×			18 —
		18.00	SPT	N=35 (6,6/9,8,9,9	"		× ×			
		18.50	D				×			=
							× × ×			=
		19.00	D				× × ×			19 =
							× ×			=
		19.50	D				× × ×			=
							× × ···×			
Y//>\Y//		20.00	U100	Ublow=100				Continued on Next Sheet		20 —



PATRICK PARSONS					Cable Percussive Borehole Log				Borehole No.  BH01  Sheet 3 of 4	
Project Name: Elmsleigh Road, Staines			Project No. L20002 Co-ords				Hole Type CP			
Location:		Elmsleig	Elmsleigh Road, Staines				Level:		Scale 1:50 Logged By	
Client: Inland Homes PLC		PLC			Dates:	Dates: 11/03/2020		/		
Well	Water Strikes     Sample and In Situ Testing       Depth (m)     Type     Result		n Situ Testing Results	Depth (m)	Level (m)	Legend Stratum Descrip		1		
		21.00 21.50 21.50 21.50 22.00 23.00 23.50 23.50 24.00 25.50 26.00 27.50 27.50	D D SPT D D U100 D D	N=47 (6,7/9,12,12,1 N=43 (6,8/8,11,12,1 Ublow=100	2)					21
		28.00	D D				XXX	between 29.00m and 29.50m band rounded flint gravels.	of black	28 —
		29.50 29.95	U100	Ublow=100			x x x x x x x x x x x x x x x x x x x	Continued on Next Sheet		30 —



PATRICKPARSONS					Cable Percussive Borehole Log				Borehole No.  BH01  Sheet 4 of 4	
Project Name:		Elmsleigh Road, Staines			Project No.		Co-ords:		Hole Type	
Location:		Elmsleiç	gh Roa	d, Staines	L20002		Level:		CP Scale 1:50	
Client:		Inland H	lomes	PLC			Dates:	11/03/2020	Logged By HA	
Well	Water Strikes	Sample Depth (m)	Type	n Situ Testing Results		Level (m)	Legend	Stratum Description	ı	
		31.50 31.50 32.00 33.50 33.70 35.00 35.00	D D SPT D U100 D SPT	50 (27 for 140mm/5 for 160mm)  Ublow=100  N=50 (8,9/50 for 290mm)	35.00			End of Borehole at 35.00m		31



#### Borehole No. Cable Percussive PATRICKPARSONS **BH02 Borehole Log** Sheet 1 of 3 Project No. Hole Type Co-ords: Project Name: Elmsleigh Road, Staines L20002 CP Scale Location: Elmsleigh Road, Staines Level: 1:50 Logged By Dates: Client: 17/03/2020 Inland Homes PLC HA Sample and In Situ Testing Water Depth Level Well Legend Stratum Description Strikes (m) (m) Results Depth (m) Туре MADE GROUND: Asphalt. 0.20 В 0.20 MADE GROUND: Brown slightly sandy gravelly clay with low cobble content. Gravel is fine to coarse 0.50 D subangular concrete, red brick, metal, glass and quartzite. Cobbles of concrete. 0 1.00 В 1 1.50 В 1.50 MADE GROUND: Greyish brown slightly silty sandy clay with rare fine subangular concrete and red brick. 2 2.50 В 2.50 Medium dense to dense brown SAND and GRAVEL. Gravel is fine to coarse subangular flint and quartzite. 3 3.50 В 3.50 SPT N=10 (2,1/3,2,3,2) 4 4.50 R SPT 4.50 N=14 (2,3/3,4,4,3) 5 5.50 SPT N=25 (2,4/6,6,7,6) 6 6.50 В SPT N=24 (2,4/4,6,7,7) 6.80 Stiff grey slightly silty slightly sandy CLAY. В 7.00 7 7.50 D 7.50 N=29 (3,4/6,7,8,8) SPT 8 8.50 8.50 D SPT N=26 (3,5/6,6,6,8) 9 U100 Ublow=65 9.50 10.00 D 10 Continued on Next Sheet

#### Remarks

1. Borehole drilled through excavated trial pit at 2.50m begl to avoid buried obstructions. 2. Borehole installed with gas and groundwater monitoring standpipe on completion. 3. Borehole completed at 25.00m begl.



				Borehole No.					
PA	TRICK	PΑ	RSONS				ercussive	BH02	
					Ь	oren	ole Log	Sheet 2 of	
Project Name:	Elmsleiç	gh Roa	d, Staines	Project No. L20002		Co-ords:		Hole Type CP	•
Location:	Elmsleiç	gh Roa	d, Staines			Level:		Scale 1:50	
Client:	Inland F	lomes	PLC			Dates:	17/03/2020	Logged By	/
Water Water	Sample	e and I	n Situ Testing	Depth	Level			TIA	
Well Strikes	Depth (m)	Туре	Results	(m)	(m)	Legend	Stratum Description		
						×			-
	10.50 10.50	D SPT	N=32 (4 5/7 7 9 10	,,		××	at 10.50m begl becomes very stiff.		
	10.50	SFI	N=32 (4,5/7,7,8,10	')		× × ×	,		
						<u> </u>			11 —
						<u> </u>			]
	11.50	D				<del>x</del> -^-x			
	12.00	D				×			12 —
	12.00	SPT	N=34 (4,7/7,8,9,10	))		× × ×			'2
	12.50	D				^×			<u> </u>
						× × ×			
						× × ×			13 📑
						<u> </u>			-
	13.50 13.50	D SPT	N=29 (5,6/6,7,8,8	,		××			-
	13.30	JF I	14-29 (3,0/0,7,0,0	,		×			]
						<del>x</del> x			14 —
						×			
	14.50	D				$\mathbb{Z}$			
	15.00	11100	Ublow=100			×x-			45
	15.00	U100	Ublow=100						15 —
	15.50	D				$=$ $\times$ $\times$			
	10.00					× × ×			
						×-×			16 —
						××			]
	16.50	D	/= =/0			XX			
	16.50	SPT	N=38 (5,7/8,9,10,1	1)		<del>x</del> x			-
						××			17 🗖
									]
	17.50	D				× × ×			
						× × ×			]
	18.00 18.00	D SPT	N=37 (6,6/8,10,9,1	0)		×_×_×			18 —
	18.50	D				× × ×			
	10.50	"				X——X			]
						<u> </u>			19 —
						XX			
	19.50	U100	Ublow=100			$\frac{\times - \frac{\wedge}{\times} - \times}{\times}$			]
						X—————————————————————————————————————			=
	20.00	D				×	Continued on Next Sheet		20 —
	I	1	1		1	1			

1. Borehole drilled through excavated trial pit at 2.50m begl to avoid buried obstructions. 2. Borehole installed with gas and groundwater monitoring standpipe on completion. 3. Borehole completed at 25.00m begl.



(	) P A '	ГКІСК	PΑ	RSONS				ercussive ole Log	Borehole N BH02 Sheet 3 of	
Projec	t Name:	Elmsleig	jh Roa		Project No. L20002		Co-ords:		Hole Type CP	
Locati	on:	Elmsleig	jh Roa	d, Staines			Level:		Scale 1:50	
Client:		Inland H	lomes l	PLC			Dates:	17/03/2020	Logged By	/
Well	Water Strikes			n Situ Testing	Depth (m)	Level (m)	Legend	Stratum Description		
		20.50 21.50 21.50	Type  D SPT	Results N=46 (6,9/9,11,13,1		(···)				21 —
		22.50	D U100	Ublow=100						23 —
		24.00 24.50	D D							24 —
		25.00 25.00	D SPT	N=50 (6,7/50 for 295mm)	25.00			End of Borehole at 25.00m		25
										26 — - - - - -
										27 — - - - - - -
										28 -
										29 —

1. Borehole drilled through excavated trial pit at 2.50m begl to avoid buried obstructions. 2. Borehole installed with gas and groundwater monitoring standpipe on completion. 3. Borehole completed at 25.00m begl.



30 -

#### Borehole No. Cable Percussive PATRICKPARSONS **BH03 Borehole Log** Sheet 1 of 4 Project No. Hole Type Co-ords: Project Name: Elmsleigh Road, Staines L20002 CP Scale Location: Elmsleigh Road, Staines Level 1:50 Logged By Client: Dates: Inland Homes PLC 13/03/2020 HA Sample and In Situ Testing Water Depth Level Well Legend Stratum Description Strikes (m) (m) Results Depth (m) Type 0.05 MADE GROUND: Asphalt. MADE GROUND: Reddish brown sand and gravel. Gravel is fine to coarse subangular concrete, red brick, quartzite and mortar. MADE GROUND: Brown slightly silty slightly gravelly 0.50 В 0.50 sandy clay. Gravel is fine to coarse subangular red brick, concrete and quartzite. В 1.00 1.50 SPT N=26 (4,7/6,7,6,7) 1.90 MADE GROUND: Dark greyish brown slightly silty 2.00 В 2 sandy slightly gravelly clay. Gravel is fine to coarse quartzite and red brick. 2.50 В 2.50 SPT N=15 (3,2/3,2,4,6) 2.80 Medium dense yellowish brown SAND and GRAVEL. В 3.00 Gravel is fine to coarse subangular flint and quartzite. 3 3.50 В 3.50 SPT N=28 (3,4/4,6,9,9) 4 4.50 R 4.50 SPT N=36 (4,5/7,9,9,11) 5 5.40 Loose reddish orange sandy GRAVEL. Gravel is fine to coarse subangular to subrounded flint and 5 50 SPT N=8 (3,3/2,2,2,2) 6 6.50 В SPT N=6 (2,2/0,2,2,2) 7 7.30 Stiff dark grey slightly silty CLAY. 7.50 D 7.50 SPT N=23 (4,5/4,5,7,7) 8.00 В 8 U100 Ublow=75 8.50 9.00 D 9

### Remarks

9.50

9.50

D SPT

1. Borehole backfilled with arisings on completion. 2. Borehole completed at 35.00m begl.

N=27 (4,4/6,6,7,8)



Continued on Next Sheet

10

(	PΑ̈́	ТКІСК	PΑ	RSONS	Cable Percussive Borehole Log				Borehole No.  BH03  Sheet 2 of 4	
Projec	t Name:	Elmsleig	gh Road	d, Staines	Project No. L20002		Co-ords:		Hole Type CP	
Location	on:	Elmsleig	gh Road	d, Staines			Level:		Scale 1:50	
Client:		Inland H	lomes I	PLC			Dates:	13/03/2020	Logged By HA	′
Well	Water Strikes			n Situ Testing	Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Туре	Results	(,	(,	<u> </u>			
		10.50 10.50	D SPT	N=33 (6,7/7,9,8,9	)		x x x	at 10.50m begl becomes very stiff.		
		11.50	D				xx xx			11 —
		12.00 12.00	D SPT	N=37 (6,7/8,9,9,1	1)		xx			12 —
		12.50	D				x			13 —
		13.50	D				××			-
		14.00	D				×_×_×			14 -
		14.50	D				××			
		15.00 15.00	D SPT	N=35 (5,7/9,8,9,9	)		<u>×_×_×</u>			15 -
		15.50	D				x x x x x x x x x x x x x x x x x x x			16 —
		16.50 16.50	D SPT	N=36 (6,7/9,8,10,8	9)		x			17 —
		17.50	D				×× ×× ××			
		18.00	U100	Ublow=100			<u>×</u> ×			18 —
		18.50	D				xx xx xx			19 —
		19.50 19.50	D SPT	N=36 (5,6/7,9,9,1			X X X X X X X X X X X X X X X X X X X			
Y//>\Y//							<del>-</del>	Continued on Next Sheet		20 —

1. Borehole backfilled with arisings on completion. 2. Borehole completed at 35.00m begl.



PATRICKPARSONS					Cable Percussive Borehole Log				Borehole No.  BH03  Sheet 3 of 4	
Projec	t Name:	Elmsleig	gh Roa		Project No. L20002		Co-ords:		Hole Type CP	;
Locati	on:	Elmsleig	gh Roa	d, Staines			Level:		Scale 1:50	
Client:		Inland H	lomes	PLC			Dates:	13/03/2020	Logged By HA	/
Well	Water Strikes			n Situ Testing	Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Туре	Results	()	()	x_^x			_
		20.50	D				x_x_x_x xx_x			-
		21.50	D				× × ×			21 -
		21.50	SPT	N=46 (6,9/8,13,12,13	3)		x _ x			22 —
		22.50	D				× ^ × × × × × × × × × × × × × × × × × ×			-
		23.50 23.50	D SPT	N=47 (6,8/9,12,12,14	4)		× × × × × × × × × × × × × × × × × × ×			23 -
		24.50	D				x x x x x x x x x x x x x x x x x x x			24 —
							× × × × × × × × × × × × × × × × × × ×			25 —
		25.50 26.00	U100	Ublow=100			xx xx xx			26 —
		26.50	D				x x x x x x x x x x x x x x x x x x x			
		27.50 27.50	D SPT	N=50 (6,10/50 for			× - × × × × × × × × × × × × × × × × × ×			27 -
				235mm)			× × × × × × × × × × × × × × × × × × ×			28 —
		28.50	D				x x x x x x x x x x x x x x x x x x x			29 —
		29.50 29.50	D SPT	N=50 (7,11/50 for 290mm)			× × × × × × × × × × × × × × × × × × ×			
Y/ <i>}</i> }}/							<u>x</u> -	Continued on Next Sheet		30 —

1. Borehole backfilled with arisings on completion. 2. Borehole completed at 35.00m begl.



	PA'	TRICKPARSONS					ercussive ole Log	Borehole N  BH03  Sheet 4 of		
Projec	t Name:	Elmsleiç	gh Road	d, Staines	Project No. L20002		Co-ords:		Hole Type CP	
Locati	on:	Elmslei	gh Road	d, Staines			Level:		Scale 1:50	
Client:		Inland H	lomes I	PLC			Dates:	13/03/2020	Logged By HA	y 
Well	Water Strikes	Sample Depth (m)	e and I	n Situ Testing Results	Depth (m)	Level (m)	Legend	Stratum Description	ı	
		30.50 31.50 31.90 32.50 34.00 34.50 35.00 35.00	D U100 D D D SPT	Ublow=100  N=50 (8,11/50 for 240mm)	35.00			End of Borehole at 35.00m		33 35 35 37 38 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 39 3

1. Borehole backfilled with arisings on completion. 2. Borehole completed at 35.00m begl.



40 -

							Borehole No.			
	PΑ̈́	ТКІСК	RICKPARSONS			Bo	reho	ole Log	WS01	
									Sheet 1 of	
Projec	t Name:	Elmsleig	jh Roa		Project No. L20002		Co-ords:		Hole Type WS	
Locati	on:	Elmsleig	jh Roa	d, Staines			Level:		Scale 1:25	
Client:		Inland H	lomes	PLC			Dates:	11/03/2020	Logged By HA	,
	\A/-+	Sample	and I	n Situ Testing	Danth	11			1171	
Well	Water Strikes	Depth (m)	Type		Depth (m)	Level (m)	Legend	Stratum Description		
		1.00 1.00	D SPT	N=7 (1,1/2,2,1,2) 50 (1,5/50 for 10mr				MADE GROUND: Pale yellowish brow sandy gravel with medium cobble cont fine to coarse subangular concrete, requartzite, tile and rare metal. Cobbles and red brick.	ent GraveLis	1

1. Borehole terminated on suspected former building concrete basement at 2.30m begl.



									Borenoie iv	0.
	PΑ̈́	TRICK	PΑ	RSONS		Bo	reho	ole Log	WS02	
							1		Sheet 1 of	
Projec	t Name:	Elmsleiç	gh Roa	d, Staines	Project No. L20002		Co-ords:		Hole Type WS	•
Locati	on:	Elmsleiç	gh Roa	d, Staines			Level:		Scale 1:25	
Client:		Inland F	lomes	PLC			Dates:	11/03/2020	Logged By HA	/
Well	Water Strikes			n Situ Testing	Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Туре	Results		, ,		MADE GROUND: Asphalt.		_
					0.12			MADE GROUND: Concrete Slab.		- -
										-
		0.60	ES		0.35 0.45			MADE GROUND: Yellowish brown slig slightly gravelly sand. Gravel is fine to u subangular red brick, concrete and qua MADE GROUND: Dark grey slightly sa gravelly clay. Gravel is medium to coar concrete and quartzite.	coarse artzite. ndy slightly se subangular	- - - - - - - -
					0.80			Soft (becoming firm below 2.00m begl) brown sandy CLAY.	yellowish	=
<b>G</b>		2.00	SPT	N=4 (0,1/1,1,1,1 N=8 (1,1/2,2,2,2						1
	•				2.20			Loose to medium dense yellowish brov slightly gravelly SAND. Gravel is fine to subangular quartzite.	o coarse	
		3.00	SPT	N=15 (3,1/2,5,5,	3.00		key	between 2.90m and 3.00 begl very of No Recovery	gravelly.	3
					4.00		incorrect incorrect in correct	End of Borehole at 4.00m		4

1. Borehole collapse between 4.00m begl and 2.90m begl. 2. Groundwater encountered at 2.30m begl. 3. Gas and groundwater monitoring standpipe installed on completion.



						_	_		Borehole No	0.
	PA'	ТКІСК	PΑ	RSONS		Bo	reho	ole Log	WS03	
							1	-	Sheet 1 of	
Projec	t Name:	Elmsleig	gh Roa	d, Staines	Project No. L20002		Co-ords:		Hole Type WS	
Locati	on:	Elmsleig	gh Roa	d, Staines			Level:		Scale 1:25	
Client:		Inland H	lomes	PLC			Dates:	11/03/2020	Logged By HA	1
Well	Water Strikes			n Situ Testing	Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Туре	Results	()	(***)		MADE GROUND: Pale grey slightly sil	ty gravelly	-
0		0.60 1.00 1.10 1.80 2.00	ES SPT D	N=4 (1,1/1,1,1,1) N=0 (1,0/0,0,0,0)	1.50			sand. Gravel is fine to coarse subangured brick and quartzite.  MADE GROUND: Dark grey slightly gr sand. Gravel is fine to coarse subangubrick, glass, tile and quartzite.  Loose pale greyish yellow clayey silty sand place.	avelly clayey lar concret, red	1 —
		3.00 4.00	SPT	N=12 (3,5/3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,				Medium dense yellowish brown sandy Gravel is fine to coarse subangular qualibelow 3.30m begl becomes slightly  End of Borehole at 4.00m	GRAVEL. artzite.	3 - 4
										5 —

1. Groundwater encountered at 2.50m begl.

		ATRICKPARSONS	D 1 1 1					Borehole No.		
	PA'	ГКІСК	PΑ	RSONS		Bo	reho	ole Log	WS03	4
							1		Sheet 1 of	
rojec	t Name:	Elmsleig	jh Roa	d, Staines	Project No. L20002		Co-ords:		Hole Type WS	9
ocati	on:	Elmoloio	h Doo	d Staines	120002		Level:		Scale	
ocau	On:	Elmsieig	,n Road	d, Staines			Levei:		1:25	
lient:		Inland H	omes l	PLC			Dates:	11/03/2020	Logged By HA	У
	Water	Sample	and I	n Situ Testing	Depth	Level				
Well	Strikes	Depth (m)	Туре		(m)	(m)	Legend	Stratum Description		
								MADE GROUND: Pale grey slightly sil sand. Gravel is fine to coarse subangu red brick and quartzite.	ty gravelly lar concrete,	-
		0.50	ES		0.30			MADE GROUND: Dark grey slightly gr sand. Gravel is fine to coarse subangu brick, glass, tile and quartzite.	avelly clayey lar concret, red	
					0.65			End of Borehole at 0.65m		-
								2.1d of 201011010 dx 0.000111		
										1 =
										2 —
										=
										]
										3 -
										1 =
										4 7
										=
										=
										5

1. Borehole terminated on concrete slab at 0.65m begl.

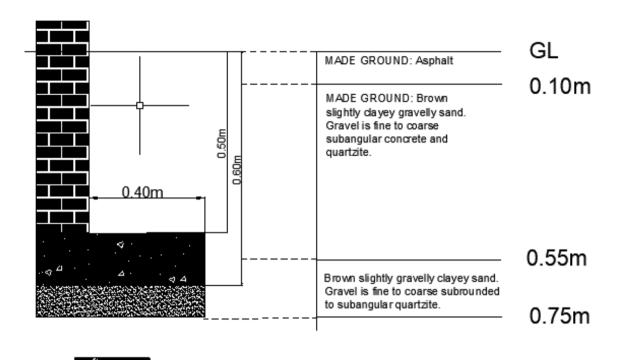


### Borehole No. **Borehole Log** PATRICKPARSONS **WS04** Sheet 1 of 1 Project No. Hole Type Co-ords: Project Name: Elmsleigh Road, Staines L20002 WS Scale Location: Elmsleigh Road, Staines Level: 1:25 Logged By Dates: Client: Inland Homes PLC 11/03/2020 HΑ Sample and In Situ Testing Water Depth Level Well Legend Stratum Description Strikes (m) (m) Depth (m) Type Results MADE GROUND: Asphalt. 0.05 MADE GROUND: Reddish brown slightly silty sandy gravel. Gravel is fine to coarse subangular red brick and concrete. 0.60 MADE GROUND: Concrete. 0.80 MADE GROUND: Dark grey slightly silty slightly gravelly sand. Gravel is fine to coarse subangular concrete and red brick. 1.00 ES 1.00 MADE GROUND: Orangish brown slightly clayey N=0 (1,1/0,0,0,0) gravelly sand. Gravel is fine to coarse subangular red 1.30 MADE GROUND: Dark grey clayey sand with large tree roots upto 6cm in diameter. 1.60 MADE GROUND: Dark grey slightly clayey slightly gravelly sand. Gravel is fine subangular red brick. D 1.80 SPT 2.00 N=25 (4,6/6,6,6,7) 2 2.30 Medium dense pale grey silty gravelly SAND. Gravel is fine to coarse subangular flint and quartzite. SPT N=20 (3,4/4,6,5,5) 3.00 3 End of Borehole at 3.00m 4 5

1. Groundwater encountered at 2.60m begl.

										0.
	PA'	TRICK	PΑ	RSONS		Во	reho	ole Log	WS05	
								0	Sheet 1 of	1
Projec	t Name:	Elmsleig	jh Roa	d, Staines	Project No. L20002		Co-ords:		Hole Type WS	;
Locati	on:	Elmsleig	gh Roa	d, Staines			Level:		Scale 1:25	
Client:		Inland H	lomes	PLC			Dates:	11/03/2020	Logged By	/
		0		. 0''					HA	
Well	Water Strikes	Depth (m)	Type	n Situ Testing  Results	Depth (m)	Level (m)	Legend	Stratum Description		
								MADE GROUND: Concrete slab.		_
					0.25					<del>-</del>
					0.25			MADE GROUND: Pale creamy grey sl gravel. Gravel is medium to coarse sul	ightly sandy pangular	]
		0.40	ES		0.50			limestone and concrete subbase.  MADE GROUND: Dark grey slightly gr	//	=
					0.50		$\overset{\times}{\star}\overset{\wedge}{\star}\overset{\times}{\star}\overset{\times}{\star}$	clay. Gravel is fine to coarse subangula concrete.	ar red brick and	=
							*	Loose pale greyish yellow slightly grav Gravel is fine subrounded quartzite.	elly silty SAND.	
							×^×××	Graver is line subrounded quartzite.		-
		1.00	SPT	N=4 (0,0/1,1,1,1)	,		× × ×			1 —
							×××°×			=
							× × × ·×			=
							* * * * * * * * *			
							* * * * * * *			_
							× × × ×			
							*.			=
							*			
		2.00	SPT	N=4 (1,0/1,1,1,1)	)		××××	below 2.00m begl becomes less gra	avelly	2 —
							× × × ×	below 2.00m begi bedomes iese gre	avony.	
							××°×			
							$\begin{pmatrix} \ddots & \ddots $			_
							* * * * * * * * * * * * * * * * * * *			
							××××			
							××××			=
							× × × ×			=
		3.00	SPT	N=7 (1,2/2,1,2,2)	)		*	below 3.00m begl becomes medium	n dense.	3 —
							*.			
							×^×××			-
							*.^			
							× × × ·			=
							*.			-
							× × × ×			
		4.00	CDT	N-40 (4 0/0 0 0 4	, 100		* * × × ×			_ =
		4.00	SPT	N=12 (1,2/3,2,3,4	4.00			End of Borehole at 4.00m		4 —
										=
										=
										=
										=
										5 —
			1 '	l .	1	1	1			-

1. Groundwater encountered at 2.60m begl.







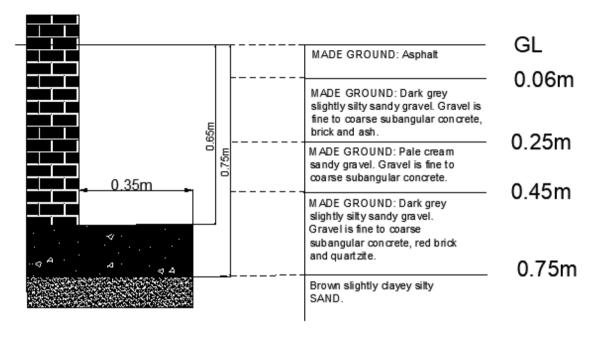


22											
P	AT	RI	C	K	P	A	R	S	0	N	S

40 St Pauls Square Jewellery Quarter Birmingham B3 1FQ T. +44 (0) 121 592 0000 E. info@patrickparsons.co.uk W. www.patrickparsons.co.uk

Inland Homes PLC	Project No.:	L20002	So
Project: Elmsleigh Road, Staines	Title:	Cross Section TP01	De

Scales: Not to scale	Issue: 0
Design/drawn: HA	Checked: JPB
Drawing no: L20002-706	Rev. 0







Concrete Foundations



Brick Foundations

(	P	A	T	R	I	C	K	P	A	R	S	0	N	S

40 St Pauls Square Jewellery Quarter Birmingham B3 1FQ T. +44 (0) 121 592 0000 E. info@patrickparsons.co.uk W. www.patrickparsons.co.uk

Client	Inland Homes PLC
Proje	ct: Elmsleigh Road, Staines

Project L20002

Title:

20002

Scales: Not to scale

Design/drawn: HA

Issue: 0
Checked: JPB

Cross Section TP02

Drawing no: L20002-706

Rev. 0



Appendix C
Gas Monitoring Results

# **Ground Gas and Groundwater Monitoring Record Sheet**

JOB DETAILS:

 Client:
 Inland Homes PLC
 Job No:
 L20002

 Site:
 Elmsleigh Road, Staines
 Visit No:
 1
 of
 4

Date: 27/04/2020 Operator: HA Project Manager: CRS

					GAS	CONC	ENTR	ATIONS					٧	OCs		(	SAS FLOWS	3	,	WELL A	ND GRO	UNDWAT	ER DATA	Comments
Monitoring Point	Methan	nane (%v/v) %LEL Carbon dioxide Carbon Hydrogen sulphide (ppm)  ak Steady Peak Steady Peak Steady Peak Steady Peak Steady Peak Steady								rogen le (ppm)	Oxygei	ı (%v/v)	PID Peak (ppm)	Product thickness (mm)	Flow ra	ate (I/hr)	Differential borehole	Time for flow		Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak S	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady	Pressure (Pa)	(secs)	(mbgl)	(111)	(IIIAOD)	(IIIAOD)		
BH01	0.2	0.2	4	4	2.1	2.1	1	1	0	0	14.7	14.7			0.1	0.1			2.54	8.92	-	-		
BH02	0.1	0.1	2	2	3.9	3.9	0	0	0	0	16.2	16.2			0.0	0.0			2.40	10.33	-	-		
WS02	0.1	0.1	2	2	1.2	1.2	0	0	0	0	18.4	18.4			0.0	0.0			2.15	2.50	•	-		
WS03	0.1	0.1	2	2	2.3	2.3	0	0	0	0	16.5	16.5			0.1	0.1			2.20	2.65				
WS04	0.1	0.1	2	2	3.1	3.1	0	0	0	0	15.8	15.8			0.1	0.1			2.00	2.30				
																							·	
Max	0.2	0.2	4	4	3.9	3.9	1	1	0	0	18.4	18.4			0.1	0.1			2.20	10.33				
Min	0.1	0.1	2	2	1.2	1.2	0	0	0	0	14.7	14.7			0.1	0.1			2.00	2.30				
GSV (I/hr)	0.0002	0.0002			0.0039	0.0039																		

METEOROLOGICAL AND SITE INFO	RMA1	ION:		(Select correct box	x with X	or enter data, as a	pplicable)		
State of ground:	Х	Dry		Moist		Wet		Snow	Frozen
Wind:		Calm	Х	Light		Moderate		Strong	
Cloud cover:		None	Х	Slight		Cloudy		Overcast	
Preciptation:	Х	None		Slight		Moderate		Heavy	
Barometric pressure (mbar):		_	1006	Before		-	1006	After	
Pressure trend:				Falling	Х	Steady		Rising	
Air Temperature (Deg. C):			10	Before		-	10	After	

# **Ground Gas and Groundwater Monitoring Record**

JOB DETAILS:

Inland Homes PLC L20002 Client: Job No: Site: Visit No: 2 **of** 4

Elmsleigh Road, Staines 18/08/2020 Operator: TW Project Manager: CRS Date:

					GAS	CON	CENTR	ATIONS	3				V	OCs		(	SAS FLOWS		1	WELL A	ND GRO	UNDWAT	ER DATA	Comments
Monitoring Point	Meth (%v		%LE	L	Carbon (%\			rbon ide (ppm)		rogen le (ppm)	Oxyge	n (%v/v)	PID Peak (ppm)	Product thickness (mm)	Flow ra	ate (I/hr)	Differential borehole	Time for flow to equalise	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak S	teady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady	Pressure (Pa)	(secs)	(IIIDGI)	(111)	(IIIAOD)	(IIIAOD)		
BH01	0.3	0.1			4.7	2.1	1	0	1	1	14.7	14.7	-	-	0.2	0.2	0.02	60	2.55	8.92	-	•		
BH02	0.5	0.5			7.3	5.6	0	0	2	1	9.3	15.2	-	-	0.1	0.1	0.03	60	2.40	10.33	-	1		
WS02	0.3	0.3			4.2	4.1	1	0	1	1	7.8	7.8	-	-	0.0	0.0	0	60	2.48	2.50	•	•		
WS03	0.1	0.1			4.9	4.9	1	0	2	2	8.9	8.9			0.0	0.0	0.02	60	2.22	2.65				
WS04	0.4	0.2			9.7	9.7	3	1	2	1	6.5	6.5			0.3	0.2	0.03	60	2.08	2.30				
Max	0.5	0.5	0	0	9.7	9.7	3	1	2	2	14.7	15.2			0.3	0.2			2.55	10.33				
Min	0.1	0.1	0	0	4.2	2.1	0	0	1	1	6.5	6.5			0.0	0.0			2.08	2.30				
GSV (I/hr)	0.0015	0.001			0.0291	0.0194											•						•	

METEOROLOGICAL AND SITE INFO	RMA	TION:		(Select correct box	x with X o	or enter data, as a	pplicable)		
State of ground:	Х	Dry		Moist		Wet		Snow	Frozen
Vind:		Calm	Х	Light		Moderate		Strong	_
Cloud cover:		None	Х	Slight		Cloudy		Overcast	
Preciptation:	Х	None		Slight		Moderate		Heavy	
Barometric pressure (mbar):			1110	Before			1110	After	
Pressure trend:				Falling	X	Steady		Rising	
Air Temperature (Deg. C):			21	Before		•	21	After	

# **Ground Gas and Groundwater Monitoring Record**

JOB DETAILS:

L20002 3 **of** 4 Client: Inland Homes PLC Job No: Elmsleigh Road, Staines 25/06/2020 Site: Visit No:

Operator: TW CRS Date: Project Manager:

					GAS	CONC	ENTR	ATIONS	;				٧	OCs		G	SAS FLOWS		,	WELL A	ND GRO	UNDWATI	ER DATA	Comments
Monitoring Point		thane %LEL Carbon dioxide Carbon Hydrogen sulphide (ppm)  k Steady Peak Steady Peak Steady Peak Steady Peak Steady Peak Steady						ogen le (ppm)	Oxyger	ı (%v/v)	PID Peak (ppm)	Product thickness (mm)	Flow ra	ite (I/hr)	Differential borehole	Time for flow to equalise	Water level (mbgl)	Depth of well (m)	Reduced level	Water level	Response Zone			
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady	Pressure (Pa)	(secs)	(IIIbgi)	(111)	(mAOD)	(mAOD)		
BH01	0.1	0.1			4.6	2.2	0	0	0	0	15.9	15.9	-		0.1	0.1			2.65	8.92	_	-		
BH02	0.4	0.4			7.4	5.8	0	0	0	0	5.5	14.3			0.0	0.0	0.9	75	2.43	10.33	-	-		
WS02	0.6	0.6			11.9	11.9	1	0	0	0	2.1	2.1			0.2	0.2	0.03	75	2.12	2.50	-	-		
WS03	0.6	0.5			6.2	4.4	0	0	0	0	8.3	8.3			0.1	0.1	0.04	75	2.25	2.65				
WS04	0.7	0.7			10.6	10.6	1	1	0	0	5.4	5.4			0.1	0.1	0.05	60	1.92	2.30				
																							·	
Max	0.7	0.7	0	0	11.9	11.9	1	1	0	0	15.9	15.9			0.2	0.2			2.65	10.33				
Min	0.1	0.1	0	0	4.6	2.2	0	0	0	0	2.1	2.1			0.0	0.0			1.92	2.30				
GSV (I/hr)	0.0014	0.001			0.0238	0.0238																		

METEOROLOGICAL AND SITE INFO	RMATION:		_(Select correct bo	x with X	or enter data, as a	pplicable)		
State of ground:	Dry		Moist	Х	Wet		Snow	Frozen
Wind:	Calm	Х	Light		Moderate		Strong	
Cloud cover:	None		Slight	Х	Cloudy		Overcast	
Preciptation:	None	Х	Slight		Moderate		Heavy	
Barometric pressure (mbar):		1000	Before		="	1000	After	
Pressure trend:			Falling	Х	Steady		Rising	
Air Temperature (Deg. C):		17	Before		-	17	After	

# **Ground Gas and Groundwater Monitoring Record**

JOB DETAILS:

Inland Homes PLC L20002 Client: Job No: Elmsleigh Road, Staines 16/09/2020 Site: Visit No: 4 **of** 4

Operator: TW Project Manager: CRS Date:

					GAS	CON	CENTR	ATIONS	3				V	OCs		(	SAS FLOWS		1	WELL A	ND GRO	UNDWAT	ER DATA	Comments
Monitoring Point	Meth (%)		%L	.EL	Carbon (%¹			rbon ide (ppm)		rogen le (ppm)	Oxyge	n (%v/v)	PID Peak (ppm)	Product thickness (mm)	Flow ra	ate (I/hr)	Differential borehole	Time for flow to equalise	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady	Pressure (Pa)	(secs)	(IIIDGI)	(111)	(IIIAOD)	(IIIAOD)		
BH01	0.5	0.5			4.5	2.1	0	0	0	0	15.1	15.3	-	-	-0.1		2.08		2.66	8.92	-	-		
BH02	0.4	0.4			9.3	4.5	0	0	1	0	5.4	15.6	-	-	0.1	0.1	0.07	60	2.51	10.33	-	-		
WS02	0.4	0.4			11.1	11.1	0	0	1	0	1.9	1.9	-		0.2	0.2	0.14	80	2.12	2.50		-		
WS03	0.5	0.5			6.1	6.1	0	0	1	1	10.7	10.7			0.1	0.1	0.02	75	2.38	2.65				
WS04	0.5	0.5			8.4	8.4	0	0	0	0	9.1	9.1			0.2	0.2	0.05	75	2.06	2.30				
						, and the second					, and the second	, and the second		·										
Max	0.5	0.5	0	0	11.1	11.1	0	0	1	1	15.1	15.6			0.2	0.2			2.66	10.33				
Min	0.4	0.4	0	0	4.5	2.1	0	0	0	0	1.9	1.9			-0.1	-0.1			2.06	2.30				
GSV (I/hr)	0.001	0.001			0.0222	0.0222																		

METEOROLOGICAL AND SITE INFO	ORMA	TION:		(Select correct box	with X c	or enter data, as a	pplicable)		
State of ground:	X	Dry		Moist		Wet		Snow	Frozen
Wind:		Calm	X	Light		Moderate		Strong	·
Cloud cover:		None		Slight	Х	Cloudy		Overcast	
Preciptation:	X	None		Slight		Moderate		Heavy	
Barometric pressure (mbar):		_	1022	Before			1024	After	
Pressure trend:				Falling		Steady	Х	Rising	
Air Temperature (Deg. C):			20	Before		•	20	After	



# Appendix D

Laboratory Test Results - Chemical





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# **Analytical Report Number: 20-95458**

Project / Site name: Elmsleigh Road, Staines Samples received on: 30/03/2020

Your job number: L20002 Samples instructed on: 01/04/2020

Your order number: Analysis completed by: 07/04/2020

**Report Issue Number:** 1 **Report issued on:** 07/04/2020

**Samples Analysed:** 1 leachate sample - 3 soil samples

Signed: Va. Crerwinska

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are : soils - 4 weeks from reporting

leachates - 2 weeks from reporting waters - 2 weeks from reporting asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.





Analytical Report Number: 20-95458 Project / Site name: Elmsleigh Road, Staines

Lah Sample Number				1488138	1488139	1488140	1
Lab Sample Number Sample Reference				BH01	BH02	BH02	
Sample Number				None Supplied	None Supplied	None Supplied	
Depth (m)				0.50	0.20	1.00	
Date Sampled				17/03/2020	17/03/2020	17/03/2020	
Time Taken				None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	17	12	9.0	
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.1	
							· yr
Asbestos in Soil Screen / Identification Name	Туре	N/A	ISO 17025	Chrysotile	-	-	
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.005	-	-	
Asbestos Quantification Total	%	0.001	ISO 17025	0.005	-	-	
General Inorganics							 
pH - Automated	pH Units	N/A	MCERTS	9.0	10.5	11.2	
Total Sulphate as SO <sub>4</sub>	%	0.005	MCERTS	0.067	1.27	1.34	
Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1) Water Soluble SO4 16hr extraction (2:1 Leachate	mg/kg	2.5	MCERTS	290	2000	260	
Equivalent)	g/l	0.00125	MCERTS	0.15	0.98	0.13	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	ma/l	1.25	MCEDIC	1/16	983	130	
Equivalent) Total Organic Carbon (TOC)	mg/l %	0.1	MCERTS MCERTS	146 1.0	983	0.4	<del>                                     </del>
Total Organic Carbon (TOC)	70	0.1	MCERTS	1.0	0.2	0.4	L
Total Phenois							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	
Total Friends (mononyane)	mg/kg		HIGERIE	11.0	11.0	11.0	
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.37	1.1	
Anthracene Fluoranthene	mg/kg	0.05	MCERTS	< 0.05 < 0.05	< 0.05 0.85	0.22 1.3	1
Pyrene	mg/kg mg/kg	0.05	MCERTS MCERTS	< 0.05	0.85	1.2	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.63	0.86	
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.67	0.80	1
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.91	0.92	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.58	0.55	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.78	0.81	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.44	0.44	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.59	0.66	
Total BAH							
Total PAH Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	6.60	8.85	
opedated Total EFA-10 FAIB	mg/kg	0.0	PICERIO	< 0.00	0.00	0.03	
Heavy Metals / Metalloids							 
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.4	14	9.9	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.7	< 0.2	
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	31	26	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	27	51	22	<u> </u>
Lead (aqua regia extractable)	mg/kg	1 0.2	MCERTS	71	47	70	<del>                                     </del>
Mercury (aqua regia extractable) Nickel (aqua regia extractable)	mg/kg mg/kg	0.3	MCERTS MCERTS	< 0.3 15	< 0.3 15	< 0.3 13	<del>                                     </del>
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	<del>                                     </del>
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	84	130	200	
	. 313						





**Analytical Report Number: 20-95458** Project / Site name: Elmsleigh Road, Staines

Lab Sample Number				1488138	1488139	1488140	
Sample Reference				BH01	BH02	BH02	
Sample Number				None Supplied	None Supplied	None Supplied	
Depth (m)		0.50	0.20	1.00			
Date Sampled				17/03/2020	17/03/2020	17/03/2020	
Time Taken				None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)							
Monoaromatics & Oxygenates		-	•				
Benzene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	
Toluene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	
Ethylbenzene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	
p & m-xylene	< 1.0	< 1.0	< 1.0				
o-xylene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	

Petroleum Hydrocarbons							
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	3.1	< 2.0	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	11	15	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	59	120	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	74	140	
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	3.7	2.1	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	26	26	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	130	150	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	160	180	





**Analytical Report Number: 20-95458** Project / Site name: Elmsleigh Road, Staines

						•	
Lab Sample Number				1488141			
Sample Reference				BH02			
Sample Number				None Supplied	<del>                                     </del>		
Depth (m)				1.00			
Date Sampled				17/03/2020			
Time Taken				None Supplied			
		_	Accreditation Status				
Analytical Parameter	_	Limit of detection	St				
(Leachate Analysis)	Units	nit ecti	at u				
(Leachade Analysis)	•	of G	s				
			š				
General Inorganics							
pH	pH Units	N/A	ISO 17025	11.9			
Speciated PAHs							
Naphthalene	μg/l	0.01	ISO 17025	< 0.01			
Acenaphthylene	μg/l	0.01	ISO 17025	< 0.01			
Acenaphthene	μg/l	0.01	ISO 17025	< 0.01			
Fluorene	μg/l	0.01	ISO 17025	< 0.01			
Phenanthrene	μg/l	0.01	ISO 17025	< 0.01			
Anthracene	μg/l	0.01	ISO 17025	< 0.01			
Fluoranthene	μg/l	0.01	ISO 17025	< 0.01			
Pyrene	μg/l	0.01	ISO 17025	< 0.01			
Benzo(a)anthracene	μg/l	0.01	ISO 17025	< 0.01			
Chrysene	μg/l	0.01	ISO 17025	< 0.01			
Benzo(b)fluoranthene	μg/l	0.01	ISO 17025	< 0.01			
Benzo(k)fluoranthene	μg/l	0.01	ISO 17025	< 0.01			
Benzo(a)pyrene	μg/l	0.01	ISO 17025	< 0.01			
Indeno(1,2,3-cd)pyrene	μg/l	0.01	NONE	< 0.01			
Dibenz(a,h)anthracene	μg/l	0.01	NONE	< 0.01			
Benzo(ghi)perylene	μg/l	0.01	NONE	< 0.01			
Total PAH							
Total EPA-16 PAHs	μg/l	0.2	NONE	< 0.2			
Heavy Metals / Metalloids							
Arsenic (dissolved)	μg/l	1.1	ISO 17025	< 1.1			
Cadmium (dissolved)	μg/l	0.08	ISO 17025	< 0.08			
Chromium (hexavalent)	μg/l	5	ISO 17025	30			
Chromium (dissolved)	μg/l	0.4	ISO 17025	35			
Copper (dissolved)	μg/l	0.7	ISO 17025	15			
Lead (dissolved)	μg/l	1	ISO 17025	1.3			
Mercury (dissolved)	μg/l	0.5	ISO 17025	< 0.5			
Nickel (dissolved)	μg/l	0.3	ISO 17025	3.5			
Selenium (dissolved)	μg/l	4	ISO 17025	< 4.0			
Zinc (dissolved)	μg/l	0.4	ISO 17025				





Analytical Report Number : 20-95458
Project / Site name: Elmsleigh Road, Staines

\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1488138	BH01	None Supplied	0.50	Brown clay and sand.
1488139	BH02	None Supplied	0.20	Light brown sand with rubble and gravel.
1488140	BH02	None Supplied	1.00	Light brown sand with rubble and gravel.





Analytical Report Number: 20-95458

Project / Site name: Elmsleigh Road, Staines

Your Order No:

# **Certificate of Analysis - Asbestos Quantification**

### Methods:

## **Qualitative Analysis**

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

### **Quantitative Analysis**

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1488138	BH01	0.50	144	Hard/Cement Type Material	Chrysotile	0.005	0.005

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.





Analytical Report Number : 20-95458
Project / Site name: Elmsleigh Road, Staines

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

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Analytical Report Number : 20-95458

Project / Site name: Elmsleigh Road, Staines

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPHCWG (Soil)	, ,,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
BH01		S	20-95458	1488138	С	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	С
BH02		S	20-95458	1488139	С	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	С
BH02		S	20-95458	1488140	С	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	С





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# **Analytical Report Number: 20-95381**

Project / Site name: Elmsleigh Road, Staines Samples received on: 30/03/2020

Your job number: L20002 Samples instructed on: 01/04/2020

Your order number: SH006 Analysis completed by: 15/04/2020

Report Issue Number: 1 Report issued on: 15/04/2020

Samples Analysed: 7 soil samples

Signed: Keroline Harel

Karolina Marek

PL Head of Reporting Team

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are : soils - 4 weeks from reporting

leachates - 2 weeks from reporting waters - 2 weeks from reporting asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.





Analytical Report Number: 20-95381 Project / Site name: Elmsleigh Road, Staines

Your Order No: SH006

Lab Sample Number				1487675	1487676	1487677	1487678	1487679
Sample Reference				BH01	BH01	BH02	BH02	BH03
Sample Number				None Supplied				
Depth (m)				3.00	6.00	3.50	11.50	6.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken		None Supplied	None Supplied	None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	61
Moisture Content	%	N/A	NONE	19	2.9	4.7	17	1.9
Total mass of sample received	kg	0.001	NONE	0.80	0.80	1.2	0.80	0.80
General Inorganics	-							
pH - Automated	pH Units	N/A	MCERTS	8.3	8.6	8.5	7.8	8.7
Total Sulphate as SO <sub>4</sub>	%	0.005	MCERTS	0.029	0.015	0.011	0.123	0.008
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.032	0.0095	0.013	0.58	0.0096
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	1.3	3.7	3.0	34	1.8
Total Sulphur	%	0.005	MCERTS	0.016	0.013	0.016	0.076	0.010
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Heavy Metals / Metalloids								
Magnesium (water soluble)	mg/kg	5	NONE	7.3	< 5.0	5.0	87	5.5
Magnesium (leachate equivalent)	mg/l	2.5	NONE	3.7	< 2.5	2.5	44	2.7

 $<sup>\</sup>ensuremath{^*}$  Despite repeating Total Sulphate and Water Soluble Sulphate analysis, the results remain contradictory.





Analytical Report Number: 20-95381 Project / Site name: Elmsleigh Road, Staines

Your Order No: SH006

Lab Sample Number				1487680	1487681			
Sample Reference				BH03	BH03			
Sample Number				None Supplied	None Supplied			
Depth (m)				18.50	29.50			
Date Sampled				Deviating	Deviating			
Time Taken	Time Taken							
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	19	14			
Total mass of sample received	kg	0.001	NONE	0.80	0.80			
General Inorganics	_				_	_	_	_
pH - Automated	pH Units	N/A	MCERTS	8.1	7.9			
Total Sulphate as SO₄	%	0.005	MCERTS	0.057*	0.084*			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.44*	0.49*			
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	14	22			
Total Sulphur	%	0.005	MCERTS	1.11	0.762			
Water Soluble Nitrate (2:1) as N (leachate equivalent)	NONE	< 2.0	< 2.0					
Heavy Metals / Metalloids								
	1							

NONE

# Magnesium (water soluble) mg/kg Magnesium (leachate equivalent) mg/l

 $<sup>\</sup>ensuremath{^*}$  Despite repeating Total Sulphate and Water Soluble Sulphate analysis, the results remain contradictory.





Analytical Report Number : 20-95381 Project / Site name: Elmsleigh Road, Staines

\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1487675	BH01	None Supplied	3.00	Brown clay and sand with gravel.
1487676	BH01	None Supplied	6.00	Brown clay and sand with gravel.
1487677	BH02	None Supplied	3.50	Brown clay and sand with gravel and stones.
1487678	BH02	None Supplied	11.50	Grey clay.
1487679	BH03	None Supplied	6.50	Brown sand with gravel and stones.
1487680	BH03	None Supplied	18.50	Grey clay.
1487681	BH03	None Supplied	29.50	Grey clay.





**Analytical Report Number: 20-95381** Project / Site name: Elmsleigh Road, Staines

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
BH01		S	20-95381	1487675	a			
BH01		S	20-95381	1487676	a			
BH02		S	20-95381	1487677	a			
BH02		S	20-95381	1487678	а			
BH03		S	20-95381	1487679	a			
BH03		S	20-95381	1487680	а			
BH03		S	20-95381	1487681	а			





**Hugh Alder** 

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# **Analytical Report Number: 20-94538**

Project / Site name: Elmsleigh Road, Staines Samples received on: 24/03/2020

Your job number: L20002 Samples instructed on: 25/03/2020

Your order number: Analysis completed by: 31/03/2020

**Report Issue Number:** 1 **Report issued on:** 31/03/2020

**Samples Analysed:** 5 leachate samples - 7 soil samples

Signed: R. CREWINSKA

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are : soils - 4 weeks from reporting

leachates - 2 weeks from reporting waters - 2 weeks from reporting asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.





Lab Sample Number				1483079 WS02	1483080 WS03	1483081 WS03A	1483082 WS04	1483083 WS05
Sample Reference Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.60	0.50	1.00	0.40
Date Sampled				11/03/2020	11/03/2020	11/03/2020	11/03/2020	11/03/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
		_	Ac					
Analytical Parameter	Units	Limit of detection	Accreditation Status					
(Soil Analysis)	क्ष	t of	tatio					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	11	8.2	11	10	15
Total mass of sample received	kg	0.001	NONE	0.90	1.1	1.1	1.2	1.0
					ù-			
Asbestos in Soil Screen / Identification Name	Туре	N/A	ISO 17025	-	Chrysotile & Amosite	Chrysotile & Amosite	-	-
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected	Detected	Detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	0.040	0.001	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	0.040	0.001	-	-
Conoral Increasing								
General Inorganics pH - Automated	pH Units	N/A	MCERTS	8.1	8.9	8.0	8.2	8.0
Total Sulphate as SO <sub>4</sub>	%	0.005	MCERTS	0.072	0.157	0.075	0.051	0.054
,								
Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)	mg/kg	2.5	MCERTS	180	600	83	220	56
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.091	0.30	0.042	0.11	0.028
Water Soluble SO4 16hr extraction (2:1 Leachate	9/1	0.00123	MCERTS	0.051	0.30	0.042	0.11	0.026
Equivalent)	mg/l	1.25	MCERTS	90.9	300	41.6	109	28.2
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.7	1.5	2.2	0.6	1.3
Total Bhanala								
Total Phenols Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenois (mononyunc)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.41	0.22	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.40	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.78	< 0.05	< 0.05	< 0.05
Phenanthrene Anthracene	mg/kg	0.05	MCERTS MCERTS	1.3 0.36	4.6 1.3	0.89 0.30	< 0.05 < 0.05	< 0.05 < 0.05
Fluoranthene	mg/kg mg/kg	0.05	MCERTS	2.5	6.4	3.0	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	2.1	5.5	2.7	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.7	3.7	2.2	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.6	2.9	1.8	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.5	2.8	2.2	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.82	2.3	1.5	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.3	3.0	2.1	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.62	1.4	1.1	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.22	0.43	0.34	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.69	1.8	1.3	< 0.05	< 0.05
Total PAH								
		0.0	MCERTS	14.5	37.8	19.7	< 0.80	< 0.80
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERIS					
•	mg/kg	0.8	MCERTS	14.5	37.0			
Heavy Metals / Metalloids		0.8						
Heavy Metals / Metalloids Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	11	16	7.7	9.0
Heavy Metals / Metalloids Arsenic (aqua regia extractable) Cadmium (aqua regia extractable)	mg/kg mg/kg	1 0.2	MCERTS MCERTS	13 < 0.2	11 0.3	16 0.4	< 0.2	< 0.2
Heavy Metals / Metalloids Arsenic (aqua regia extractable) Cadmium (aqua regia extractable) Chromium (hexavalent)	mg/kg mg/kg mg/kg	1 0.2 1.2	MCERTS MCERTS MCERTS	13 < 0.2 < 1.2	11 0.3 < 1.2	16 0.4 < 1.2	< 0.2 < 1.2	< 0.2 < 1.2
Heavy Metals / Metalloids Arsenic (aqua regia extractable) Cadmium (aqua regia extractable) Chromium (hexavalent) Chromium (aqua regia extractable)	mg/kg mg/kg mg/kg mg/kg	1 0.2 1.2	MCERTS MCERTS MCERTS MCERTS	13 < 0.2 < 1.2 250	11 0.3 < 1.2 26	16 0.4 < 1.2 21	< 0.2 < 1.2 15	< 0.2 < 1.2 20
Heavy Metals / Metalloids Arsenic (aqua regia extractable) Cadmium (aqua regia extractable) Chromium (hexavalent) Chromium (aqua regia extractable) Copper (aqua regia extractable)	mg/kg mg/kg mg/kg mg/kg mg/kg	1 0.2 1.2 1	MCERTS MCERTS MCERTS MCERTS MCERTS	13 < 0.2 < 1.2 250 85	11 0.3 < 1.2 26 39	16 0.4 < 1.2 21 44	< 0.2 < 1.2 15 11	< 0.2 < 1.2 20 28
Heavy Metals / Metalloids Arsenic (aqua regia extractable) Cadmium (aqua regia extractable) Chromium (hexavalent) Chromium (aqua regia extractable)	mg/kg mg/kg mg/kg mg/kg	1 0.2 1.2	MCERTS MCERTS MCERTS MCERTS	13 < 0.2 < 1.2 250	11 0.3 < 1.2 26	16 0.4 < 1.2 21	< 0.2 < 1.2 15	< 0.2 < 1.2 20
Heavy Metals / Metalloids Arsenic (aqua regia extractable) Cadmium (aqua regia extractable) Chromium (hexavalent) Chromium (aqua regia extractable) Copper (aqua regia extractable) Lead (aqua regia extractable)	mg/kg mg/kg mg/kg mg/kg mg/kg	1 0.2 1.2 1 1	MCERTS MCERTS MCERTS MCERTS MCERTS MCERTS	13 < 0.2 < 1.2 250 85 350	11 0.3 < 1.2 26 39 180	16 0.4 < 1.2 21 44 290	< 0.2 < 1.2 15 11 62	< 0.2 < 1.2 20 28 170
Heavy Metals / Metalloids Arsenic (aqua regia extractable) Cadmium (aqua regia extractable) Chromium (hexavalent) Chromium (aqua regia extractable) Copper (aqua regia extractable) Lead (aqua regia extractable) Mercury (aqua regia extractable)	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	1 0.2 1.2 1 1 1 0.3	MCERTS MCERTS MCERTS MCERTS MCERTS MCERTS MCERTS MCERTS	13 < 0.2 < 1.2 250 85 350 2.8	11 0.3 < 1.2 26 39 180 0.8	16 0.4 < 1.2 21 44 290 1.9	< 0.2 < 1.2 15 11 62 0.4	< 0.2 < 1.2 20 28 170 0.9





Lab Sample Number				1483079	1483080	1483081	1483082	1483083
Sample Reference				WS02	WS03	WS03A	WS04	WS05
Sample Number				None Supplied				
Depth (m)				0.60	0.60	0.50	1.00	0.40
Date Sampled				11/03/2020	11/03/2020	11/03/2020	11/03/2020	11/03/2020
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics & Oxygenates								
Benzene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	μg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	14	26	13	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	44	79	36	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	59	110	49	< 10	< 10





Lab Sample Number				1483084	1483085			
Sample Reference				BH03	BH03			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.50	1.00			
Date Sampled				17/03/2020	17/03/2020			
Time Taken				None Supplied	None Supplied			
		l _	Ac					
Analytical Parameter	⊆	Limit of detection	Accreditation Status					
(Soil Analysis)	Units	CE: E	creditat Status					
		3 3	i di					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	7.4	10			
Total mass of sample received	kg	0.001	NONE	1.3	1.5			
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	_	_			
,								
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
Asbestos Quantification (Stage 2) Asbestos Quantification Total	%	0.001 0.001	ISO 17025 ISO 17025	-	<u> </u>			
Aspestos Quantification Total	70	0.001	130 17023					
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.6	8.2			
Total Sulphate as SO <sub>4</sub>	%	0.005	MCERTS	0.026	0.049			
L								
Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1) Water Soluble SO4 16hr extraction (2:1 Leachate	mg/kg	2.5	MCERTS	120	58			
Equivalent)	g/l	0.00125	MCERTS	0.060	0.029			
Water Soluble SO4 16hr extraction (2:1 Leachate	9/-	0.00125	HOLKIO	0.000	0.025			
Equivalent)	mg/l	1.25	MCERTS	59.5	29.0			
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.4	0.3			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Total Friends (monorityane)	mg/kg		HICERTS	11.0	1.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Phenanthrene Anthracene	mg/kg mg/kg	0.05	MCERTS MCERTS	1.3 0.33	1.5 0.27			
Fluoranthene	mg/kg	0.05	MCERTS	3.0	3.2			
Pyrene	mg/kg	0.05	MCERTS	2.6	2.8			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.8	1.9			
Chrysene	mg/kg	0.05	MCERTS	1.7	1.4			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.8	1.7			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	0.77		ļ	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.6	1.5			
Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene	mg/kg mg/kg	0.05	MCERTS MCERTS	0.83 0.24	0.72 0.18			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.24	0.80			
	9/1/9	. 0.03		5.50	5.00	1		1
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	17.3	16.5			
Heavy Metals / Metalloids			могото	12	12			
Arsenic (aqua regia extractable) Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS MCERTS	12 < 0.2	13 < 0.2			
Cadmium (aqua regia extractable) Chromium (hexavalent)	mg/kg mg/kg	1.2	MCERTS	< 1.2	< 1.2			
Chromium (aqua regia extractable)	mg/kg	1.2	MCERTS	20	25			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23	11			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	30			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.2	< 0.3	<u> </u>		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	19			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	55	46			





Lab Sample Number				1483084	1483085		
Sample Reference				BH03	BH03		
Sample Number	Sample Number						
Depth (m)				0.50	1.00		
Date Sampled				17/03/2020	17/03/2020		
Time Taken				None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)							
Monoaromatics & Oxygenates							
Benzene	μg/kg	1	MCERTS	< 1.0	< 1.0		
Toluene	μg/kg	1	MCERTS	< 1.0	< 1.0		
Ethylbenzene	μg/kg	1	MCERTS	< 1.0	< 1.0		
p & m-xylene	μg/kg	1	MCERTS	< 1.0	< 1.0		
o-xylene	μg/kg	1	MCERTS	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	μg/kg	1	MCERTS	< 1.0	< 1.0		

#### **Petroleum Hydrocarbons**

r carolculii riyarocarbono							
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	2.7	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	17	16		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	31	28		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	51	44		





Lab Sample Number				1483086	1483087	1483088	1483089	1483090
Sample Reference				WS02	WS03	WS04	WS05	BH03
Sample Number				None Supplied				
Depth (m)				0.60	0.60	1.00	0.40	0.50
Date Sampled				11/03/2020	11/03/2020	11/03/2020	11/03/2020	17/03/2020
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					
General Inorganics								
pH	pH Units	N/A	ISO 17025	7.9	9.1	7.5	7.6	8.0
Speciated PAHs		0.01	Trac 470	. 0.01	1 .001	. 0.01		. 0.01
Naphthalene	μg/l 	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	μg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	μg/l 	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	μg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	μg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	μg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	μg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	μg/l 	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	μg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	μg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	μg/l	0.01	ISO 17025	< 0.01 < 0.01	< 0.01	< 0.01	< 0.01	< 0.01 < 0.01
Benzo(k)fluoranthene	μg/l	0.01	ISO 17025 ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	μg/l	0.01		< 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01
Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene	μg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	μg/l μg/l	0.01	NONE NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	р9/1	0.01	NONE	< 0.01	₹ 0.01	< 0.01	₹ 0.01	< 0.01
Total PAH		0.2	NONE	- 0.3	-03	~ n n	<b>403</b>	- 0.0
Total EPA-16 PAHs	μg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Heavy Metals / Metalloids								
Arsenic (dissolved)	μg/l	1.1	ISO 17025	5.1	27	4.2	6.9	2.8
Cadmium (dissolved)	μg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chromium (hexavalent)	μg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	μg/l	0.4	ISO 17025	13	2.4	1.2	0.8	0.9
Copper (dissolved)	μg/l	0.7	ISO 17025	31	19	7.8	9.0	5.8
Lead (dissolved)	μg/l	1	ISO 17025	24	14	6.9	9.6	5.3
Mercury (dissolved)	μg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	μg/l	0.3	ISO 17025	5.0	4.4	1.6	2.3	1.0
Selenium (dissolved)	μg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Zinc (dissolved)	μg/l	0.4	ISO 17025	21	16	6.5	11	4.3





Analytical Report Number: 20-94538

Project / Site name: Elmsleigh Road, Staines

Your Order No:

# **Certificate of Analysis - Asbestos Quantification**

#### Methods:

#### **Qualitative Analysis**

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

#### **Quantitative Analysis**

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1483080	WS03	0.60	165	Loose Fibres & Sheeting/Board Debris	Chrysotile & Amosite	0.040	0.040
1483081	WS03A	0.50	162	Loose Fibres & Sheeting/Board Debris	Chrysotile & Amosite	0.001	0.001

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.





\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1483079	WS02	None Supplied	0.60	Brown loam and clay with gravel and vegetation.
1483080	WS03	None Supplied	0.60	Brown loam and clay with gravel and vegetation.
1483081	WS03A	None Supplied	0.50	Brown loam and clay with gravel and vegetation.
1483082	WS04	None Supplied	1.00	Brown loam and clay with gravel and vegetation.
1483083	WS05	None Supplied	0.40	Brown loam and clay with gravel and vegetation.
1483084	BH03	None Supplied	0.50	Brown clay and sand with gravel and vegetation.
1483085	BH03	None Supplied	1.00	Brown clay and loam with gravel and vegetation.





Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditatio Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP- OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS





Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



# Appendix E

Laboratory Test Results – Geotechnical



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



#### **Liquid and Plastic Limits**

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

JSA Consulting Engineers Ltd T/A Patrick P Client:

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020

> Date Tested: 06/04/2020 Sampled By: Not Given

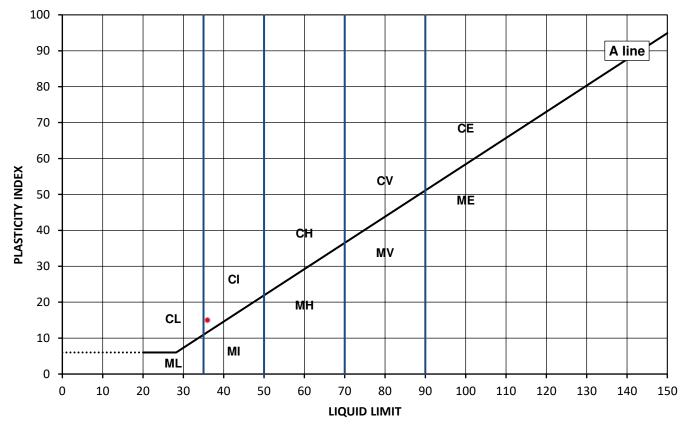
**Test Results:** 

Laboratory Reference: 1487666 Depth Top [m]: 2.00 BH01 Depth Base [m]: Not Given Hole No.: Sample Reference: Not Given Sample Type: D

Soil Description: Yellowish brown slightly gravelly sandy CLAY

Sample Preparation: Tested after washing to remove >425um

As Received Moisture	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425μm
Content [%]	[%]	[%]	[%]	BS Test Sieve
26	36	21	15	95



Legend, based on BS 5930:2015 Code of practice for site investigations

**Plasticity** Liquid Limit С Low below 35 Clay L Silt Medium 35 to 50 М Ī Н High 50 to 70 Very high 70 to 90 Ε Extremely high exceeding 90

Organic 0 append to classification for organic material ( eg CHO )

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

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This

report may not be reproduced other than in full without the prior written approval of the issuing

Remarks:

analysis.

Signed: Marika

Monika Janoszek

Buside

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

laboratory. The results included within the report are representative of the samples submitted for Page 1 of 1

**Date Reported:** 16/04/2020 GF 232.8



# **Liquid and Plastic Limits**

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



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

JSA Consulting Engineers Ltd T/A Patrick P Client:

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380

Date Sampled: Not Given

**Test Results:** 

Laboratory Reference: 1487667 BH01 Hole No.: Sample Reference: Not Given

Soil Description: Dark grey slightly sandy CLAY

Tested in natural condition Sample Preparation:

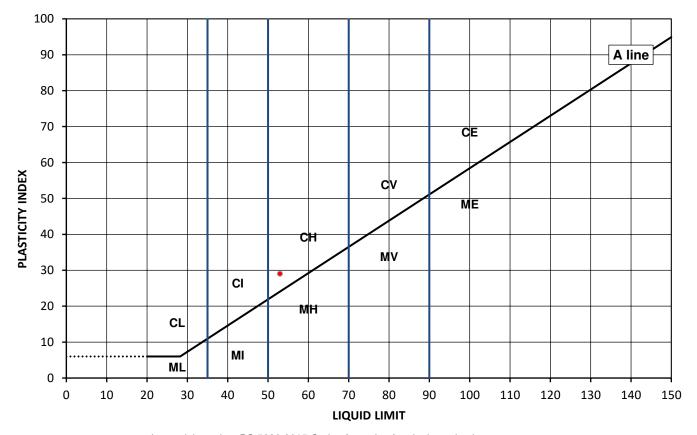
Date Received:	30/03/2020
Date Tested:	06/04/2020
Sampled By:	Not Given

Depth Top [m]: 8.50

Sample Type: D

Depth Base [m]: Not Given

As Received Moisture	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425µm
Content [%]	[%]	[%]	[%]	BS Test Sieve
24	53	24	29	100



Legend, based on BS 5930:2015 Code of practice for site investigations

**Plasticity** Liquid Limit С Low below 35 Clay L Silt Medium 35 to 50 М Τ Н High 50 to 70 Very high 70 to 90 Ε Extremely high exceeding 90

Organic 0 append to classification for organic material ( eg CHO )

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

Remarks:

Signed: Marika

Buside

Monika Janoszek

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



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



#### **Liquid and Plastic Limits**

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

Client: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 06/04/2020

Sampled By: Not Given

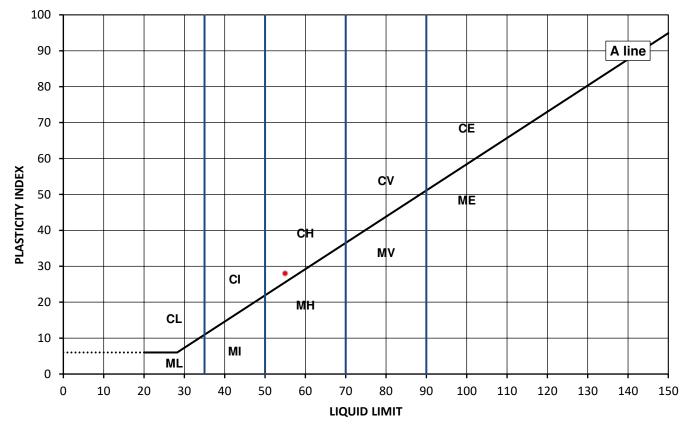
**Test Results:** 

Laboratory Reference: 1487668 Depth Top [m]: 33.70 BH01 Depth Base [m]: Not Given Hole No.: Sample Reference: Not Given Sample Type: D

Soil Description: Dark brown slightly sandy CLAY

Tested in natural condition Sample Preparation:

As Received Moisture	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425μm
Content [%]	[%]	[%]	[%]	BS Test Sieve
20	55	27	28	100



Legend, based on BS 5930:2015 Code of practice for site investigations

**Plasticity** Liquid Limit С Low below 35 Clay L Silt Medium 35 to 50 М Ī Н High 50 to 70 Very high 70 to 90 Ε Extremely high exceeding 90

Organic 0 append to classification for organic material ( eg CHO )

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

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report may not be reproduced other than in full without the prior written approval of the issuing

Remarks:

analysis.

Signed: Marika

Monika Janoszek PL Deputy Head of Geotechnical Section

for and on behalf of i2 Analytical Ltd

Buside laboratory. The results included within the report are representative of the samples submitted for

**Date Reported:** 16/04/2020

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GF 232.8



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



#### **Liquid and Plastic Limits**

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

Client: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020

> Date Tested: 06/04/2020 Sampled By: Not Given

Depth Top [m]: 14.50

Sample Type: D

Depth Base [m]: Not Given

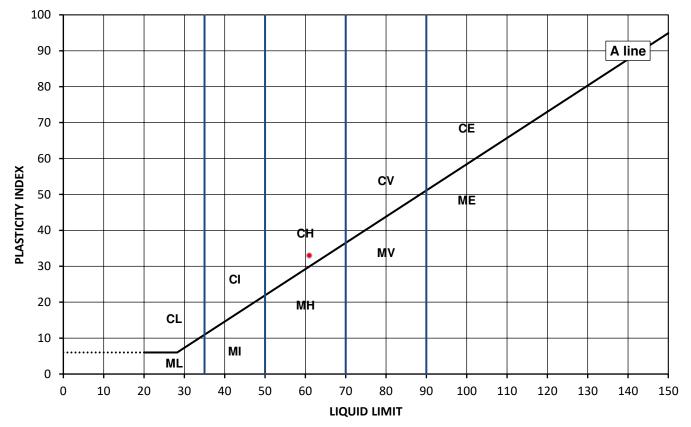
**Test Results:** 

Laboratory Reference: 1487670 **BH03** Hole No.: Sample Reference: Not Given

Soil Description: Dark brown CLAY

Sample Preparation: Tested in natural condition

As Received Moisture	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425μm
Content [%]	[%]	[%]	[%]	BS Test Sieve
22	61	28	33	100



Legend, based on BS 5930:2015 Code of practice for site investigations

**Plasticity** Liquid Limit С Low below 35 Clay L М Silt Medium 35 to 50 Ī Н High 50 to 70 Very high 70 to 90 Ε Extremely high exceeding 90

Organic 0 append to classification for organic material ( eg CHO )

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

Remarks:

Signed: Marika

Monika Janoszek

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

Page 1 of 1

Buside **Date Reported:** 16/04/2020



**Liquid and Plastic Limits** 

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



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

Client: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380

Date Sampled: Not Given Date Received: 30/03/2020

Date Tested: 06/04/2020 Sampled By: Not Given

Depth Top [m]: 22.50

Sample Type: D

Depth Base [m]: Not Given

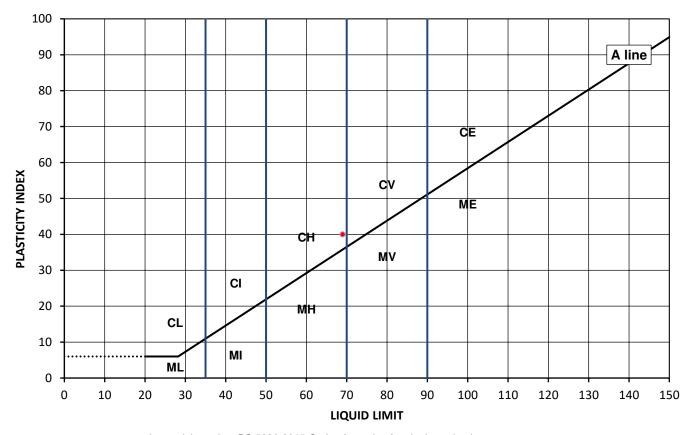
**Test Results:** 

Laboratory Reference: 1487671 BH02 Hole No.: Sample Reference: Not Given

Soil Description: Dark brown CLAY

Sample Preparation: Tested in natural condition

As Received Moisture	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425μm
Content [%]	[%]	[%]	[%]	BS Test Sieve
23	69	29	40	100



Legend, based on BS 5930:2015 Code of practice for site investigations

**Plasticity** Liquid Limit С Low below 35 Clay L Silt Medium 35 to 50 М Ī Н High 50 to 70 Very high 70 to 90 Ε Extremely high exceeding 90

Organic 0 append to classification for organic material ( eg CHO )

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

Remarks:

Signed: Marika

Monika Janoszek

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

Buside

Page 1 of 1

**Date Reported:** 16/04/2020

GF 232.8



Plastic Limit

[%]

24

Liquid and Plastic Limits

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



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

Client: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Liquid Limit

[%]

52

Client Reference: L20002 Job Number: 20-95380

Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 06/04/2020

Sampled By: Not Given

Depth Top [m]: 10.50

Sample Type: D

28

Depth Base [m]: Not Given

**Test Results:** 

Laboratory Reference: 1487672 Hole No.: BH03 Sample Reference: Not Given

As Received Moisture

Content [%]

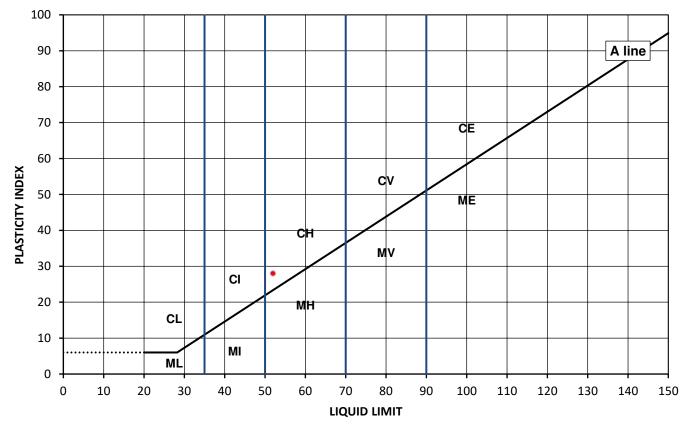
25

Soil Description: Dark brown slightly sandy CLAY

Sample Preparation: Tested in natural condition

Plasticity Index	% Passing 425μm
[%]	BS Test Sieve

100



Legend, based on BS 5930:2015 Code of practice for site investigations

**Plasticity** Liquid Limit С Low below 35 Clay L М Silt Medium 35 to 50 Н High 50 to 70 Very high 70 to 90 Ε Extremely high exceeding 90

Organic O append to classification for organic material ( eg CHO )

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

Remarks:

Signed:

Monika Janoszek PL Deputy Head of Geotechnical Section

for and on behalf of i2 Analytical Ltd

tted for Page 1 of 1



**Liquid and Plastic Limits** 

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



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

Client: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given

Date Received: 30/03/2020 Date Tested: 06/04/2020 Sampled By: Not Given

Depth Top [m]: 17.50

Sample Type: D

Depth Base [m]: Not Given

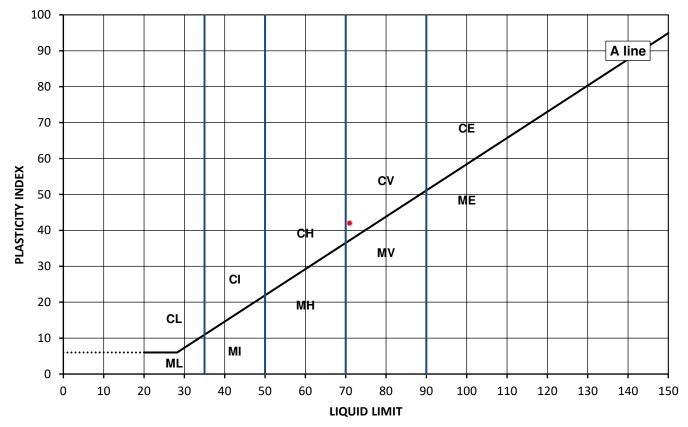
**Test Results:** 

Laboratory Reference: 1487673 **BH03** Hole No.: Sample Reference: Not Given

Soil Description: Dark grey CLAY

Sample Preparation: Tested in natural condition

As Received Moisture	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425μm
Content [%]	[%]	[%]	[%]	BS Test Sieve
24	71	29	42	100



Legend, based on BS 5930:2015 Code of practice for site investigations

**Plasticity** Liquid Limit С Low below 35 Clay L М Silt Medium 35 to 50 Ī Н High 50 to 70 Very high 70 to 90 Ε Extremely high exceeding 90

Organic 0 append to classification for organic material ( eg CHO )

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

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Remarks:

analysis.

Signed: Marika

Monika Janoszek PL Deputy Head of Geotechnical Section

**Date Reported:** 16/04/2020

for and on behalf of i2 Analytical Ltd



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



#### **Liquid and Plastic Limits**

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

Client: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380

Date Sampled: Not Given Date Received: 30/03/2020

Date Tested: 06/04/2020 Sampled By: Not Given

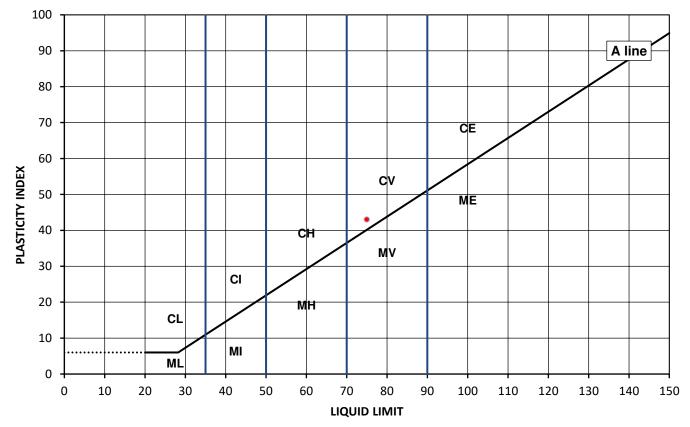
**Test Results:** 

Laboratory Reference: 1487674 Depth Top [m]: 28.50 **BH03** Depth Base [m]: Not Given Hole No.: Sample Reference: Not Given Sample Type: D

Soil Description: **Brown CLAY** 

Sample Preparation: Tested in natural condition

As Received Moisture	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425μm
Content [%]	[%]	[%]	[%]	BS Test Sieve
26	75	32	43	100



Legend, based on BS 5930:2015 Code of practice for site investigations

**Plasticity** Liquid Limit С Low below 35 Clay L М Silt Medium 35 to 50 Ī Н High 50 to 70 Very high 70 to 90 Ε Extremely high exceeding 90

Organic 0 append to classification for organic material ( eg CHO )

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

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report may not be reproduced other than in full without the prior written approval of the issuing

Remarks:

analysis.

Signed: Marika

Monika Janoszek PL Deputy Head of Geotechnical Section

for and on behalf of i2 Analytical Ltd

Buside laboratory. The results included within the report are representative of the samples submitted for

Page 1 of 1

**Date Reported:** 16/04/2020

GF 232.8





Client Address:

**Summary of Classification Test Results** 

Tested in Accordance with:

Client: JSA Consulting Engineers Ltd T/A Patrick P MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990:

Clause 8.2

40 St Pauls Square, B3 7FQ

Hugh Alder Contact:

Elmsleigh Road, Staines Site Address:

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

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



Client Reference: L20002

Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 06/04/2020

Sampled By: Not Given

#### **Test results**

			Sample	e							Atte	berg			Density		#	
Laboratory Reference	Hole No.	Reference	Depth Top	Depth Base	Туре	Description Remarks MC		мс wc		% Passing 425um	ιι	PL	PI	bulk	dry	PD	Total Porosity#	
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%	
1487666	BH01	Not Given	2.00	Not Given	D	Yellowish brown slightly gravelly sandy CLAY	Atterberg 1 Point	26		95	36	21	15					
1487667	BH01	Not Given	8.50	Not Given	D	Dark grey slightly sandy CLAY	Atterberg 1 Point	24		100	53	24	29					
1487668	BH01	Not Given	33.70	Not Given	D	Dark brown slightly sandy CLAY	Atterberg 1 Point	20		100	55	27	28					
1487671	BH02	Not Given	22.50	Not Given	D	Dark brown CLAY	Atterberg 1 Point	23		100	69	29	40					
1487672	BH03	Not Given	10.50	Not Given	D	Dark brown slightly sandy CLAY	Atterberg 1 Point	25		100	52	24	28					
1487670	BH03	Not Given	14.50	Not Given	D	Dark brown CLAY	Atterberg 1 Point	22		100	61	28	33					
1487673	BH03	Not Given	17.50	Not Given	D	Dark grey CLAY	Atterberg 1 Point	24		100	71	29	42					
1487674	BH03	Not Given	28.50	Not Given	D	Brown CLAY	Atterberg 1 Point	26		100	75	32	43					

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Harika

Monika Janoszek PL Deputy Head of Geotechnical Section

for and on behalf of i2 Analytical Ltd

**Date Reported:** 16/04/2020

Page 1 of 1

GF 234.10





#### **Determination of California Bearing Ratio**

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



Tested in Accordance with: BS 1377-4: 1990: Clause 7

JSA Consulting Engineers Ltd T/A Patrick P Client:

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Elmsleigh Road, Staines Site Address:

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

Client Reference: L20002 Job Number: 20-95380

Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 15/04/2020

Sampled By: Not Given

Not soaked

days

days

**Test Results:** 

Laboratory Reference: 1487650 BH02 Hole No.: Sample Reference: Not Given

Light brown gravelly SAND Sample Description:

Depth Top [m]: 0.20 Depth Base [m]: Not Given

Sample Type: B

#### **Specimen Preparation:**

Initial Specimen details

Condition Remoulded Details

Recompacted with specified standard effort using 2.5kg rammer

Period of soaking Time to surface Amount of swell recorded Dry density after soaking

Soaking details

mm Mg/m3

Material retained on 20mm sieve removed

Bulk density Dry density

Moisture content

1.87 Mg/m3 1.57

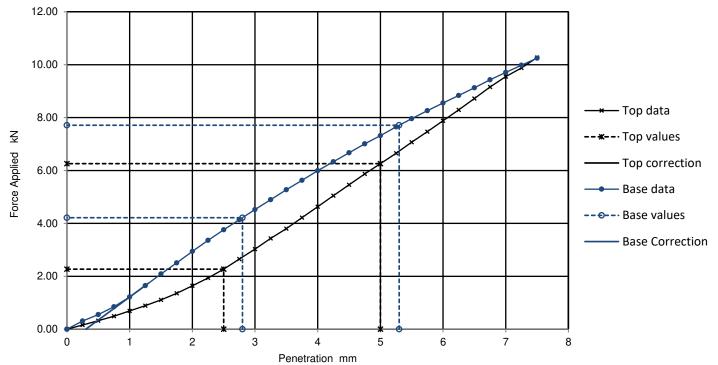
18

Mg/m3 19

%

Surcharge applied kg 4.9 kPa





Results

TOP **BASE** 

Curve		CBR Va	ılues, %	
correction applied	2.5mm	5mm	Highest	Average
No	17.0	31.0	31.0	
Yes	32.0	39.0	39.0	

Moisture Content % 20 20

Monika Janoszek

Remarks:

Test/ Specimen specific remarks:

Signed:

Houks Buside

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

**Date Reported: 16/04/2020** 

laboratory. The results included within the report are representative of the samples submitted for

analysis.

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This

report may not be reproduced other than in full without the prior written approval of the issuing

Page 1 of 1

GF 108.14





#### **Determination of California Bearing Ratio**

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



Tested in Accordance with: BS 1377-4: 1990: Clause 7

JSA Consulting Engineers Ltd T/A Patrick P Client:

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Elmsleigh Road, Staines Site Address:

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

Client Reference: L20002

Job Number: 20-95380 Date Sampled: Not Given

Date Received: 30/03/2020 Date Tested: 15/04/2020 Sampled By: Not Given

**Test Results:** 

Laboratory Reference: 1487651 BH03 Hole No.: Sample Reference: Not Given

Brown slightly clayey gravelly SAND Sample Description:

Depth Top [m]: 0.50 Depth Base [m]: Not Given

Sample Type: B

#### **Specimen Preparation:**

Condition Remoulded Details Recompacted with specified standard effort using 2.5kg rammer

Period of soaking days Time to surface days Amount of swell recorded mm Dry density after soaking Mg/m3

Material retained on 20mm sieve removed

20 %

2.21

13

Surcharge applied

Soaking details

kg 4.9 kPa

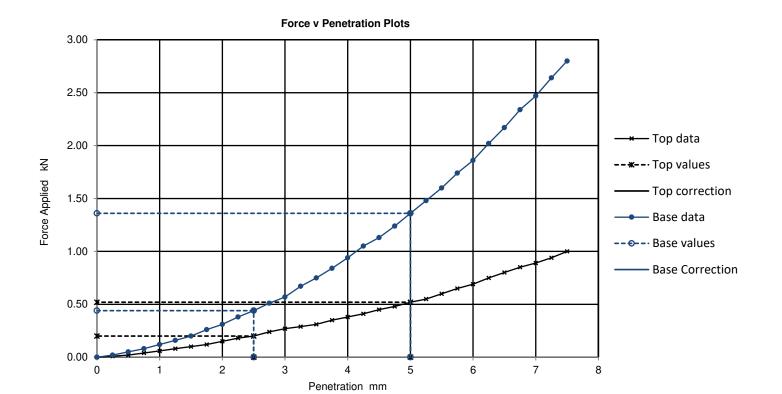
Not soaked

Initial Specimen details

Bulk density Dry density Moisture content

1.96 Mg/m3

Mg/m3



Results

TOP **BASE** 

Curve		CBR Va	ılues, %	
correction applied	2.5mm	5mm	Highest	Average
No	1.5	2.6	2.6	
No	3.3	6.8	6.8	

Moisture Content % 13 12

Remarks:

Test/ Specimen specific remarks:

Signed: Houks

Buside

**Date Reported: 16/04/2020** 

Monika Janoszek PL Deputy Head of Geotechnical Section for and on behalf of i2 Analytical Ltd

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analysis.

Page 1 of 1

GF 108.14

#### **SUMMARY REPORT**

#### Summary of Undrained Shear Strength Using Hand Vane Apparatus Test Results

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



Client: JSA Consulting Engineers Ltd T/A Patrick P

Tested in Accordance with: In-house Method G074 Guideline for Hand Held Shear Vane Test, New Zealand Geotechnical Society INC, August 2001

Client Reference: L20002 Job Number: 20-95380

Date Sampled: Not Given Date Received: 30/03/2020

Date Tested: 10/04/2020

Sampled By: Not Given

40 St Pauls Square, B3 7FQ

Hugh Alder

Elmsleigh Road, Staines Site Address:

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

#### **Test results**

Contact:

Client Address:

			Sample	)				Shear	Shear	Shear	Shear	Shear				
Laboratory Reference	Hole No.	Reference	Depth Top m	Depth Base m	Туре	Description	Remarks	Vane Reading 1 kPa	Vane Reading 2 kPa	Vane Reading 3 kPa	Vane Reading 4 kPa	Vane Reading Average kPa	Tv kPa			
1487653	BH01	Not Given	15.00	Not Given	U	Dark brown CLAY		130<	130<	130<	130<	130<				
1487655	BH01	Not Given	25.50	Not Given	U	Dark brown CLAY		UTP	UTP	UTP	UTP	UTP				
1487658	BH02	Not Given	9.50	Not Given	U	Brownish grey CLAY		86	78	122	110	99				
1487660	BH02	Not Given	19.50	Not Given	U	Brown CLAY		130<	130<	130<	130<	130<				
1487664	BH03	Not Given	25.50	Not Given	U	Dark brown CLAY		130<	130<	130<	130<	130<				

Note: UTP - Unable To Penetrate

Comments:

Signed:

Marika

Monika Janoszek PL Deputy Head of Geotechnical Section for and on behalf of i2 Analytical Ltd

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> **Date Reported: 16/04/2020** Page 1 of 1

GF 150.12



#### **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



JSA Consulting Engineers Ltd T/A Patrick P Client:

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 08/04/2020 Sampled By: Not Given

#### **Test Results:**

Laboratory Reference: 1487652 BH01 Hole No.: Sample Reference: Not Given

Sample Description: Brownish grey silty CLAY

Depth Top [m]: 10.50 Depth Base [m]: Not Given

Sample Type: U

Test Number Lenath Diameter **Bulk Density** Moisture Content Dry Density Membrane Correction

194.27 mm 102.33 mm 2.06 Mg/m3 26 1.64 Mg/m3 0.80 kPa

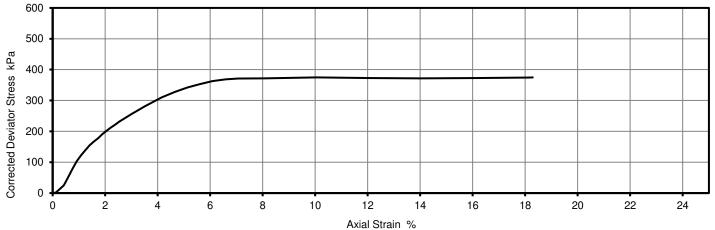
Rate of Strain Cell Pressure Axial Strain at failure Deviator Stress, ( $\sigma$ 1 -  $\sigma$ 3)f Undrained Shear Strength, cu

Mode of Failure Membrane thickness

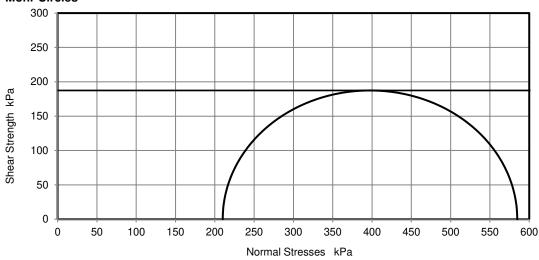
2.00	%/min
210	kPa
18.3	%
375	kPa
187	kPa ½(σ1-σ3)f

Compound 0.23

#### **Deviator Stress v Axial Strain**



#### **Mohr Circles**





Position within sample



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: Harika

Monika Janoszek PL Deputy Head of Geotechnical Section for and on behalf of i2 Analytical Ltd

Buside Page 1 of 1

**Date Reported:** 16/04/2020

GF 184.10



#### **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



JSA Consulting Engineers Ltd T/A Patrick P Client:

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 08/04/2020 Sampled By: Not Given

#### **Test Results:**

Laboratory Reference: 1487654 BH01 Hole No.: Sample Reference: Not Given

Brownish grey slightly silty CLAY Sample Description:

Depth Top [m]: 19.50 Depth Base [m]: 19.95 Sample Type: U

1	
191.29	mm
101.96	mm
2.03	Mg/m3
24	%
1.64	Mg/m3
0.34	kPa
	101.96 2.03 24 1.64

Rate of Strain Cell Pressure Axial Strain at failure Deviator Stress, ( $\sigma$ 1 -  $\sigma$ 3)f Undrained Shear Strength, cu

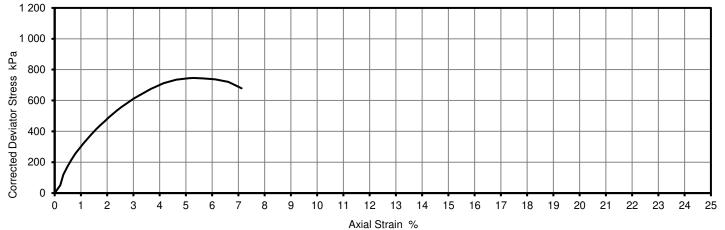
Mode of Failure Membrane thickness

2.00	%/min
390	kPa
5.3	%
746	kPa
373	kPa ½( σ1 - σ3 )f
Brittle	

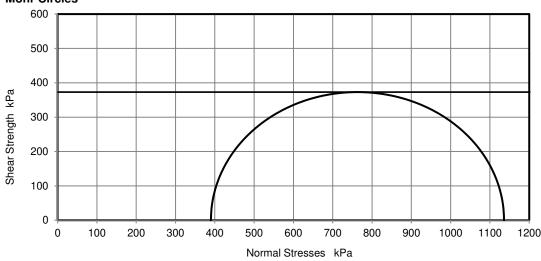
mm

0.24

#### **Deviator Stress v Axial Strain**



#### **Mohr Circles**





Position within sample



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: Marika

Monika Janoszek PL Deputy Head of Geotechnical Section for and on behalf of i2 Analytical Ltd

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Page 1 of 1

**Date Reported:** 16/04/2020

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#### **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: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002
Job Number: 20-95380
Date Sampled: Not Given
Date Received: 30/03/2020
Date Tested: 08/04/2020
Sampled By: Not Given

#### **Test Results:**

Laboratory Reference: 1487656 Hole No.: BH01 Sample Reference: Not Given

Sample Description: Brownish grey silty CLAY

Depth Top [m]: 29.50 Depth Base [m]: Not Given

Sample Type: U

Test Number	1	
Length	195.57	mm
Diameter	101.92	mm
Bulk Density	2.07	Mg/m3
Moisture Content	20	%
Dry Density	1.72	Mg/m3
Membrane Correction	0.75	kPa

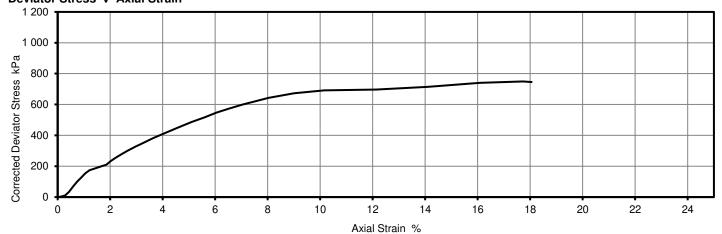
Rate of Strain
Cell Pressure
Axial Strain at failure
Deviator Stress, (σ1 - σ3)f
Undrained Shear Strength, cu

Mode of Failure Membrane thickness

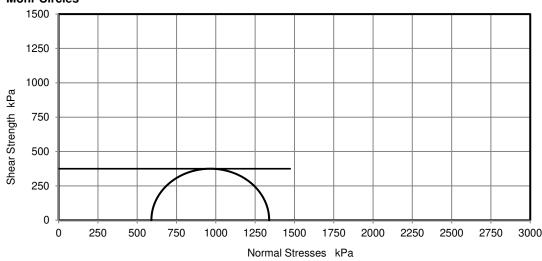
2.00	%/min
590	kPa
17.7	%
749	kPa
375	kPa ¹

375 kPa ½(σ1 - σ3)f Compound 0.22 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:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

ed for Page 1 of 1

Date Reported: 16/04/2020



#### 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: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

mm

mm

Mg/m3

Mg/m3

kPa

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002
Job Number: 20-95380
Date Sampled: Not Given
Date Received: 30/03/2020
Date Tested: 08/04/2020
Sampled By: Not Given

Depth Top [m]: 33.50

%

kPa

mm

½( σ1 - σ3 )f

#### **Test Results:**

Test Number

**Bulk Density** 

Dry Density

Moisture Content

Membrane Correction

Lenath

Diameter

Laboratory Reference: 1487657 Hole No.: BH01 Sample Reference: Not Given

Sample Description: Brownish grey silty CLAY

74.29

37.30

2.01

20

1.68

1.44

Depth Base [m]: Not Given Sample Type: U

2.00 %/min 670 kPa

12.1

805

0.21

Axial Strain at failure Deviator Stress, (σ1 - σ3)f Undrained Shear Strength, cu

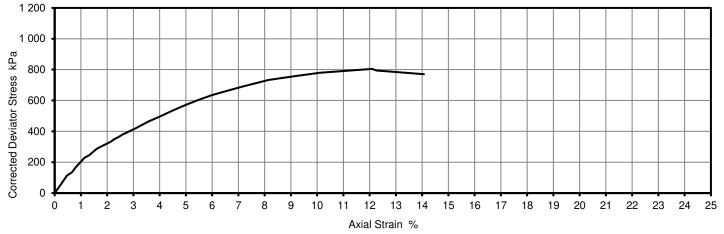
402 kPa Compound

Mode of Failure Membrane thickness

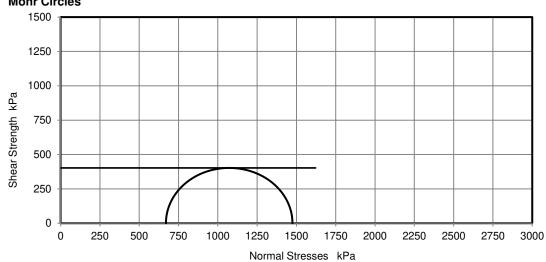
Rate of Strain

Cell Pressure

#### **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:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Durokille Page 1 of 1

Date Reported: 16/04/2020



#### 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: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002
Job Number: 20-95380
Date Sampled: Not Given
Date Received: 30/03/2020
Date Tested: 08/04/2020
Sampled By: Not Given

#### **Test Results:**

Laboratory Reference: 1487659 Hole No.: BH02 Sample Reference: Not Given

Sample Description: Brownish grey CLAY

Depth Base [m]: Not Given Sample Type: U

Test Number Length Diameter Bulk Density Moisture Content Dry Density

Membrane Correction

1 97.67 mm
102.30 mm
2.06 Mg/m3
23 %
1.67 Mg/m3
0.40 kPa

Rate of Strain
Cell Pressure
Axial Strain at failure
Deviator Stress, (σ1 - σ3)f
Undrained Shear Strength, cu

Mode of Failure Membrane thickness

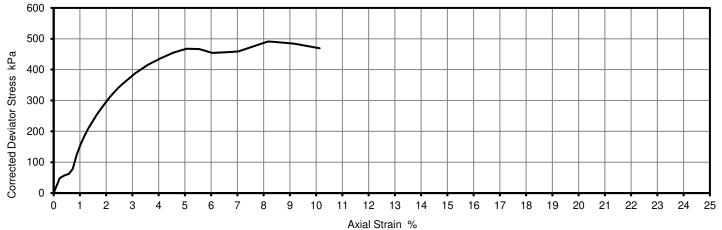
2.00	%/min
300	kPa
8.2	%
491	kPa
245	kPa 1/4/

0.21

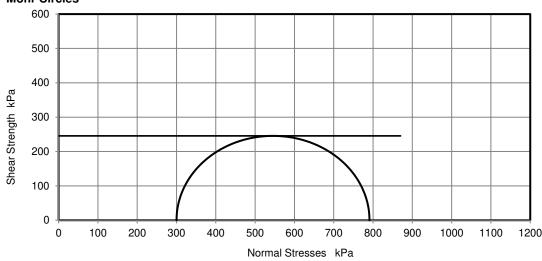
Depth Top [m]: 15.00

245 kPa ½(σ1 - σ3 )f Brittle

#### **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:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Buside

**Date Reported:** 16/04/2020 **GF 184.10** 



#### **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



JSA Consulting Engineers Ltd T/A Patrick P Client:

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 08/04/2020 Sampled By: Not Given

#### **Test Results:**

Laboratory Reference: 1487661 Depth Top [m]: 23.50 BH02 Depth Base [m]: Not Given Hole No.: Sample Reference: Not Given Sample Type: U

Sample Description: Brownish grey slightly silty CLAY

Test Number	1	
Length	199.90	mm
Diameter	103.00	mm
Bulk Density	2.01	Mg/m3
Moisture Content	25	%
Dry Density	1.61	Mg/m3
Membrane Correction	0.63	kPa

Rate of Strain Cell Pressure Axial Strain at failure Deviator Stress, ( $\sigma$ 1 -  $\sigma$ 3)f Undrained Shear Strength, cu

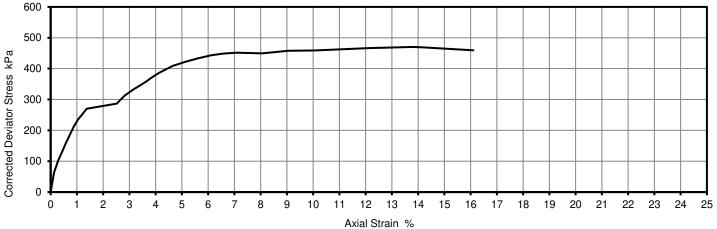
Mode of Failure Membrane thickness

	_
2.00	%/min
470	kPa
13.8	%
470	kPa
235	kPa ½( σ1 - σ3 )f
Brittle	Ī

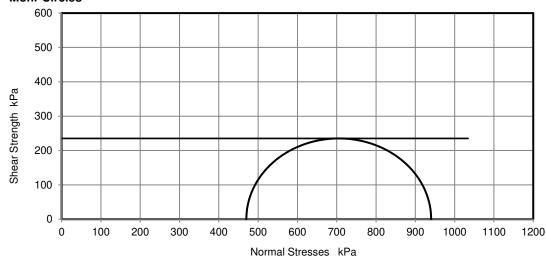
mm

0.23

#### **Deviator Stress v Axial Strain**



#### **Mohr Circles**





Position within sample



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: Hanks

Monika Janoszek PL Deputy Head of Geotechnical Section for and on behalf of i2 Analytical Ltd

Buside

Page 1 of 1 **Date Reported:** 16/04/2020



#### **Triaxial Compression**

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40 St Pauls Square, B3 7FQ

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 08/04/2020 Sampled By: Not Given

#### **Test Results:**

Test Number

**Bulk Density** 

Dry Density

Moisture Content

Lenath

Diameter

Laboratory Reference: 1487662 BH03 Hole No.: Sample Reference: Not Given

Sample Description: Brownish grey silty CLAY

> 74.88 mm 36.99 mm 2.02 Mg/m3 22 1.65 Mg/m3

2.18 Membrane Correction kPa Rate of Strain Cell Pressure Axial Strain at failure Deviator Stress, ( $\sigma$ 1 -  $\sigma$ 3)f Undrained Shear Strength, cu

Mode of Failure Membrane thickness 2.00 %/min 170 kPa 20.0 % 342 kPa

Depth Top [m]: 8.50

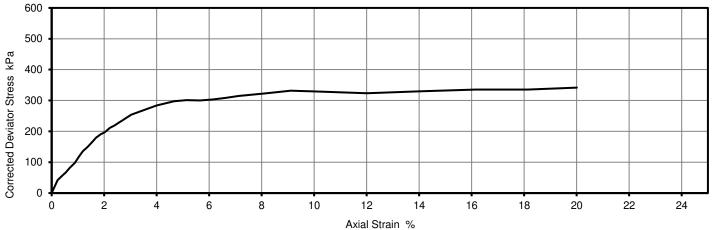
Sample Type: U

Depth Base [m]: Not Given

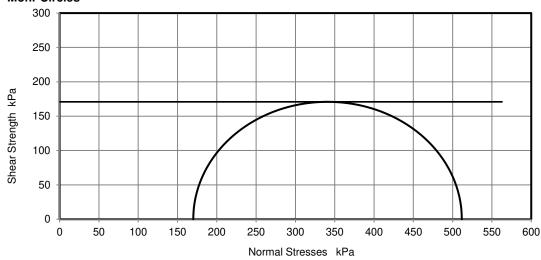
171 kPa ½( σ1 - σ3 )f Brittle

0.21 mm

#### **Deviator Stress v Axial Strain**

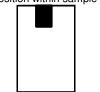


#### **Mohr Circles**





Position within sample



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: Hanks

Monika Janoszek PL Deputy Head of Geotechnical Section for and on behalf of i2 Analytical Ltd

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**Date Reported:** 16/04/2020



#### **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: JSA Consulting Engineers Ltd T/A Patrick P

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002
Job Number: 20-95380
Date Sampled: Not Given
Date Received: 30/03/2020
Date Tested: 08/04/2020
Sampled By: Not Given

#### **Test Results:**

Laboratory Reference:1487663Depth Top [m]: 18.00Hole No.:BH03Depth Base [m]: Not GivenSample Reference:Not GivenSample Type: U

Sample Description: Brownish grey slightly silty CLAY

Test Number	1	
Length	75.84	mm
Diameter	37.31	mm
Bulk Density	1.96	Mg/m3
Moisture Content	24	%
Dry Density	1.58	Mg/m3
Membrane Correction	0.45	kPa

Rate of Strain

Cell Pressure

Axial Strain at failure

Deviator Stress, (σ1 - σ3)f

Undrained Shear Strength, cu

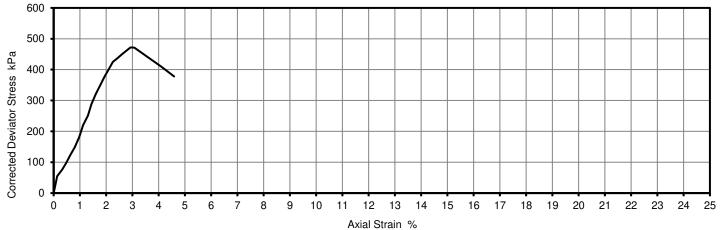
Mode of Failure Membrane thickness

2.00	%/min
360	kPa
2.9	%
472	kPa
236	kPa ½( σ1 - σ3 )f

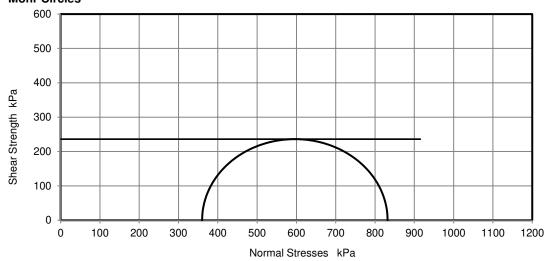
Brittle

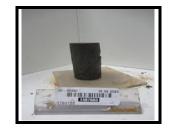
0.21 mm

**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:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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Page 1 of 1

Date Reported: 16/04/2020

GF 184.10



#### **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



JSA Consulting Engineers Ltd T/A Patrick P Client:

Client Address:

40 St Pauls Square, B3 7FQ

Contact: Hugh Alder

Site Address: Elmsleigh Road, Staines

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

Client Reference: L20002 Job Number: 20-95380 Date Sampled: Not Given Date Received: 30/03/2020 Date Tested: 08/04/2020 Sampled By: Not Given

#### **Test Results:**

Laboratory Reference: 1487665 **BH03** Hole No.: Sample Reference: Not Given

Sample Description: Brownish grey silty CLAY

Test Number 195.83 Lenath mm Diameter 102.75 mm **Bulk Density** 2.11 Mg/m3 Moisture Content 18 1.78 Dry Density Mg/m3 0.41 Membrane Correction kPa

Rate of Strain Cell Pressure Axial Strain at failure Deviator Stress, ( $\sigma$ 1 -  $\sigma$ 3)f Undrained Shear Strength, cu Mode of Failure Membrane thickness

2.00	%/min
630	kPa
7.5	%
1108	kPa
554	kPa ½( σ1 - σ3 )f
Compound	

mm

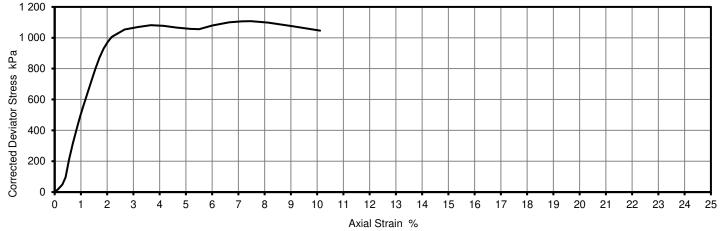
0.23

Depth Top [m]: 31.50

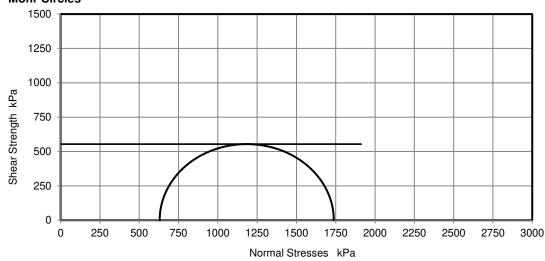
Sample Type: U

Depth Base [m]: Not Given

**Deviator Stress v Axial Strain** 



#### **Mohr Circles**





Position within sample



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:

analysis.

Signed: Hanks

Monika Janoszek PL Deputy Head of Geotechnical Section

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for and on behalf of i2 Analytical Ltd

**Date Reported:** 16/04/2020

GF 184.10



# Appendix F Patrick Parsons Generic Assessment Criteria (GAC)

Phase II Site Appraisal Rev1
Elmsleigh Road, Staines

L20002

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PATRICK PARSONS	5																		
* Non SOM dependent	Residential with Homegrown Produce					Allotments			Commercial			Public Open Space Near Residential Housing			Public Open Space Park  1 2.5 6			Source	
SOM % Antimony Arsenic	1	<b>2.5</b> 37	6	1	<b>2.5</b>	6	1 2.5 6			1 2.5 6			1	<b>2.5</b> 79	6	1	7		
Bardium Bardium Bardium Bardium Cadminum (III) Chromium (IVI) (Neavalent) Coronium (IVI) (Neavalent) Coronium (IVI) Chromium (IVI) (Neavalent) Coronium (IVI) Chromium (IVI) Chromium (IVI) Chromium (IVI) Lead Mohydderum Nokel		1.7 290 11 910 6 2400 1.2 40 11 200			1.7 11000 85 910 6 7100 1.2 56 15 310			35 45 1.9 18000 1.8 520 21 19 6 80			12 240000 190 8600 33 68000 58 1100 320 2300 980 12000			2.2 21000 120 1500 7.7 12000 16 120 40 630 230 1100			170 63 46000 5555 33000 220 44000 30 240 68 1300 800 1800		7 7 7,9 7 7 7 7 7 7 7 8
Vanadium Zinc Tributlytinoxide		410 3700			1200 40000		91 620				9000 730000		2000 81000			5000 170000			7 7
Accnaphthene Acnaphthene Acnaphthene Abnarcace Benzolal animacene Benzolal animacene Benzolal animacene Benzolal privere Benz	210 170 2400 7.2 2.6 320 77 15 0.24 280 170 27 2.3 95	510 420 5400 11 2.7 3.3 340 93 22 0.28 560 400 36 5.6 220 1200	1100 920 11000 13 3 3.7 350 100 27 0.3 890 860 41 13 440 2000	3000 2900 31000 11 3.2 3.9 360 110 30 0.31 1500 2800 45 2.3 1300 3700	4700 4600 35000 14 3.2 4.0 360 110 31 0.32 1600 3800 46 5.6 1500 3800	6000 6000 37000 15 3.2 4.0 360 110 32 0.32 1600 4500 46 13 1500 3800	34 28 380 2.9 0.97 0.99 290 37 4.1 0.14 52 27 9.5 4.1 15	85 69 950 6.5 2.0 2.1 470 75 9.4 0.27 130 67 21 10 38 270	200 160 2200 13 3.5 3.9 640 130 19 0.43 290 160 39 24 90 620	84000 83000 520000 170 35 44 3900 1200 350 3.5 23000 63000 500 190 22000 54000	97000 97000 540000 170 35 44 4000 1200 350 3.6 23000 68000 510 460 22000 54000 54000	100000 100000 540000 180 36 45 4000 1200 350 3.6 23000 71000 510 1100 23000 54000	15000 15000 74000 29 5.7 7.1 640 190 57 0.57 3100 9900 82 4900 3100 7400	15000 15000 74000 29 5.7 7.2 640 190 57 0.57 3100 9900 82 4900 3100 7400	15000 15000 74000 29 5.7 7.2 640 190 57 0.58 3100 9900 82 4900 3100 7400	29000 29000 1500000 49 11 13 1400 370 93 1.1 6300 20000 150 1200 6200	30000 30000 150000 56 12 15 1500 410 110 1.3 6300 20000 170 1900 6200	30000 30000 150000 62 13 16 1600 440 120 1.4 6400 20000 180 3000 6300	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Coal Tar (Bigl) as surrogate marker) Benzene Tolune Ethybenzene m Xylene o Xylene p Xylene p Xylene terbut bert but of other (MTBE) Methy tiert but of other to-Procylenatene to-Procylenatene # Procylenatene	0.79 0.087 130 47 59 60 56	0.98 0.17 290 110 140 140 130	1.1 0.37 660 260 320 330 310	1.2 0.38 880 83 82 88 79	1.2 0.7 1900 190 190 210 180	1.2 1.4 3900 440 450 480 430	0.32 0.017 22 16 31 28 29	0.67 0.034 51 39 74 67 69	1.2 0.075 120 91 170 160 160	15 27 56000 5700 6200 6600 5900	15 47 110000 13000 14000 15000 14000	15 90 180000 27000 31000 33000 30000	2.2 72 56000 24000 41000 41000	2.2 72 56000 24000 42000 42000 42000	2.2 73 56000 25000 43000 43000 43000	4.4 90 87000 17000 17000 17000 17000	4.7 100 95000 22000 24000 24000 23000	4.8 110 100000 27000 32000 33000 31000	7 7 7 7 7 7
85 Syree 36 Alphate C5-5-6 36 Alphate C5-5-6 36 Alphate C5-5-6 37 Alphate C5-5-6 38 Alphate C5-5-6 38 Alphate C5-5-6 38 Alphate C5-5-10-12 38 Alphate C5-10-12 38 Alphate C5-10-15 38 Alphate C5-10-12 38 Aromate C5-10-12 38 Alphate C5-10-12 38 Alph	42 100 27 130 1100 65000 70 130 34 74 140 260 1100 1100	78 230 65 330 2400 92000 140 290 83 180 330 540 1500 1500	160 530 150 760 4300 110000 300 660 190 380 660 930 1700 1700 1900	42 100 27 130 1100 65000 65000 370 860 47 250 1800 1900 1900	78 230 65 330 2400 92000 690 1800 110 590 2300 1900 1900	160 530 150 770 4400 110000 110000 1400 3900 270 1200 2500 1900 1900 1900	730 2300 320 2200 11000 260000 13 22 8.6 13 23 46 370 370 1200	1700 5600 770 4400 13000 270000 27 51 21 31 57 110 820 820 2100	3900 13000 1700 7300 13000 270000 270000 57 120 51 74 130 260 1600 1600 3000	3200 7800 2000 9700 59000 1600000 1600000 35000 35000 36000 36000 28000 28000 28000 28000 28000	5900 17000 4800 23000 82000 1700000 1700000 46000 110000 8100 28000 28000 28000 28000 28000 28000	12000 40000 11000 47000 90000 1800000 1800000 17000 34000 38000 28000 28000 28000 28000	570000 600000 13000 13000 13000 250000 56000 56000 56000 5000 5100 3800 3800 3800 3800	\$90000 610000 13000 13000 13000 250000 250000 56000 56000 5000 5100 3800 3800 3800	600000 620000 13000 13000 13000 250000 250000 56000 5000 5000 5000 3800 3800 3800 3800	95000 150000 140000 21000 250000 450000 76000 87000 7200 9200 10000 7600 7800 7800 7800	130000 220000 18000 23000 25000 480000 480000 85000 9700 10000 7700 7800 7800	180000 320000 21000 24000 26000 490000 92000 100000 9300 100000 10000 7900 7900 7900	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
2.3.4.6-Fetrachtorophenol 2.4.6-Firchtorophenol 2.4.6-Firchtorophenol 2.4.0-birchtyphenol 2.4.0-birchyphenol 2.4.0-birchyphenol 2.4.0-birchyphenol 2.4.0-birchyphenol 2.4.0-birchyphenol 3.4.0-birchyphenol																			
1.1.1-Trickhoresthane 1.1.2-Tetachoresthane 1.1.2-Tetachoresthane 1.1.2-Tetachoresthane 1.1.2-Tetachoresthane 1.1.2-Tetachoresthane 1.1.2-Dichhoresthane 1.2-Dichhoresthane 1.2-Dichhore																			
Trinitrotoluene TNT 2,4-Dinitrotoluene 6 2,5-Dinitrotoluene 6 HMX HMX HMX																			
Dieldrin Atrazine \$0 \$\text{Atrazine}\$ \$0 \$\text{Alpha-Findosulfan}\$ \$2 \$2 \$4 \$4 \$4 \$4 \$4 \$4 \$4 \$4 \$4 \$4 \$4 \$4 \$4																			
Chicrobenzene 1,3-dichiorobenzene 1,3-dichiorobenzene 1,4-dichiorobenzene 1,4-dichiorobenzene 1,4-dichiorobenzene 1,2-4-frichiorobenzene																			
Bis (2-ethylhexyl) phthalate growth benzyl phthalate glow- burly phthalate glow- burly phthalate glow- octyl p																			
Bromodichloromethane Bromodicm (Tribromomethane) Carbon disulphide Biphenyl Hexachloro-1,3-butadiene									$\dashv$										H

#### LOWER SATURATION LIMITS (shown in comments where applicable)

Where the S4UL exceeds the lower saturation limit and inhalation is an important contribution to exposure i.e. a red "traffic light" in the CLEA software) the modelled S4UL is reported but the lower saturation limit is also presented in brackets together with an indication of whether this was the solubility (sol) or vapour saturation (opp) limit. Risk sesseros should use their judgement in adopting such values on a case-by-case basis.

consulting engineers	Water Standards  1 unless otherwise stated 200 0.5 (mg/NH4/I) 100 11 5 250 (mg/I) 55 250 (mg/I) 150 150 150 150 150 150 150 150 150 150		200 0.5 (mg/l) 1000 10 10 5 250 (mg/l) 50 1500 10 0.5 (0.1 for treatment works) (mg/l) 250 (mg/l) 250 (mg/l) 100	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Mean Per	95- Annual	95- centile	inland Surface   Water   Annual   Average EGS   µg/I unle	Water Annual Average EOS ss ofherwise s	Inland Surface Water Max Allowable Cone EQS stated  See Cd Sheet	Other Surface Water Max Allowable Conc EQS	Groundwater [Source 22]
Aluminium Ammoniacal Nitrogen Beryllum Beryllum Beryllum Beryllum Beryllum Boron Borona Beromate Cadmium Chloride Cyanazine Fluoride Irelation Irel	200 0.5 (mgNH4// 100 11 100 12 250 (mg/l 56 2000 57 1500 11 200 (mg/L 250 (mg/l 100 (Bg/l 100 (Bg/l 100 (Bg/l		200 0.5 (mg/l) 1000 10 5 250 (mg/l) 50 1500 10 6 10 6 7 10 10 10 10 10 10 10 10 10 10 10 10 10	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 4.7 3.4 1 1	5 32 0.6 3.76 5 1	10	µg/I unik	ss otherwise's	See Cd Sheet		7 0.000 3 1 15
Ammoniaal Nitrogen Ammoniam Antimony Antenic Barium Bervillum Boron Boro	0.5 (mg/NH4/I) 1000 101 15 250 (mg/I) 15 50 1500 200 201 16 50 (mg/I) 22 50 (mg/I) 200 (	0 1 1 1 1 1	0.5 (mg/l) 5 100 11000 100 15 250 (mg/l) 50 20000 20000 20000 15000 200 200 50 15000 200 200 50 100 101 250 (mg/l) 250 (mg/l) 250 (mg/l) 250 (mg/l)	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 4.7 3.4 1 1	5 32 0.6 3.76 5 1	10					7 0.000 3 1 15
Antimony Arsenic Barium Beryllum Boron Boron Bromate Cadmium Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine Chromium (III) Chromium (III) Chromium (IVI) Chromium	50 mg/L 250	5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5 100 1000 1000 1000 1000 1000 1000 100	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	4.7 3.4 1 1	5 32 0.6 3.76 5 1	10 32					7 0.00 3. 1 1 3:
Barlum Baryim Chloride Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine Chromium (VI) Copper Cyanide Cyanazine Fluoride Voyanazine Baryim Ba	1000 11 5 250 (mg/l 55 250 (mg/l 55 15000 200 15 15 50 10 200 10 25 11 200 (mg/L 250 (mg/L	0 1 1 1 1 1 1	1000 10 5 5 250 (mg/l) 50 1500 2000 10 50 1500 200 10 50 10 200 200 200 10 200 200 10 200 200 30 10 200 30 10 200 30 30 30 30 30 30 30 30 30 30 30 30 3	3333 3333 33333 33333 33333 3	4.7 3.4 1 1	32 0.6 3.76 5 1	10 32					3 16 0.00
Boron Bromate Cadmium Chlorine	11		10 5 250 (mg/l) 50 20000 50 1500 200 10 55 1 20 50 (mg/l) 250 (mg/l) 250 (mg/l) 250 (mg/l)	333333333333333333333333333333333333333	4.7 3.4 1 1	32 0.6 3.76 5 1	10 32					0.00 3 1 3 15
Cadmium Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine Chromium (III) Chromium (III) Chromium (IVI) Chromium (VI) Chromiu	55 (mg/l 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55 (2000 55)	55 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5 5 250 (mg/l) 5 6 250 (mg/l) 5 6 2000 5 6 2000 5 6 1500 5 6 1500 5 6 1 2 2 5 0 (mg/l) 6 5 6 1 2 2 5 0 (mg/l) 2 5 0 (mg/l) 2 5 0 (mg/l) 2 5 0 (mg/l) 1 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0	33 33 33 33 33 33 33 33 33 33 33 33 33	4.7 3.4 1 1	32 0.6 3.76 5 1	10 32					3 1 3 16 0.0
Chlorine Chlorine Chlorine Chromium (III) Chromium (IVI) Chromium	55 2000 55 1500 200 11 15 20 (ma) NO3/I 0.5(mg) NO2/I 1200 (mg/L 250 (mg/L 250 (mg/L 0.5)		500 2000 50 1500 10 200 10 50 1 2 2 50 (mg/l) 250 (mg/l) 250 (mg/l)	333333333333333333333333333333333333333	4.7 3.4 1 1	32 0.6 3.76 5 1	32	1.2	1.3	14		3 11
Chromium (III) Chromium (III) Chromium (IVI) Copper Cyanide Cyanazine Fluoride Ivon Lead (and its compounds) Manganese Mercury (and its compounds) Machadenum Nickel Nitrites Selenium Sodium So	2000 50 1500 110 150 150 150 150 150 150	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2000 50 1500 200 10 50 50 (ma/li 0.5 (0.1 for treatment works) (mg/li 10 200 (mg/li 250 (mg/li 100	333333333333333333333333333333333333333	3.4 1 1	0.6 3.76 5 1		1.2	1.3	14		1:
Chromium (otal) Copper Cyanide Cyanazine Fluoride Ton Lead (and its compounds) Manganese Mercury (and its compounds) Manganese Mercury (and its compounds) Mohbdenum Nickel Nitrite Selenium Sodinum S	2000 50 1500 110 150 150 150 150 150 150	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2000 50 1500 200 10 50 50 (ma/li 0.5 (0.1 for treatment works) (mg/li 10 200 (mg/li 250 (mg/li 100	333333333333333333333333333333333333333	1 1	3.76 5 1		1.2	1.3	14		0.0
Cyanide Cyanazine Fluoride Iton Lead (and its compounds) Manganese Mercury (and its compounds) Mohydenum Nickel Nikrite Nikrite Selenium Sodium Sulphate Vanadium Tritium (for radioactivity) Zinc Trin Tritium (for radioactivity) Zinc Tributlyiin Compounds Polycyclic aromatic hydrocarbons Benzo(alphitrocarbons Benzo(alphitrocarbon	50 1500 200 10 15 50 50 (ma)NO3II 0.5(mg)NO2II 200 (mg/L 250 (mg/L 100 (Bg/I	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	50 1500 200 200 10 50 50 60 7 0.5 (0.1 for treatment works) (mg/l) 250 (mg/l) 250 (mg/l) 100	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1	5 1	5	1.2	1.3	14		0.0
Fluoride from Lead (and its compounds) Manganeses Mercury (and its compounds) Mobydenum Nickel Nikria Nikria Nikria Nikria Selenium Sodium Sulphate Vanadium Tritium (for radioactivity) Zinc Benzo(alphinacene Benzo(alphinacene Benzo(alphinacene Fluoranthene Indeno(123-cdlpyrene Alphinatic (For radioactivity) Zinc Tritium (for radioactivity) Zinc Tritium (for radioactivity) Zinc Tritium (for radioactivity) Zinc Zinc Zinc Zinc Zinc Zinc Zinc Zinc	2000 11 55 50 (maNO3/1 0.5(mgNO2/1 11 200 (mg/L 250 (mg/l 100 (Bg/l	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2000 10 50 50 50 (ma/l) 0.5 (0.1 for treatment works) (mg/l) 10 200 (mg/l) 250 (mg/l)	333333333333333333333333333333333333333		1		1.2	1.3	14		
Lead (and its compounds) Manganese Mercury (and its compounds) Mohydeanum Nickel Setenium Sodium Sod	10 (Bg/l	) 1 ) 1   1   1   1   1   1   1   1   1	100 550 1 1 200 (mg/l) 0.5 (0.1 for treatment works) (mg/l) 200 (mg/l) 250 (mg/l)	3 3 3 3 3 3 3 3 3 3		1		1.2	1.3	14		
Mercury (and its compounds) Mohytdenum Nickel Nikrite Nikrite Selenium Sodium Sulphate Vanadum Tritium (for radioactivity) Zinc Tributlylin Compounds Polycyclic aromatic hydrocarbons Benzo(alphitoranthene Indenof (123-cdlipyrene Benzo(alphyrene Chrysene Diberz(alphianthracene Fluoranthene Indenof (123-cdlipyrene Anghithalene Pyrene Fluoranthene Indenof (124-dripyrene Anghithalene Pyrene Elbubenzone Tribusene Elbybenzone Tribusene	10 (mg/L) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 200 50 (mo/l) 0.5 (0.1 for treatment works) (mg/l) 250 (mg/l) 250 (mg/l) 100	3 3 3 3 3 3	123						14	
Nickel Nikrate Nikrate Nikrate Sedenium Sodium Sulphate Vanadum Tiritium (for radioactivity) Zinc Tributylin Compounds Polysyciic aromatic hydrocarbons Benzo(alphitoranthene Indenof 123-cdlipyrene Nolysene Dibenz(alphitoranthene) Benzolen Indenof 123-cdlipyrene Naphithalene Pyrene Fluoranthene Indenof 123-cdlipyrene Anthracone Phenanthrene Acenaphthene Benzone Toluene Ethybenzone Toluene Ethybenzone Toluene Ethybenzone Toluene Bethybenzone Toluene Sylene O-Kylene O-Kylene O-Kylene O-Kylene O-Kylene Sylene Alphatate E C > 5-6 Alphatate E C > 5-7 Aromatic E C > 8-10 Aromatic E	50 (maNo2) 0.5(mgNo2) 1 200 (mg/L 250 (mg/l 100 (Bg/l	) 1 ) 1 ) 1 ) 1 ) 1 ) 1 ) 1	50 (mg/l) 0.5 (0.1 for treatment works) (mg/l) 10 200 (mg/l) 250 (mg/l)	3 3 3 3 3						0.07	0.07	
Nikrite Sodium Sodium Sodium Sodium Sodium Sodium Sulphate Vanadum Tri Tritium (for radioactivity) Zinc Zinc Zinc Zinc Zinc Zinc Zinc Zinc	0.5(mgNo2) 11 200 (mg/L 250 (mg/l 100 (Bg/l	) 1 ) 1 ) 1 ) 1 ) 1	0.5 (0.1 for treatment works) (mg/l) 10 200 (mg/l) 250 (mg/l)	3 3 3 3								
Sodium Sulphate Vanadum Tritium (for radioactivity) Zinc Demzo(alphuroramhene Demzo(alphuroramhene Demzo(alphuroramhene Demzo(alphuroramhene Demzo(alphuroramhene) Dibenz(alphaintracene Dibenz(alphaintracene) Dibenz(alphaintracene) Dibenz(alphaintracene) Prorene Dibenz(alphaintracene) Prenene Prenene Prenene Prenene Prenene Prenene Demzone Acenaphthene Acenaphthene Benzone Toluene Ethybenzone Toluene Ethybenzone Toluene Demylene Dem	200 (mg/L 250 (mg/L 100 (Bq/l 0.1	) 1	200 (mg/l) 250 (mg/l) 100	3 3 3								37
Vanadium Tritium (for radioactivity) Zize Tributylin Compounds Polycyclic aromatic hydrocarbons Benzolghinoramhene Indenol (123-cdipyrene Indenol (123-cdipyrene) Indenol (123-cdipyrene	100 (Bg/I	) 1	100	3								150
Tribum (for radioactivity) Zinc Zinc Zinc Zinc Zinc Zinc Zinc Zinc	0.1	1 1										188
Zinc Tinbutlytin Compounds Polysycite aromatic hydrocarbons Benzic(plimburgene Chrysene Chrysene Chrysene Chrysene Pluorambene Indenot (123-cdlipvene Naphthalene Pluorambene Harborne Raphthalene Premarthrene Acenaphthyene Acenaphthyene Acenaphthyene Benzine Toluene Benzine Toluene Toluene Toluene Harborne Harborne Polysine Displane Sylene Displane Sylene Polysine Polysine Sylene Sylene Sylene Alphatic EC >6-8-8 Alphatic EC >6-8-8 Alphatic EC >10-12 Alphatic EC >10-14 Alphatic EC >10-15 Alphatic EC >10-16 Aromatic EC >5-7 Aromatic EC >5-7 Aromatic EC >5-7 Aromatic EC >1-10-12 Aromatic	0.1	1 1			l							
Polycyclic aromatic hydrocarbons Benzo(a)lamthracene Benzo(a)lamthracene Benzo(a)lymoranthene Indeno(123-cdlymoranthene Indeno(123-cdlymoranthene Indeno(123-cdlymoranthene Persone Preme Benzone Toluene Benzone Toluene Toluene Toluene Toluene Toluene Preme Premoleum Hydrocarbons EC > 44-70 Premol Premoleum			0.1	3	10.9	6.8		0.0002	0.0002	0.0015	0.0015	
Benzolpflucramthene Benzolpflucramthene Benzolpflucramthene Benzolpflucramthene Benzolpflucramthene Benzolpflucramthene Benzolpflucramthene Benzolpflucramthene Benzolpflucramthene Dibenzipflucramthene Dibenzipflucramthene Dibenzipflucramthene Dibenzipflucramthene Denzene Denzene Denzene Denzene Tolleene Benzene Tolleene Benzene Tolleene Benzene Tolleene Tolleene Hightenebene Denzene Tolleene Polytenebene Denzene Tolleene Benzene Benzene Tolleene Benzene Benze	0.01	1 1						0.0002	0.0002	0.0013	0.0015	
Benzolofulberviene Indenol 123-cdloyrene Benzolofulyrene Benzolofulyrene Benzolofulyrene Chrysene Dibenzafahantracene Fluoranthene Indenol 123-cdloyrene Nchrysene Dibenzafahantracene Fluoranthene Indenol 123-cdloyrene Naphthalene Pyrene Prene Prene Prene Prene Benzone Anthracene Phenanthrene Acanaphthylene Acanaphthylene Acanaphthylene Acanaphthylene Acanaphthylene Acanaphthylene Acanaphthylene Acanaphthylene Acanaphthylene Professor Benzone Toluene Professor Benzone Toluene Professor Benzone Professor Benzone Professor Benzone Propylena Professor Benzone Propylena Professor Benzone Propylena Professor Benzone Professor Benzone Professor Benzone	0.01	1 1								0.017 0.017	0.017 0.017	0
Benzolalpyrene Chrysene Dibenzalphanthracene Fluoranthene Indenol (123-cdlpyrene Naphthalene Naphthalene Pyrene Persone Fluoranthene Phenanthrene Acanaphthylene Persone Benzone Toluene Toluene Toluene Toluene Toluene Toluene Toluene Tolyene Tol	0.01	1								8.20E-03	8.20E-04	
Dibenz/alpinthracene		1	0.01	3				1.70E-04	1.70E-04	0.27	0.027	0.0
indenof123-cdipyrene Naphthalene Pyrene Pyrene Phronene Phronene Anthracene Phenanthrene Acenaphthylene Acenaphthylene Acenaphthylene Acenaphthylene Acenaphthylene Acenaphthylene Tolluene Toll								0.0000	0.0000	0.40	0.40	
Pyrene Pitorene Anthracene Phenanthrene Acanaphthylene Acanaphthylene Acanaphthylene Acanaphthene Benzane Benzane Ethylbenzene								0.0063	0.0063	0.12	0.12	0
Anthracene Phenanthrene Acanaphthylene Acanaphthylene Acanaphthene Benzene Tolluene Benzene Tolluene Benzene Tolluene Benzene Tolluene Benzene Tolluene Tolluene Tolluene Benzene Tolluene Tollu								2	2	130	130	0.
Acanaphthylene Acanaphthene Benzare Benzare Totulene Eithytkenzene m*Xyleine Sövjene Sövjene 1,2.4.1 Timethylbenzene 1,2.4.1 Timethylbenzene so-Propylbenzene Sovpropylbenzene Propylbenzene Systene Alphatic EC >5-6 Alphatic EC >5-6 Alphatic EC >6-8-8 Alphatic EC >6-8-9 Alphatic EC >10-12 Alphatic EC >10-12 Alphatic EC >10-12 Alphatic EC >10-15 Alphatic EC >10-16 Alphatic EC >10-16 Alphatic EC >10-16 Alphatic EC >10-17 Aromatic EC >2-8-10 Aromatic EC >10-12 Aromatic EC >10-12 Aromatic EC >10-12 Aromatic EC >10-12 Aromatic EC >10-13 Aromatic EC >10-14 Aromatic EC >10-15 Aromatic EC >10-16 Aromatic EC >10-16 Aromatic EC >10-17 Aromatic EC >10-18 Aromatic EC >10-19 Aroma								0.3	0.3	0.7	0.7	
Benzene Totluene Ethytbenzene												
Ethybenzene mXylene O-Xylene O-Xylene O-Xylene O-Xylene O-Xylene O-Xylene O-Xylene O-Xylene D-Xylene Methyl tert-butyl ether 12.4-Trimethylbenzene iso-Propylbenzene Sio-Propylbenzene Syrene Syrene Alphatic EC >5-6 Alphatic EC >5-6 Alphatic EC >8-8 Alphatic EC >8-8 Alphatic EC >8-10 Alphatic EC >10-12 Alphatic EC >10-12 Alphatic EC >10-15 Aromatic EC >10-12 Aromatic EC >10-12 Aromatic EC >10-12 Aromatic EC >10-15 Aromatic EC >10	1	1 1	1	3				10	8	50	50	
Phenol Bibhenwi Phenol Bibhenwi Phenol Pheno												
2-Chicrophenol 2-4,6-Trichirorphenol 2-3,6-Trichirorphenol 2-3,6-Trichirorphenol 2-3,6-Trichirorphenol Pentiachiror-phenol 4-Chioro-3-Methyl-Phenol 4-Chioro-3-Methyl-Phenol 3-Methylphenol (G-cresol) 3-Methylphenol (m-cresol) 4-Methylphenol (h-cresol) 2-4-Dimethylphenol (h-cresol) 2-4-Dimethylphenol (d-(1,1'3,3'-stetramethylbutyl)-phenol)) Octylphenol (d-(1,1'3,3'-stetramethylbutyl)-phenol))					7.7	46 7.7	46					
2.4.5-Tichlorophenol 2.3.4.6-Tetrachlorophenol Pentachloro-phenol 4-Chioro-3-Methyl-Phenol 2-Methyl-Phenol (-cresol) 3-Methyl-Phenol (m-cresol) 4-Methyl-Phenol (m-cresol) 2.4-Dimethyl-Phenol (-cresol) Cytyl-Phenol (4-(1,17,3,3'-tetramethylbutyl)-phenol)) Nortyphenol (4-(1,17,3,3'-tetramethylbutyl)-phenol))					4.2	140 0.42	6					
Pentachioro-phenol 4-Chioro-3-Methyl-Phenol 2-Methylphenol (o-cresol) 3-Methylphenol (m-cresol) 4-Methylphenol (m-cresol) 4-Methylphenol (p-cresol) 2-4-Dimethylphenol Octylphenol ((4-(1,13,3'-stetramethylbutyl)-phenol)) Norwjphenol (4-Norwjphenol)												
2-Methylphenol (o-cresol) 3-Methylphenol (m-cresol) 4-Methylphenol (p-cresol) 2-4-Dimethylphenol Octylphenol ((4-(1,1-3,3-\tetramethylphenol)) Nonylphenol (4-Nonylphenol)								0.4	0.4	1	1	
4-Methylphenol (p-cresol) 2,4-Dimethylphenol Octylphenol ((4-(1,1',3,3'-tetramethylbutyl)-phenol)) Nonylphenol (4-Nonylphenol)												
Octylphenol ((4-(1,1',3,3'-tetramethylbutyl)-phenol)) Nonylphenol (4-Nonylphenol)												
Tribalomethanes (TOTAL)								0.1 0.3	0.01 0.3	2	2	
Inhalomethanes (TOTAL) Chloromethane	100	1	100	3								
Dichloromethane Trichloromethane (Chloroform)								20 2.5	20 2.5			
Chloroethane 1,1-Dichloroethane			3	3				10	10			
1,2-Dichloroethane 1,2-Dichloropropane			Š	3				10	10			
1,1,1-trichloroethane												
1,1-Dichloroethene Cis 1,2 Dichloroethene Tenne 1,2 Dichloroethene												
Trans 1,2 Dichloroethene Trichloroethene (ethylene)	10		10					10	10			
Tetrachloroethene (ethylene) 1,3-Dichloropropene	10		10					10	10			
Tetrachloromethane Hexachloroethane		1	3	3								
Hexachloro-cyclohexane Trichloroethene	3							0.02	0.002	0.04	0.02	
Trichloromethane (Chloroform) Epichlorohydrin	\$	1 1	0.1	3								
Vinyl Chloride Hexachloro-butadiene	0.1	5 1	0.5	3						0.6	0.6	
C10-C13 Chloroalkanes		1						0.4	0.4	0.6 1.4	1.4	
Dichloroacetonitrile Monochloroacetate	0.1											
Dichloroacetate Trichloroacetate	0.1											
Formaldehyde Trinitrotoluene TNT	0.1								-	-		
2,4-Dinitrotoluene 2,6-Dinitrotoluene Chloronitrotoluenes RDX	0.1						l					

	HMX	1		ı	1 1	1			1				1	ii ii
_	Pesticides (TOTAL) TOTAL Aldrin, Dieldrin, Endrin	0.5	1	0.5	3					0.01	0.005			
	Other Pesticides	0.1	1	0.1	3							0.7	0.7	
	Alachlor Aldrin	0.03	1	0.03	3					0.3	0.3	0.7	0.7	0.0225
	Atrazine									0.6	0.6	2	2	0.075
	Hydroxyatrazine Dieldrin	0.03	1	0.03	3									0.025
	Endrin Atrazine													
	Bentazone Bentazone													0.075
	Chlorfenvinphos Chlorpyrifos									0.1	0.1	0.3	0.3	
	Chlorotoluron									0.03	0.03	0.1	0.1	
	Cypermethrin DDT					0.0001	0.0004	0.0001	0.0004	8E-05 0.025	8E-06 0.025	6E-04	6E-05	
	para-para-DDT									0.01	0.01			
	Diazinon Dichlorprop					0.01 0.01	0.02	0.01	0.26					
	Dichlorvos									6E-04	6E-05	7E-04	7E-05	
	Directhoate Diruon (DCMU)					0.48	4	0.48	4					
des	Epichlorohydrin													
stick	Fenitrothion Fenoprop													
Pest	Heptachlor	0.03	1	0.03	3					2E-07	1E-08	3E-04	3E-05	
	Heptachlor epoxide Isoproturon	0.03	1	0.03	3					2E-07	1E-08	3E-04	3E-05	0.075
	Lindane					0.5	0.0	0.5	0.0					
	Linuron Malathion					0.5	0.9	0.5	0.9					
	MCPA													0.075
	Mecoprop Metolachlor					18	187	18	187					0.075
	Methoxychlor													
	Molinate Pendimethalin					0.3	0.58							
	Permethrin					0.001	0.01	0.0002	0.001					0.075
	Simazine Trifluralin									1 0.03	1 0.03	4	4	0.075
	2,4-Dichlorophenoxyacetic acid (2,4-D)					0.3	1.3	0.3	1.3					
	2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T) 2,4-DB													
	Alpha-Endosulfan													
	Beta-Endosulfan Alpha- Hexachlorocyclohexanes (including lindane)													
	Beta-Hexachlorohexanes (including lindane)													
_	Gamma-Hexachlorohexanes (including lindane) Chlorobenzene													
	1,2-dichlorobenzene													
S	1,3-dichlorobenzene 1,4-dichlorobenzene													
mati	1,2,3-Trichlorobenzene													
Aro	1,2,4-Trichlorobenzene 1,3,5-Trichlorobenzene													
ated	1,2,3,4-Tetrachlorobenzene													
盲	1,2,3,5-Tetrachlorobenzene 1,2,4,5-Tetrachlorobenzene													
ភ	Trichlorobenzenes									0.4 0.007	0.4 0.0007			
	Pentachloro-benzene Hexachloro-benzene									0.007	0.0007	0.05	0.05	
_	2-Chloronaphthalene									1.3	1.3			
ates	Di(2-ethylhexyl) phthalate Butyl benzyl phthalate					7.5	51	0.75	10	1.3	1.3			
thal	Di-n-butyl phthalate													
Ph	Di-n-octyl phthalate Diethyl Phthalate													
un o	Bibromoacetonitrile Dibromochloromethane											-		
Ę,	1,2-Dibromo-3-chloropropane													
o Pe	1,2-Dibromomethane Brominated diphenylether											0.14	0.014	
ninat	Bromobenzene											0.17	0.014	
300	Bromodichloromethane Bromoform (Tribromomethane)													
	Acrylamide	0.1	1	0.1	3									
	1,4-Dioxane Biphenyl													
	Carbon disulphide													
	EDTA Microcystin-LR													
Othe	Monochloroamine													
J	N-Nitrosodimethylamine Nitrilotriacetic acid													
	Cyanuric Acid													
	Sodium dichloroisocyanurate Terbuthylzine													
_	Colour	20 (mg/l Pt/Co)	1	20 (mg/l Pb/Co)	3									
	Conductivity pH	2500 (μS/cm at 20º) 6.5-9.5	1	2500 (μS/cm at 20°) 6.5-9.5	3									1880 (μS/cm at 20º)
her	pH Total Biochemical Oxygen Demand (BOD) Total Chemical Oxygen Demand (COD)	0.5-0.5		3.5-3.5										
ŏ	Total Chemical Oxygen Demand (COD) Suspended Solids													
	Total Dissolved Solids													
_	Turbidity	1 NTU	1	1 NTU	3									



# **UK locations:**

London Huddersfield

# **Birmingham**

Guildford

# International locations:

Dubai



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