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GEO-ENVIRONMENTAL & GEOTECHNICAL ASSESSMENT (GROUND INVESTIGATION) REPORT

FORMER SITE OF HPH4, HYDE PARK,
1 MILLINGTON ROAD,
HAYES,
LONDON,
UB3 4AZ

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Report Title: **Geo-environmental & Geotechnical Assessment Ground Investigation Report for HPH4, Hyde Park, 1 Millington Road, Hayes, London, UB3 4AZ**

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CONTENTS

Page

EXECUTIVE SUMMARY

Site Details	**Site Address**	HPH4, Hyde Park, 1 Millington Road, Hayes, London, UB3 4AZ
	National Grid	E:509088, N:179269
	Site Area	0.37Ha (approx.)
	Proposed Development	The proposed development is to comprise the construction of a new residential building to consist of approximately 8-9 storeys containing approximately 130 residential units.
Encountered Conditions	**Scope of Works**	The assessment incorporated a desk study to determine the site's setting to inform a preliminary risk assessment followed by an intrusive investigation to confirm the ground and groundwater conditions and support the development of a geotechnical and geo-environmental assessment. The ground investigation was undertaken in two phases, on 28th June 2021 and 11th November 2021 and comprised the following: • 5No windowless sampler boreholes to a maximum depth of 2mbgl. • 3No cable percussion boreholes to a maximum depth of 30mbgl. • Installation of 6No gas, vapour and groundwater monitoring wells. A standalone vapour intrusion detailed quantitative risk assessment was also commissioned to be issued under separate cover to investigate potential risk from vapour inhalation highlighted by previous investigations.
	Ground Conditions	The ground conditions encountered broadly consistent with those anticipated from the desk study, and comprised Made Ground, to depths of up to 1.92m, underlain by loose to very dense sandy gravel of the Lynch Hill Gravel Member, to a maximum proven depth of 5.20mbgl, underlain by firm to stiff consistency clay of the London Clay Formation to the base of the boreholes (maximum depth of 30mbgl).
	Groundwater	Groundwater strikes were reported at 3.6mbgl and 4.10mbgl respectively within BH1 and BH2, rising to 3.1mbgk and 3.5mbgl in BH1-BH2 respectively. No strike was reported within BH3 although water was added to aid drilling and may have masked a strike. No groundwater strikes were reported within the windowless sampler boreholes. During return monitoring completed to date, groundwater was encountered at depths of between 1.55m to 2.25mbgl within the Lynch Hill Gravel Member.
Geo-environmental Assessment Summary and Recommendations		Following generic risk assessments, no contaminants contained within the testing suite were reported at concentrations in excess of generic assessment criteria for the protection of human health within a "residential without plant uptake" end-use scenario. Asbestos in the form of loose chrysotile fibres were detected in a single sample out of 8No analysed in the laboratory. The site proposal indicates that the majority of the site will remain covered by a combination of the proposed building footprint and hard surfacing. Where this is the case, no formal remedial measures are considered necessary in terms of human health, as the building and hard surfacing are expected to provide a barrier to potential receptors. In areas of soft landscaping, existing soils should be encapsulated beneath a minimum of 450mm of imported clean topsoil, placed on a geotextile membrane. A significant risk to plant growth has not been identified. Risks to controlled waters from soils are considered negligible. Further assessment of risks to human health via vapour intrusion will be reported under separate cover.

		Following the completion of four return gas monitoring visits the site is considered Characteristic Situation 1 for which no formal gas protection measures are considered necessary. A remedial strategy will be required for the proposed development. As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out, and caution must be exercised during construction works. Should any contamination be encountered, a suitably qualified environmental consultant should be informed immediately, so that adequate measures may be recommended.
Geotechnical Considerations	**Foundations**	Based on the ground and groundwater conditions encountered, it is considered that traditional strip/trench-fill foundations up to 1.2m wide may be formed within the underlying Lynch Hill Gravel at a minimum depth of 0.60m for an allowable bearing capacity of 200kPa. Foundations must be deepened beneath any Made Ground. Alternatively, a piled solution would be suitable and indicative pile carrying capacities are given in Table 10.1.
	Ground Floor Slabs	Suspended floor slabs are is recommended.
	Sulphates	Buried concrete for foundations should be designed to Class DS-2 (AC2) in the Made Ground, DS-1 AC-1 within the Lynch Hill Gravel Member and SD-2 AC-1 in the London Clay Formation.
	Excavations	Temporary excavations are unlikely to remain stable and some form of temporary support or battering back to a safe angle and dewatering are likely to be required. Subject to seasonal variations, surface water/groundwater encountered during site works could likely be dealt with by conventional pumping from a sump used to collate waters.
	Pavement and Subgrade	Preliminary CBR design values of 2.5% and 5% are recommended for pavements constructed within the Made Ground and Lynch Hill Gravel Member respctively.
Recommended Further Work		The following works are recommended: • Preparation of vapour inhalation risk assessment & a Remedial Strategy should be prepared. • Seek approval of the Generic Quantitative Risk Assessments, and Vapour Inhalation Risk Assessments from the Local Authority, NHBC and other relevant stakeholders; • Seek confirmation of the water supply pipe requirements by the appropriate service provider.
This Executive Summary is intended to provide a brief summary of the main findings and conclusions of the investigation. For detailed information, the reader is referred to the full text.		

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Millington Road (HPH4) LLP ("The Client") has commissioned Jomas Associates Ltd ('Jomas') to undertake an investigation of the geotechnical and geo-environmental factors pertaining to the proposed development at a site referred to as HPH4, Hyde Park, 1 Millington Road, Hayes, London, UB3 4AZ (herein referred to as 'the site'). The site's location is presented in Figure 1.

1.1.2 Various reports have been produced for the site and issued separately (detailed in Table 1.1 below), followed by an intrusive investigation (detailed in this report).

Table 1.1: Previous/Supplied Reports

Title	Author	Reference	Date
Hyde Park Hayes Building 4 – Phase 1 Environmental Assessment	Ramboll	R1620010949_01_HPH4 _ Ph1	9th November 2020
Hyde Park Hayes 4 Groundwater Survey	Ramboll	L1700000706JR22_01	9th November 2020
HPH4 Groundwater Contamination Commentary	Ramboll	-	-
Desk Study/Preliminary Risk Assessment Report for Former Site of HPH4, Hyde Park, 1 Millington Road, Hayes, London, UB3 4AZ	Jomas Associates	P3284J2275	May 2021

1.1.3 The Jomas intrusive investigation has been undertaken in accordance with Jomas' proposal dated 9th June 2021.

1.2 Proposed Development

1.2.1 The proposed development is to comprise the construction of a new residential building to consist of approximately 8-9 storeys containing approximately 130 residential units. Ground floor areas are understood to comprise parking, maintenance and communal internal areas. A plan of the ground floor layout is provided as Figure 3.

1.2.2 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997.

1.3 Objectives

1.3.1 The objectives of Jomas' investigation are as follows:

- To undertake an intrusive investigation, to determine the ground and groundwater conditions as well as to assess the nature and extent of contaminants (if any) potentially present at the site;

- To establish the presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the Land Contamination Risk Management (LCRM); and,
- To determine soil/rock properties to inform the geotechnical assessment for foundations, drainage, excavation stability, pavement design and buried concrete and recommendations for further action (if required).

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- Intrusive ground investigation to determine shallow ground conditions, and potential for contamination at the site;
- Undertaking of laboratory chemical and geotechnical testing upon samples obtained;
- Return ground gas/groundwater monitoring;
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Limitations

1.5.1 Jomas has prepared this report for the sole use of Millington Road (HPH4) LLP, in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

1.5.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas has actual knowledge to the contrary, information obtained from public sources or provided to Jomas by site personnel and other information sources, have been assumed to be correct. Jomas does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.

1.5.3 Whilst every effort has been made to ensure the accuracy of the data supplied, and any analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.

1.5.4 Any reports provided to Jomas have been reviewed in good faith. Jomas cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.

1.5.5 This investigation and report has been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.

1.5.6 This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending

on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.

2 PREVIOUS WORKS

2.1 Site Information

2.1.1 The site location plan is appended to this report in Figure 1, Appendix 1.

Table 2.1: Site Information

Name of Site	Former site of HPH4, Hyde Park
Address of Site	1 Millington Road Hayes UB3 4AZ
Approx. National Grid Ref.	509088 179269
Site Area (Approx)	0.37ha
Site Occupation	Car park and unoccupied land
Local Authority	London Borough of Hillingdon

2.2 Phase 1 Environmental Assessment (Ramboll UK Ltd, 9th November 2020)

2.2.1 A Phase 1 Environmental Assessment was prepared for the site by Ramboll UK Ltd on behalf of Threadneedle UKPEC Hayes Jersey LP, dated 9th November 2020.

2.2.2 The report includes observations from a site inspection in 2014 and ad-hoc observations during Ramboll's groundwater monitoring surveys at a wider site area between 2016 and 2020. At that time the site was being used as a contractor's compound associated with development of a nearby site.

2.2.3 A programme of environmental monitoring of groundwater across the Hyde Park Hayes site has been undertaken by Ramboll in support of the discharge of planning conditions associated with the redevelopment of an adjacent site known as HPH5. Two (2) monitoring wells included within the monitoring programme lie within the boundary of the current study site, referred to by Ramboll as HPH4.

2.2.4 A review of historical mapping reached similar conclusions to those identified by Jomas Associates in the Desk Study. However, aerial photography not seen by Jomas indicated that in the post WW2 years, the eastern part of the site appears unsurfaced and in use for storage, potentially associated with off-site aviation works. The western part of site had the appearance of possible allotment gardens.

2.2.5 Ramboll noted records of four (4) former landfills within 1km of the subject site. The nearest of these (located 770m south-west at its nearest point) is the Frogsditch Farm landfill site, operated by Hall Aggregates Limited. The landfill was authorised to receive inert construction and demolition waste between 1982 and 1989.

2.2.6 Ramboll identified the following on site potentially contaminative activities:

- Use of the site for warehousing from c. early 1970's to c. late 2010's. Potential contaminants would depend on the nature of materials stored in the warehouse; fuels

and other hydrocarbons may be present if refuelling activities were undertaken on-site.

- Storage associated with off-site Westland Aircraft Ltd (Fairy Aviation Division) Aeronautical Engineering Works from the 1940s, potentially up to site redevelopment in the early 1970s.

2.2.7 The following potentially contaminative activities were identified as having taken place in the surrounding area:

- Westland Aircraft Ltd (Fairy Aviation Division) Aeronautical Engineering Works from the 1940s, potentially up to site redevelopment in the early 1970s. The Westlands site is indicated to have included fuel storage in underground storage tanks, and the specific location of these tanks is unconfirmed. Potential contaminants would depend on the nature of materials stored and utilised, but could include hydrocarbon fuels and oils, solvents, and metals.

- Gramophone factories from at least the 1910s to the 1990s approximately 170m north of the site. Potential contaminants from the Gramophone Factory could include solvents, hydrocarbons, metals and asbestos.

- Further industrial and commercial land use in the area, including a large unidentified Factory 290m north-west (1960s to 1990s); and a Transport Depot 190m north-west (from 1960s).

2.2.8 Ground conditions from previous investigations at the HPH4 site were reported to comprise:

- Made Ground comprising reworked natural strata with some observations of concrete and brick fragments to depths of between 0.7m (REH01) and 1.8m (BH11) below ground level (bgl);

- Natural strata underlying the made ground comprised dense sandy gravel of flint (Lynch Hill Gravels) with discrete bands of gravelly sand and silty clay (REH01 only) to depths of between 4.5m bgl (BH11) and 4.7m bgl (REH01);

- The London Clay was encountered at the base of the Lynch Hill Gravels in both boreholes on the HPH4 plot.

2.2.9 Environmental assessments of the wider Hyde Park Hayes site and remediation verification reporting for HPH5 (a site located to the east-southeast of HPH4) was undertaken by the consultant Jacobs on behalf of (its client) the former owner of the site (Melfords) in conjunction with the planning process for the construction of HPH5. Long term monitoring of groundwater conditions was requested by the EA in conjunction with the discharge of planning condition No.14 relating to groundwater contamination. Ramboll was commissioned to undertake longer term groundwater monitoring in 2016 to discharge this condition.

2.2.10 The Groundwater Assessment programme comprised eight (8) groundwater monitoring and sampling surveys over the period March 2016 to March 2017, reported and submitted to the Local Planning Authority (LPA) (ref: RUK16-20878_GWA_2, dated 10th October 2017). The outstanding Planning Condition 14 associated with HPH5 was discharged by the LPA following submission of the Ramboll report.

2.2.11 A subsequent programme of three (3) groundwater monitoring and sampling surveys were subsequently undertaken in 2018 (April, September and December). A further confirmatory survey was undertaken in October 2020.

2.2.12 The findings of the groundwater monitoring were summarised by Ramboll as follows:

- Groundwater depths on the HPH4 plot ranged from 1.46m bgl (BH11, October 2020) to 2.68m bgl (BH11, April 2018).
- Overall, groundwater flow direction was towards the east/north-east across the wider HPH area, which was broadly consistent with the findings of Jacobs' previous assessments and indicating a recharge mound in the vicinity of HPH4 (unsurfaced ground on/off-site to the west). Therefore, groundwater flow was considered to flow away from HPH4 towards the wider HPH site.
- The groundwater system within the Lynch Hill Gravels aquifer was considered to have been demonstrated by long term field monitoring surveys to be moderately dynamic, with seasonal fluctuations in groundwater levels and physio-chemical parameters observed;

2.2.13 Groundwater physico-chemical testing on-site indicated that the groundwater at the wider HPHP site (and specifically HPH4) is oxygenated (>1.5mg/l dissolved O2) and oxidising (>100mV redox potential), which provides a supporting line of evidence for the presence of a local recharge zone. The observed groundwater conditions were not considered to be conducive to microbially-mediated de-chlorination of chlorinated hydrocarbons (natural attenuation);

2.2.14 Contaminants of concern have not been detected in samples from BH11 in any of the groundwater monitoring surveys conducted by Ramboll between March 2016 and December2018;

2.2.15 Since the installation of REH01 in July 2016, some contaminants, including chlorinated hydrocarbons (specifically Trichloroethene and cis-1,2-Dichloroethene), have been detected at concentrations exceeding the remedial targets derived by DQRA by SKM. However, since December 2016 only one (1) of seven (7) samples recovered from REH01 (the September 2018 sample) were exceeded the remedial target. The latest detected concentration at RE0H1 from the October 2020 sample survey was again below the remedial target and was found to be consistent with the reported declining trend in TCE concentrations at this location since December 2016.

2.2.16 Concentrations of these contaminants have been assessed as having exhibited an overall decreasing trend between August 2016 and December 2018 (despite a moderate increase in detected concentrations in September 2018).

2.2.17 In the absence of observed groundwater conditions conducive to natural attenuation processes, the observed declining concentration in contaminant concentrations was considered likely to be representative of a declining source influenced by dilution and dispersion processes in the groundwater formation.

2.2.18 Ramboll considered that the HPH4 site area and wider Hyde Park Hayes site benefit from a significant level of environmental assessment which serves to reduce the uncertainty associated with the assessment of the potential for contaminated land to affect future users of HPH4.

2.2.19 According to Ramboll, the site of HPH5 was considered by Jacobs to represent the primary source area for observed chlorinated solvent impacts to groundwater.

2.2.20 Ramboll considered that a robust understanding of the environmental conditions has been established at HPH4. Ramboll considered that a localised contamination impact to groundwater has been identified in one (1) of the two (2) monitoring wells on the HPH4 plot (REH01); however, Ramboll also considered that statistical analysis of the available dataset indicated an overall declining trend in detected concentrations since the installation of the monitoring well in 2016.

2.2.21 Ramboll considered that a Planning Consent for redevelopment of HPH4 would likely include standard contaminated land related conditions; and that a requirement for onerous remedial intervention is considered to be unlikely. Ramboll concluded that the Environment Agency has de-prioritised the site and consistently declined to provide comment on the discharging of Planning Conditions relating to groundwater contamination at HPH5.

2.2.22 Using the activities undertaken as part of the HPH5 development as a template, remedial interventions that might be required at HPH4 were considered likely to be limited to:

- Segregation and removal of impacted soils (if any);
- Dewatering of excavations (likely only required if development includes construction of a basement); and
- Inclusion of a vapour impermeable membrane as a precautionary measure to prevent the ingress of any residual volatile compounds present in soil / groundwater into the indoor airspace.

2.3 Hyde Park Hayes 4 Groundwater Survey (Ramboll UK Ltd, 9th November 2020)

2.3.1 A further groundwater sampling visit was conducted by Ramboll in October 2020, and included the groundwater monitoring wells BH11 and REH011 present on the HPH4 site.

2.3.2 Trichloroethene was the only chlorinated solvents compound detected above the laboratory method detection limits. A concentration of 26 µg/L was detected in REH011 only, which did not exceed the remedial target of 179 ug/L.

2.3.3 Ramboll's conclusions were unchanged from those presented in their Phase 1 Environmental Assessment.

2.4 Desk Study/Preliminary Risk Assessment Report (Jomas Associates, May 2021)

2.4.1 At the time of a site walkover by Jomas in April 2021, the site was occupied by a car park in the east of the site and unoccupied soft landscaping in the west.

2.4.2 The historical record of the site indicated that the site remained undeveloped until after World War 2, when the site appears to have been used for storage associated with the adjacent aviation works. From the 1970's until recent demolition ca 2013, the site appears to have been developed with a warehouse.

2.4.3 The site vicinity underwent significant development in the early part of the 20th century with a gramophone factory 240m north of the site, and an aviation works 90m east during the

1930s. The aviation works appeared to have been redeveloped with industrial warehouses from the 1970s onwards, with more recent commercial developments occurring in the last ten years.

2.4.4 The British Geological Survey indicated that the site is directly underlain by superficial deposits of the Lynch Hill Gravel Member, underlain by solid deposits of the London Clay Formation. Artificial deposits are reported across the entire site, reported as worked ground (undivided).

2.4.5 The superficial deposits underlying the site were identified as a Principal Aquifer with the underlying solid deposits identified as Unproductive. A review of the Enviro+Geoinsight Report indicated that there are no source protection zones within 500m of the site.

2.4.6 There were no potable water abstractions reported within 2km of the site and no surface water features within 1km of the site.

2.4.7 There were no Environment Agency Zone 2 or 3 floodplains reported within 250m of the site.

2.4.8 It was recommended that an intrusive investigation be undertaken to clarify potential risks to the identified receptors.

Conceptual Site Model (CSM)

2.4.9 The conceptual site model is reproduced in Table 2.2 overleaf.

Table 2.1: Site Information

Source	Pathway	Receptor	Assessment to date	Further investigation required?
• Warehouse on site from c. early 1970's to c. late 2010's – (S1) • Use of site for storage associated with nearby aircraft works - (S2) • Potential for Made Ground associated with previous development operations – on site (S4)	• Ingestion • Inhalation or contact with potentially contaminated dust and vapours	• Future site users • Construction workers • Maintenance workers • Neighbouring site users	The reports of previous investigations at the site made available to Jomas Associates have focussed on groundwater quality. No soil analysis data has been provided. Acute and sub chronic risks to construction/maintenance workers are outside the scope of this assessment but would be expected to be managed by appropriate health and safety procedures	Yes
	• Inhalation of vapours	• Future site users • Construction workers • Maintenance workers • Neighbouring site users	An extended period of groundwater monitoring has been undertaken by Ramboll on a wider site area, with 2no monitoring wells within the study site. Concentrations of a chlorinated solvent trichloroethene have been detected within one well (REH011), which could has the potential to pose a risk to human health via vapour inhalation pathways The source of the detected trichloroethene contamination was considered to have originated from an off-site source at a site known as HPH5. Ramboll suggested that inclusion of a vapour impermeable membrane as a precautionary measure could be required to prevent ingress of residual volatile organic contamination (VOCs) into the indoor airspace. Although the site historically is likely to have been used for storage of materials associated with the nearby aircraft site, the potential for a residual on site source of VOC contamination is considered to be low to medium risk. Acute and sub chronic risks to construction/maintenance workers are outside the scope of this assessment but would be expected to be managed by appropriate health and safety procedures.	Yes. It is noted that the previous investigations at the site were undertaken as part of investigation of a wider site area, and it is recommended that further sampling is undertaken on the study site to reduce uncertainty in relation to the proposed development.
	• Permeation of water pipes and attack on concrete foundations by aggressive soil conditions	• Building structures/services	The reports of previous investigations at the site made available to Jomas Associates have focussed on groundwater quality. No soil analysis data has been provided.	Yes
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. • Horizontal and vertical migration of contaminants within groundwater	• Controlled waters - Principal aquifer	Given the groundwater monitoring undertaken at the site to date, the relatively low concentrations of contaminants detected, and the lack of groundwater abstractions or surface waters in the vicinity of the site, further risk assessment in relation to controlled waters is not considered necessary.	No

Table 2.1: Site Information

Source	Pathway	Receptor	Assessment to date	Further investigation required?
• Current and previous industrial use –off site (S3) ○ Grammophone factory 240m NE (from ca 1910) ○ Gas works 300m north (from ca 1910) ○ Aviation works 90m east (from ca 1930s) ○ USTs for fuel storage at adjacent site to the north, and wider within the adjacent former aviation works	• Horizontal and vertical migration of contaminants within groundwater • Inhalation of vapours	• Future site users • Construction workers • Maintenance workers	An extended period of groundwater monitoring has been undertaken by Ramboll on a wider site area, with 2no monitoring wells within the study site. Concentrations of a chlorinated solvent trichloroethene have been detected within one well (REH011), which could have the potential to pose a risk to human health via vapour inhalation pathways The source of the detected trichloroethene contamination was considered to have originated from an off-site source at a site known as HPH5. Ramboll suggested that inclusion of a vapour impermeable membrane as a precautionary measure could be required to prevent ingress of residual volatile organic contamination (VOCs) into the indoor airspace. Acute and sub chronic risks to construction/maintenance workers are outside the scope of this assessment but would be expected to be managed by appropriate health and safety procedures.	Yes. It is noted that the previous investigations at the site were undertaken as part of investigation of a wider site area, and it is recommended that further sampling is undertaken on the study site to reduce uncertainty in relation to the proposed development.
• Former brick fields 20m north and 130m north east (S5) • Worked ground on site and in wider site vicinity (S6)	• Accumulation and Migration of Soil Gases (P5)	• Future site users • Construction workers • Maintenance workers	Although no current or historic landfill sites are recorded within the proximity of the site, this desk study has identified historic brickfield in the site vicinity. Previous reports by Ramboll referenced 4no former landfill sites within 1km of the site, with the nearest located 770m south west of the site. In addition, the site and the wider site vicinity is recorded by the BGS as comprising worked ground, and the site vicinity has been the location of significant historical industrial activities. No recorded ground gas risk assessment has been referenced within the previous reports provided. Although the risk associated with ground gas risk is considered to be low to moderate, it is recommended that further investigation and assessment be undertaken in this regard to confirm that risks are acceptable in relation to the proposed development.	Yes

3 GROUND INVESTIGATION

3.1 Scope of Works

3.1.1 The ground investigation was undertaken in two phases, on 28th June 2021 and 11th November 2021.

3.1.2 A summary of the fieldwork carried out at the site, with justifications for exploratory hole positions, is presented in Table 3.1 below.

Table 3.1: Scope of Intrusive Investigation

Investigation Type	Number of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved	Justification
Windowless Sample Boreholes	5	WS1-5	Up to 2mbgl	Non-targeted for general site coverage. Obtain shallow samples for laboratory geotechnical testing. To allow in-situ geotechnical testing.
Cable Percussion Boreholes	2	BH1-BH3	Up to 30m bgl	Obtain deeper samples for laboratory geotechnical testing. To allow in-situ geotechnical testing.
Monitoring Wells	6	WS1, WS3 & WS5 BH1, BH2, BH3	Up to 6mbgl	Wells in WS1, WS3, WS5 installed to 1.2mbgl for ground gas monitoring and vapour sampling BH1-3 installed up to 6mbgl for gas and groundwater monitoring.

3.1.3 The ground investigation was undertaken in accordance with British Standard BS5930:2015+A1:2020 "Code of practice for ground investigations", British Standard BS10175:2011+A2:2017 "Investigation of potentially contaminated sites - code of practice", NHBC Standards, Chapter 4.1 and AGS Guidelines for Good Practice in Site Investigations.

3.1.4 Exploratory hole positions are shown on the exploratory hole location plan presented in Figure 2, Appendix 1. The exploratory hole records are included in Appendix 2.

3.1.5 Where monitoring well installations were not installed, the exploratory holes were backfilled with the arisings (in the reverse order in which they were drilled) and the ground surface was reinstated so that no depression was left.

3.2 In-situ Geotechnical Testing

3.2.1 In-situ geotechnical testing included Standard Penetration Tests. The determined 'N' values have been used to determine the relative density of granular materials and have been used with standard correlations to infer various other derived geotechnical parameters including the undrained shear strength of the cohesive strata. The results of the individual tests are on the appropriate exploratory hole logs in Appendix 2.

3.2.2 In-situ California Bearing Ratios (CBRs) were determined using a TRL dynamic cone penetrometer (DCP) and the methodology laid out in IAN 73/06. The CBR values have then been calculated using the methodology laid out in both IAN 73/06 and TRL 587. Copies of the test results and calculations are provided in Appendix 7.

3.3 Laboratory Analysis

3.3.1 A programme of laboratory testing, scheduled by Jomas Associates Limited, was carried out on selected samples of Made Ground and natural strata.

Chemical Testing

3.3.2 Soil samples were submitted to i2 Analytical (a UKAS and MCerts accredited laboratory) for analysis.

3.3.3 The samples were analysed for a wide range of contaminants as shown in Table 3.2 below:

Table 3.2: Chemical Tests Scheduled

	No. of tests	
Test Suite	**Made Ground / Topsoil**	**Natural**
Basic Suite 3	4	-
Basic Suite 5	2	-
Total Organic Carbon	4	1
Water Soluble Sulphate	6	6
TPHCWG (inc BTEX)	3	1
VOC	3	1
PCBs	2	-
Asbestos Screen & ID	7	1

3.3.4 The determinands contained in the Basic Suite 3 are as detailed in Table 3.3 below. Basic Suite 5 contains the same determinands but without the hydrocarbon compounds to avoid overlapping with the extended hydrocarbon testing.

3.3.5 The Hydrocarbon Suite includes TPHCWG, PAH, phenols, VOCs BTEX & MTBE.

Table 3.3: Basic Suite of Determinands

DETERMINAND	LIMIT OF DETECTION (mg/kg)	UKAS ACCREDITATION	TECHNIQUE
Arsenic	1	Y (MCERTS)	ICPMS
Cadmium	0.2	Y (MCERTS)	ICPMS
Chromium	1	Y (MCERTS)	ICPMS
Chromium (Hexavalent)	4	Y (MCERTS)	Colorimetry
Lead	1	Y (MCERTS)	ICPMS
Mercury	0.3	Y (MCERTS)	ICPMS
Nickel	1	Y (MCERTS)	ICPMS

Selenium	1	Y (MCERTS)	ICPMS
Copper	1	Y (MCERTS)	ICPMS
Zinc	1	Y (MCERTS)	ICPMS
Boron (Water Soluble)	0.2	Y (MCERTS)	ICPMS
pH Value	0.1 units	Y (MCERTS)	Electrometric
Sulphate (Water Soluble)	0.0125g/l	Y (MCERTS)	Ion Chromatography
Total Cyanide	1	Y (MCERTS)	Colorimetry
Speciated/Total PAH	0.05/0.80	Y (MCERTS)	GCFID
Phenols	1	Y (MCERTS)	HPLC
Total Petroleum Hydrocarbons (banded)	-	N Y (MCERTS)	Gas Chromatography

3.3.6 To support the selection of appropriate tier 1 screening values, 5No. samples were analysed for total organic carbon.

3.3.7 The laboratory test results are included in Appendix 3.

Geotechnical Laboratory Testing

3.3.8 In addition to the contamination assessment, soil samples were submitted to the UKAS Accredited laboratory of i2 Analytical Ltd for a series of tests.

3.3.9 This testing was designed to classify the samples; and to obtain parameters (either directly or sufficient to allow relevant correlations to be used) relevant to the technical objectives of the investigation.

3.3.10 The following laboratory geotechnical testing was carried out:

Table 3.4 Laboratory Geotechnical Analysis

Methodology	Test Description	Number of tests
BS EN 17892	Moisture Content Determination	6
BS1377:1990	Liquid and Plastic Limit Determination (Atterberg Limits)	12
BS1377:1990	Particle Size Distribution - Sieving	2
BS1377:1990	Determination of the undrained shear strength in triaxial compression with single stage loading and without measurement of pore pressure	11

3.3.11 In addition, 6No soil samples were analysed for a modified BRE Special Digest 1 suite (acid and water soluble sulphate, total sulphur and pH) to assist with the ACEC classification for buried concrete.

3.3.12 The laboratory test results are included in Appendix 4.

4 GROUND CONDITIONS ENCOUNTERED

4.1 General

4.1.1 A summary of the conditions encountered during the physical investigation of the site is presented in the following section.

4.2 Ground Conditions

4.2.1 The ground conditions encountered were broadly consistent with those anticipated, i.e. a thickness of Made Ground overlying granular deposits of the Lynch Hill Gravel Member, overlying the London Clay Formation. The ground conditions are summarised in Table 4.1 below.

Table 4.1 : Ground Conditions Encountered

Stratum and Description	Encountered from (mbgl)	Base of strata (mbgl)	Thickness range (m)
Asphalt. Overlying concrete in BH1. (MADE GROUND) WS5, BH1 only	GL	0.26-0.30	0.26-0.30
Brown gravelly clay with rootlets. Gravel consists of medium rounded flint. (MADE GROUND – Topsoil) WS4, BH2 only	GL	0.09-0.20	0.09-0.20
Light brown to grey sandy gravel. Gravel consists of concrete and brick. (MADE GROUND)	GL-0.30	0.22-1.80	0.22-1.60
Dark brown to grey slightly sandy slightly gravelly clay. Sand is fine. Gravel consists of fine to medium angular to sub-rounded flint, brick and asphalt. (MADE GROUND)	0.10-0.37	0.97-1.92	0.65-1.60
Loose to very dense light brown to orangish brown clayey sandy GRAVEL/SAND AND GRAVEL. Sand is fine to medium. Gravel consists of fine to medium angular to sub-angular flint. (LYNCH HILL GRAVEL MEMBER)	0.97-1.92	>1.30-5.20	>0.08-3.20
Firm to stiff consistency** grey CLAY. Claystone bands reported. (LONDON CLAY FORMATION)	5.00-5.20	>30.00	>24.80->25.00

***Consistency estimated using semi-empirical correlations with SPT N-values, Plasticity Indices and published literature*

4.2.2 The presence of asphalt gravel within the Made Ground across the site was only the only visual evidence of contamination reported.

4.3 Groundwater

4.3.1 Groundwater strikes and groundwater monitoring are summarised below.

Table 4.3: Groundwater Strikes During Investigation

Exploratory Hole ID	Depth Encountered (mbgl)	Depth After 20mins (mbgl)	Stratum
BH1	3.6	3.1	Lynch Hill Gravel Member
BH2	4.10	3.5	Lynch Hill Gravel Member
BH3		No Strike*	
WS1		No Strike	
WS2		No Strike	
WS3		No Strike	
WS4		No Strike	
WS5		No Strike	

*Water added to aid drilling from 3.0mbgl may have masked a strike.

4.3.2 The return groundwater monitoring results are presented in Appendix 5 and are summarised below.

Table 4.4: Groundwater Monitoring Summary

Exploratory Hole ID	Depth Encountered (m bgl)	Depth to Base of Well (m bgl)	Stratum
BH1	1.51-1.60	6.08	Lynch Hill Gravel Member/London Clay Formation
BH2	1.78-2.08	4.69	Lynch Hill Gravel Member
BH3	2.14-2.25	5.52	Lynch Hill Gravel Member
WS1	1.52-1.80	1.89	Made Ground
WS3	Dry	1.47	Made Ground
WS5	Dry	1.07	Made Ground/Lynch Hill Gravel Member

4.3.3 It should be noted that changes in groundwater levels can occur for a number of reasons including seasonal effects and variations in drainage. Such fluctuations may only be recorded by the measurement of the groundwater level within a standpipe or piezometer installed within appropriate response zones. Changes in groundwater level can have a direct effect on excavation stability and dewatering requirements, and cohesive soils can soften under rising or high groundwater levels.

4.4 Limitations

4.4.1 The windowless sampler boreholes all refused between 1.30-2.00mbgl on very dense natural granular material.

4.5 Geotechnical Testing Results

4.5.1 Standard Penetration Tests (SPT) were undertaken in the borehole locations to a maximum depth of 29.5mbgl.

4.5.2 SPT 'N' values ranged between N = 11 – 45 within the granular soils of the Lynch Hill Gravel Member which equates to medium dense to very dense relative density.

4.5.3 Within the London Clay Formation, SPT N- values of 10 – 61 were reported. This corresponds with a medium to very high strength in the cohesive soils (based on correlations postulated by Stroud & Butler, 1975 and Stroud, 1989).

4.5.4 The blow counts showed a general trend of increasing with depth within both the granular and cohesive strata; however, as would be expected, is a significant drop in N values can be observed at the transition between the Lynch Hill Gravel and the underlying London Clay Formation.

4.5.5 The results of geotechnical laboratory testing undertaken from the recovered samples of the Lynch Hill Gravel Member and London Clay Formation (excluding Topsoil and Made Ground) are summarised in Table 4.5.

Table 4.5: Summary of Geotechnical Test Results

Parameter		Made Ground	Lynch Hill Gravel Member	London Clay Formation
Moisture Content (%)		8.0 – 16	-	25 – 32
Liquid Limit (%)		37 – 39	-	65 – 7
Plastic Limit (%)		18 – 25	-	25 – 33
Plasticity Index (%)		14 – 19	-	40 – 45
Particle Size Distribution	Gravel (%)	-	39 – 74	-
	Sand (%)	-	25 – 48	-
	Clay/Silt (%)	-	1 –13	-
pH		7.8 – 11.0	8.5	8.2 – 9.1
Water soluble sulphate (g/l)		0.073 – 0.66	0.051	0.14 – 0.83
Total Sulphur (%)		-	0.033	0.341 – 2.70
SPT (N)		11 – 45	8 – 98	10 – 61

4.6 Summary of General Derived Properties

4.6.1 Based on the analysis of the ground investigation data and past experience with similar deposits, the general parameters given in Table 4.6, have been derived for the Lynch Hill Gravel Member and London Clay Formation materials.

Table 4.6: Derived Parameters for Lynch Hill Gravel and London Clay Formation

Property*	Lynch Hill Gravel Member	London Clay Formation
Unit Weight	20	18.5
Drained Friction, φ' (◦)	30	21.33 – 21.97 [1)]
SPT 'N' Value	8 – 98	10 – 61
Drained Young's Modulus, E' (MPa)[3)]	8 – 98	-
Undrained Young's Modulus, E_u (MPa)[4)]	-	12 – 73.2
Undrained Shear Strength, c_u (kPa)[5)]	-	48 - 147
Modified Plasticity Index (%)	-	39.2 – 44
Volume Change Potential [NHBC]	Non-shrinkable	Medium to High
Modulus of Volume Compressibility, m_v (m^2/MN)[6)]	-	0.036 – 0.222

[1)] Calculated from: $\varphi' = (42° - 12.5\log10I_p)$ for $5\% \leq I_p \leq 100\%$ Where, I_p is the soil's plasticity index (BS8002:2015).
[3)] Calculated from: E' = 1 N MPa, based on the guidance given in CIRIA Report 143
[4)] Calculated from: E_u = 1.2 N MPa, based on the guidance given in CIRIA Report 143.
[5)] The undrained shear strength (c_u) of the cohesive soils was correlated to the SPT "N" values using Stroud (1974), where $c_u=f_1N$ and f_1 is factor related to the Plasticity Index (PI) of the clay (a value of f_1 equal to 5.0 for PI ≤ 25% and a value of f_1 value equal to 4.5 for PI>25).
[6)] Calculated from: $m_v = 1/f_2$ N m^2/MN, f_2 is a coefficient proposed by Stroud and Butler (1975) and varies with Plasticity Index (PI) and presented in Figure 27 of CIRIA Report 27.
*These reported values are not considered as '*Characteristic Values*'.

5 RISK ASSESSMENT – ANALYTICAL FRAMEWORK

5.1 Context and Objectives

5.1.1 This section seeks to evaluate the level of chronic risk pertaining to human health and the environment which may result from both the existing use and proposed future use of the site. It makes use of the ground investigation findings, as described in the previous sections, to evaluate further the potential pollutant linkages identified in the desk study. A combination of qualitative and quantitative techniques is used, as described below.

5.1.2 The purpose of generic quantitative risk assessment is to compare concentrations of contaminants found on site against generic assessment criteria (GAC) to establish whether there are actual or potential unacceptable risks. It also determines whether further detailed assessment is required. The approaches detailed all broadly fit within a tiered assessment structure in line with the framework set out in the Department of Environment, Food and Rural Affairs (DEFRA), EA and Institute for Environment and Health Publication, Guidelines for Environmental Risk Assessment and Management.

5.2 Analytical Framework – Soils

5.2.1 There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

5.2.2 The CLEA model provides a methodology for quantitative assessment of the long term risks posed to human health by exposure to contaminated soils. Toxicological data have been used to calculate Soil Guideline Values (SGV) for individual contaminants, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.

5.2.3 In the absence of any published SGVs for certain substances, or where the assumptions made in generating the SGVs do not apply to the site, Jomas Associates Limited have compared the soil analytical results to other available GAC, including the LQM/CIEH S4ULs and DEFRA C4SL. Site-specific assessments are undertaken wherever possible and/or applicable. All assessments are carried out in accordance with the CLEA protocol.

5.2.4 The assessment criteria used for the screening of determinands within soils are identified within Table 5.1.

Table 5.1: Selected Assessment Criteria – Contaminants in Soils

Substance Group	Determinand(s)	Assessment Criteria Selected
Organic Substances		
Non-halogenated Hydrocarbons	Total Petroleum Hydrocarbons (TPHCWG banded)	S4UL
	Total Phenols	S4UL
Polycyclic Aromatic Hydrocarbons (PAH-16)	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene	S4UL
Volatile Organic Compounds (VOCs/sVOCs).	Toluene, Ethylbenzene, Benzene, Xylenes	S4UL
Inorganic Substances		
Heavy Metals and Metalloids	Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Copper, Zinc	S4UL
	Copper, Zinc, Nickel	BS: 3882 (2015).
Cyanides	Free Cyanide	CLEA v1.06
Sulphates	Water Soluble Sulphate	BRE Special Digest 1:2005

5.2.5 It is understood that the proposed development is to comprise the construction of a new residential building to consist of approximately 8-9 storeys containing approximately 130 residential units.

5.2.6 As a result, the site has been assessed with regards to a residential without plant uptake end use scenario.

5.2.7 GAC have been selected with consideration to the Soil Organic Matter content of the soil. From the soils analytical results, the average value for Total Organic Carbon for the Made Ground is 0.6%, which gives an equivalent SOM of 1.032%. Therefore, published GAC have been selected as those derived assuming a SOM of 1%.

5.3 BRE

5.3.1 The BRE Special Digest 1:2005, 'Concrete in Aggressive Ground' is used with soluble sulphate and pH results to assess the aggressive chemical environment of future underground concrete structures at the site.

5.4 Analytical Framework – Groundwater and Leachate

5.4.1 The requirement to protect groundwater from pollution is outlined in Groundwater protection: Principles and practice (GP3, EA, August 2013, v1.1).

5.4.2 Where undertaken, the groundwater quality analysis comprises a Level 1 assessment in accordance with the EA Remedial Targets Methodology Document (EA, 2006).

5.4.3 The criteria used by Jomas' in the Level 1 assessment of groundwater and leachate quality are shown in Table 5.2.

Table 5.2: Selected Assessment Criteria – Contaminants in Water

Substance Group	Determinand(s)	Assessment Criteria Selected
Metals	Arsenic, Copper, Cyanide, Mercury, Nickel, Lead, Zinc, Chromium	EQS/DWS
	Selenium	DWS
PAHs	Sum of Four – benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, indeno(1,2,3-c,d)pyrene	DWS
PAHs	Benzo(a)pyrene,	DWS
PAHs	Remainder	LEC
Total Petroleum Hydrocarbons	Aliphatic C5-C6, Aliphatic >C6-C8, Aliphatic >C8-C10. Aliphatic >C10-C12, Aliphatic >C12-C16, Aliphatic >C16-C21, Aromatic C5-C7, Aromatic >C7-C8, Aromatic >C8-C10, Aromatic >C10-C12, Aromatic >C12-C16, Aromatic >C16-C21, Aromatic> C21-C35	DWS/WHO
Benzene	Benzene	DWS
Toluene	Toluene	EQS
Ethylbenzene	Ethylbenzene	EQS
Xylene	Xylene	EQS
Oxygen Demand	Chemical Oxygen Demand and Biological Oxygen Demand	Urban Waste Water Treatment (England and Wales) Regulations

Environmental Quality Standards EQS

Environmental Quality Standards (EQS) have been released by the EA for dangerous substances, as identified by the EC Dangerous Substances Directive. EQS can vary for each substance, for the hardness of the water and can be different for fresh, estuarine or coastal waters.

Lowest Effect Concentration (LEC)

These criteria relate to the concentration of PAHs in groundwater. They are taken from the EA R&D Technical Report P45 – Polycyclic Aromatic Hydrocarbons (PAH): Priorities for Environmental Quality Standard Development (2001).

WHO Health

These screening criteria have been taken from the World Health Organisation Guidelines for Drinking Water Quality (1984). The health value is a guideline value representing the concentration of a contaminant that does not result in any significant risk to the receptor over a lifetime of exposure.

Further criteria have been obtained from 'Petroleum Products in Drinking-water' - Background document for development of WHO Guidelines for Drinking-water Quality (2005).

UK Drinking Water Standards (DWS)

These comprise screening criteria provided by the Drinking Water Inspectorate (DWI) in the Water Supply (Water Quality) Regulations 2006,

Urban Waste Water Treatment (England and Wales) Regulations - UWWT Regs

The Urban Waste Water Treatment (England and Wales) Regulations SI/1994/2841 as amended by SI/2003/1788 sets down minimum standards for the discharge of treated effluent from waste water treatment works to inland surface waters, groundwater, estuaries or coastal waters. Standards of (125mg/L) COD and (25mg/L) BOD have been set.

6 GENERIC QUANTITATIVE RISK ASSESSMENT – SOIL DATA

6.1 Screening of Soil Chemical Analysis Results – Human Health Risk Assessment

6.1.1 Laboratory analysis for soils are summarised in Tables 6.1 to 6.4. Raw laboratory data is included in Appendix 3.

Table 6.1: Soil Laboratory Analysis Results – Metals, Metalloids, Phenol, Cyanide

Determinand	Unit	No. samples tested	Screening Criteria		Min	Max	No. Exceeding
Arsenic	mg/kg	8	S4UL	40	9.8	18	0
Cadmium	mg/kg	8	S4UL	85	<0.2	8.3	0
Chromium	mg/kg	8	S4UL	910	20	25	0
Lead	mg/kg	8	C4SL	310	12	150	0
Mercury	mg/kg	8	S4UL	56	<0.3	<0.3	0
Nickel	mg/kg	8	S4UL	180	13	29	0
Copper	mg/kg	8	S4UL	7100	18	51	0
Zinc	mg/kg	8	S4UL	40000	38	110	0
Total Cyanide [A]	mg/kg	8	CLEA v 1.06	33	<1.0	<1.0	0
Selenium	mg/kg	8	S4UL	430	<1.0	<1.0	0
Boron Water Soluble	mg/kg	8	S4UL	11000	1.2	4.7	0
Phenols	mg/kg	8	S4UL	440	<1.0	<1.0	0

Notes: [A] Generic assessment criteria derived for free inorganic cyanide.

Table 6.2: Soil Laboratory Analysis Results – Polycyclic Aromatic Hydrocarbons (PAHs)

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Naphthalene	mg/kg	8	S4UL	2.3	<0.05	<0.05	0
Acenaphthylene	mg/kg	8	S4UL	2900	<0.05	<0.05	0
Acenaphthene	mg/kg	8	S4UL	3000	<0.05	<0.05	0
Fluorene	mg/kg	8	S4UL	2800	<0.05	<0.05	0
Phenanthrene	mg/kg	8	S4UL	1300	<0.05	0.55	0
Anthracene	mg/kg	8	S4UL	2300	<0.05	0.10	0
Fluoranthene	mg/kg	8	S4UL	1500	<0.05	1.5	0
Pyrene	mg/kg	8	S4UL	3700	<0.05	1.5	0
Benzo(a)anthracene	mg/kg	8	S4UL	11	<0.05	0.65	0
Chrysene	mg/kg	8	S4UL	30	<0.05	0.79	0

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Benzo(b)fluoranthene	mg/kg	8	S4UL	3.9	<0.05	0.92	0
Benzo(k)fluoranthene	mg/kg	8	S4UL	110	<0.05	0.59	0
Benzo(a)pyrene	mg/kg	8	S4UL	3.2	<0.05	0.72	0
Indeno(123-cd)pyrene	mg/kg	8	S4UL	45	<0.05	0.55	0
Dibenzo(ah)anthracene	mg/kg	8	S4UL	0.31	<0.05	<0.05	0
Benzo(ghi)perylene	mg/kg	8	S4UL	360	<0.05	0.72	0
Total PAH	mg/kg	8	-	-	<0.80	8.49	-

Table 6.3: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPH)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
C_8-C_{10}	mg/kg	4	S4UL	27	<0.1	<0.1	0
>C_{10}-C_{12}	mg/kg	4	S4UL	130	<2.0	<2.0	0
>C_{12}-C_{16}	mg/kg	4	S4UL	1100	<4.0	<4.0	0
>C_{16}-C_{21}	mg/kg	4	S4UL	1900	<1.0	5.2	0
>C_{21}-C_{35}	mg/kg	4	S4UL	1900	<10	21	0
Total TPH	mg/kg	4	-		<17.1	26.2	-

Note: *The lower value of guidelines for Aromatic/Aliphatics has been selected

Table 6.4: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPHCWG)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C_5-C_6 Aliphatic	mg/kg	4	S4UL	42	0.001	0.001	0
>C_6-C_8 Aliphatic	mg/kg	4	S4UL	100	0.001	0.001	0
>C_8-C_{10} Aliphatic	mg/kg	4	S4UL	27	0.001	0.001	0
>C_{10}-C_{12} Aliphatic	mg/kg	4	S4UL	130	<1.0	<1.0	0
>C_{12}-C_{16} Aliphatic	mg/kg	4	S4UL	1100	<8.0	49	0
>C_{16}-C_{35} Aliphatic	mg/kg	4	S4UL	65000	<16.0	49	0
>C_5-C_7 Aromatic	mg/kg	4	S4UL	370	0.001	0.001	0
>C_7-C_8 Aromatic	mg/kg	4	S4UL	860	0.001	0.001	0
>C_8-C_{10} Aromatic	mg/kg	4	S4UL	47	0.001	0.001	0
>C_{10}-C_{12} Aromatic	mg/kg	4	S4UL	250	<1.0	<1.0	0
>C_{12}-C_{16} Aromatic	mg/kg	4	S4UL	1800	<2.0	<2.0	0
>C_{16}-C_{21} Aromatic	mg/kg	4	S4UL	1900	<10	<10	0

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C_{21}-C_{35} Aromatic	mg/kg	4	S4UL	1900	<10	23	0
Total TPH (Ali/Aro)	mg/kg	4	-	-	<20.0	49	-

6.2 Asbestos in Soil

6.2.1 8No samples were screened in the laboratory for the presence of asbestos. The results of the analysis are summarised below in Table 6.5 below.

Table 6.5: Asbestos Analysis – Summary

Sample	Screening Result	Quantification result (%)	Comments
WS1 – 0.25mbgl	Not detected	-	-
WS1 – 1.50mbgl	Detected	-	Chrysotile – Loose Fibres
WS2 – 0.40mbgl	Not detected	-	-
WS3 – 0.20mbgl	Not detected	-	-
WS3 – 1.50mbgl	Not detected	-	-
WS4 – 0.20mbgl	Not detected	-	-
WS4 – 0.80mbgl	Not detected	-	-
WS5 – 0.60mbgl	Not detected	-	-

6.3 Volatile Organic Compounds

6.3.1 In addition to the suites outlined previously, 4No samples were tested for the presence of volatile organic compounds including BTEX compounds (benzene, toluene, ethylbenzene, xylene).

6.3.2 No VOCs were reported above the laboratory detection limit within any tested sample.

6.4 Polychlorinated Biphenyl (PCB) Concentrations

6.4.1 In addition to the suites outlined previously, 2No samples were analysed for the presence of PCBs.

6.4.2 No PCBs were reported above the laboratory method detection limit.

6.5 Vapour Risk Assessment from a Soil Source

6.5.1 As outlined in Table 6.2-6.4, no polyaromatic hydrocarbons or petroleum hydrocarbon fractions have been found in excess of their generic screening criteria for the protection of human health within a 'residential without plant uptake' end-use scenario. The generic screening criteria considers all possible pathways between the source and the receptor, including vapour inhalation.

6.5.2 On the basis that no contaminants are reported in excess of generic assessment criteria, it is considered that there is a negligible risk to end users of the proposed development associated with vapour risk inhalation from soils.

6.6 Summary of Human Health Generic Quantitative Risk Assessment

6.6.1 In summary, no exceedances of contaminants above the GAC were recorded in any of the soil samples tested.

6.6.2 Asbestos was detected in a single sample of made ground at the site .

6.7 Screening of Soil Chemical Analysis Results – Potential Risks to Plant Growth

6.7.1 Zinc, copper and nickel are phytotoxins and could therefore inhibit plant growth in soft landscaped areas. Concentrations measured in soil for these determinands have been compared with the pH dependent values given in BS:3882 (2015). This does not constitute a full BS:3882 topsoil test.

6.7.2 Table 6.6 shows the soil analytical results compared with the relevant screening values, adopting a pH value of greater than 7, as indicated by the results of the laboratory analysis.

Table 6.6: Soil Laboratory Analysis Results – Phytotoxic Determinands

Determinand	Threshold level (mg/kg)	Min (mg/kg)	Max (mg/kg)	No. Exceeding
Nickel	110	13	29	0
Copper	200	18	51	0
Zinc	300	38	110	0

6.7.3 None of the samples exceeded the threshold levels and a significant risk to plant growth has not been identified.

6.8 Screening for Water Pipes Materials

6.8.1 The results of the analysis have been assessed for potential impact upon water supply pipes. Table 6.7 below summarises the findings of the assessment:

Table 6.7: Screening Guide for Water Pipes

Determinand	No. of tests	Threshold adopted for PE (mg/kg)	Value for site data (mg/kg)		No of Exceedances
			Min	Max	
Total VOCs	4	0.5	<0.056	<0.056	0
BTEX	4	0.1	<0.004	<0.004	0
MTBE	4	0.1	<0.001	<0.001	0
EC5-EC10	8	1	<0.006	<0.1	0
EC10-EC16	8	10	<6.0	<6.0	0
EC16-EC40	8	500	<11	49	0

Determinand	No. of tests	Threshold adopted for PE (mg/kg)	Value for site data (mg/kg)		No of Exceedances
			Min	Max	
Naphthalene	8	5	<0.05	<0.05	0
Phenols	8	2	<1.0	<1.0	0

*Laboratory detection limit

6.8.3 The above suggests that upgraded pipe work is unlikely to be required.

6.9 Waste Characterisation

6.9.1 The classification of materials for waste disposal purposes was outside the scope of this report. Should quantities of material require off-site disposal, waste classification will be required to determine whether soils may be treated as hazardous or non-hazardous.

6.9.2 Note that Waste Acceptance Criteria (WAC) analysis may then be required by the landfill operator to determine whether materials can be disposed of at either an inert, stable non-reactive hazardous or hazardous landfill.

7 GENERIC QUANTITATIVE RISK ASSESSMENT – GROUNDWATER DATA

7.1 Groundwater sampling

7.1.1 Samples of groundwater obtained from the borehole installations installed within exploratory locations BH1, BH2, and BH3 were submitted for chemical analysis.

7.1.2 The samples were obtained by means of low flow methodology. Groundwater sampling records are presented in Appendix 7.

7.2 Assessment of groundwater analytical data with respect to controlled waters

7.2.1 The results of the laboratory testing are summarised in Tables 7.1 to 7.3 below and compared to GAC for controlled waters receptors. Analytical laboratory certificates are presented in Appendix 3.

Table 7.1: Groundwater Laboratory Analysis Results

Determinand	Unit	No. samples tested	Screening Criteria		Min	Max	No of Exceedances
Arsenic	µg/l	3	10	DWS	0.43	1.16	0
	µg/l		50	EQS	0.43	1.16	0
Cadmium	µg/l	3	5	DWS	0.05	0.11	0
Chromium	µg/l	3	50	DWS	2.1	2.6	0
Lead	µg/l	3	10	DWS	<0.2	<0.2	0
	µg/l		1.2*	EQS	<0.2	<0.2	0
Nickel	µg/l	3	20	DWS	6.4	7.6	0
	µg/l		4*	EQS	6.4	7.6	3No (BH1, BH2, BH3)
Copper	µg/l	3	12	EQS	2.0	5.7	0
			2000	DWS	2.0	5.7	0
Zinc	µg/l	3	5000	DWS	3.9	6.0	0
	µg/l		12.9**	EQS	3.9	6.0	0
Mercury	µg/l	3	1	DWS	<0.05	<0.05	0
Selenium	µg/l	3	10	DWS	1.2	2.4	0
Boron	µg/l	3	1000	DWS	73	390	0
	µg/l		2000	EQS	73	390	0
Cyanide (Total)	µg/l	3	50	DWS	<1.0	3.4	0
	µg/l		1	EQS	<1.0	3.4	0
Phenols (Total)	µg/l	3	7.7	EQS	<10	<10	0

* bioavailable concentration
**bioavailable concentration + ambient background concentration dissolved for Thames Groundwater (2 µg/L)

Table 7.2: Groundwater Analysis Results – Polycyclic Aromatic Hydrocarbons (PAHs)

Determinand	Unit	No. samples tested	Screening Criteria		Min.	Max.	No. of Exceedances
Naphthalene	µg/l	3	2.4	EQS	<0.01	<0.01	0
Acenaphthylene	µg/l	3	-	-	<0.01	<0.01	0
Acenaphthene	µg/l	3	-	-	<0.01	<0.01	0
Fluorene	µg/l	3	-	-	<0.01	<0.01	0
Phenanthrene	µg/l	3	-	-	<0.01	<0.01	0
Anthracene	µg/l	3	0.1	EQS	<0.01	<0.01	0
Fluoranthene	µg/l	3	0.0063	EQS	<0.01	<0.01	0
Pyrene	µg/l	3	-	-	<0.01	<0.01	0
Benzo(a)anthracene	µg/l	3	-	-	<0.01	<0.01	0
Chrysene	µg/l	3	-	-	<0.01	<0.01	0
Sum of four Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(ghi)perylene Indeno(123-cd)pyrene	µg/l	3	0.1	DWS	<0.04	<0.04	0
Benzo(a)pyrene	µg/l	3	0.01	DWS	<0.01	<0.01	0
Dibenzo(ah)anthracene	µg/l	3	0.00017	EQS	<0.01	<0.01	0

Table 7.3: Groundwater Analysis Results– TPHCWG & BTEX – Controlled Waters

Determinand	Unit	No. Samples tested	Screening Criteria		Min.	Max.	No. of Exceedances
Benzene	µg/l	3	1.0	DWS	<1.0	<1.0	0
	µg/l	3	10	EQS	<1.0	<1.0	0
Toluene	µg/l	3	74	EQS	<1.0	<1.0	0
Ethyl benzene	µg/l	3	300	WHO	<1.0	<1.0	0
Xylenes (total)	µg/l	3	30	EQS	<1.0	<1.0	0
MTBE	µg/l	3	15	WHO	<1.0	<1.0	0
>C5-C6 Aliphatic	µg/l	3	15000	WHO	<1.0	<1.0	0
>C6-C8 Aliphatic	µg/l	3	15000	WHO	<1.0	<1.0	0
>C8-C10 Aliphatic	µg/l	3	300	WHO	<1.0	<1.0	0
>C10-C12 Aliphatic	µg/l	3	300	WHO	<10	<10	0
>C12-C16 Aliphatic	µg/l	3	300	WHO	<10	<10	0
>C16-C21 Aliphatic	µg/l	3	-	-	<10	<10	0
>C21-C35 Aliphatic	µg/l	3	-	-	<10	<10	0
>C5-C7 Aromatic	µg/l	3	10	WHO	<1.0	<1.0	0

Determinand	Unit	No. Samples tested	Screening Criteria		Min.	Max.	No. of Exceedances
>C7-C8 Aromatic	µg/l	3	700	WHO	<1.0	<1.0	0
>C8-C10 Aromatic	µg/l	3	300	WHO	<1.0	<1.0	0
>C10-C12 Aromatic	µg/l	3	90	WHO	<10	<10	0
>C12-C16 Aromatic	µg/l	3	90	WHO	<10	<10	0
>C16-C21 Aromatic	µg/l	3	90	WHO	<10	<10	0
>C21-C35 Aromatic	µg/l	3	90	WHO	<10	<10	0

7.2.2 In addition to the suite outlined above, the three water samples were also analysed for a suite of volatile organic compounds. None of the compounds analysed for were reported above the laboratory method detection limit.

7.2.3 Similarly, for the BTEX (Benzene, Toluene, Ethylbenzene and Xylene) compounds, none of the results were reported above the laboratory method of detection.

7.2.4 Concentrations of nickel were found to exceed environmental water quality standard. It is noted that the EQS is for bioavailable concentrations which is likely to be lower than the total concentration reported. In addition, no environmental receptors have been identified in close proximity to the site, and the concentrations do not exceed the drinking water standard, and are therefore not considered to pose a significant risk to the Principal Aquifer beneath the site.

7.3 Assessment of groundwater analytical data with respect to vapour intrusion pathways

7.3.1 On the basis that no organic substances were reported above detection limit within groundwater samples, a vapour risk from groundwater is not considered to be present.

7.3.2 Dedicated vapour sampling is proposed at the site and will be assessed under separate cover.

8 SOIL GAS RISK ASSESSMENT

8.1 Soil Gas Results

8.1.1 Four return monitoring visits have been undertaken between 1st December 2021 and 26th January 2022 to monitor wells installed within boreholes at the site for soil gas concentrations and groundwater levels. Two further monitoring visits are proposed.

8.1.2 During these visits atmospheric pressure ranged between 995mb and 1034mb and pressure trends observed were falling and static.

8.1.3 The results of the monitoring undertaken are summarised in Table 8.1 below, with the monitoring records presented in Appendix 5.

Table 8.1: Summary of Gas Monitoring Data

Hole No.	Number of monitoring events	CH_4 (%)	CO_2 (%)	O_2 (%)	VOCs (ppm)	Steady Flow Rate (l/hr)	Peak Flow Rate (l/hr)	Depth to water (m bgl)	Well Response Zone as Installed (top / bottom) (m bgl)	Strata targeted by response zone
BH1	4	0.0-0.4	0.5-2.1	13.6-20.1	0.0-3.0	0.0-+0.4	0.0-+0.4	1.51-1.60	1.00 – 6.0	Lynch Hill Gravel - London Clay
BH2	4	0.0-0.4	0.1-2.8	18.5-21.4	0.0-2.0	0.0-+0.2	0.0-+0.2	1.78-2.08	1.00 – 5.20	Lynch Hill Gravel
BH3	4	0.1-0.4	0.1-0.3	16.0-21.2	0.0-2.0	0.0-+0.5	0.0-+0.5	2.14-2.25	1.00 – 5.00	Made Ground – Lynch hill Gravel
WS1	4	0.0-0.3	0.0-0.3	13.6-20.0	0.0-2.0	0.0-+0.2	0.0-+0.2	1.52-1.80	0.50 – 1.20	Made Ground
WS3	4	0.0-0.3	0.1-0.6	21.0-21.2	0.0-2.0	0.0-+0.1	0.0-+0.1	Dry	0.50 – 1.20	Made Ground
WS5	4	0.0-0.4	1.4-1.8	18.7-20.5	0.0-4.0	0.0-+0.2	0.1-+0.2	Dry	0.50 – 1.20	Made Ground – Lynch Hill Gravel

8.2 Screening of Results

8.2.1 As shown in Table 8.1, methane has been to a maximum concentration of 0.4% to date. Carbon dioxide has been reported to a maximum concentration of 2.8% v/v. Screening of the monitoring well headspaces with a photo-ionisation detector (PID) has detected maximum Volatile Organic Compound (VOC) concentration to a maximum level of 4.0ppm. A maximum flow rate of 0.5l/hr has been reported.

8.2.2 In the assessment of risks posed by hazardous ground gases and selection of appropriate mitigation measures, BS8485 (2015) + A1 (2019) identifies four types of development, termed Type A to Type D.

8.2.3 Type B buildings are defined as

"private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small to medium size rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels."

8.2.4 Type B has been adopted as the relevant category for the proposed development.

8.2.5 The soil gas assessment method is based on that proposed by Wilson & Card (1999), which was a development of a method proposed in CIRIA publication R149 (CIRIA, 1995). The method uses both gas concentrations and borehole flow rates to define a characteristic situation based on the limiting borehole gas volume flow for methane and carbon dioxide. In both these methods, the limiting borehole gas volume flow is renamed as the Gas Screening Value (GSV).

8.2.6 The Gas Screening Value (litres of gas per hour) is calculated by using the following equation

GSV = (Concentration/100) X Flow rate

Where concentration is measured in percent (%)
and flow rate is measured in litres per hour (l/hr)

8.2.7 To accord with C665, worst case conditions are used in the calculation of GSVs for the site. These have been summarised below in Table 8.2.

8.2.8 The Characteristic Situation is then determined from Table 8.5 of CIRIA C665.

Table 8.2: Summary of Gas Monitoring Data

Gas	Concentration (v/v %)	Peak Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (after CIRIA C665)
CO_2	2.8	0.5	0.014	**1**
CH_4	0.4	0.5	0.002	**1**

8.2.9 Based on the calculated GSVs, and in consideration of the conceptual site model, the site is classified as Characteristic Situation 1 (CS1) and no formal gas protection measures are considered to be necessary.

8.2.10 BS 8576:2013 has been used to derived threshold levels for carbon monoxide and volatile organic compounds.

8.2.11 Given the recorded levels it is not considered that additional protection measures need to be incorporated to protect end users from the recorded carbon monoxide concentrations.

8.2.12 PID screening of the monitoring well headspace has revealed maximum concentrations of VOCs of 4ppm.

8.2.13 Dedicated vapour sampling and assessment has been commissioned to investigation a potential risk form vapour inhalation indicated by previous investigations and will be reported under separate cover.

9 GEO-ENVIRONMENTAL ASSESSMENT SUMMARY AND RECOMMENDATIONS

9.1 Land Quality Impact Summary

9.1.1 Following the ground investigation, the following is noted:

- It is understood that the proposed development is to comprise the construction of a new residential building to consist of approximately 8-9 storeys containing approximately 130 residential units.
- Following generic risk assessments, no contaminants contained within the testing suite were reported at concentrations in excess of generic assessment criteria for the protection of human health within a "residential without plant uptake" end-use scenario.
- Asbestos in the form of loose chrysotile fibres were detected in a single sample out of 8No analysed in the laboratory.
- The site proposal indicates that the majority of the site will remain covered by a combination of the proposed building footprint and hard surfacing. Where this is the case, no formal remedial measures are considered necessary in terms of human health, as the building and hard surfacing are expected to provide a barrier to potential receptors. In areas of soft landscaping, existing soils should be encapsulated beneath a minimum of 450mm of imported clean topsoil, placed on a geotextile membrane.
- A significant risk to plant growth has not been identified.
- Risks to controlled waters from soils are considered negligible.
- Further assessment of risks to human health via vapour intrusion will be reported under separate cover.
- Following the completion of four return gas monitoring visits the site is considered Characteristic Situation 1 for which no formal gas protection measures are considered necessary.
- Upgraded potable water supply pipe materials are unlikely to be required. The water supply pipe requirements for this site should be discussed at an early stage with the relevant Utility provider
- A remedial strategy will be required for the proposed development.
- As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out. Should any contamination be encountered, a suitably qualified environmental consultant should be informed immediately, so that adequate measures may be recommended.

9.1.2 The above conclusions are made subject to approval by the statutory regulatory bodies.

9.2 Review of Pollutant Linkages Following Ground Investigation

9.2.1 The site CSM has been revised and updated from that suggested in the desk study in view of the ground investigation data, including soil laboratory analysis results. Table 9.1 highlights

whether pollutant linkages identified in the original CSM are still relevant following the risk assessment, or whether pollutant linkages, not previously identified, exist.

Source	Pathway	Receptor	Relevant Pollutant Linkage	Comment
• Warehouse on site from c. early 1970's to c. late 2010's – (S1) • Use of site for storage associated with nearby aircraft works - (S2) Potential for Made Ground associated with previous development operations – on site (S4)	• Ingestion • Inhalation or contact with potentially contaminated dust and vapours	• Future site users • Construction workers • Maintenance workers • Neighbouring site users	**Y**	Asbestos fibres detected on site. See Section 9.1 above for remedial measures.
	• Inhalation of vapours	• Future site users • Construction workers • Maintenance workers • Neighbouring site users	**TBC**	No evidence of a vapour risk from this investigation; however, dedicated vapour assessment is being undertaken under separate cover.
	• Permeation of water pipes and attack on concrete foundations by aggressive soil conditions	• Building structures/services	**TBC**	Contact should be made with relevant utility providers to confirm if upgraded materials are required. The concrete classification to protect buried concrete is discussed in Section 10.3.
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. • Horizontal and vertical migration of contaminants within groundwater	• Controlled waters - Principal aquifer	**N**	No significant risk to controlled waters receptors identified.

Source	Pathway	Receptor	Relevant Pollutant Linkage	Comment
• Current and previous industrial use –off site (S3) ○ Gramophone factory 240m NE (from ca 1910) ○ Gas works 300m north (from ca 1910) ○ Aviation works 90m east (from ca 1930s) ○ USTs for fuel storage at adjacent site to the north, and wider within the adjacent former aviation works	• Horizontal and vertical migration of contaminants within groundwater • Inhalation of vapours	• Future site users • Construction workers • Maintenance workers		
• Former brick fields 20m north and 130m north east (S5) • Worked ground on site and in wider site vicinity (S6)	• Accumulation and Migration of Soil Gases (P5)	• Future site users • Construction workers • Maintenance workers	**TBC**	Currently considered Characteristic Situation 1. Two visits outstanding.

10 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

10.1 General

10.1.1 Subsequent to intrusive investigation of the site and receipt of the laboratory test results, the following geotechnical assessments have been made.

10.2 Proposed Foundations

General

10.2.1 The Made Ground is not considered to provide suitable bearing strata due to its variability and the unacceptable risk of total and differential settlement.

10.2.2 All foundations should be deepened beneath these deposits, soft clay, root or desiccated zones, or disturbed ground, and founded within underlying competent strata.

Conventional Foundations

10.2.3 Based on the ground and groundwater conditions encountered, conventional shallow foundations may be suitable.

10.2.4 It is considered that traditional strip/trench-fill foundations up to 1.2m wide may be formed within the underlying Lynch Hill Gravel at a minimum depth of 0.60m for an allowable bearing capacity of 200kPa. Total and differential settlements should be contained within tolerable limits.

10.2.5 This depth, however, does not take into account the depth of Made Ground and foundations may need to be deepened further accordingly.

10.2.6 Where foundations need to change levels as a result, the foundations should be stepped and reinforced. These steps should be no deeper than half of the width of the foundation and each step should not exceed 0.5m.

10.2.7 Any foundations greater than 2.50m deep would require structure-specific design by a structural engineer.

10.2.8 Formations should be proof-compacted prior to pouring of concrete.

10.2.9 Where any unexpected or soft ground conditions are encountered during the groundworks, works in that area should cease and the advice of a suitably qualified geotechnical engineer sought.

Piled Foundations

10.2.10 Piled foundations would also be suitable.

10.2.11 Preliminary load capacities calculated for varying diameter of CFA piles are given in Table 10.1. The design should be used for preliminary purposes only as the actual working load is dependent on the type of pile and method of installation.

Table 10.1: Indicative Pile Capacities (kN)

Pile toe depth (m bgl)	Pile diameter (mm)		
	450	600	800
	Indicative Allowable Pile Capacity (kN)		
15	315	444	636
17	369	521	744
20	463	650	926
22	532	746	1060
25	648	906	1282
27	*733*	*1022*	*1443*
30	*872*	*1212*	*1706*

10.2.12 To comply with BS EN 1997 and the guidance given by the Federation of Piling Specialists the ground must be proven to a minimum of 5m below the proposed toe of the piles. Consequently, values below 25mbgl have been given indicatively in grey italics.

10.2.13 The construction of a piled foundation is a specialist job and the advice of a reputable local contractor familiar with the type of ground and groundwater conditions encountered on this site should be sought prior to finalising the design.

10.2.14 These working loads have been calculated on the basis of the ground and groundwater conditions encountered in the boreholes and assume the following:

- Partial factors were applied on the sum of the end bearing and skin friction working loads as defined by BS EN 1997 using Design Approach 1 Combination 2.
- No allowance has been made for additional forces acting on the pile shaft, such as negative skin friction, or loading due to desiccation or heave forces.
- Groundwater level was adopted as 3m bgl.

10.2.15 The preliminary working loads given are applicable to single vertically loaded piles. Where groups of piles are to be constructed, the working load of each individual pile should be reduced by a factor of 0.8 and a calculation made to check for the factor of safety against block failure.

10.2.16 A temporary working platform is likely to be required. In addition, some form of temporary drainage may also be required to prevent the working platform becoming waterlogged or deteriorating during use. A working platform should be designed in accordance with BRE BR470, or similar design standard.

10.3 Sulphates

10.3.1 Sulphate attack on building foundations occurs where sulphate solutions react with the various products of hydration in Ordinary Portland Cement (OPC) or converted High-Alumina Cement (HAC). The reaction is expansive, and therefore disruptive, not only due to the formation of minute cracks, but also due to loss of cohesion in the matrix.

10.3.2 In accordance with BRE Special Digest 1, the characteristic values of sulphate used to determine the concrete classification are determined using the methodology summarised in the table below.

Table 10.2: Concrete in the Ground Characteristic Value Determination

No Samples in the dataset	Method for determining the sulphate characteristic value
1 - 4	Highest value
5-9	Mean of the top 2No highest results
10 or greater	Mean of the top 20% highest results

10.3.3 Table 10.3 summarises the analysis of the aggressive nature of the ground for each of the strata encountered within the ground investigation.

Table 10.3: Concrete in the Ground Classes

Stratum	No Samples	pH range	Characteristic WS Sulphate (mg/l)	Design Sulphate Class	ACEC Class
Made Ground	6	7.8-11.0	603.5	DS-2	AC-2
Lynch Hill Gravel Member	1	8.5	50.5	DS-1	AC-1
London Clay Formation	5	8.2-9.1	614.5	DS-2	AC-1

10.3.4 It should be noted that the BGS description of the London Clay Formation notes that it includes "disseminated pyrite". It is therefore common practice to ensure that buried concrete formed in London Clay Formation has a Design Sulphate Class of at least DS-2.

10.3.5 The concrete structures, including foundations, will need to be designed in accordance with BS EN 1992-1-1:2004+A1:2014. It is recommended that the advice of this publication be taken for the design and specification of all sub-surface concrete.

10.4 Ground Floor Slabs

10.4.1 Given the depths of made ground encountered at the site, a suspended floor slab is recommended for the proposed development. This would also be required if piled foundations are adopted.

10.5 Excavations

10.5.1 Temporary excavations within the Made Ground and granular soils are unlikely to remain stable and some form of temporary support or battering back to a safe angle and dewatering are likely to be required.

10.5.2 Ground works should always be designed in such a manner to avoid entry into excavations by construction or maintenance personnel. However, in the event that such works cannot be avoided or designed out, they should only be undertaken in accordance with a safe system of work, following an appropriate risk assessment and in accordance with any legislative requirements, e.g. Confined Spaces Regulations.

10.5.3 Subject to seasonal variations, surface water/groundwater encountered during site works could likely be dealt with by conventional pumping from a sump used to collate waters.

10.6 Pavement and Subgrade

10.6.1 Four in-situ California Bearing Ratio (CBR) tests were undertaken using a Transport Research Laboratory (TRL) Dynamic Penetrometer (DCP). Table 10.4 summarises the results of the in-situ CBR testing.

Table 10.4 – Summary of CBR Test Results

Position	Depth Range (mm)	Stratum	CBR (%)	
			IAN 73/06	TRL 587
CBR1	50 - 250	Made Ground	25.1	24.6
	250 - 500	Made Ground	53.9	50.0
CBR2	50 – 250	Made Ground	19.5	19.5
	250 – 350	Made Ground	46.4	43.5
	350 – 500	Made Ground	84.6	75.9
CBR3	50 - 200	Made Ground	20.9	20.8
	200 – 350	Made Ground	41.6	39.3
	350 - 500	Made Ground	72.7	66.0
CBR4	50 – 200	Made Ground	20.9	20.8
	200 – 250	Made Ground	78.6	70.9
	250 - 300	Made Ground	302	247

10.6.2 The engineering characteristics of Made Ground are variable and unpredictable and the CBR value of these materials does not predict the overall settlements that may occur. It would be prudent to assume a worst case CBR value of 2.5% for the preliminary design of pavements constructed upon the Made Ground and these materials should also be deemed frost susceptible throughout thus a minimum pavement thickness of 450mm would be appropriate.

10.6.3 To account for potential variability, a reduced CBR value of 5% is recommended for use in preliminary design where building within the granular soils of the Lynch Hill Gravel Member.

10.6.4 Additional CBR testing should be undertaken after detailed design is complete to confirm suitability.

11 REFERENCES

BRE Report BR211: Radon: Protective measures for new dwellings, 2015

BRE Special Digest 1: Concrete in Aggressive Ground, 2005

British Standards Institution (2004) Eurocode 7 – Geotechnical design - Part 1: General rules. BS EN 1997-1. Incorporating Corrigendum No.1. BSI, London

British Standards Institution (2007) Eurocode 7 – Geotechnical design - Part 2: Geotechnical investigation and testing. BS EN 1997-2. BSI, London

British Standards Institution (2007) BS 3882:2007 *Specification for topsoil and requirements for use.* Milton Keynes: BSI

British Standards Institution (2011) BS 10175:2011 *Code of practice for the investigation of potentially contaminated sites*. Milton Keynes: BSI

British Standards Institution (2013) BS 8576:2013 *Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOC's),* Milton Keynes: BSI

British Standards Institution BS 5930:2015+A1:2020 *Code of practice for ground investigations*. Milton Keynes: BSI

British Standards Institution (2015) BS 8485:2015 Incorporating corrigendum No.1 *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* Milton Keynes: BSI

CIEH & CL:AIRE (2008) *Guidance on comparing soil contamination data with a critical concentration*. London: Chartered Institute of Environmental Health (CIEH) and CL:AIRE

CIRIA C665 (2007) *Assessing risks posed by hazardous ground gases to buildings London,* CIRIA

Environment Agency (2020) *Land contamination risk management (LCRM)*

Environment Agency, NHBC & CIEH (2008) *Guidance for the safe development of housing on land affected by contamination*. R & D Publication 66. London: Environment Agency

Environment Agency (2006) *Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination* Environment Agency

LQM/CIEH S4ULs. LQM, 2014

Ministry of Housing, Communities & Local Government: *National Planning Policy Framework*. February 2019.

M Zohrabi and PL Scott (2003) TRL Report TRL587 *The Correlation between the CBR Value and Penetrability of Pavement Construction Materials;* Transport Research Laboratory

NHBC Standards 2021. NHBC, Milton Keynes (note that a new version is issued every year and date is to be kept updated)

The Highways Agency (2009) *Design Manual for Roads and Bridges: Design Guidance for Road Pavement Foundations (Draft HD25) Interim Advice Note 73/06 Revision 1* (2009)

Transport and Road Research Laboratory (1984) *The Structural Design of Bituminous Roads*, TRRL report LR1132

APPENDICES

APPENDIX 1 – FIGURES

PROJECT NAME:	Former site of HPH4, Hyde Park	**CLIENT:**	Milington Road (HPH4) LLP
TITLE:	Site location plan	**PROJECT NO.**	P3284J2275
DATE:	May 2021	**FIGURE:**	1

PROJECT NAME:	Former site of HPH4, Hyde Park, Hayes	**CLIENT:**	Millington Road (HPH4) LLP
TITLE:	GI Plan	**PROJECT NO.**	P3284J2275
DATE:	8/06/2021	**FIGURE:**	2

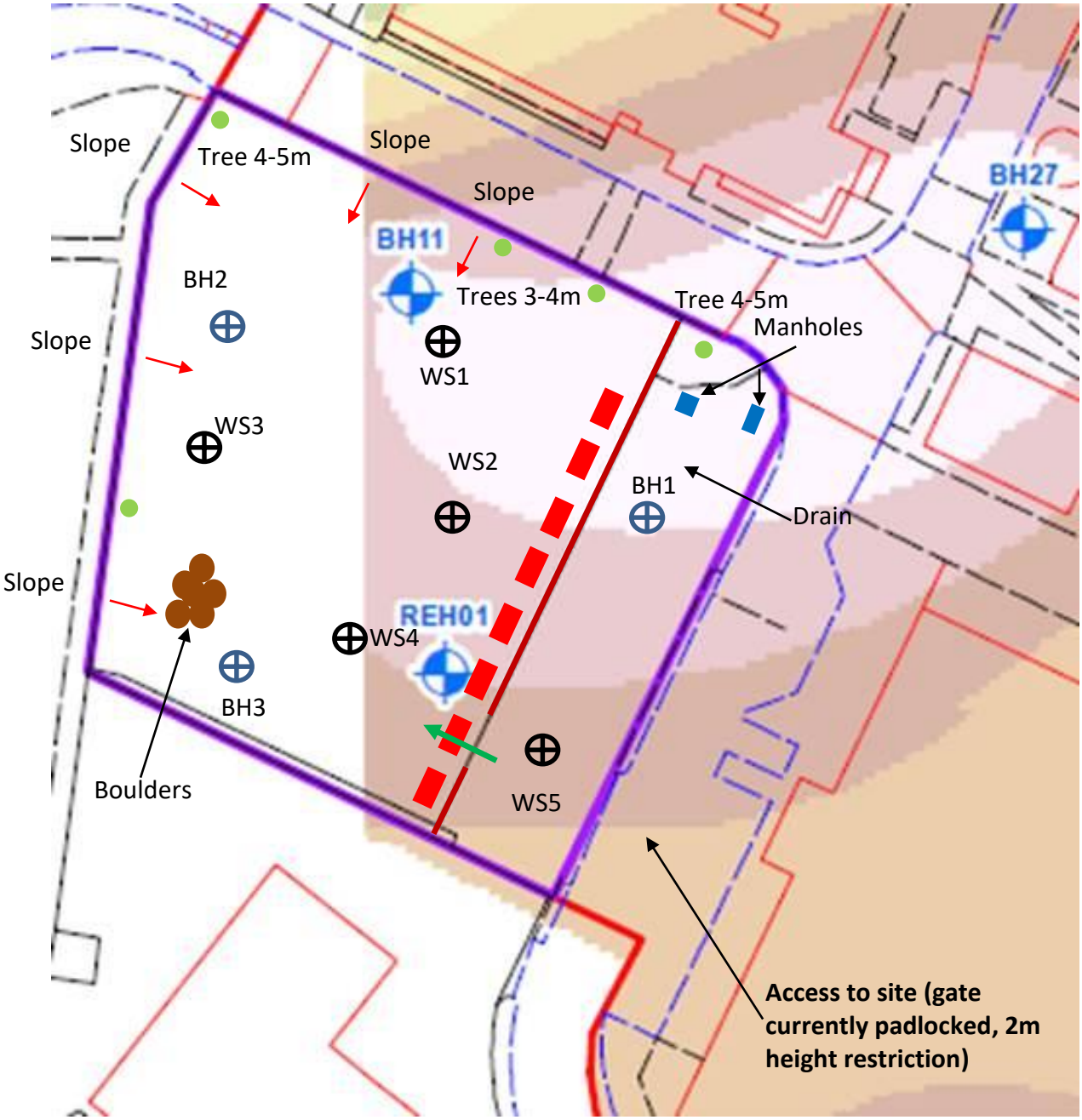
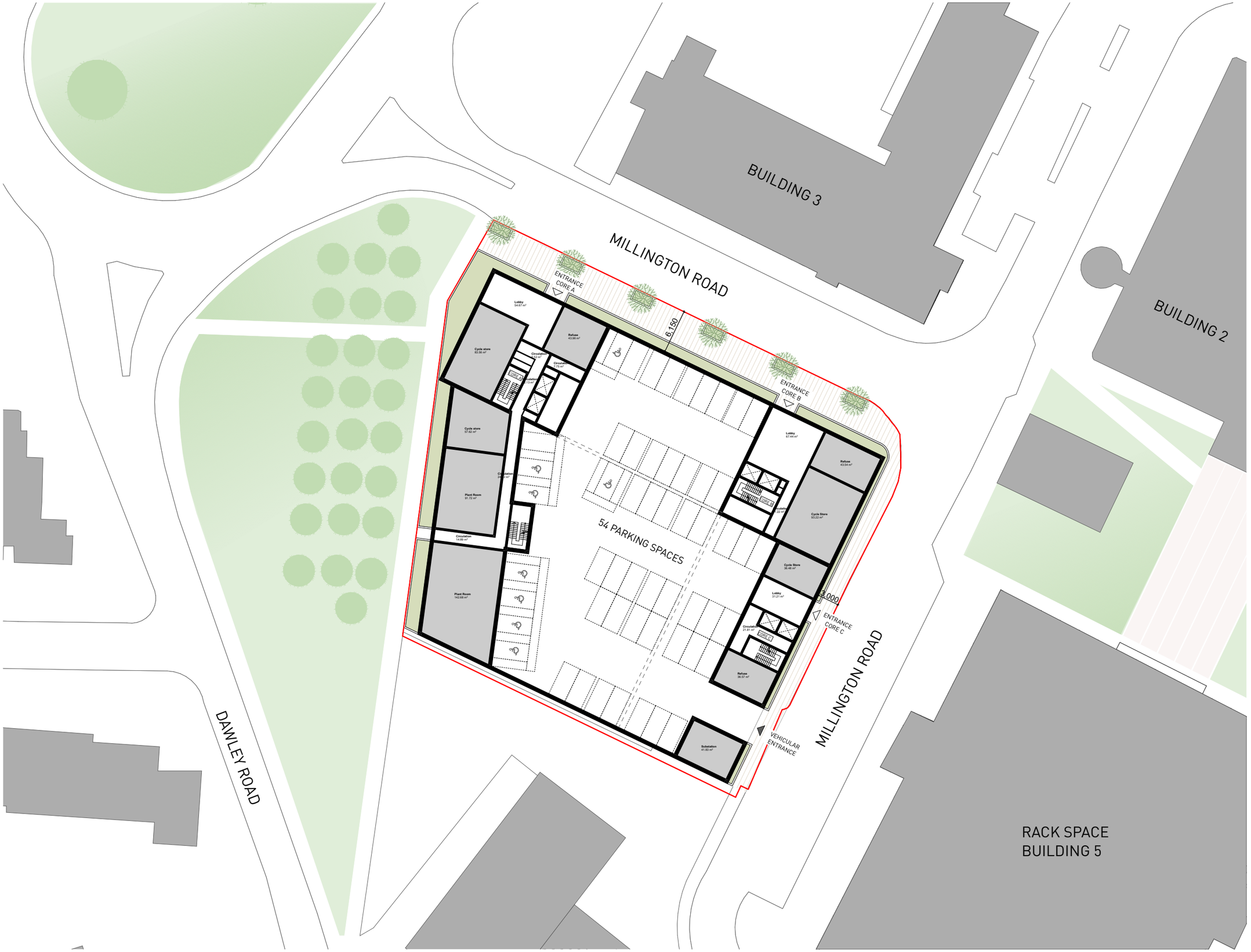


Figure 3: Proposed Ground Floor Plan



rev date description

DRAFT WORK IN PROGRESS 22.04.21

stockwool

The Pump House 19 Hooper Street
London E1 8BU 020 7264 8600
info@stockwool.co.uk

Client
Bellway

Project
Millington Road

Drawing
Ground Floor Plan

Status
WORK IN PROGRESS

Scale	**1:500, 1:200@A3**
CAD File	**P1085_MillingtonMainModel**
Date	**22/04/2021**
Drawn	**SM**
Checked	**AP**

Project no_Drawing no_Revision
P1085_SK(20)000_

APPENDIX 2 – EXPLORATORY HOLE RECORDS

CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH1		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Cable Percussion | Dando 3000	Sheet No:	1 Of 6

Water levels recorded during boring, m

Date:	28/06/2021					
Hole depth:						
Casing depth:						
Level water on strike:	3.6					
Water Level after 20mins:	3.1					

Remarks

1: Water added to aid drilling from 1.2m-2.5m bgl
2: *Field description
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00					
											0.15		Asphalt. (MADE GROUND)	
											0.30		Concrete. (MADE GROUND)	
D B	0.30												Brown to grey sandy gravel. Gravel consists of brick and concrete. (MADE GROUND)	
									0.50					
									1.00		1.10			
D SPT B	1.20	10	15	15	22	13		50					Very dense becoming medium dense orangish clayey very gravelly SAND. Gravel consists of sub-angular to sub-rounded flint. (LYNCH HILL GRAVEL MEMBER)	
									1.50					
SPT-C B	2.00	7	9	10	12	14	16	52	2.00					
									2.50					
SPT-C B	3.00	4	4	5	4	4	4	17	3.00					
									3.50					
SPT-C B	4.00	3	3	4	3	3	4	14	4.00					
									4.50					
SPT-C	5.00	2	2	3	2	2	2	9	5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH1		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Cable Percussion | Dando 3000	Sheet No:	2 Of 6

Water levels recorded during boring, m

Date:	28/06/2021					
Hole depth:						
Casing depth:						
Level water on strike:	3.6					
Water Level after 20mins:	3.1					

Remarks

1: Water added to aid drilling from 1.2m-2.5m bgl
2: *Field description
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
SPT-C	5.00	2	2	3	2	2	2	9	5.00				Very dense becoming medium dense orangish clayey very gravelly SAND. Gravel consists of sub-angular to sub-rounded flint. (LYNCH HILL GRAVEL MEMBER)	
											5.20			
D	5.50								5.50				Firm to stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
									6.00					
U100	6.50								6.50					
	59 blows, 100% recovery													
D	7.00								7.00					
									7.50					
SPT	8.00	2	3	4	4	4	5	17	8.00					
D	8.50								8.50					
									9.00					
U100	9.50								9.50					
	71 blows, 70% recovery													
D	10.00								10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH1		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Cable Percussion | Dando 3000	Sheet No:	3 Of 6

Water levels recorded during boring, m

Date:	28/06/2021					
Hole depth:						
Casing depth:						
Level water on strike:	3.6					
Water Level after 20mins:	3.1					

Remarks

1: Water added to aid drilling from 1.2m-2.5m bgl

2: *Field description

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	10.00								10.00				Firm to stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
									10.50					
SPT	11.00	2	4	4	4	4	5	17	11.00					
D	11.50								11.50					
									12.00					
SPT	12.50	25		50				50	12.50		12.50			
	50 blows for 64mm penetration												Grey CLAYSTONE. (LONDON CLAY FORMATION)	
											12.90			
D	13.00								13.00				Stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
									13.50					
U100	14.00								14.00					
	85 blows, 100% recovery													
D	14.50								14.50					
									15.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH1		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Cable Percussion | Dando 3000	Sheet No:	4 Of 6

Water levels recorded during boring, m

Date:	28/06/2021					
Hole depth:						
Casing depth:						
Level water on strike:	3.6					
Water Level after 20mins:	3.1					

Remarks

1: Water added to aid drilling from 1.2m-2.5m bgl

2: *Field description

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									15.00				Stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
SPT	15.50	3	4	5	7	7	8	27	15.50					
D	16.00								16.00					
									16.50					
U100	17.00								17.00					
	89 blows, 100% recovery													
D	17.50								17.50					
									18.00					
SPT	18.50	4	5	6	8	8	9	31	18.50					
D	19.00								19.00					
									19.50					
U100	20.00								20.00					
	100 blows, 90% recovery													

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH1		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Cable Percussion | Dando 3000	Sheet No:	5 Of 6

Water levels recorded during boring, m

Date:	28/06/2021					
Hole depth:						
Casing depth:						
Level water on strike:	3.6					
Water Level after 20mins:	3.1					

Remarks

1: Water added to aid drilling from 1.2m-2.5m bgl

2: *Field description

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
U100	20.00								20.00				Stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
	100 blows, 90% recovery													
D	20.50								20.50					
									21.00					
SPT	21.50	4	7	9	10	10	12	41	21.50					
D	22.00								22.00					
									22.50					
U100	23.00								23.00					
	110 blows, no recovery													
B														
D														
SPT	23.50	6	6	8	10	11	13	42	23.50					
D	24.00								24.00					
									24.50					
U100	25.00								25.00					
	114 blows, 100% recovery													

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH1		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Cable Percussion | Dando 3000	Sheet No:	6 Of 6

Water levels recorded during boring, m

Date:	28/06/2021					
Hole depth:						
Casing depth:						
Level water on strike:	3.6					
Water Level after 20mins:	3.1					

Remarks

1: Water added to aid drilling from 1.2m-2.5m bgl
2: *Field description
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
U100	25.00								25.00				Stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
	114 blows, 100% recovery													
D	25.50								25.50					
									26.00					
SPT	26.50	6	8	10	12	12	15	49	26.50					
D	27.00								27.00					
									27.50					
U100	28.00								28.00					
	120 blows, 90% recovery													
D	28.50								28.50					
									29.00					
SPT	29.50	7	9	12	14	16	8	50	29.50					
											30.00			
									30.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH2		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Cable Percussion Dando 4000	Sheet No:	1 Of 6

Water levels recorded during boring, m

Date:	11/11/2021					
Hole depth:	30.00					
Casing depth:	6.00					
Level water on strike:	4.10					
Water Level after 20mins:	3.5					

Remarks

1: * Denotes field observation
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									0.00				Grass over black sandy clay. (MADE GROUND - Topsoil)	
											0.10		Brown sandy gravelly clay. Gravel consists of brick. (MADE GROUND)	
B	0.30													
D									0.50					
D	1.00								1.00		1.00			
B	1.20												Medium dense to dense brown orange sandy GRAVEL. Gravel consists of sub-angular to sub-rounded flint. (LYNCH HILL GRAVEL MEMBER)	
S		11	12	14	16	30		60						
									1.50					
B	2.00								2.00					
C		6	6		9	10	11	30						
									2.50					
B	3.00								3.00					
C		3	4	4	4	4	5	17						
									3.50					
B	4.00								4.00					
C		2	3	3	4	3	2	12						
									4.50					
C	5.00	2	1	2	2	2	2	8	5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	BH2
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Cable Percussion Dando 4000	Sheet No:	2 Of 6

Water levels recorded during boring, m

Date:	11/11/2021					
Hole depth:	30.00					
Casing depth:	6.00					
Level water on strike:	4.10					
Water Level after 20mins:	3.5					

Remarks

1: * Denotes field observation

2:

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
C	5.00	2	1	2	2	2	2	8	5.00				Medium dense to dense brown orange sandy GRAVEL. Gravel consists of sub-angular to sub-rounded flint. (LYNCH HILL GRAVEL MEMBER)	
											5.20			
D	5.50								5.50				Firm becoming stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
									6.00					
S	6.50	2	2	2	3	3	3	11	6.50					
D	7.00								7.00					
									7.50					
U	8.00								8.00					
	69 blows for 100% recovery													
D	8.50								8.50					
									9.00					
S	9.50	2	3	3	4	3	4	14	9.50					
D	10.00								10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH2		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Cable Percussion Dando 4000	Sheet No:	3 Of 6

Water levels recorded during boring, m

Date:	11/11/2021					
Hole depth:	30.00					
Casing depth:	6.00					
Level water on strike:	4.10					
Water Level after 20mins:	3.5					

Remarks

1: * Denotes field observation

2:

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	10.00								10.00				Firm becoming stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
									10.50					
U	11.00								11.00					
	120 blows for 40% recovery-claystone encountered													
D	11.50								11.50					
									12.00					
S	12.50	3	4	4	5	6	6	21	12.50					
D	13.00								13.00					
									13.50					
S	14.00	3	4	4	5	6	7	22	14.00					
									14.50					
D	15.00								15.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH2		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Cable Percussion Dando 4000	Sheet No:	4 Of 6

Water levels recorded during boring, m

Date:	11/11/2021					
Hole depth:	30.00					
Casing depth:	6.00					
Level water on strike:	4.10					
Water Level after 20mins:	3.5					

Remarks

1: * Denotes field observation
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	15.00								15.00				Firm becoming stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
U	15.50								15.50					
	85 blows for 100% recovery													
D	16.00								16.00					
									16.50					
S	17.00	4	5	6	7	8	8	29	17.00					
									17.50					
D	18.00								18.00					
U	18.50								18.50					
	95 blows for 100% recovery													
D	19.00								19.00					
									19.50					
S	20.00	4	7	8	9	9	10	36	20.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH2		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Cable Percussion Dando 4000	Sheet No:	5 Of 6

Water levels recorded during boring, m

Date:	11/11/2021					
Hole depth:	30.00					
Casing depth:	6.00					
Level water on strike:	4.10					
Water Level after 20mins:	3.5					

Remarks

1: * Denotes field observation
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
S	20.00	4	7	8	9	9	10	36	20.00				Firm becoming stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
									20.50					
D	21.00								21.00					
U	21.50								21.50					
	100 blows for 100% recovery													
D	22.00								22.00					
									22.50					
S	23.00	5	6	8	9	10	12	39	23.00					
									23.50					
D	24.00								24.00					
U	24.50								24.50					
	110 blows for 100% recovery													
D	25.00								25.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH2		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	MD	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Cable Percussion Dando 4000	Sheet No:	6 Of 6

Water levels recorded during boring, m

Date:	11/11/2021					
Hole depth:	30.00					
Casing depth:	6.00					
Level water on strike:	4.10					
Water Level after 20mins:	3.5					

Remarks

1: * Denotes field observation
2:
3:
4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	25.00								25.00				Firm becoming stiff consistency* grey CLAY. (LONDON CLAY FORMATION)	
									25.50					
S	26.00	6	7	9	10	12	13	44	26.00					
									26.50					
D	27.00								27.00					
U	27.50								27.50					
	115 blows for 100% recovery													
D	28.00								28.00					
									28.50					
S	29.00	7	9	10	12	14	15	51	29.00					
									29.50					
									30.00		30.00			

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH3		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	RM	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Dando 2000 Cable Percussive Rig	Sheet No:	1 Of 6

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater strike reported

2: Water added from 3.0m may have masked any groundwater strike.

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
B	0.00								0.00				Grass over brown sandy clay. (MADE GROUND - Topsoil)	
											0.20		Brown clayey sandy gravel. Sand is fine to coarse. Gravel consists of fine to coarse angular to sub-rounded brick concrete flint. (MADE GROUND)	
D	1.00								1.00					
S	1.50	8	10	10	11	12	12	45	1.50		1.80			
D	2.00								2.00				Medium dense light brown SAND and GRAVEL. (LYNCH HILL GRAVEL MEMBER)	
S		8	8	10	8	10	10	38						
D	3.00								3.00					
S		7	5	5	5	7	5	22						
									3.50					
D	4.00								4.00					
S		5	5	7	5	4	5	21						
									4.50					
D	5.00								5.00		4.98		Firm, becoming stiff consistency* grey silty CLAY. (LONDON CLAY FORMATION)	
S		3	2	3	3	2	3	11						

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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		CABLE PERCUSSION BOREHOLE RECORD	
		Exploratory Hole No:	BH3
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	RM	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Dando 2000 Cable Percussive Rig	Sheet No:	2 Of 6

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater strike reported

2: Water added from 3.0m may have masked any groundwater strike.

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	5.00								5.00					
S		3	2	3	3	2	3	11					Firm, becoming stiff consistency* grey silty CLAY. (LONDON CLAY FORMATION)	
									5.50					
D	6.00								6.00					
U	6.50								6.50					
	55 blows for 80% recovery													
D	7.00								7.00					
									7.50					
S	8.00	2	2	3	2	3	2	10	8.00					
B														
									8.50					
D	9.00								9.00					
U	9.50								9.50					
	70 blows for 85% recovery													
D	10.00								10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH3		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	RM	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Dando 2000 Cable Percussive Rig	Sheet No:	3 Of 6

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater strike reported

2: Water added from 3.0m may have masked any groundwater strike.

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
D	10.00								10.00				Firm, becoming stiff consistency* grey silty CLAY. (LONDON CLAY FORMATION)	
									10.50					
S B	11.00	2	2	3	4	5	4	16	11.00					
									11.50					
									12.00					
U	12.50								12.50					
	77 blows for 100% recovery													
D	13.00								13.00					
									13.50					
S B	14.00	3	4	5	8	5	7	25	14.00					
									14.50					
									15.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	BH3
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	RM	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Dando 2000 Cable Percussive Rig	Sheet No:	4 Of 6

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater strike reported

2: Water added from 3.0m may have masked any groundwater strike.

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									15.00				Firm, becoming stiff consistency* grey silty CLAY. (LONDON CLAY FORMATION)	
U	15.50								15.50					
	80 blows for 90% recovery													
D	16.00								16.00					
									16.50					
S B	17.00	4	5	7	7	8	10	32	17.00					
									17.50					
									18.00					
U	18.50								18.50					
	92 blows for 100% recovery													
D	19.00								19.00					
									19.50					
S B	20.00	7	7	8	10	10	10	38	20.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

		Exploratory Hole No:	BH3
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	RM	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Dando 2000 Cable Percussive Rig	Sheet No:	5 Of 6

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater strike reported

2: Water added from 3.0m may have masked any groundwater strike.

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
S	20.00	7	7	8	10	10	10	38	20.00				Firm, becoming stiff consistency* grey silty CLAY. (LONDON CLAY FORMATION)	
B														
									20.50					
									21.00					
S	21.50	10	8	10	11	10	10	41	21.50					
B														
									22.00					
									22.50					
U	23.00								23.00					
	100 blows for no recovery													
D	23.50								23.50					
									24.00					
S	24.50	8	8	10	15	15	10	50	24.50					
	10 blows for 20mm penetration in R6													
B														
									25.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:	BH3		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	RM	Date Commenced:	11/11/2021
Checked By:	SL	Date Completed:	11/11/2021
Type and diameter of equipment:	Dando 2000 Cable Percussive Rig	Sheet No:	6 Of 6

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater strike reported

2: Water added from 3.0m may have masked any groundwater strike.

3:

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
									25.00				Firm, becoming stiff consistency* grey silty CLAY. (LONDON CLAY FORMATION)	
									25.50					
S B	26.00	10	10	12	12	11	12	47	26.00					
									26.50					
									27.00					
U	27.50								27.50					
	105 blows for 100% recovery													
D	28.00								28.00					
									28.50					
S	29.00	7	12	12	13	13	12	50	29.00					
									29.50					
											30.00			
									30.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	WS1
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	JO	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater reported

2: Borehole refused at 2.0m bgl on very dense gravel.

3: CBR test undertaken using Dynamic Cone Penetrometer

4:

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
ES	0.25									0.32		Light brown to grey sandy gravel. Gravel consists of concrete and brick. (MADE GROUND)	
ES	0.50											Dark brown to grey slightly sandy slightly gravelly clay. Sand is fine. Gravel consists of fine to medium angular to sub-angular flint, brick and asphalt. (MADE GROUND)	
SPT	1.20	2	2	3	4	3	4	14					
ES	1.50												
ES	1.95									1.92			
SPT	2.00	8	13	19	24	7		50				Very dense light brown clayey sandy GRAVEL. Sand is fine to medium. Gravel consits of fine to medium angular to sub-angular flint. (LYNCH HILL GRAVEL MEMBER)	
	50 blows for 155mm penetration									2.00			

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS2		
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	JO	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater reported

2: Borehole refused at 2.0m bgl on very dense gravel

3: CBR test undertaken using Dynamic Cone Penetrometer

4:

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
										0.00			
ES	0.25									0.32		Light brown to grey sandy gravel. Sand is medium to coarse. Gravel consists of medium to coarse sub-angular to sub-rounded concrete and brick. (MADE GROUND)	
ES	0.40									0.50		Dark brown to grey slightly sandy slightly gravelly clay. Sand is fine. Gravel consists of fine to medium angular to sub-angular flint, brick and asphalt. (MADE GROUND)	
ES	1.20									1.00			
SPT		2	2	3	2	3	3	11		1.52			
ES	1.75									1.50		Very dense light brown clayey sandy GRAVEL. Sand is fine to medium. Gravel consits of fine to medium angular to sub-angular flint. (LYNCH HILL GRAVEL MEMBER)	
SPT	2.00	11	13	18	22	10		50		2.00			
	50 blows for 155mm penetration									2.00			
										2.50			
										3.00			
										3.50			
										4.00			
										4.50			
										5.00			

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	WS3
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	JO	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater reported

2: Borehole refused on very dense gravel at 1.6m bgl

3: CBR test undertaken using Dynamic Cone Penetrometer

4:

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
										0.00		Light brown to grey sandy gravel. Sand is medium to coarse. Gravel consists of medium to coarse sub-angular to sub-rounded concrete and brick. (MADE GROUND)	
										0.22		Dark brown sandy gravelly clay. Sand is fine. Gravel consists of fine to medium angular to sub-angular flint, brick and asphalt. (MADE GROUND)	
SPT	1.20	2	3	3	3	2	3	11		1.44			
SPT	1.60	6	9	13	18	19		50		1.60		Very dense light brown clayey sandy GRAVEL. Sand is fine to medium. Gravel consits of fine to medium angular to sub-angular flint. (LYNCH HILL GRAVEL MEMBER)	
	50 blows for 175mm penetration												

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	WS4
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	JO	Date Commenced:	28/06/2021
Checked By:	SL	Date Completed:	28/06/2021
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater reported

2: Borehole refused at 1.5m bgl on very dense gravel

3: CBR test undertaken using Dynamic Cone Penetrometer

4:

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
										0.00			
ES	0.20									0.09		Brown gravelly clay with rootlets. Gravel consists of medium rounded flint. (MADE GROUND - Topsoil)	
ES	0.50									0.37		Light brown to grey sandy gravel. Sand is medium to coarse. Gravel consists of medium to coarse sub-angular to sub-rounded concrete and brick. (MADE GROUND)	
ES	0.80									0.50		Dark brown sandy gravelly clay. Sand is fine. Gravel consists of fine to medium angular to sub-angular flint, brick and asphalt. (MADE GROUND)	
										1.00			
ES	1.20									1.02		Medium dense becoming very dense light brown clayey sandy GRAVEL. Sand is fine to medium. Gravel consits of fine to medium angular to sub-angular flint. (LYNCH HILL GRAVEL MEMBER)	
SPT		1	1	2	5	6	8	21					
SPT	1.50	8	12	17	24	9		50		1.50			
	50 blows for 153mm penetration												
										2.00			
										2.50			
										3.00			
										3.50			
										4.00			
										4.50			
										5.00			

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

		Exploratory Hole No:	WS5
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ	Project No:	P3284J2275
Client:	Millington Road (HPH4) LLP	Ground Level:	
Logged By:	JO	Date Commenced:	28/06/2021
Checked By:		Date Completed:	28/06/2021
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: No groundwater reported

2: Borehole refused at 1.3m bgl on very dense gravel

3:

4:

Sample or Tests									Strata				
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N					
										0.00		Asphalt. (MADE GROUND)	
ES	0.30									0.26		Dark brown to grey slightly sandy slightly gravelly clay. Sand is fine. Gravel consists of fine to medium angular to sub-angular flint, brick and asphalt. (MADE GROUND)	
ES	0.60									0.50			
ES	0.90									0.97			
ES	1.20									1.00		Very dense light orangish brown clayey slightly sandy GRAVEL. Sand is fine to medium. Gravel consits of fine to medium angular to sub-angular flint. (LYNCH HILL GRAVEL MEMBER)	
SPT		6	7	10	17	21	2	50		1.30			
	50 blows for 225mm penetration												
										1.50			
										2.00			
										2.50			
										3.00			
										3.50			
										4.00			
										4.50			
										5.00			

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

APPENDIX 3 – CHEMICAL LABORATORY TEST RESULTS

Accounts
Jomas Associates Ltd
Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD

e: Jomas Associates -

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 21-84720

Project / Site name:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London	**Samples received on:**	29/06/2021
Your job number:	JJ2275	**Samples instructed on/ Analysis started on:**	02/07/2021
Your order number:	P3284JJ2275.8	**Analysis completed by:**	09/07/2021
Report Issue Number:	1	**Report issued on:**	09/07/2021
Samples Analysed:	8 soil samples		

Signed:

Joanna Wawrzeczko
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: 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, Londor
Your Order No: P3284JJ2275.8

Lab Sample Number				1925471	1925472	1925473	1925474	1925475
Sample Reference				WS1	WS1	WS2	WS3	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	1.50	0.40	0.20	1.50
Date Sampled				28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021
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	< 0.1
Moisture Content	%	0.01	NONE	7.7	9.8	6.3	12	6.6
Total mass of sample received	kg	0.001	NONE	1.0	0.90	1.0	1.0	0.80
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile- Loose FIbres	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	10.8	-	7.8	10.1	-
Total Cyanide	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Total Sulphate as SO4	mg/kg	50	MCERTS	10000	-	730	5600	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.54	-	0.27	0.66	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	544	-	269	663	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.2	-	0.3	-	< 0.1
Total Phenols								
Total Phenols (monohydric)	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	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.25	0.43	< 0.05	0.29	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.10	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.45	0.85	< 0.05	0.63	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.68	0.88	< 0.05	0.74	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.25	0.37	< 0.05	0.36	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.52	0.54	< 0.05	0.53	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.37	0.65	< 0.05	0.59	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.19	0.26	< 0.05	0.28	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.20	0.42	< 0.05	0.40	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.29	< 0.05	0.29	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.40	< 0.05	0.41	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	2.91	5.19	< 0.80	4.52	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	-	9.8	11	-
Boron (water soluble)	mg/kg	0.2	MCERTS	4.7	-	1.2	1.7	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	-	0.4	0.8	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	< 4.0	< 4.0	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	-	24	22	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	-	22	23	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	24	-	27	24	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	-	18	14	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	49	-	51	58	-

Analytical Report Number: 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, Londor
Your Order No: P3284JJ2275.8

Lab Sample Number				1925471	1925472	1925473	1925474	1925475
Sample Reference				WS1	WS1	WS2	WS3	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	1.50	0.40	0.20	1.50
Date Sampled				28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	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
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	µg/kg	1	MCERTS	-	< 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								
Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
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	< 2.0	-	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	< 8.0	< 8.0	-	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	< 8.0	< 8.0	-	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	< 10	-	< 10
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	< 2.0	-	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	< 10	< 10	-	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	23	< 10	-	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	28	< 10	-	< 10
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0	-
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	-	-	< 4.0	-
TPH (C16 - C21)	mg/kg	1	MCERTS	5.2	-	-	3.4	-
TPH (C21 - C40)	mg/kg	10	MCERTS	21	-	-	15	-
VOCs								
Chloromethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
Chloroethane	µg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
Bromomethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
Vinyl Chloride	µg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
Cis-1,2-dichloroethene	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
1,1-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Trichloromethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
Benzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0

Analytical Report Number: 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, Londor
Your Order No: P3284JJ2275.8

Lab Sample Number				1925471	1925472	1925473	1925474	1925475
Sample Reference				WS1	WS1	WS2	WS3	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	1.50	0.40	0.20	1.50
Date Sampled				28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
1,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Trichloroethene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Dibromomethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
Toluene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
Tetrachloroethene	µg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Styrene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Tribromomethane	µg/kg	1	NONE	-	< 1.0	< 1.0	-	< 1.0
o-Xylene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Bromobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	< 1.0

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	< 0.007	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, L
Your Order No: P3284JJ2275.8

Lab Sample Number				1925476	1925477	1925478
Sample Reference				WS4	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.80	0.60
Date Sampled				28/06/2021	28/06/2021	28/06/2021
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	%	0.01	NONE	6.0	11	14
Total mass of sample received	kg	0.001	NONE	1.0	0.80	0.80
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
General Inorganics						
pH - Automated	pH Units	N/A	MCERTS	11.0	7.8	8.0
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	11000	830	720
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.073	0.20	0.36
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	72.8	204	361
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.2	-	1.7
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
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	0.55	0.43
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.10	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.28	1.5	1.0
Pyrene	mg/kg	0.05	MCERTS	0.34	1.5	0.99
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.65	0.40
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.79	0.65
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.92	0.68
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.59	0.35
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.72	0.37
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.55	0.30
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	0.72	0.40
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	8.49	5.57
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	18	13
Boron (water soluble)	mg/kg	0.2	MCERTS	2.0	1.3	2.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	8.3	5.3
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24	25	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	51	49
Lead (aqua regia extractable)	mg/kg	1	MCERTS	12	69	150
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	29	17
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	97	110

Analytical Report Number: 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, L
Your Order No: P3284JJ2275.8

Lab Sample Number				1925476	1925477	1925478
Sample Reference				WS4	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.80	0.60
Date Sampled				28/06/2021	28/06/2021	28/06/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Monoaromatics & Oxygenates						
Benzene	µg/kg	1	MCERTS	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-
Petroleum Hydrocarbons						
Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	49	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	49	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	< 10	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	< 10	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	-
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	-	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	-	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	-	< 1.0
TPH (C21 - C40)	mg/kg	10	MCERTS	< 10	-	< 10
VOCs						
Chloromethane	µg/kg	1	ISO 17025	-	< 1.0	-
Chloroethane	µg/kg	1	NONE	-	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	-	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	-	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	-	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	-	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	-	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	< 1.0	-
Benzene	µg/kg	1	MCERTS	-	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	-	< 1.0	-

Analytical Report Number: 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, L
Your Order No: P3284JJ2275.8

Lab Sample Number				1925476	1925477	1925478
Sample Reference				WS4	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.80	0.60
Date Sampled				28/06/2021	28/06/2021	28/06/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
1,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	-	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	-	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	-	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	-	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	-	< 1.0	-
Styrene	µg/kg	1	MCERTS	-	< 1.0	-
Tribromomethane	µg/kg	1	NONE	-	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	-	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	-	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	-	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	-

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	< 0.001	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	< 0.001	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	< 0.001	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	< 0.001	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	< 0.001	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	< 0.001	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	< 0.001	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	< 0.007	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London

* 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 *
1925471	WS1	None Supplied	0.25	Brown sandy loam with gravel.
1925472	WS1	None Supplied	1.5	Brown clay and loam with gravel.
1925473	WS2	None Supplied	0.4	Brown clay and loam with gravel.
1925474	WS3	None Supplied	0.2	Brown sandy loam with gravel and vegetation.
1925475	WS3	None Supplied	1.5	Brown clay and loam with gravel.
1925476	WS4	None Supplied	0.2	Brown sandy loam with gravel.
1925477	WS4	None Supplied	0.8	Brown clay and loam with gravel.
1925478	WS5	None Supplied	0.6	Brown clay with gravel.

Analytical Report Number : 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
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
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
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	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
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
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
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
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
PRO (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-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
Total cyanide in soil	Determination of total cyanide 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
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
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
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

Analytical Report Number : 21-84720
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Sulphate, water soluble, in soil	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

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-86769

Project / Site name:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3	**Samples received on:**	29/06/2021
Your job number:	JJ2275	**Samples instructed on/ Analysis started on:**	06/07/2021
Your order number:	P3284JJ2275-10	**Analysis completed by:**	26/07/2021
Report Issue Number:	1	**Report issued on:**	26/07/2021
Samples Analysed:	3 soil samples		

Signed: Karolina Marek

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

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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: 21-86769
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4A
Your Order No: P3284JJ2275-10

Lab Sample Number				1937451	1937452	1937453
Sample Reference				BH1	BH1	BH1
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				3.00	8.50	22.00
Date Sampled				Deviating	Deviating	Deviating
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	%	0.01	NONE	2.6	16	16
Total mass of sample received	kg	0.001	NONE	0.40	1.3	1.3

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.5	8.2	8.8
Total Sulphate as SO4	mg/kg	50	MCERTS	210	2100	980
Total Sulphate as SO4	%	0.005	MCERTS	0.021	0.213	0.098
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.051	0.83	0.40
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	50.5	826	403
Total Sulphur	mg/kg	50	MCERTS	330	27000	5000
Total Sulphur	%	0.005	MCERTS	0.033	2.70	0.495

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-86769
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

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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 *
1937451	BH1	None Supplied	3	Brown sand with gravel.
1937452	BH1	None Supplied	8.5	Brown clay and sand with gravel.
1937453	BH1	None Supplied	22	Brown clay and sand.

Analytical Report Number : 21-86769
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-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
Total Sulphur in soil	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
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
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
Sulphate, water soluble, in soil	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

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Sample Deviation Report

Analytical Report Number : 21-86769
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH1	None Supplied	S	1937451	a	None Supplied	None Supplied	None Supplied
BH1	None Supplied	S	1937452	a	None Supplied	None Supplied	None Supplied
BH1	None Supplied	S	1937453	a	None Supplied	None Supplied	None Supplied

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Analytical Report Number : 21-24727

Project / Site name:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	**Samples received on:**	12/11/2021
Your job number:	JJ2275	**Samples instructed on/ Analysis started on:**	24/11/2021
Your order number:	P3284JJ2275 17	**Analysis completed by:**	26/11/2021
Report Issue Number:	1	**Report issued on:**	26/11/2021
Samples Analysed:	3 soil samples		

Signed: A. Czerwińska

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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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: 21-24727
Project / Site name: Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ
Your Order No: P3284JJ2275 17

Lab Sample Number				2092500	2092501	2092502
Sample Reference				BH2	BH3	BH3
Sample Number				D	D	D
Depth (m)				22.00	9.00	23.50
Date Sampled				Deviating	Deviating	Deviating
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	%	0.01	NONE	15	23	21
Total mass of sample received	kg	0.001	NONE	2.0	1.6	2.0

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.1	8.2	8.9
Total Sulphate as SO4	mg/kg	50	MCERTS	610	520	610
Total Sulphate as SO4	%	0.005	MCERTS	0.061	0.052	0.061
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.22	0.14	0.22
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	225	140	222
Total Sulphur	mg/kg	50	MCERTS	4700	3400	3400
Total Sulphur	%	0.005	MCERTS	0.468	0.343	0.341

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-24727
Project / Site name: Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ

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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 *
2092500	BH2	D	22	Brown clay.
2092501	BH3	D	9	Brown clay and sand.
2092502	BH3	D	23.5	Brown clay.

Analytical Report Number : 21-24727
Project / Site name: Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-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
Total Sulphur in soil	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
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
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
Sulphate, water soluble, in soil	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

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Analytical Report Number : 21-24727
Project / Site name: Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH2	D	S	2092500	a	None Supplied	None Supplied	None Supplied
BH3	D	S	2092501	a	None Supplied	None Supplied	None Supplied
BH3	D	S	2092502	a	None Supplied	None Supplied	None Supplied

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Analytical Report Number : 21-27212

Project / Site name:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3	**Samples received on:**	03/12/2021
Your job number:	JJ2275	**Samples instructed on/ Analysis started on:**	06/12/2021
Your order number:	P3284JJ2275.19	**Analysis completed by:**	13/12/2021
Report Issue Number:	1	**Report issued on:**	13/12/2021
Samples Analysed:	3 water samples		

Signed: Karolina Marek

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

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An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-27212
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

Your Order No: P3284JJ2275.19

Lab Sample Number				2106396	2106397	2106398
Sample Reference				BH1	BH2	BH3
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				5.00	3.60	4.52
Date Sampled				Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
General Inorganics						
pH	pH Units	N/A	ISO 17025	7.0	6.9	7.8
Electrical Conductivity at 20 °C	µS/cm	10	ISO 17025	920	860	890
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0	3.4
Sulphate as SO4	µg/l	45	ISO 17025	74500	265000	308000
Ammoniacal Nitrogen as NH4	µg/l	15	ISO 17025	33	69	150
Hardness - Total	mgCaCO3/l	1	ISO 17025	333	534	496
Total Phenols						
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10
Speciated PAHs						
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Total PAH						
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16
Heavy Metals / Metalloids						
Boron (dissolved)	µg/l	10	ISO 17025	73	340	390
Calcium (dissolved)	mg/l	0.012	ISO 17025	110	190	180
Magnesium (dissolved)	mg/l	0.005	ISO 17025	13	13	8.4
Arsenic (dissolved)	µg/l	0.15	ISO 17025	1.16	0.43	1.07
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.11	0.09	0.05
Chromium (dissolved)	µg/l	0.2	ISO 17025	2.1	2.5	2.6
Copper (dissolved)	µg/l	0.5	ISO 17025	2.0	3.4	5.7
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	7.6	7.4	6.4
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.3	1.2	2.4
Zinc (dissolved)	µg/l	0.5	ISO 17025	3.9	5.4	6.0

Analytical Report Number: 21-27212
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

Your Order No: P3284JJ2275.19

Lab Sample Number				2106396	2106397	2106398
Sample Reference				BH1	BH2	BH3
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				5.00	3.60	4.52
Date Sampled				Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Monoaromatics & Oxygenates						
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons						
TPH-CWG - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) $_{HS+EH\_1D\_AL\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35 $_{EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) $_{HS+EH\_1D\_AR\_\#1\_\#2\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
VOCs						
Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0

Analytical Report Number: 21-27212
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

Your Order No: P3284JJ2275.19

Lab Sample Number				2106396	2106397	2106398
Sample Reference				BH1	BH2	BH3
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				5.00	3.60	4.52
Date Sampled				Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-27212
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Electrical conductivity at 20oC of water	Determination of electrical conductivity in water by electrometric measurement. Accredited Matrices SW, GW, PW	In-house method	L031-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammonium as NH4 in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Analytical Report Number : 21-27212
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

Analytical Report Number : 21-27212
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 21-27212
Project / Site name: Former site of HPH4, Hyde Park, Millington Road, Hayes, London, UB3 4AZ

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH1	None Supplied	W	2106396	ab	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b
BH1	None Supplied	W	2106396	ab	Volatile organic compounds in water	L073B-PL	b
BH2	None Supplied	W	2106397	ab	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b
BH2	None Supplied	W	2106397	ab	Volatile organic compounds in water	L073B-PL	b
BH3	None Supplied	W	2106398	ab	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b
BH3	None Supplied	W	2106398	ab	Volatile organic compounds in water	L073B-PL	b

APPENDIX 4 – GEOTECHNICAL LABORATORY TEST RESULTS

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

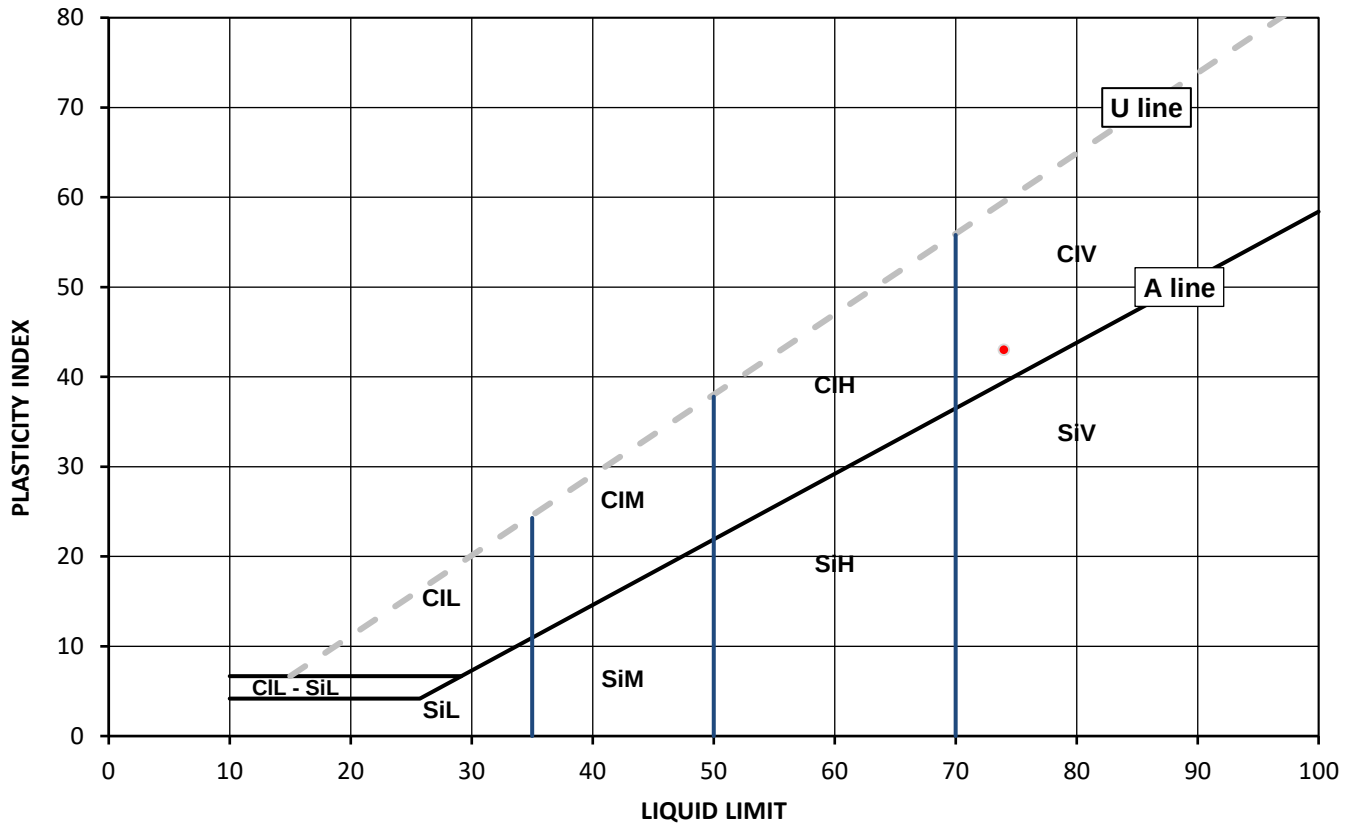
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1937441	Depth Top [m]:	25.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Soil Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
32	74	31	43	100



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

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

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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

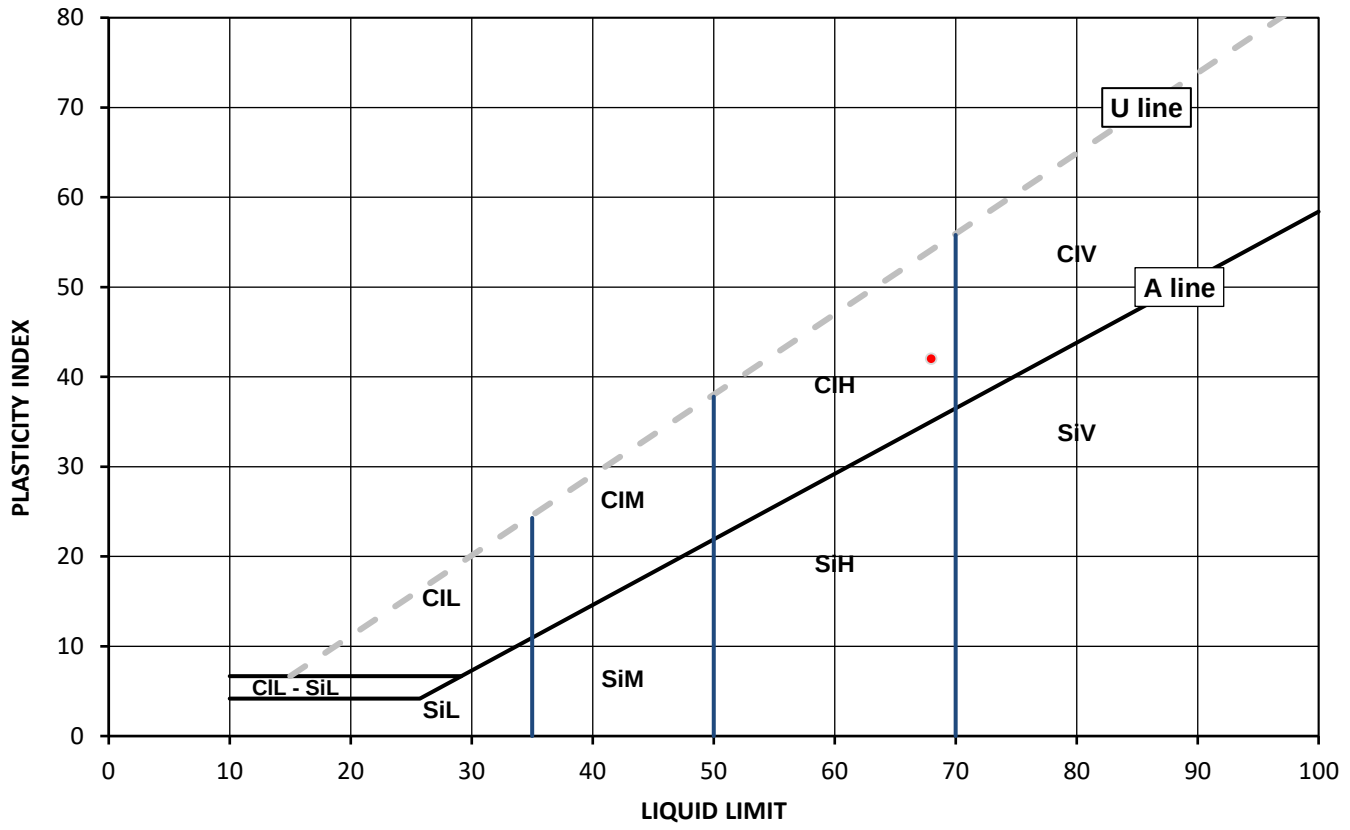
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

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

Test Results:

Laboratory Reference:	1937443	Depth Top [m]:	5.50
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Soil Description:	Greyish brown slightly gravelly CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
30	68	26	42	99



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

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

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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

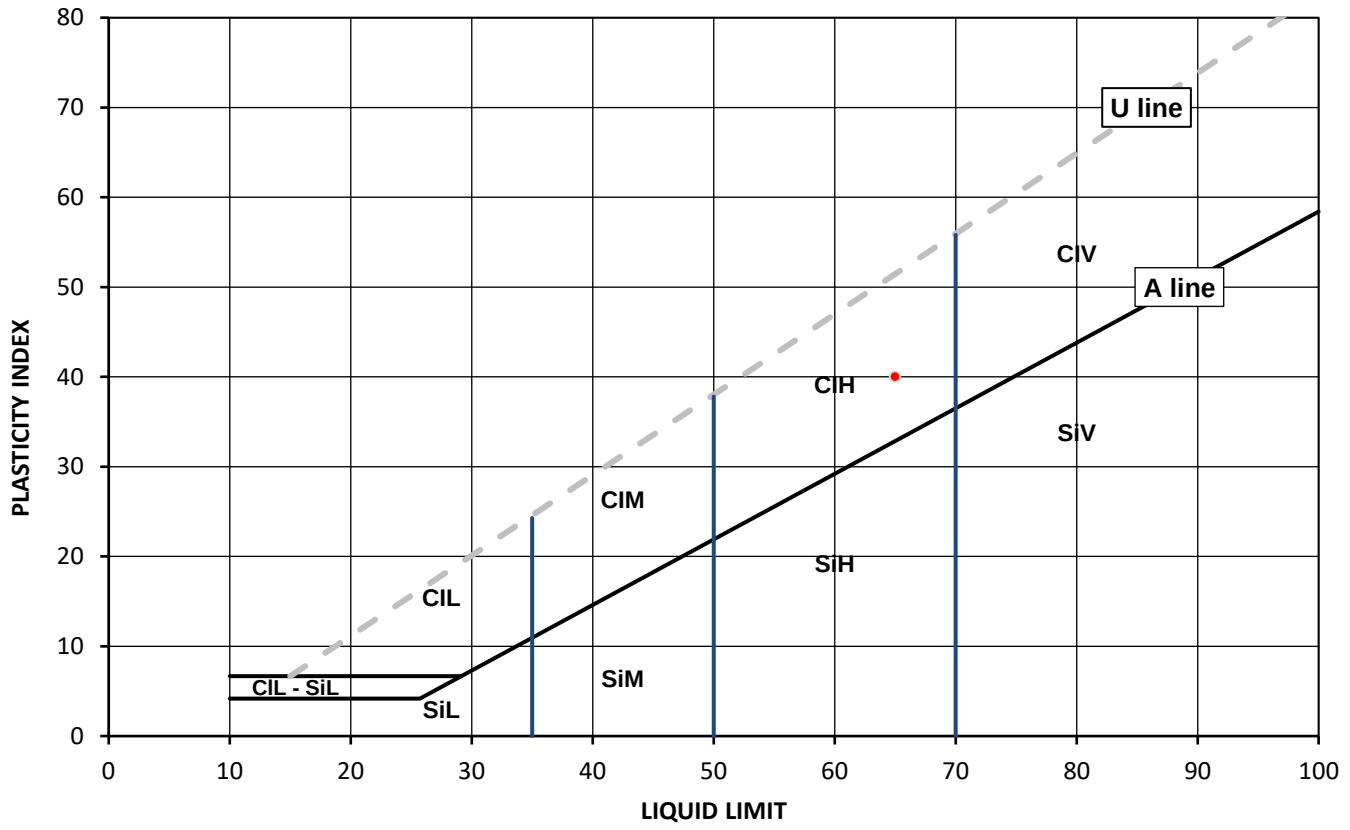
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

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

Test Results:

Laboratory Reference:	1937444	Depth Top [m]:	11.50
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Greyish brown slightly gravelly CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	65	25	40	98



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

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

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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

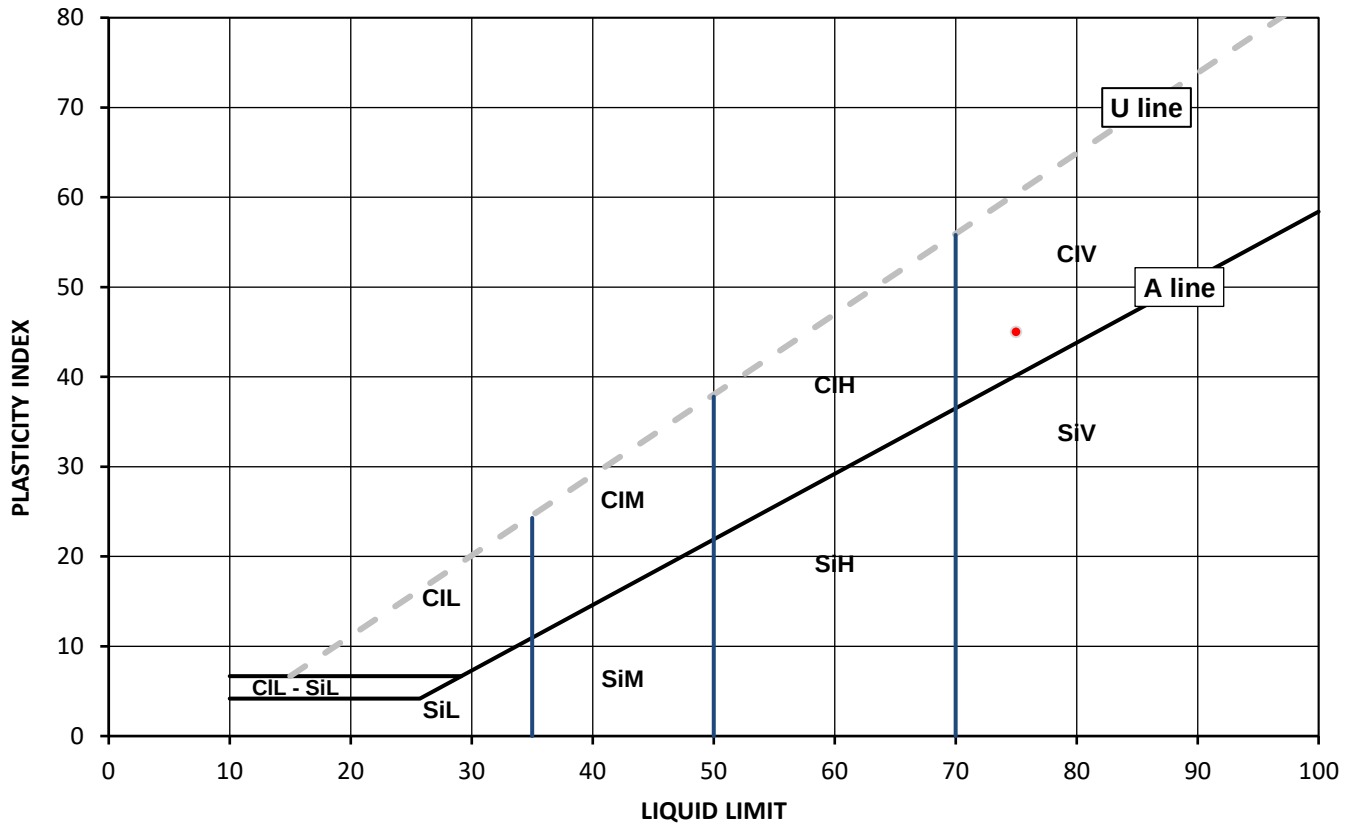
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

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

Test Results:

Laboratory Reference:	1937445	Depth Top [m]:	14.50
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Soil Description:	Greyish brown CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	75	30	45	100



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

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

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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

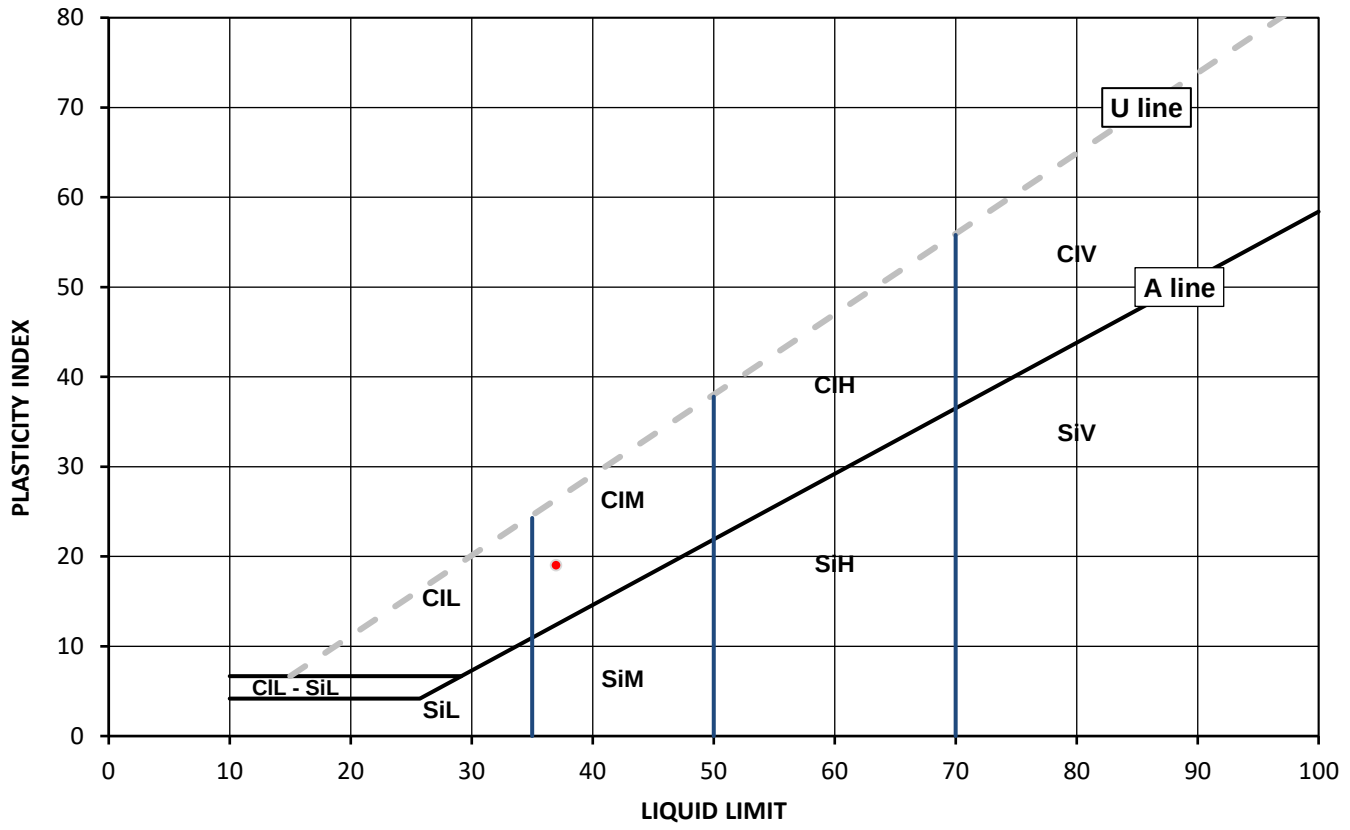
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

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

Test Results:

Laboratory Reference:	1937446	Depth Top [m]:	1.20
Hole No.:	WS2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	ES
Soil Description:	Brown to grey gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
14	37	18	19	36



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

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

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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 236.10

SUMMARY REPORT

Summary of Classification Test Results

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

4041

Tested in Accordance with:

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

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD

Contact: Josephine Whitehead

Site Address: Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ

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

Client Reference: JJ2275
Job Number: 21-86767
Date Sampled: Not Given
Date Received: 29/06/2021
Date Tested: 20/07/2021
Sampled By: Client

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
1937443	BH1	Not Given	5.50	Not Given	B	Greyish brown slightly gravelly CLAY	Atterberg 4 Point	30		99	68	26	42						
1937444	BH1	Not Given	11.50	Not Given	D	Greyish brown slightly gravelly CLAY	Atterberg 4 Point	27		98	65	25	40						
1937445	BH1	Not Given	14.50	Not Given	B	Greyish brown CLAY	Atterberg 4 Point	27		100	75	30	45						
1937441	BH1	Not Given	25.00	Not Given	U	Brown CLAY	Atterberg 4 Point	32		100	74	31	43						
1937448	WS1	Not Given	0.50	Not Given	ES	Brown very gravelly sandy CLAY		8.0											
1937446	WS2	Not Given	1.20	Not Given	ES	Brown to grey gravelly sandy CLAY	Atterberg 4 Point	14		36	37	18	19						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

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

Date Reported: 27/07/2021

GF 238.12

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

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

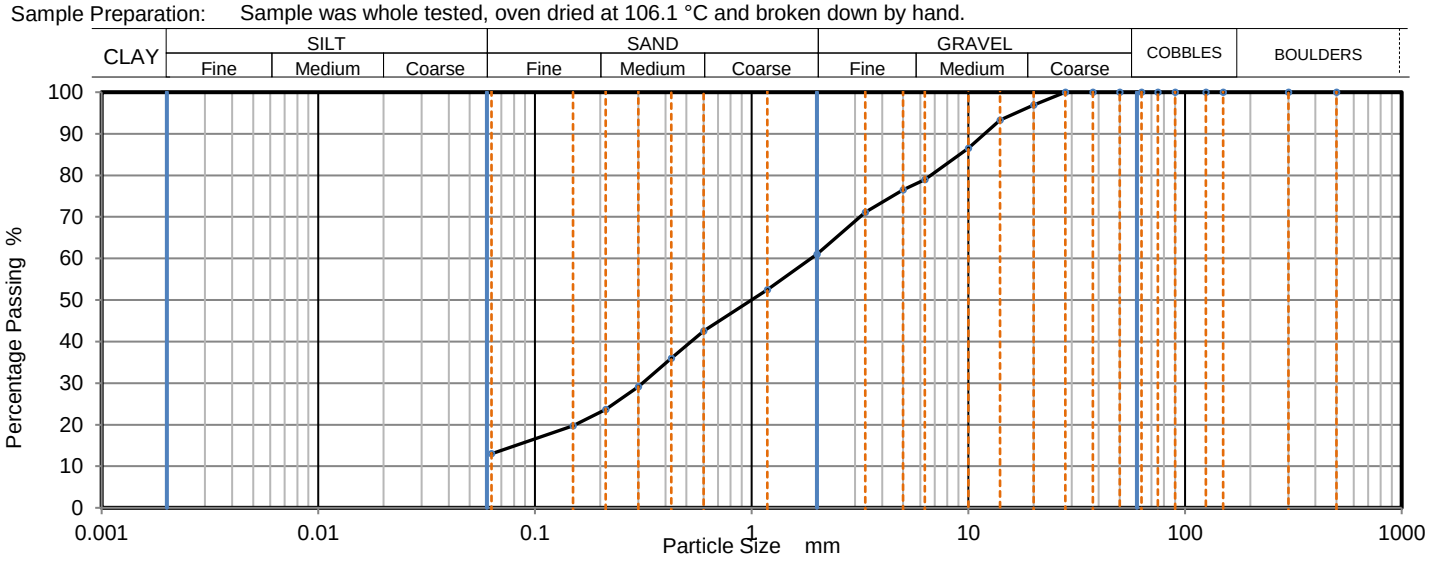
4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

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

Test Results:

Laboratory Reference:	1937447	Depth Top [m]:	2.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Yellowish brown very gravelly clayey SAND		
Sample Preparation:	Sample was whole tested, oven dried at 106.1 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	93		
10	87		
6.3	79		
5	77		
3.35	71		
2	61		
1.18	53		
0.6	43		
0.425	36		
0.3	29		
0.212	24		
0.15	20		
0.063	13		

Sample Proportions	% dry mass
Very coarse	0
Gravel	39
Sand	48
Fines <0.063mm	13

Grading Analysis		
D100	mm	28
D60	mm	1.88
D30	mm	0.314
D10	mm	
Uniformity Coefficient		> 30
Curvature Coefficient		

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

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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 100.20

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING 4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

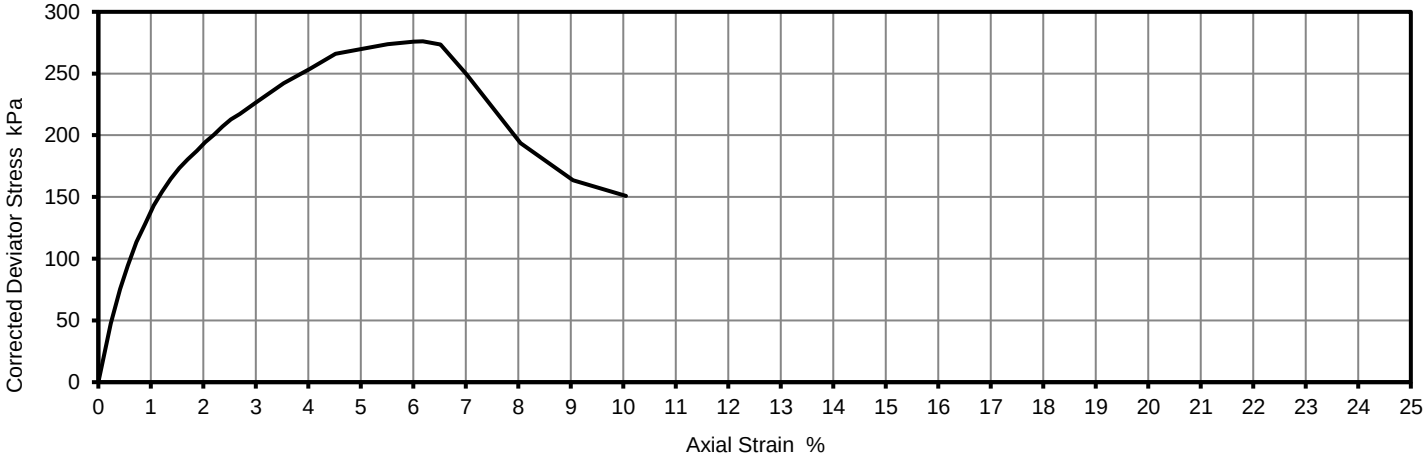
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

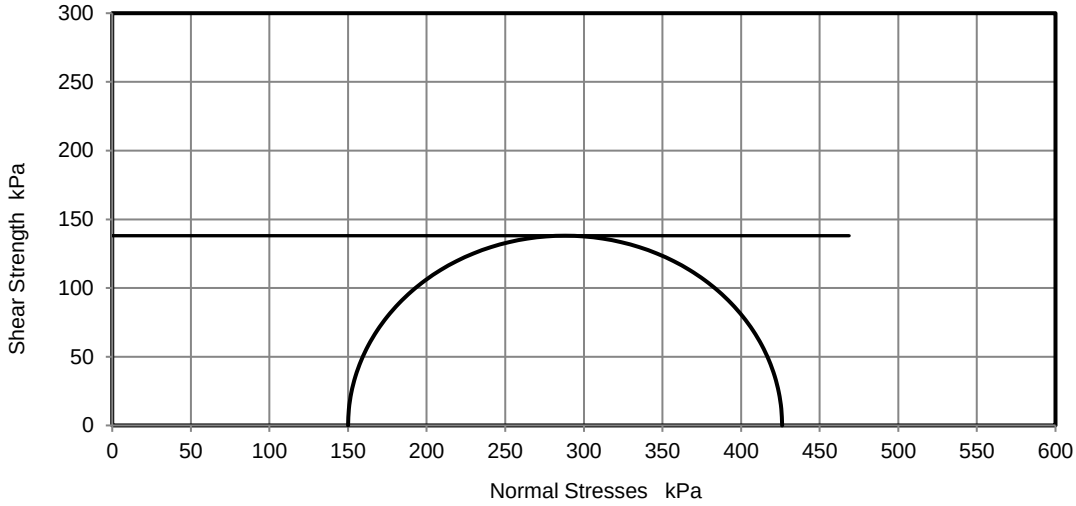
Laboratory Reference:	1937437	Depth Top [m]:	6.50
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Greyish brown CLAY		

Test Number	1		Rate of Strain	1.97	%/min	
Length	202.58	mm	Cell Pressure	150	kPa	
Diameter	102.36	mm	Axial Strain at failure	6.2	%	
Bulk Density	1.99	Mg/m3	Deviator Stress, (σ1 - σ3)f	276	kPa	
Moisture Content	28	%	Undrained Shear Strength, cu	138	kPa	½(σ1 - σ3)f
Dry Density	1.56	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.46	kPa	Membrane thickness	0.29	mm	

Deviator Stress v Axial Strain



Mohr Circles



Position within sample

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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING
4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

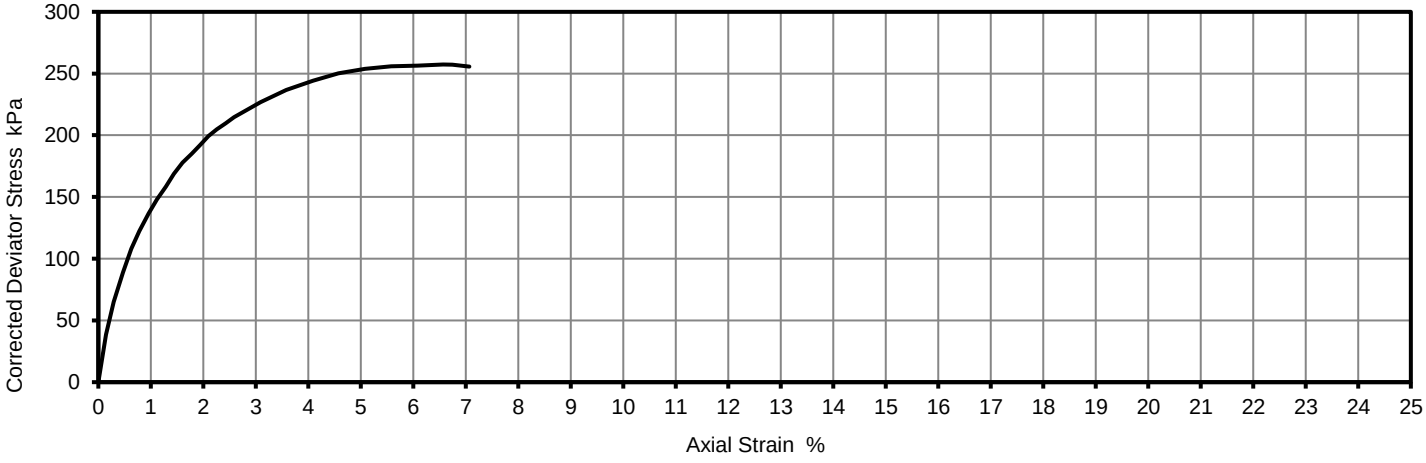
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

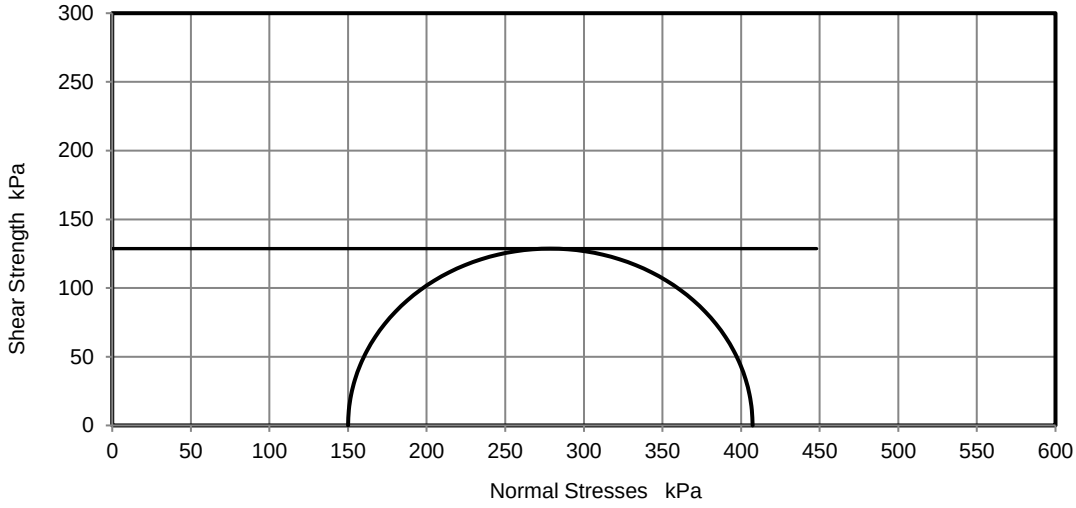
Laboratory Reference:	1937438	Depth Top [m]:	9.50
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Greyish brown CLAY		

Test Number	1		Rate of Strain	1.98	%/min	
Length	201.78	mm	Cell Pressure	150	kPa	
Diameter	101.97	mm	Axial Strain at failure	6.6	%	
Bulk Density	2.03	Mg/m3	Deviator Stress, (σ1 - σ3)f	257	kPa	
Moisture Content	25	%	Undrained Shear Strength, cu	129	kPa	½(σ1 - σ3)f
Dry Density	1.62	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.44	kPa	Membrane thickness	0.27	mm	

Deviator Stress v Axial Strain



Mohr Circles



Position within sample

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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING 4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

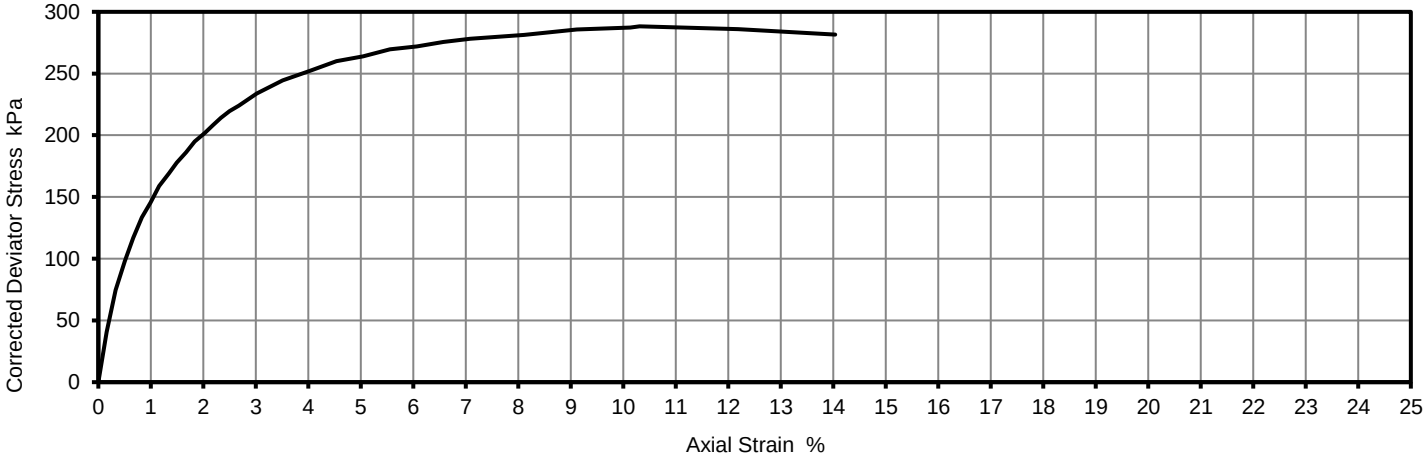
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

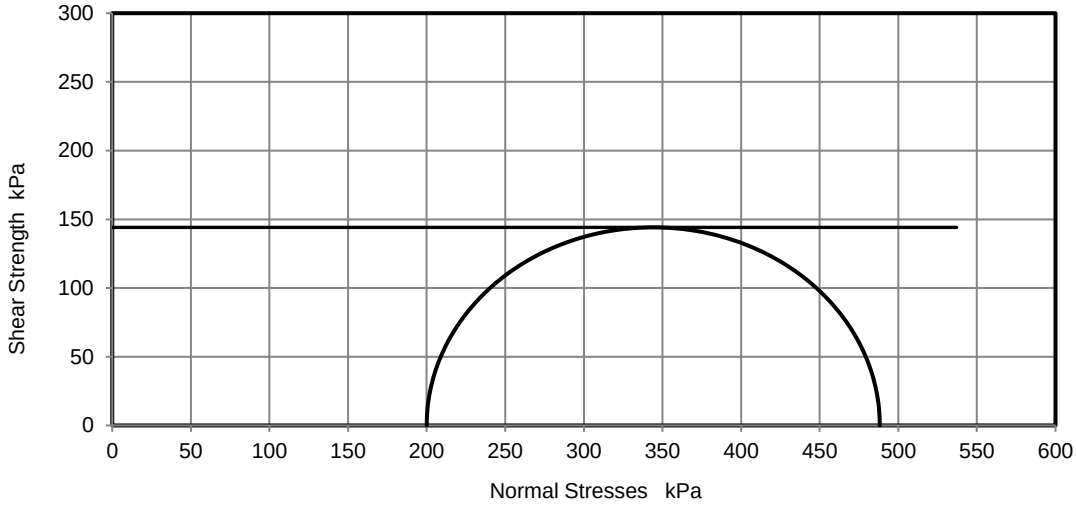
Laboratory Reference:	1937439	Depth Top [m]:	14.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		

Test Number	1		Rate of Strain	2.00	%/min	
Length	138.86	mm	Cell Pressure	200	kPa	
Diameter	69.87	mm	Axial Strain at failure	10.3	%	
Bulk Density	1.97	Mg/m3	Deviator Stress, (σ1 - σ3)f	288	kPa	
Moisture Content	26	%	Undrained Shear Strength, cu	144	kPa	½(σ1 - σ3)f
Dry Density	1.56	Mg/m3	Mode of Failure	Compound		
Membrane Correction	0.85	kPa	Membrane thickness	0.26	mm	

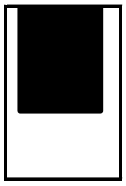
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING
4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

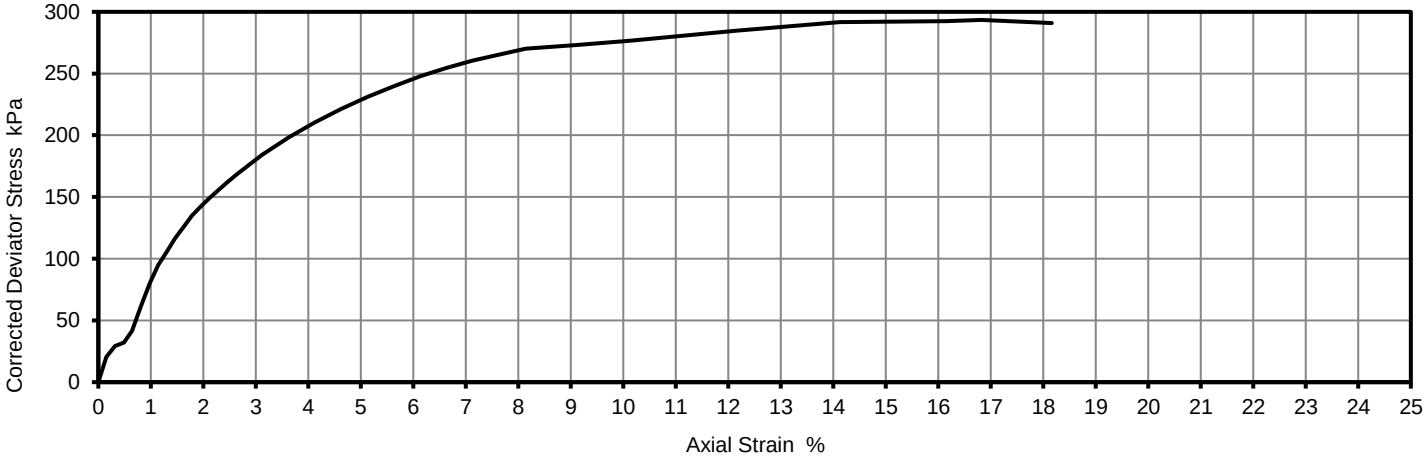
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

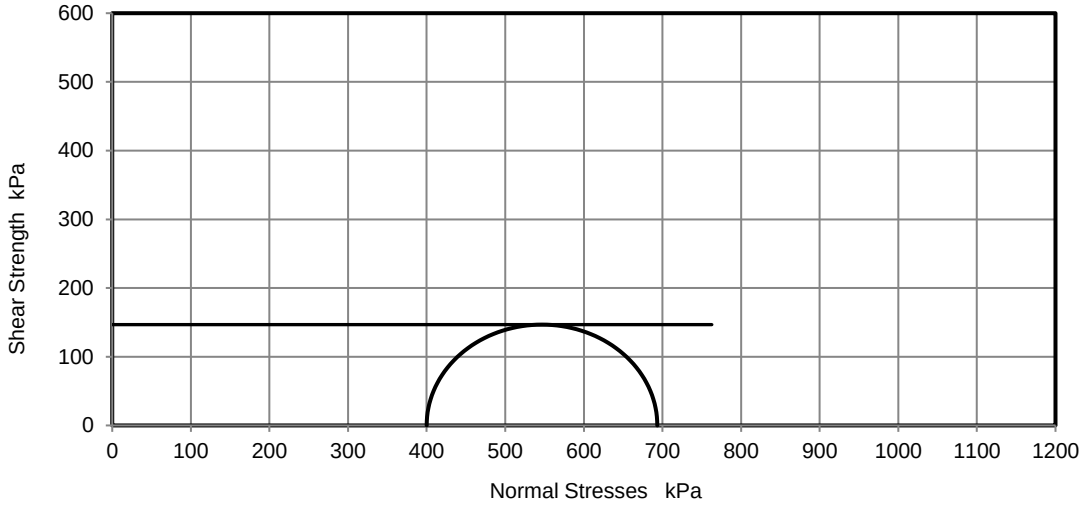
Laboratory Reference:	1937440	Depth Top [m]:	17.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		

Test Number	1		Rate of Strain	2.00	%/min	
Length	199.16	mm	Cell Pressure	400	kPa	
Diameter	102.60	mm	Axial Strain at failure	16.8	%	
Bulk Density	2.01	Mg/m3	Deviator Stress, (σ1 - σ3)f	293	kPa	
Moisture Content	26	%	Undrained Shear Strength, cu	147	kPa	½(σ1 - σ3)f
Dry Density	1.59	Mg/m3	Mode of Failure	Compound		
Membrane Correction	0.78	kPa	Membrane thickness	0.24	mm	

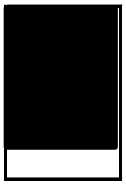
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

4041

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

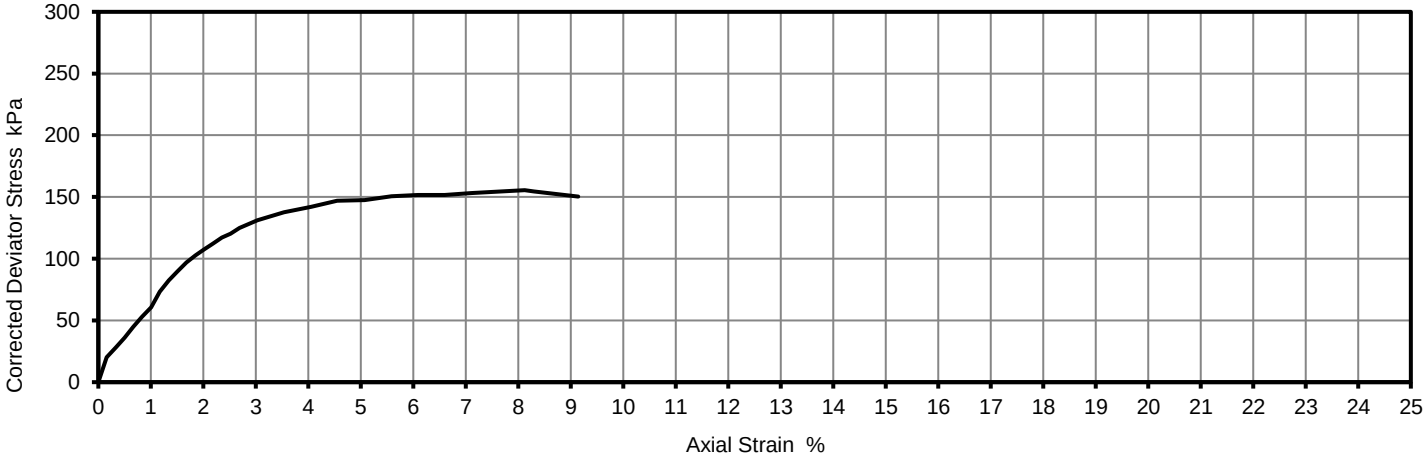
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

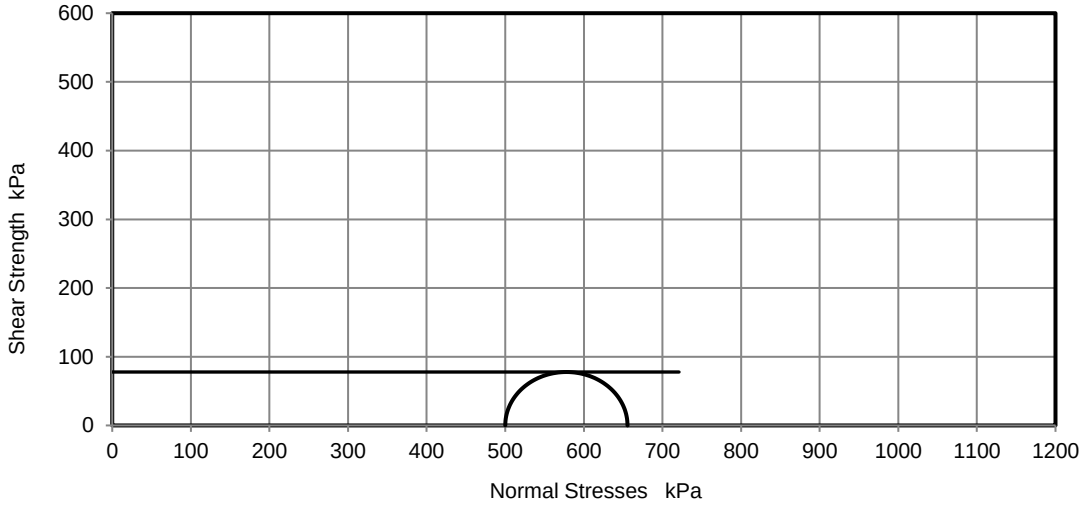
Laboratory Reference:	1937441	Depth Top [m]:	25.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		

Test Number	1		Rate of Strain	2.00	%/min	
Length	198.68	mm	Cell Pressure	500	kPa	
Diameter	103.04	mm	Axial Strain at failure	8.1	%	
Bulk Density	1.96	Mg/m3	Deviator Stress, (σ1 - σ3)f	156	kPa	
Moisture Content	32	%	Undrained Shear Strength, cu	78	kPa	½(σ1 - σ3)f
Dry Density	1.48	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.52	kPa	Membrane thickness	0.28	mm	

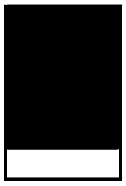
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



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

Remarks:

Signed:

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

Date Reported: 27/07/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING 4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-86767
		Date Sampled:	Not Given
		Date Received:	29/06/2021
Contact:	Josephine Whitehead	Date Tested:	20/07/2021
Site Address:	Former site of HPH4, Hyde Park, Millington Road, Hayes, London UB3 4AZ	Sampled By:	Client

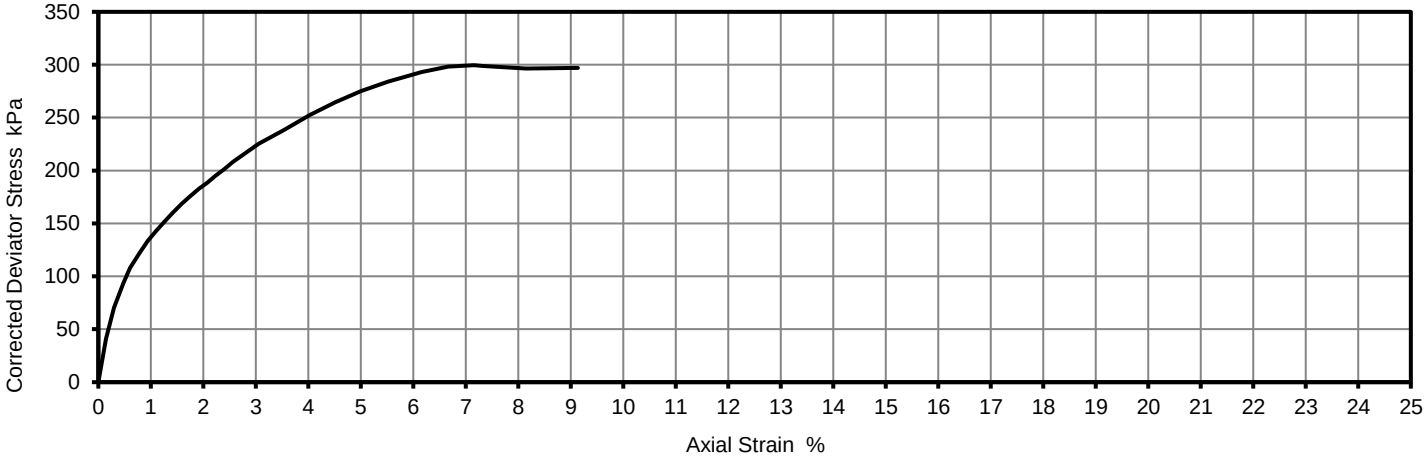
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

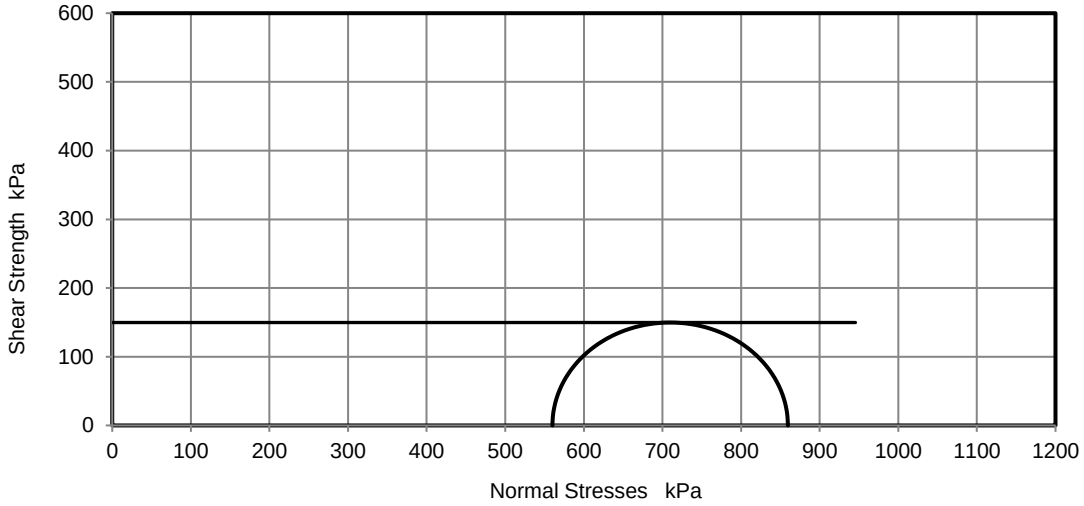
Laboratory Reference:	1937442	Depth Top [m]:	28.00
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		

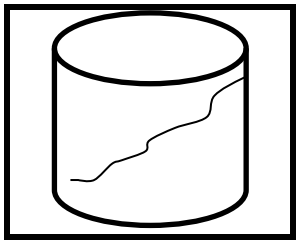
Test Number	1		Rate of Strain	1.97	%/min	
Length	202.87	mm	Cell Pressure	560	kPa	
Diameter	102.21	mm	Axial Strain at failure	7.2	%	
Bulk Density	2.01	Mg/m3	Deviator Stress, (σ1 - σ3)f	300	kPa	
Moisture Content	26	%	Undrained Shear Strength, cu	150	kPa	½(σ1 - σ3)f
Dry Density	1.60	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.50	kPa	Membrane thickness	0.29	mm	

Deviator Stress v Axial Strain

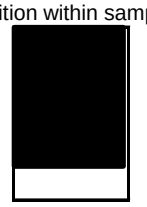


Mohr Circles





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: Unable to take a photo.

Signed:

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

Date Reported: 27/07/2021

GF 184.11

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

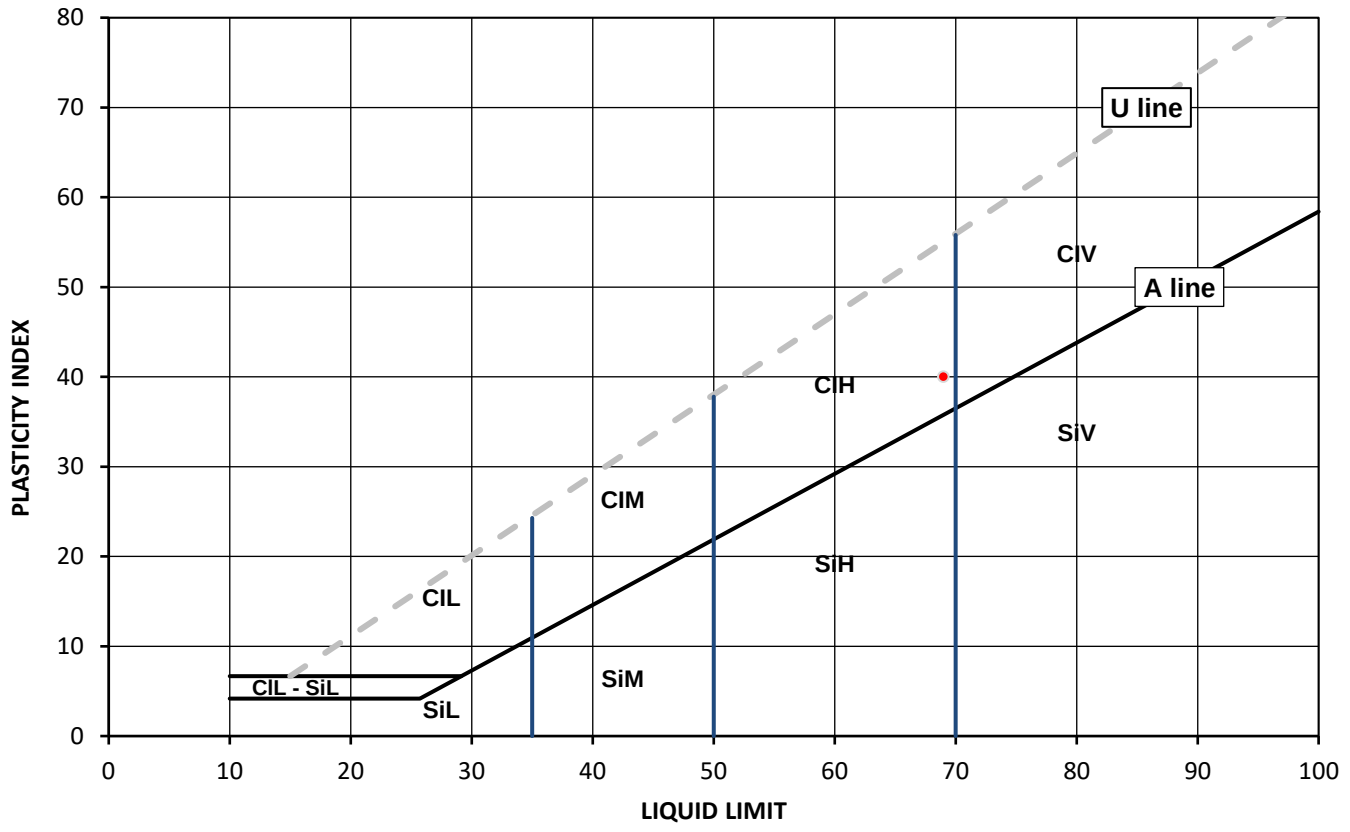
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2094192	Depth Top [m]:	8.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Greyish brown CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
26	69	29	40	100



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

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

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

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 236.11

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

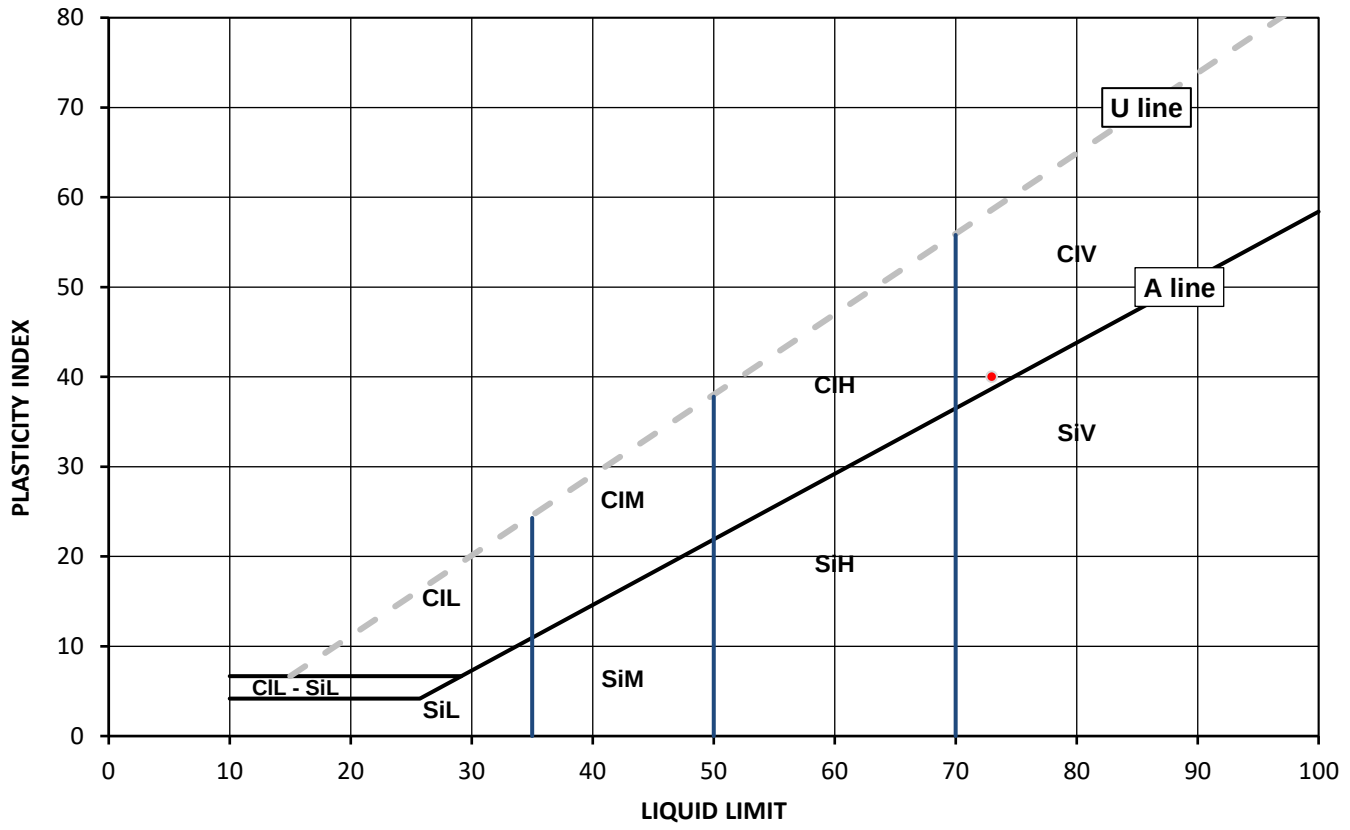
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2094193	Depth Top [m]:	15.50
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brownish grey CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
26	73	33	40	100



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

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

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

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 236.11

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

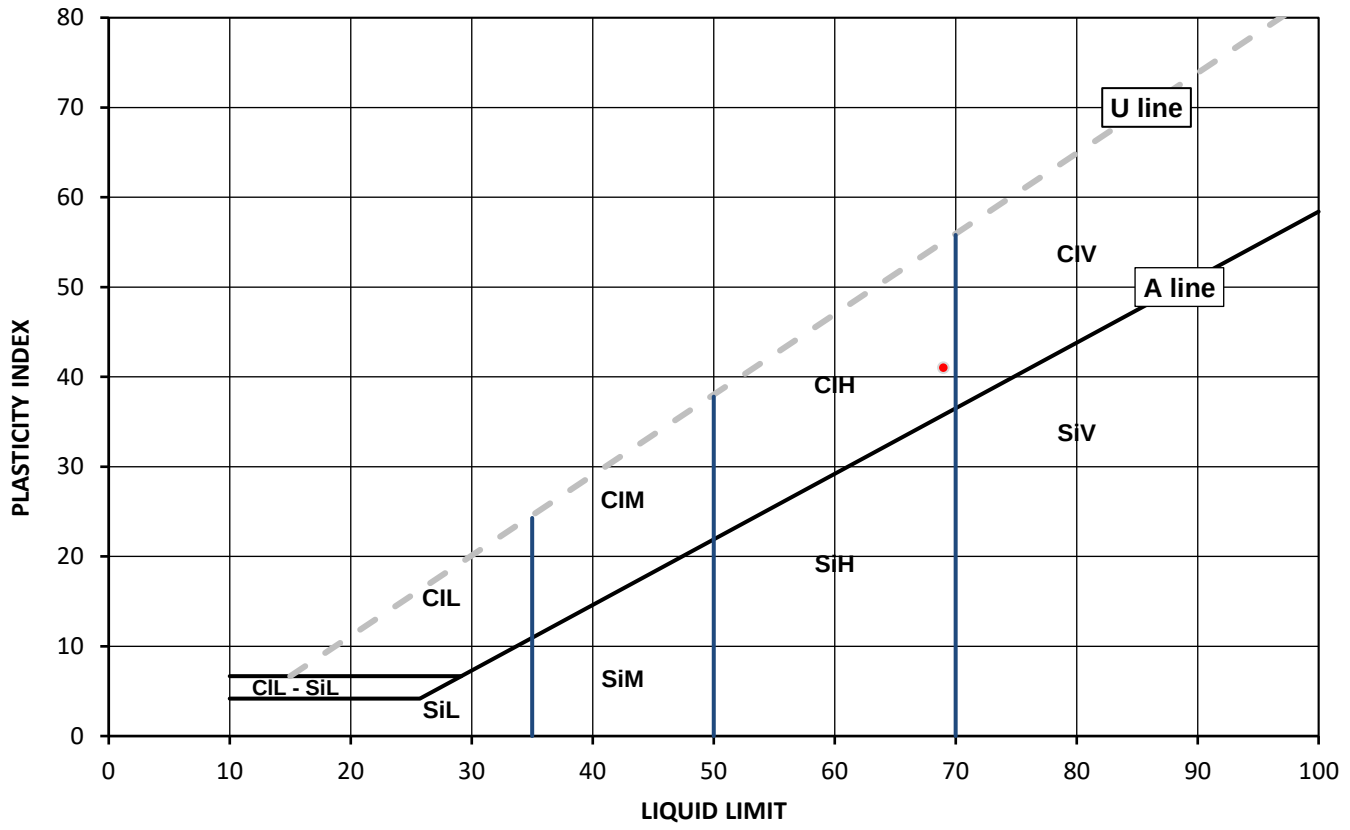
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2094194	Depth Top [m]:	27.50
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
25	69	28	41	100



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

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

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

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 236.11

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

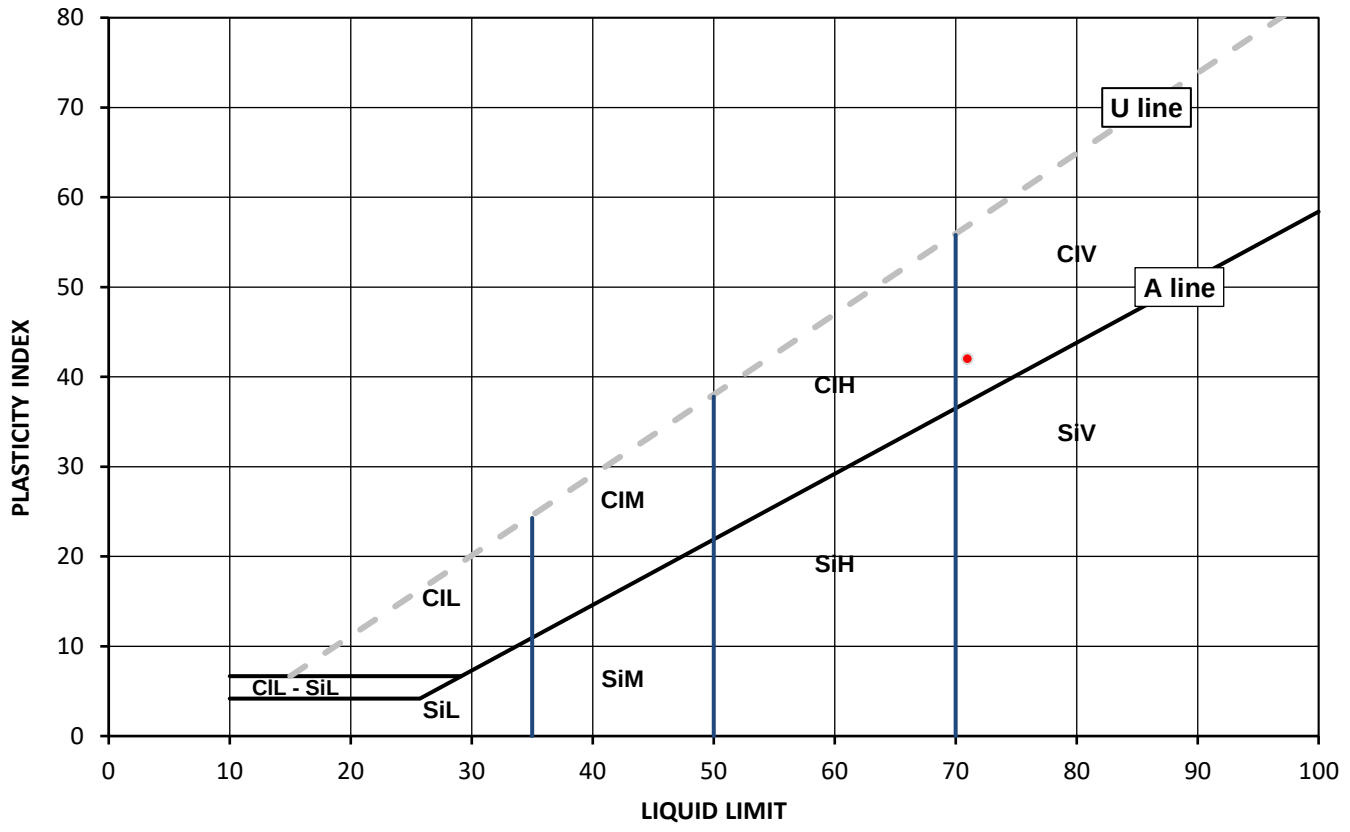
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2094195	Depth Top [m]:	12.50
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
28	71	29	42	100



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

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

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

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 236.11

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

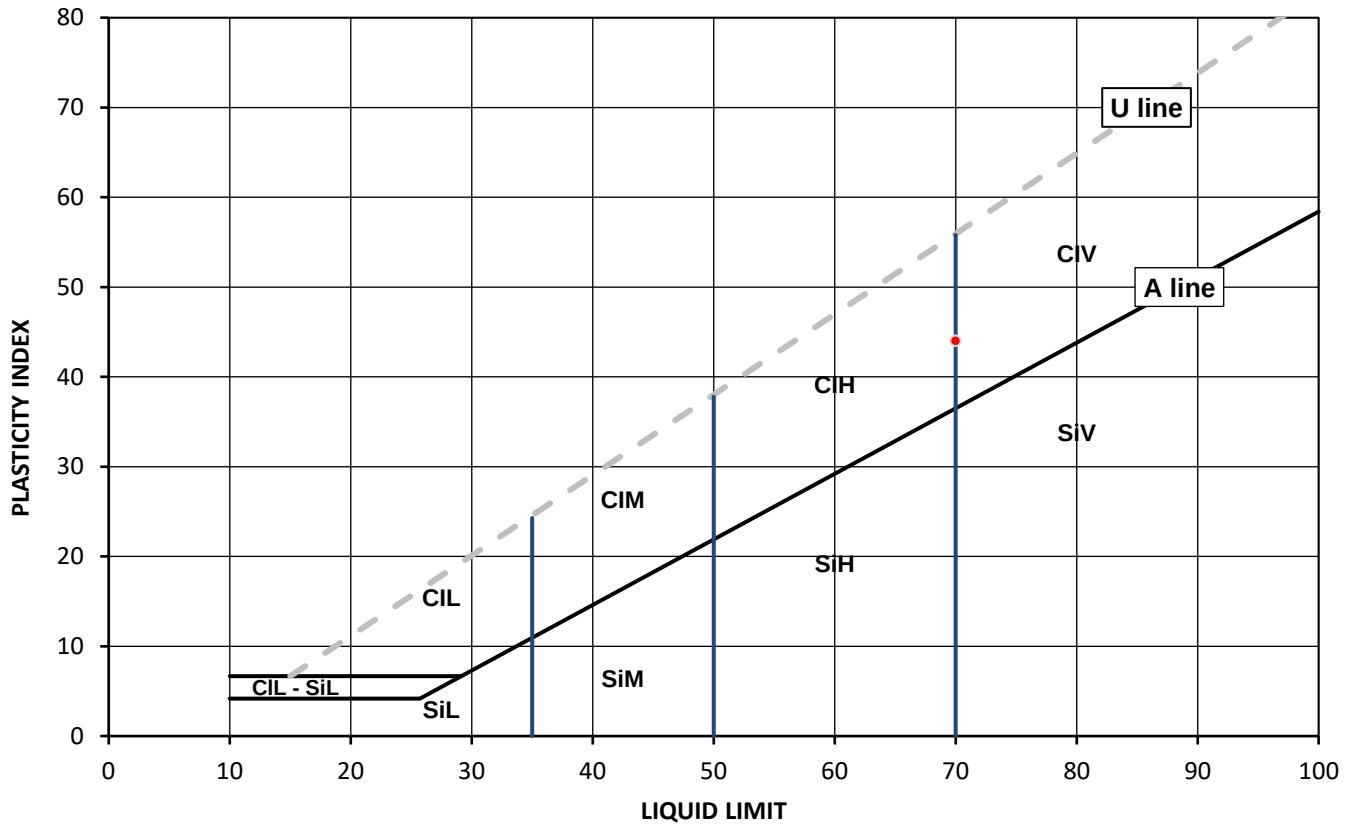
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2094196	Depth Top [m]:	18.50
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	70	26	44	100



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

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

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

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 236.11

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

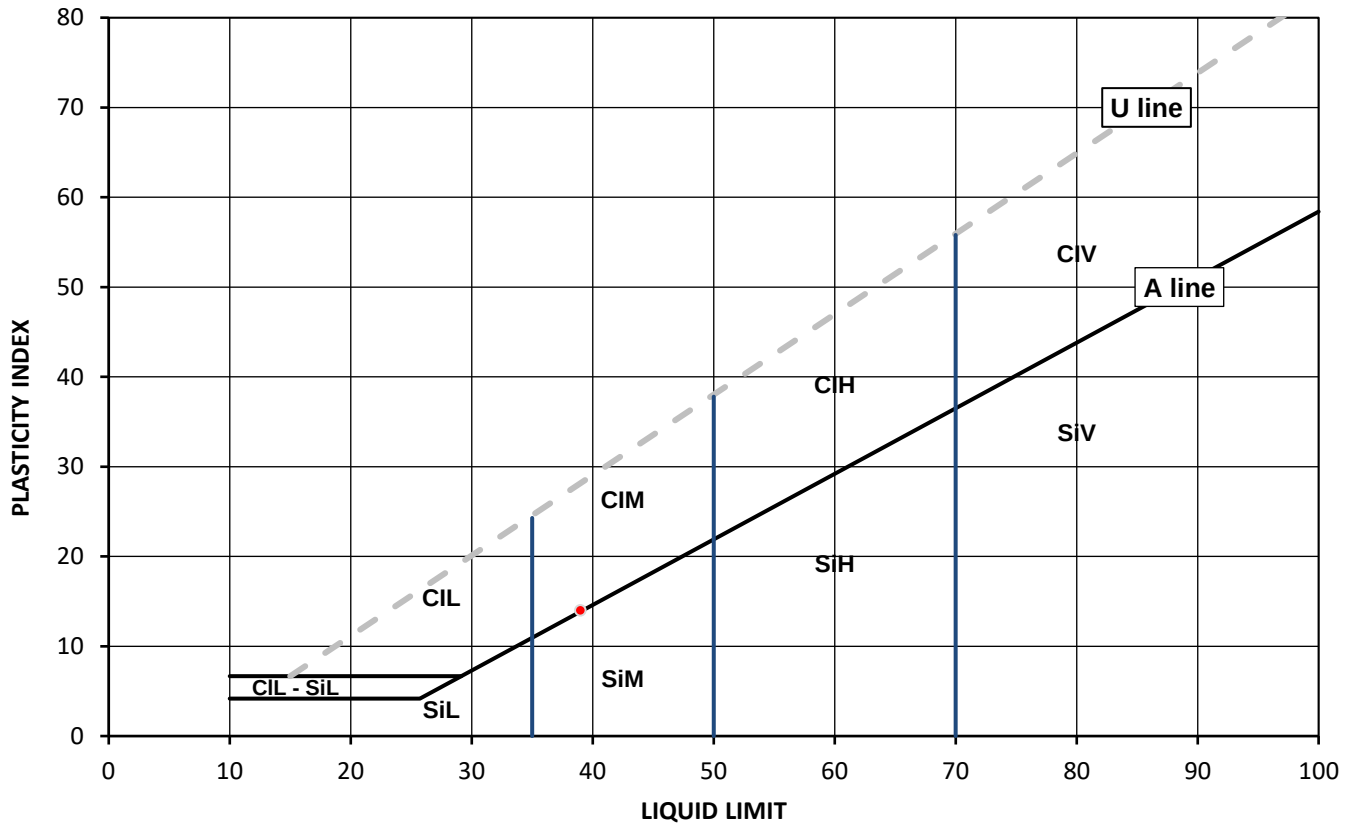
Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	02/12/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2094197	Depth Top [m]:	0.30
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	39	25	14	100



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

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

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

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 236.11

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

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

4041

Client: Jomas Associates Ltd

Client Address: Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD

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

Client Reference: JJ2275
Job Number: 21-25023
Date Sampled: Not Given
Date Received: 12/11/2021
Date Tested: 29/11 - 02/12/2021
Sampled By: Not Given

Contact: Suneel Law

Site Address: Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type			%	%	% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3	%		
2094197	BH2	Not Given	0.30	Not Given	B	Brown sandy CLAY	Atterberg 4 Point	16		100	39	25	14						
2094192	BH2	Not Given	8.00	Not Given	U	Greyish brown CLAY	Atterberg 4 Point	26		100	69	29	40						
2094193	BH2	Not Given	15.50	Not Given	U	Brownish grey CLAY	Atterberg 4 Point	26		100	73	33	40						
2094194	BH2	Not Given	27.50	Not Given	U	Dark brown CLAY	Atterberg 4 Point	25		100	69	28	41						
2094195	BH3	Not Given	12.50	Not Given	U	Dark brown CLAY	Atterberg 4 Point	28		100	71	29	42						
2094196	BH3	Not Given	18.50	Not Given	U	Dark brown CLAY	Atterberg 4 Point	27		100	70	26	44						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 238.13

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

UKAS TESTING 4041

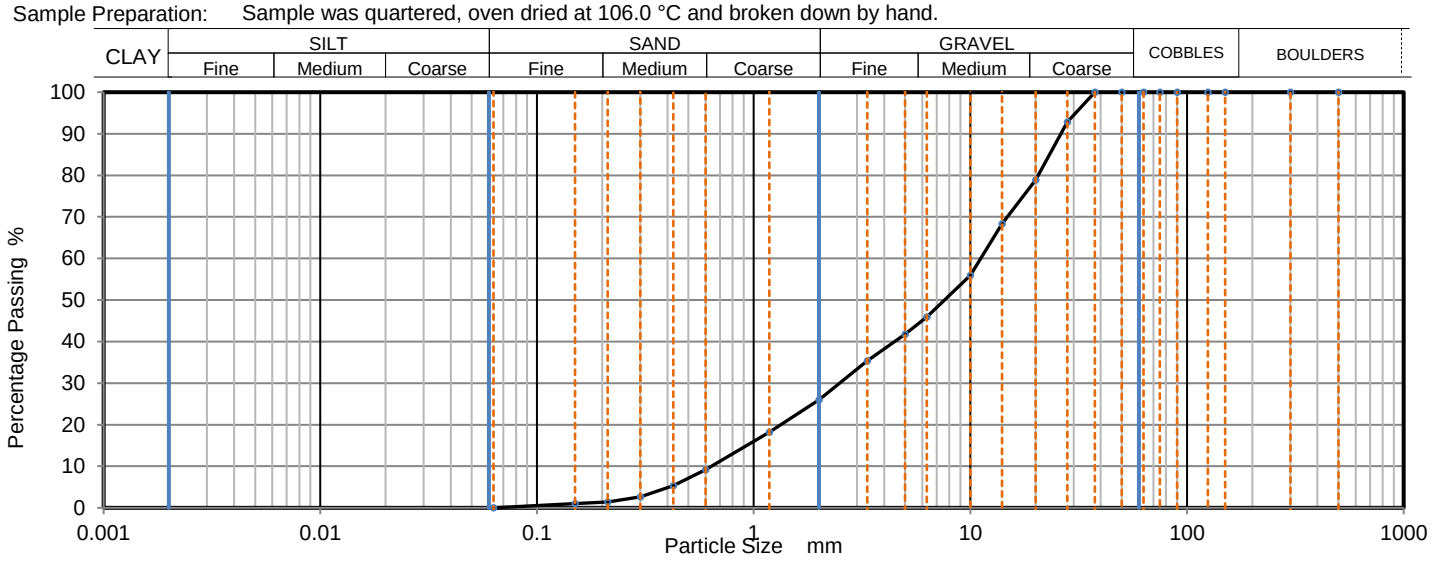
Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	02/12/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2094198	Depth Top [m]:	3.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown sandy GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 106.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	93		
20	79		
14	68		
10	56		
6.3	46		
5	42		
3.35	35		
2	26		
1.18	18		
0.6	9		
0.425	5		
0.3	3		
0.212	1		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	74
Sand	25
Fines <0.063mm	1

Grading Analysis		
D100	mm	37.5
D60	mm	11.2
D30	mm	2.49
D10	mm	0.635
Uniformity Coefficient		18
Curvature Coefficient		0.88

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

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

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 100.21

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING 4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

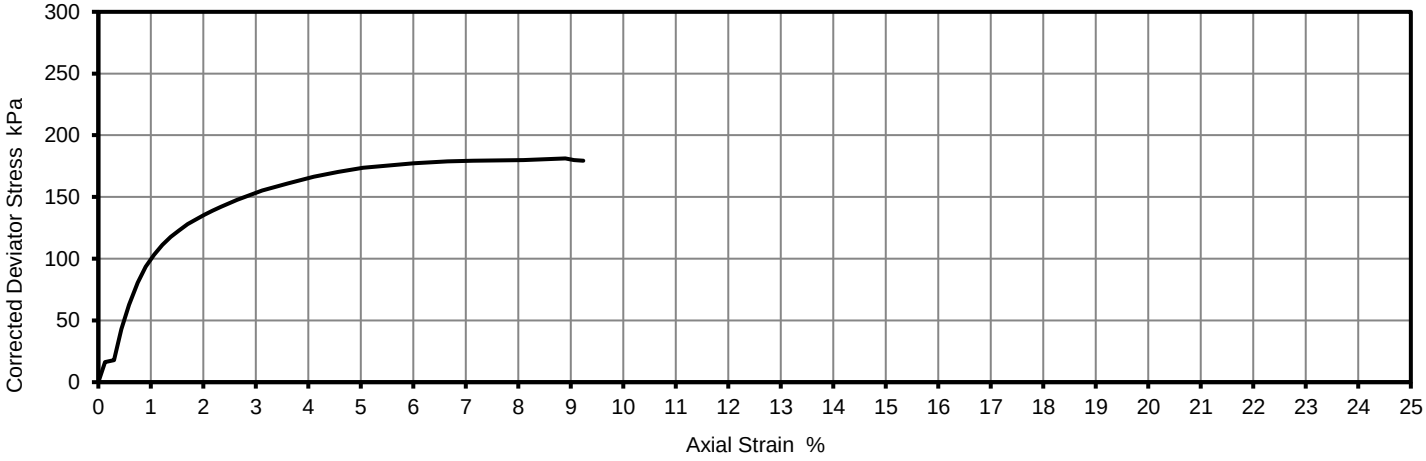
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

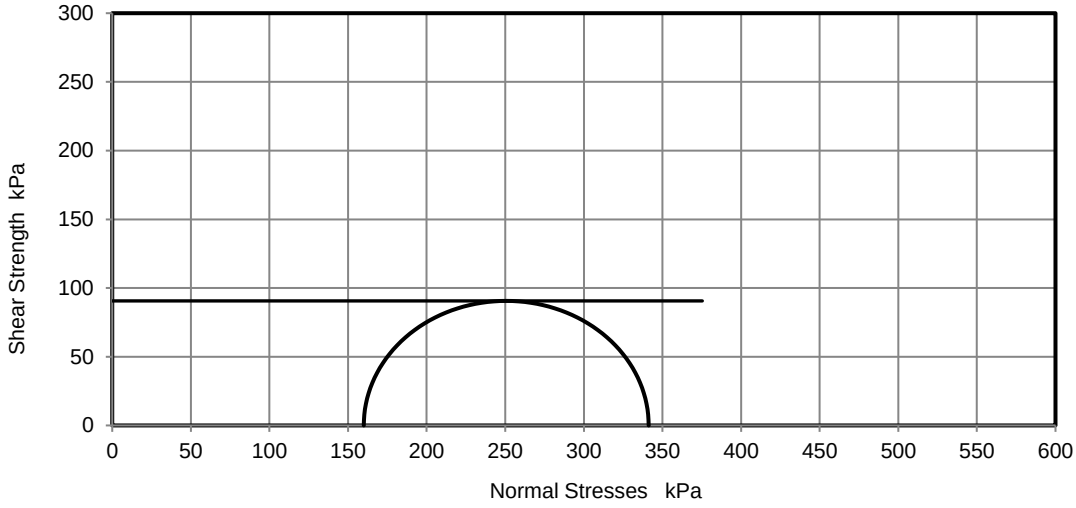
Laboratory Reference:	2094192	Depth Top [m]:	8.00
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Greyish brown CLAY		

Test Number	1		Rate of Strain	1.95	%/min	
Length	204.72	mm	Cell Pressure	160	kPa	
Diameter	102.01	mm	Axial Strain at failure	8.9	%	
Bulk Density	2.00	Mg/m3	Deviator Stress, (σ1 - σ3)f	181	kPa	
Moisture Content	26	%	Undrained Shear Strength, cu	91	kPa	½(σ1 - σ3)f
Dry Density	1.58	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.58	kPa	Membrane thickness	0.29	mm	

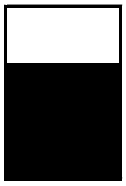
Deviator Stress v Axial Strain



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: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING 4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

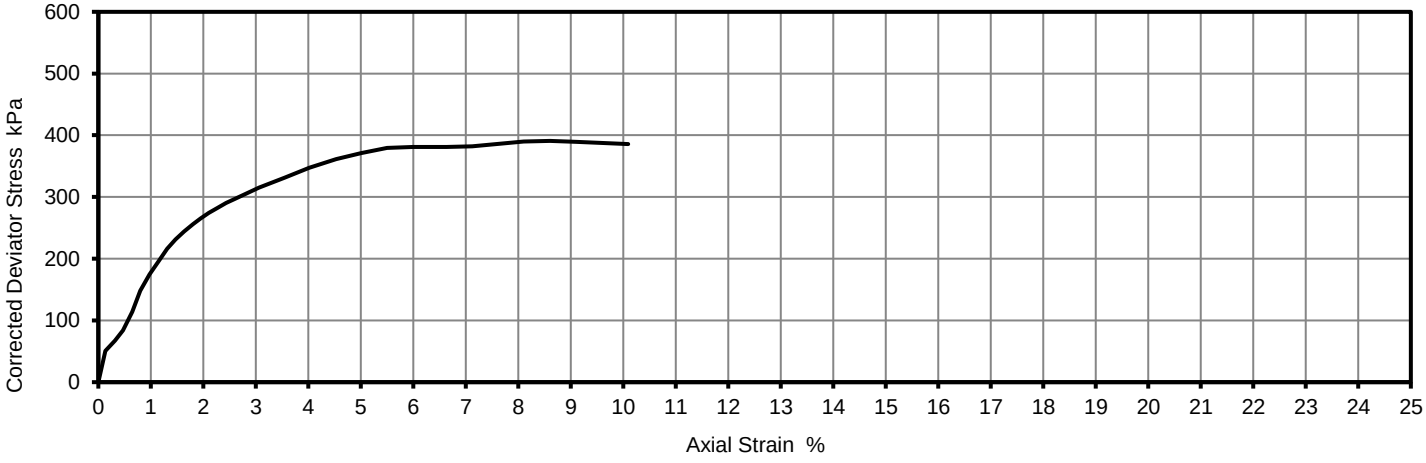
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

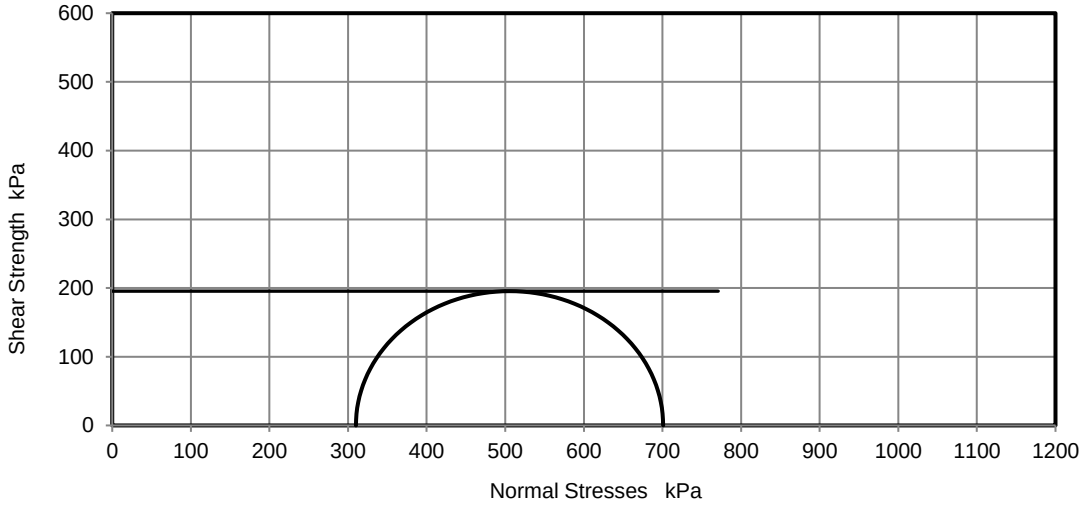
Laboratory Reference:	2094193	Depth Top [m]:	15.50
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brownish grey CLAY		

Test Number	1		Rate of Strain	2.00	%/min	
Length	139.81	mm	Cell Pressure	310	kPa	
Diameter	70.00	mm	Axial Strain at failure	8.6	%	
Bulk Density	1.99	Mg/m3	Deviator Stress, (σ1 - σ3)f	391	kPa	
Moisture Content	26	%	Undrained Shear Strength, cu	195	kPa	½(σ1 - σ3)f
Dry Density	1.58	Mg/m3	Mode of Failure	Compound		
Membrane Correction	0.74	kPa	Membrane thickness	0.26	mm	

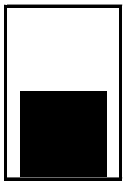
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



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

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING 4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

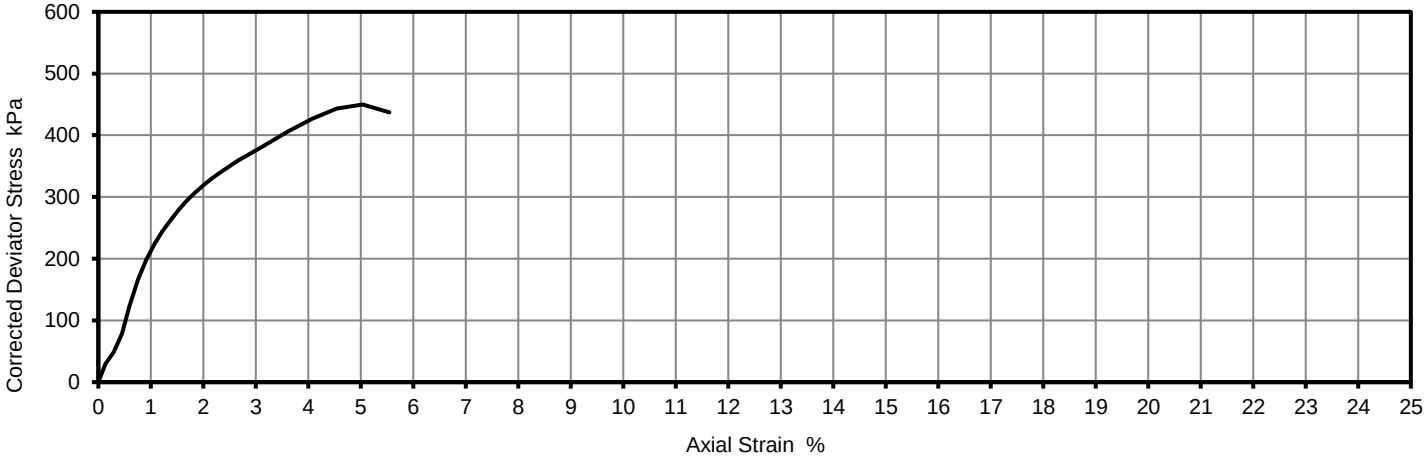
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

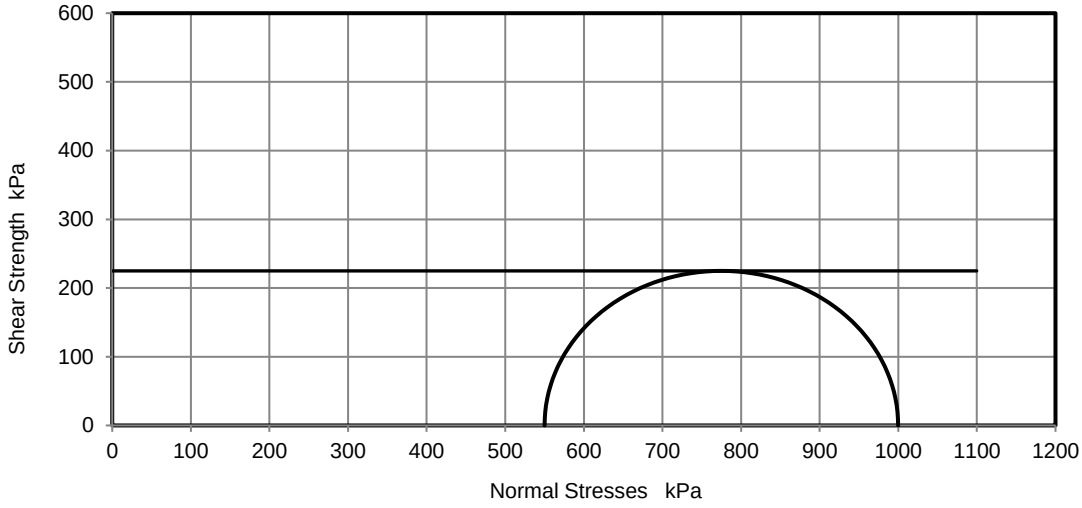
Laboratory Reference:	2094194	Depth Top [m]:	27.50
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		

Test Number	1		Rate of Strain	1.98	%/min	
Length	201.71	mm	Cell Pressure	550	kPa	
Diameter	102.42	mm	Axial Strain at failure	5.0	%	
Bulk Density	2.03	Mg/m3	Deviator Stress, (σ1 - σ3)f	450	kPa	
Moisture Content	25	%	Undrained Shear Strength, cu	225	kPa	½(σ1 - σ3)f
Dry Density	1.63	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.40	kPa	Membrane thickness	0.29	mm	

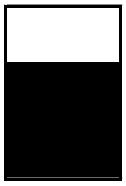
Deviator Stress v Axial Strain



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: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING 4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

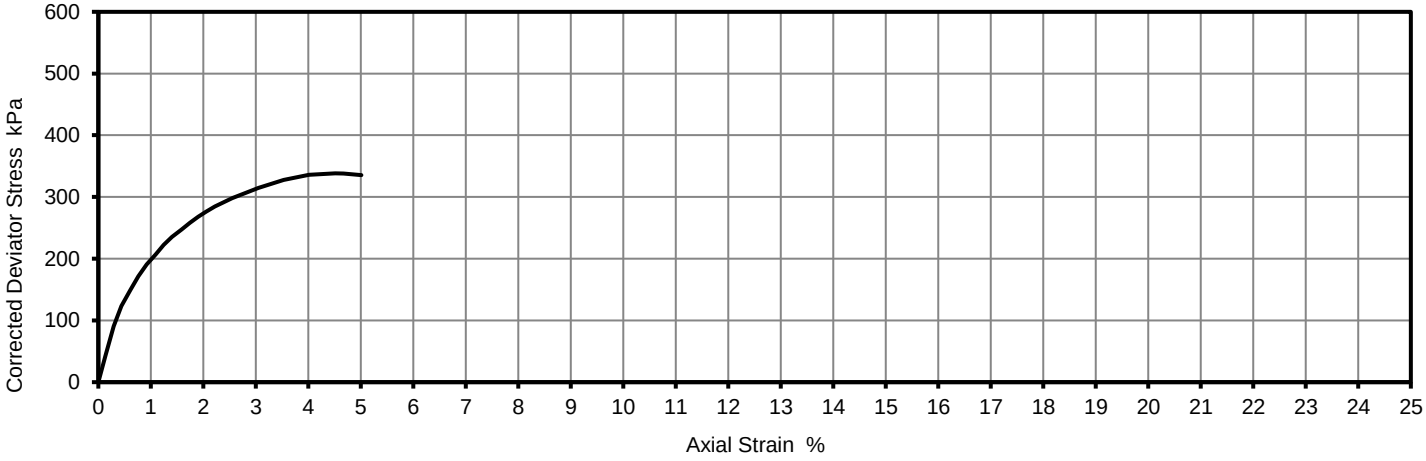
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

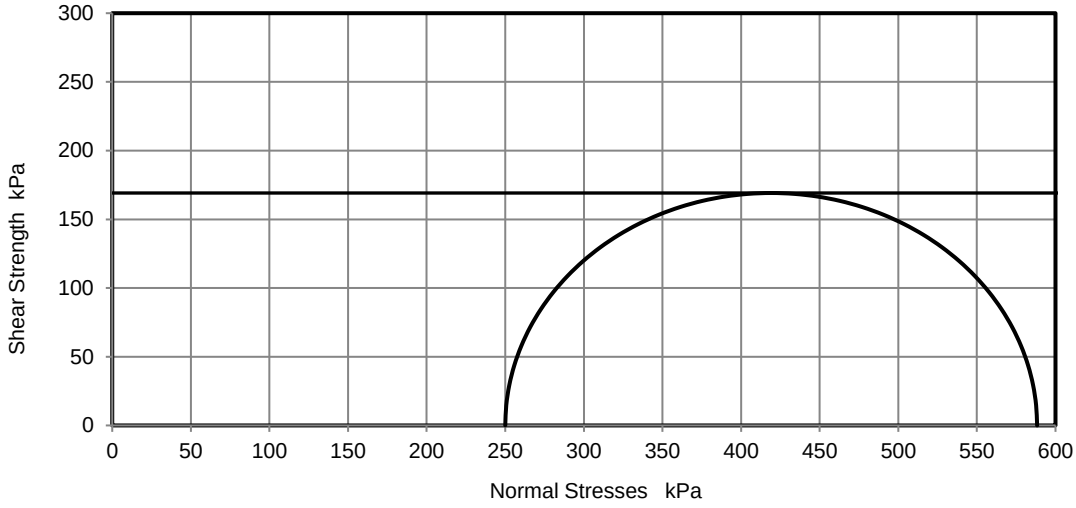
Laboratory Reference:	2094195	Depth Top [m]:	12.50
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		

Test Number	1		Rate of Strain	2.00	%/min	
Length	140.51	mm	Cell Pressure	250	kPa	
Diameter	69.05	mm	Axial Strain at failure	4.5	%	
Bulk Density	2.02	Mg/m3	Deviator Stress, (σ1 - σ3)f	338	kPa	
Moisture Content	28	%	Undrained Shear Strength, cu	169	kPa	½(σ1 - σ3)f
Dry Density	1.58	Mg/m3	Mode of Failure	Brittle		
Membrane Correction	0.38	kPa	Membrane thickness	0.21	mm	

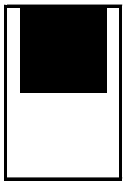
Deviator Stress v Axial Strain



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:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 184.11

TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

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

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

UKAS TESTING 4041

Environmental Science

Client:	Jomas Associates Ltd	Client Reference:	JJ2275
Client Address:	Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD	Job Number:	21-25023
		Date Sampled:	Not Given
		Date Received:	12/11/2021
Contact:	Suneel Law	Date Tested:	29/11/2021
Site Address:	Former site of HPH4 Hyde Park Millington Road Hayes London UB3 4AZ	Sampled By:	Not Given

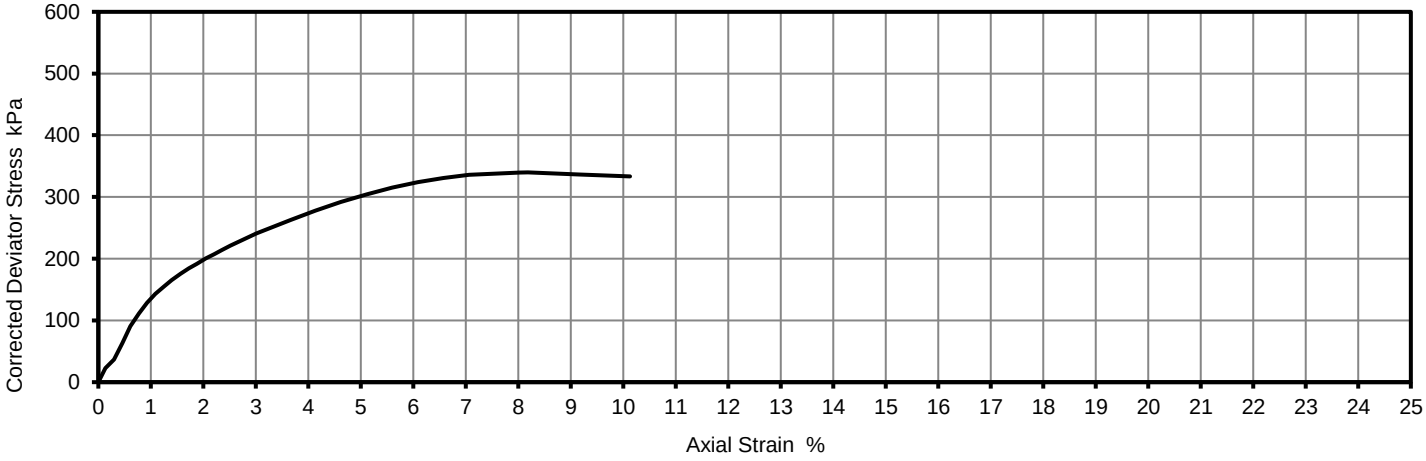
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

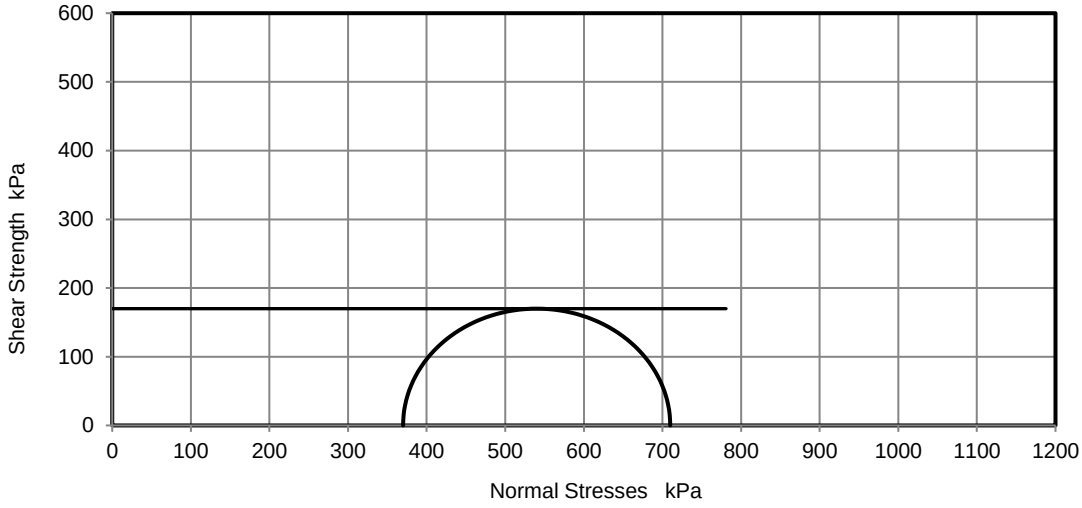
Laboratory Reference:	2094196	Depth Top [m]:	18.50
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown CLAY		

Test Number	1		Rate of Strain	1.99	%/min	
Length	201.23	mm	Cell Pressure	370	kPa	
Diameter	101.97	mm	Axial Strain at failure	8.2	%	
Bulk Density	1.98	Mg/m3	Deviator Stress, (σ1 - σ3)f	340	kPa	
Moisture Content	27	%	Undrained Shear Strength, cu	170	kPa	½(σ1 - σ3)f
Dry Density	1.55	Mg/m3	Mode of Failure	Compound		
Membrane Correction	0.45	kPa	Membrane thickness	0.24	mm	

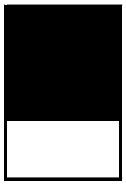
Deviator Stress v Axial Strain



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: Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 09/12/2021

GF 184.11

APPENDIX 5 – SOIL GAS MONITORING RESULTS

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Former site of HPH4,Hyde Park, Millington Road,Hayes,London,UB3 4AZ	**Operative(s):** HAH	**Date:** 01/12/2021	**Time:** 13:30	**Round:** 1	**Page:** 1 of 1

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
Analox	GA5000	G501805	26/11/2020
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny	**Ground Conditions:** Wet	**Temperature**: 9°C
Barometric Pressure (mbar): 995	**Barometric Pressure Trend (24hr):** Falling	**Ambient Concentration:** 0.3% CH_4, 0.1% CO_2, 21.2% O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to Base of well (mbgl)
	Peak	Steady						Peak	steady					
BH1	-0.0	-0.0	996	0.2	-	0.5	20.1	3	2	0	1	-	1.60	6.08
BH2	+0.0	+0.0	996	0.1	-	0.1	21.4	2	1	0	1	-	2.08	4.69
BH3	+0.1	+0.1	996	0.1	-	0.1	21.2	2	2	0	1	-	2.25	5.52
WS1	+0.0	+0.0	996	0.1	-	0.4	19.7	2	1	0	1	-	1.80	1.89
WS3	-0.0	-0.0	996	0.1	-	0.1	21.2	2	1	0	1	-	Dry	1.47
WS5	-0.1	+0.0	995	0.2	-	1.4	20.0	4	3	0	1	-	Dry	1.07

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Former site of HPH4,Hyde Park, Millington Road,Hayes,London,UB3 4AZ	**Operative(s):** SEJ	**Date:** 21/12/2021	**Time:** 10:00	**Round:** 2	**Page:** 1 of 1

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
Analox	GA5000	G501805	26/11/2020
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Overcast	**Ground Conditions:** Dry	**Temperature**: 5°C
Barometric Pressure (mbar): 1023	**Barometric Pressure Trend (24hr):** Steady	**Ambient Concentration:** 0.3% CH_4, 0.1% CO_2, 21.2% O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to Base of well (mbgl)
	Peak	Steady						Peak	steady					
BH1	+0.4	+0.4	1024	0.4	-	2.1	14.9	1.6	1.0	0	0	-	1.55	6.11
BH2	+0.0	+0.0	1024	0.4	-	1.7	19.2	1.7	0.6	0	0	-	1.96	4.73
BH3	+0.5	+0.5	1023	0.4	-	0.3	18.1	1.9	1.9	0	1	-	2.17	5.54
WS1	-0.0	-0.0	1023	0.3	-	0.3	13.6	1.4	0.7	0	0	-	1.71	1.95
WS3	+0.1	+0.1	1022	0.3	-	0.6	21.1	1.7	0.5	0	0	-	Dry	1.50
WS5	+0.0	-0.0	1023	0.4	-	1.8	18.7	2.7	1.3	0	0	-	Dry	1.10

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Former site of HPH4,Hyde Park, Millington Road,Hayes,London,UB3 4AZ	**Operative(s):** DJH	**Date:** 17/01/2021	**Time:** 14:30	**Round:** 3	**Page:** 1 of 1

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
Analox	GA5000	G501805	26/11/2020
PID	MultiRAE	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Sunny	**Ground Conditions:** Damp	**Temperature**: 9°C
Barometric Pressure (mbar): 1034	**Barometric Pressure Trend (24hr):** Steady	**Ambient Concentration:** 0.1% CH_4, 0.0% CO_2, 21.2% O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to Base of well (mbgl)
	Peak	Steady						Peak	steady					
BH1	+0.2	+0.2	1034	0.0	-	2.0	13.6	0	0	0	0	-	1.51	6.07
BH2	+0.2	+0.2	1035	0.0	-	2.8	18.5	0	0	0	0	-	1.78	4.69
BH3	+0.3	+0.3	1035	0.1	-	0.1	16.0	0	0	0	1	-	2.14	5.55
WS1	+0.2	+0.2	1034	0.0	-	0.0	20.0	0	0	0	0	-	1.52	1.94
WS3	+0.1	+0.1	1035	0.0	-	0.2	20.2	0	0	0	0	-	Dry	1.46
WS5	+0.2	+0.2	1034	0.0	-	1.8	19.9	0	0	0	0	-	Dry	1.07

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Former site of HPH4,Hyde Park, Millington Road,Hayes,London,UB3 4AZ	**Operative(s):** JRO	**Date:** 26/01/2022	**Time:** 15:00	**Round:** 4	**Page:** 1 of 1

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
Analox	GA5000	G505801	12/04/2021
PID	Phocheck tiger	T-106448	01/03/2021
Dip Meter	GeoTech		

MONITORING CONDITIONS

Weather Conditions: Overcast	**Ground Conditions:** Dry	**Temperature**: 10°C
Barometric Pressure (mbar): 1029	**Barometric Pressure Trend (24hr):** Falling	**Ambient Concentration:** 0.0 % CH_4, 0.0% CO_2, 21.3% O_2

MONITORING RESULTS

Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH_4 %	CH_4 % LEL	CO_2 %	O_2 %	VOC (ppm)		H_2S (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to Base of well (mbgl)
	Peak	Steady						Peak	steady					
BH1	0.2	0.2	1029	0.0	-	0.8	19.5	0.6	0.4	0	0	-	1.54	6.07
BH2	0.1	0.1	1029	0.0	-	0.9	19.4	0.8	0.5	0	0	-	1.84	4.70
BH3	0.0	0.0	1030	0.2	-	0.2	16.7	1.2	1.2	0	0	-	2.15	5.51
WS1	0.0	0.0	1029	0.0	-	0.2	19.7	0.3	0.3	0	0	-	1.62	1.89
WS3	0.1	0.1	1029	0.0	-	0.1	21.0	0.3	0.3	0	0	-	Dry	1.47
WS5	0.2	0.2	1029	0.0	-	1.6	20.5	0.8	0.6	0	0	-	Dry	1.04

APPENDIX 6 – GROUNDWATER SAMPLING RECORDS

LOW FLOW GROUNDWATER MONITORING BOREHOLE RECORD SHEET

Site: Former site of HPH4,Hyde Park, Millington Road,Hayes,London,UB3 4AZ	**Operative(s):** HAH	**Date:** 01/12/2021	**Time:** 9:30	**Round:** 1	**Page:** 1 of 1

MONITORING EQUIPMENT

Instrument Type	Instrument Make	Serial No.	Date Last Calibrated
SmarTROLL MP	In-Situ	448904	26/06/2019
Dip Meter	In-Situ		

MONITORING CONDITIONS

Weather Conditions: Sunny	**Ground Conditions:** Dry	**Temperature:** 8 °C

Hole ID	Temperature (°C)	Specific Conductivity (µS/cm)	pH	(ORP) Oxidation-Reduction Potential (mV)	(RDO) Rugged Dissolved Oxygen Concentration (mg/L)	Depth to product – NB do not sample if present	Water Level (Start of testing)	Water Level (End of testing)	Depth to base of well (m)	Sample depth (tube intake depth) – (m)	Comments
BH1	14.13	1027.9	6.36	159.8	0.73	-	1.60	1.95	6.08	5	• Cloudy • No odour • Stabilized at 18 min
BH2	13.81	979.50	6.72	167.2	2.09	-	2.08	2.22	4.69	3.6	• Clear • No odour • Stabilized at 14 min
BH3	14.20	1023.2	7.09	168.3	2.49	-	2.25	2.37	5.52	4.52	• Slightly Cloudy • No odour • Stabilized at 18 min

APPENDIX 7 – CBR CALCULATIONS

CBR Calculation

Jomas Job: Former site of HPH4, Hyde Park
Jomas Job No.: P3284J2275

Test Location: WS1
Date of Test: 28/06/2021

Calculating Engineer: SRC **Date:** 30/06/2021
Approved by: JF **Date:** 22/12/2021

Depth (mm)	Nr Blow	Cumulative blows
50	3	3
100	5	8
150	4	12
200	4	16
250	6	22
300	9	31
350	11	42
400	10	52
450	8	60
500	11	71
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS1-Test 1	50	250	10.5	25.1	24.6	138.45
WS1-Test 2	250	500	5.1	53.9	50.0	225.8

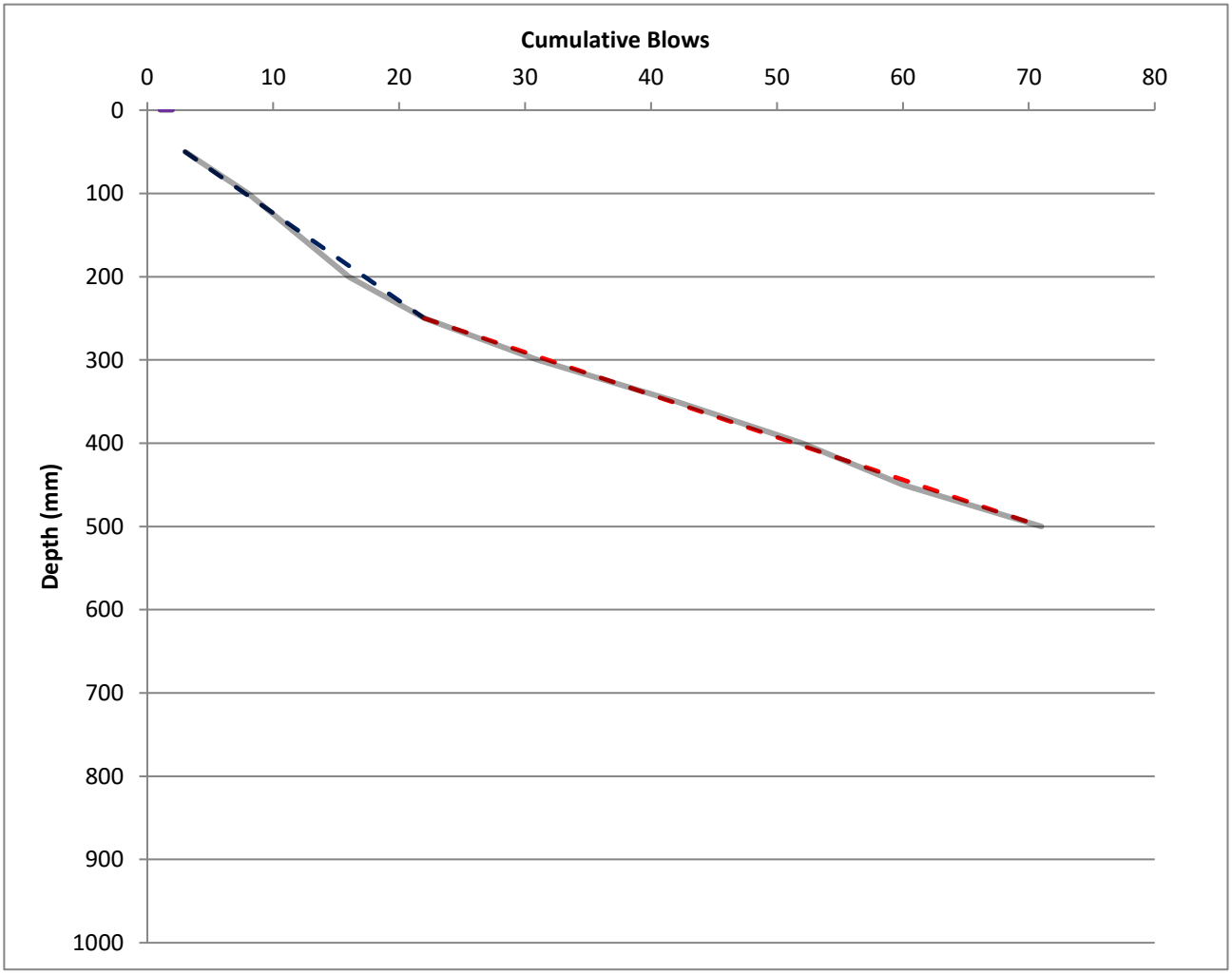
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Former site of HPH4, Hyde Park
Jomas Job No.: P3284J2275

Test Location: WS2
Date of Test: 28/06/2021

Calculating Engineer: SRC **Date:** 30/06/2021
Approved by: JF **Date:** 22/12/2021

Depth (mm)	Nr Blow	Cumulative blows
50	2	2
100	4	6
150	3	9
200	3	12
250	5	17
300	7	24
350	10	34
400	12	46
450	15	61
500	18	79
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS2-Test 1	50	250	13.3	19.5	19.5	117.8
WS2-Test 2	250	350	5.9	46.4	43.5	205.16
WS2-Test 3	350	500	3.3	84.6	75.9	301.32

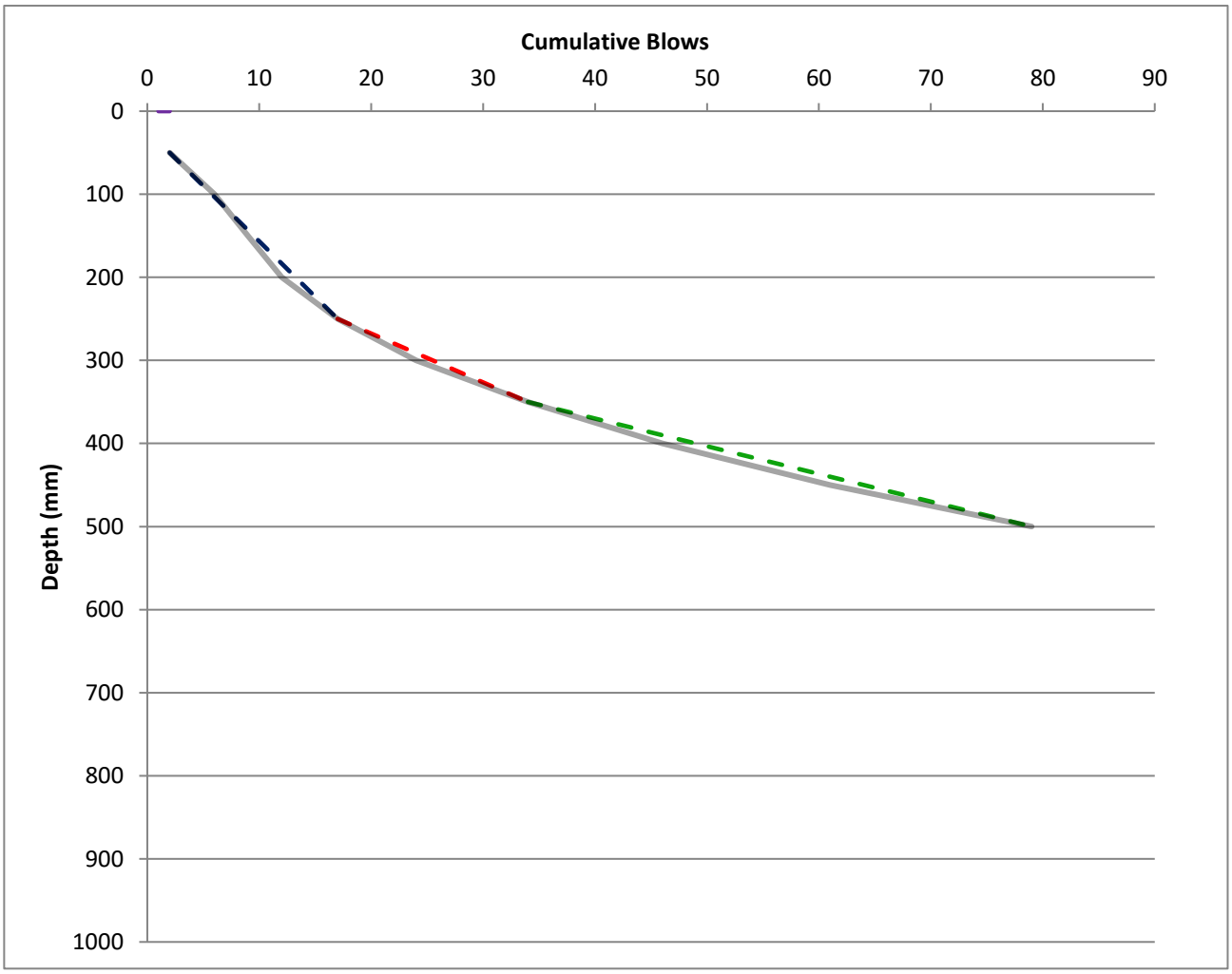
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Former site of HPH4, Hyde Park
Jomas Job No.: P3284J2275

Test Location: WS3
Date of Test: 28/06/2021

Calculating Engineer: SRC **Date:** 30/06/2021
Approved by: JF **Date:** 22/12/2021

Depth (mm)	Nr Blow	Cumulative blows
50	3	3
100	3	6
150	5	11
200	4	15
250	6	21
300	8	29
350	9	38
400	12	50
450	13	63
500	14	77
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS3-Test 1	50	200	12.5	20.9	20.8	123.14
WS3-Test 2	200	350	6.5	41.6	39.3	191.31
WS3-Test 3	350	500	3.8	72.7	66.0	273.46

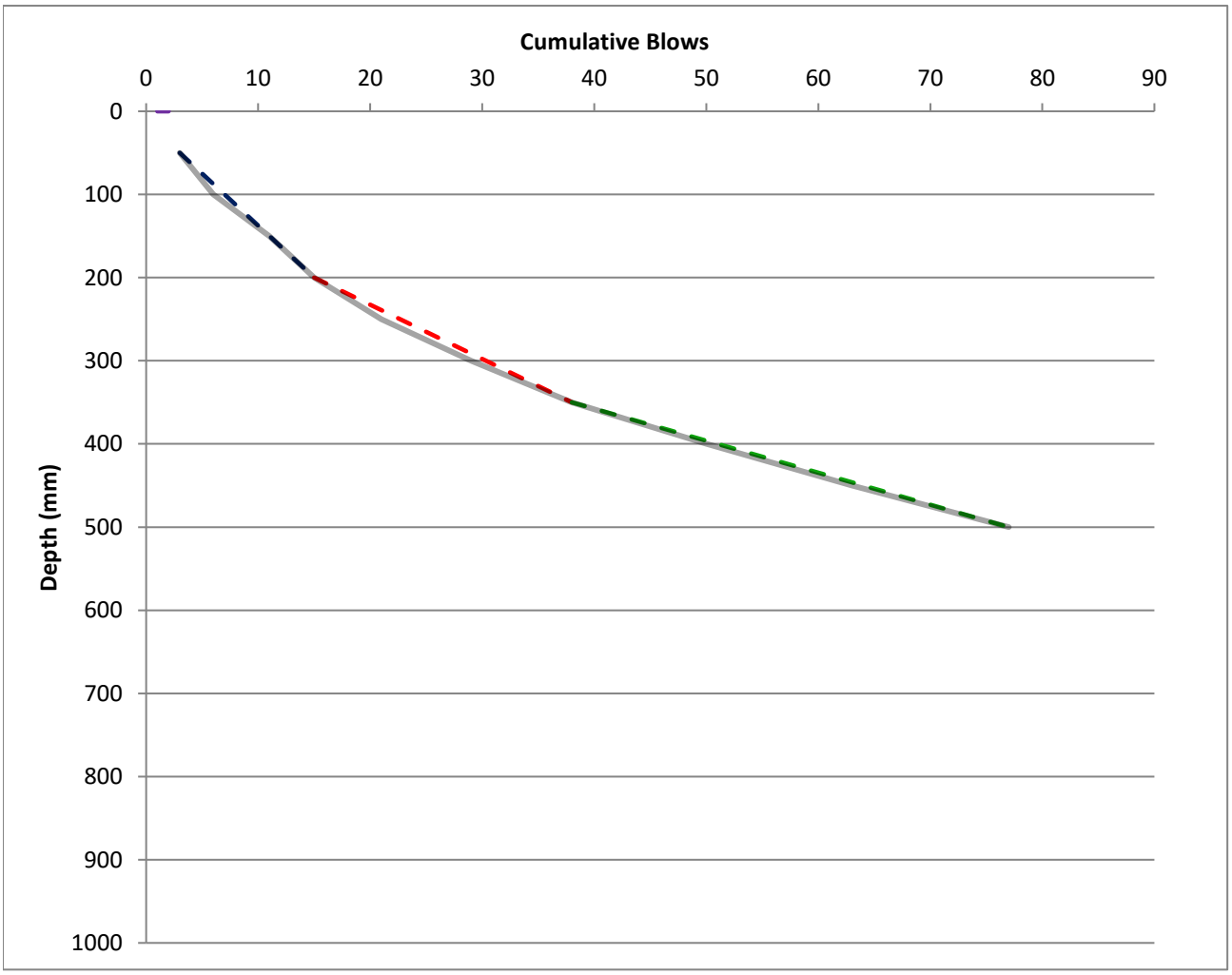
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Former site of HPH4, Hyde Park
Jomas Job No.: P3284J2275

Test Location: WS4
Date of Test: 28/06/2021

Calculating Engineer: SRC **Date:** 30/06/2021
Approved by: JF **Date:** 22/12/2021

Depth (mm)	Nr Blow	Cumulative blows
50	2	2
100	4	6
150	3	9
200	5	14
250	14	28
300	50	78
350		
400		
450		
500		
550		
600		
650		
700		
750		
800		
850		
900		
950		
1000		

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS4-Test 1	50	200	12.5	20.9	20.8	123.14
WS4-Test 2	200	250	3.6	78.6	70.9	287.46
WS4-Test 3	250	300	1.0	302	247.0	680.33

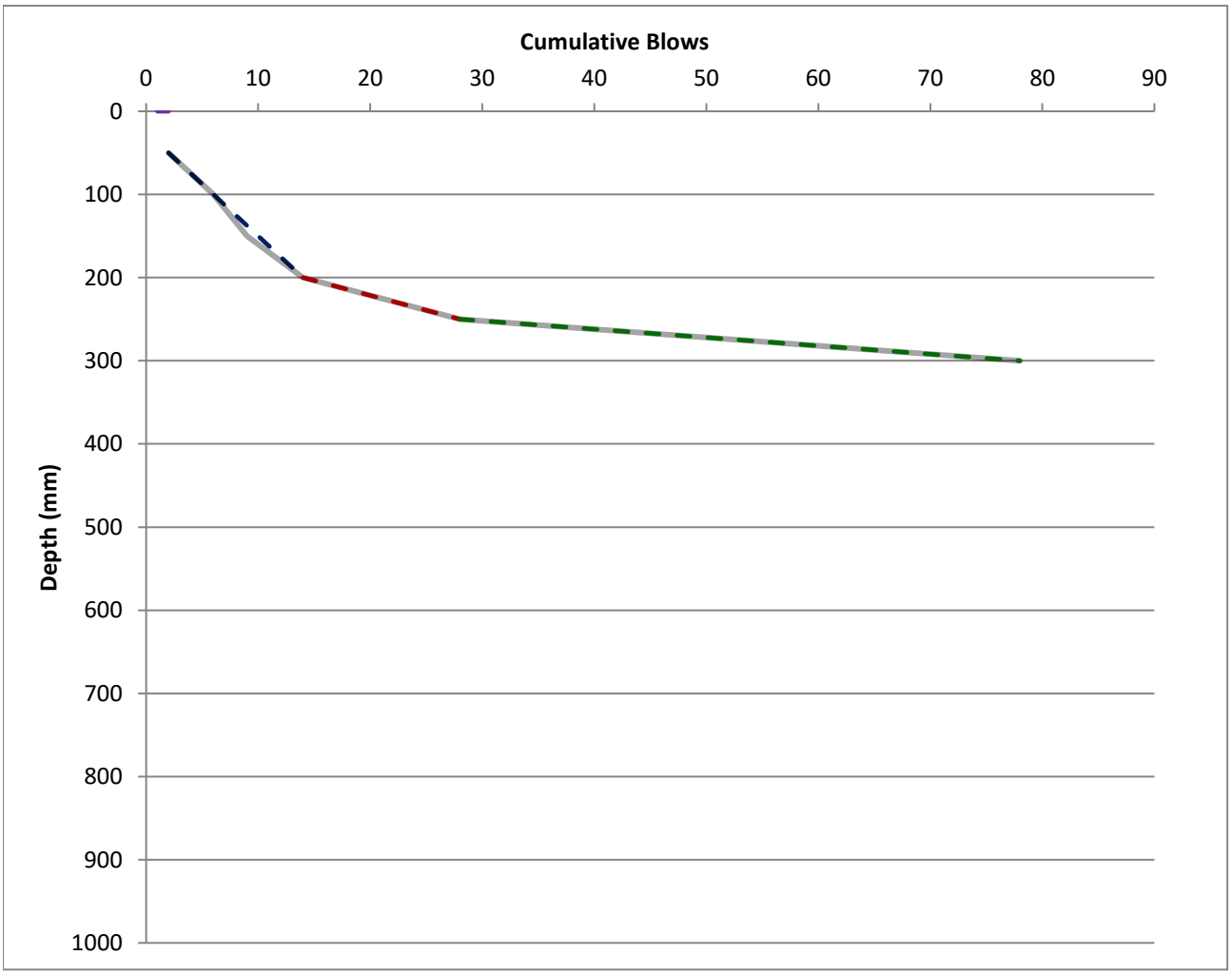
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodoloies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



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