

APPENDIX C

GEOTECHNICAL REPORT

(PHASE 1 AND 2)



Report on a **GEOTECHNICAL GROUND INVESTIGATION**

Ref: 21/33613 | Date: May 2021

**139 Cranley Gardens,
Muswell Hill,
London,
N10 3AG**

Prepared for:
Lee Doherty

DOCUMENT CONTROL

<i>Project</i>	139 Cranley Gardens, Muswell Hill, London, N10 3AG
<i>Document Type</i>	Report on a Ground Investigation
<i>Document Reference</i>	SAS 21/33613
<i>Document Status</i>	Final
<i>Revision</i>	0
<i>Changes</i>	-
<i>Date</i>	May 2021
<i>Document Version</i>	V1.1 – 1/21

Checked

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Ref: 21/33613
Date: May 2021

CONTENTS

1.0 EXECUTIVE SUMMARY	4
2.0 INTRODUCTION	5
2.1 OUTLINE AND LIMITATIONS OF REPORT	5
3.0 SITE DETAILS	5
3.1 SITE LOCATION	5
3.2 PUBLISHED GEOLOGY	5
4.0 SCOPE OF WORK	6
4.1 SITE WORKS	6
4.2 GROUND CONDITIONS	7
4.3 GROUNDWATER	8
5.0 IN-SITU AND LABORATORY TESTS	8
5.1 IN-SITU TESTS	8
5.2 CLASSIFICATION TESTS	8
5.3 SULPHATE AND PH ANALYSES	9
6.0 WASTE ACCEPTANCE CRITERIA TESTING	9
6.1 WASTE ACCEPTANCE CRITERIA ANALYSIS	9
7.0 FOUNDATION DESIGN	10
7.1 GENERAL	10
7.2 SITE PREPARATION WORKS	10
7.3 CONVENTIONAL SPREAD FOUNDATIONS	10
7.4 PILED FOUNDATIONS	11
7.5 RETAINING WALLS	11
7.6 FLOOR SLABS	12
7.7 EXCAVATIONS	12
7.8 CHEMICAL ATTACK ON BURIED CONCRETE	12
8.0 LIST OF APPENDICES	13
9.0 REFERENCES	14

APPENDIX A

BOREHOLE LOGS

APPENDIX B

LABORATORY TEST & GROUNDWATER MONITORING DATA

1.0 Executive Summary

Site Location	139 Cranley Gardens, Muswell Hill, London, N10 3AG
Client	Lee Doherty
Proposed Development	It is proposed to construct a basement beneath the rear garden of the existing property on-site.
Environmental Setting	The 1:50000 Geological Survey of Great Britain (England and Wales) covering the area indicates the site to be underlain by deposits of London Clay Formation at depth. A surface cover of Made Ground should also be expected. The Bedrock geology underlying the site has been classified as a non-aquifer.

GEOTECHNICAL INVESTIGATION

Ground Conditions Encountered	The borehole revealed ground conditions that were generally consistent with the geological records and known history of the area and comprised Made Ground up to 0.60m in thickness resting on the London Clay Formation at depth.
Groundwater	Groundwater was encountered at a depth of 0.85m below ground level in Borehole 1 after a period of approximately two weeks. However, as the London Clay Formation is a non-aquifer, the water encountered is not groundwater, but instead, is surface water which has become trapped within the monitoring pipe.
Engineering Observations & Recommendations	Based on the ground and groundwater conditions encountered in the borehole, it could, in theory, be possible to support the proposed new development on conventional strip foundations taken down below the Made Ground and any weak superficial soils and placed in the natural stiff silty sandy clay deposits which occur at a depth of 0.60m across the site. Using theory from Terzaghi (1943), strip foundations placed within natural soils may be designed to allowable net bearing pressures of approximately 165kN/m² at 1.00m depth below ground level increasing to 250kN/m² at 3.00m depth below ground level in order to allow for a factor of safety of 2.5 against general shear failure. The actual allowable bearing pressure applicable will depend on the form of foundation, its geometry and depth in accordance with classical analytical methods, details of which can be obtained from "Foundation Design and Construction", Seventh Edition, 2001 by M J Tomlinson (see references) or similar texts.

2.0 Introduction

2.1 Outline and Limitations of Report

At the request of Lee Doherty, a ground investigation was carried out in connection with a proposed development at the above site.

The information was required for the design and construction of foundations and infrastructure for the proposed development, which includes the construction of a basement level beneath the rear garden of the existing property on site.

The recommendations and comments given in this report are based on the ground conditions encountered in the exploratory hole made during the investigation and the results of the tests made in the field and the laboratory. It must be noted that there may be special conditions prevailing at the site remote from the exploratory hole location which have not been disclosed by the investigation and which have not been taken into account in the report. No liability can be accepted for any such conditions.

3.0 Site Details

National Grid Reference: TQ – 292 890

3.1 Site Location

The site is located on the southern side of Cranley Gardens, Muswell Hill at approximate postcode N10 3AG. The site consists of a semi-detached two storey residential property, with a small single storey gym/garden studio within the rear garden and a front driveway.

The site is bound by residential properties to the east and west and open land to the south.

3.2 Published Geology

The 1:50000 Geological Survey of Great Britain (England and Wales) covering the area indicates the site to be underlain by deposits of London Clay Formation at depth. A surface cover of Made Ground should also be expected.

4.0 Scope of Work

4.1 Site Works

The proposed scope of works was agreed by the client prior to the commencement of the investigations. To achieve this, the following works were undertaken:-

- The drilling of one continuous flight auger borehole to a depth of 12.00m below ground level (Borehole 1).
- The installation of a groundwater monitoring standpipe to a depth of 5.00m depth in Borehole 1, together with a single return monitoring visit.
- The excavation by hand of four trial pits to 1.50m maximum depth to expose existing foundations on-site (Trial Pits 1 to 4 inclusive). However, the trial pit excavations were postponed for a later date to reduce the disturbance and risk of damage to the property.
- Sampling and in-situ testing as appropriate to the ground conditions encountered in the borehole.
- Laboratory testing to determine the engineering properties of the soils encountered in the exploratory hole.
- Interpretative reporting on foundation options for the proposed building and infrastructure.

4.2 Ground Conditions

The approximate location of the exploratory hole is illustrated on the site sketch plan, Figure 1 below.

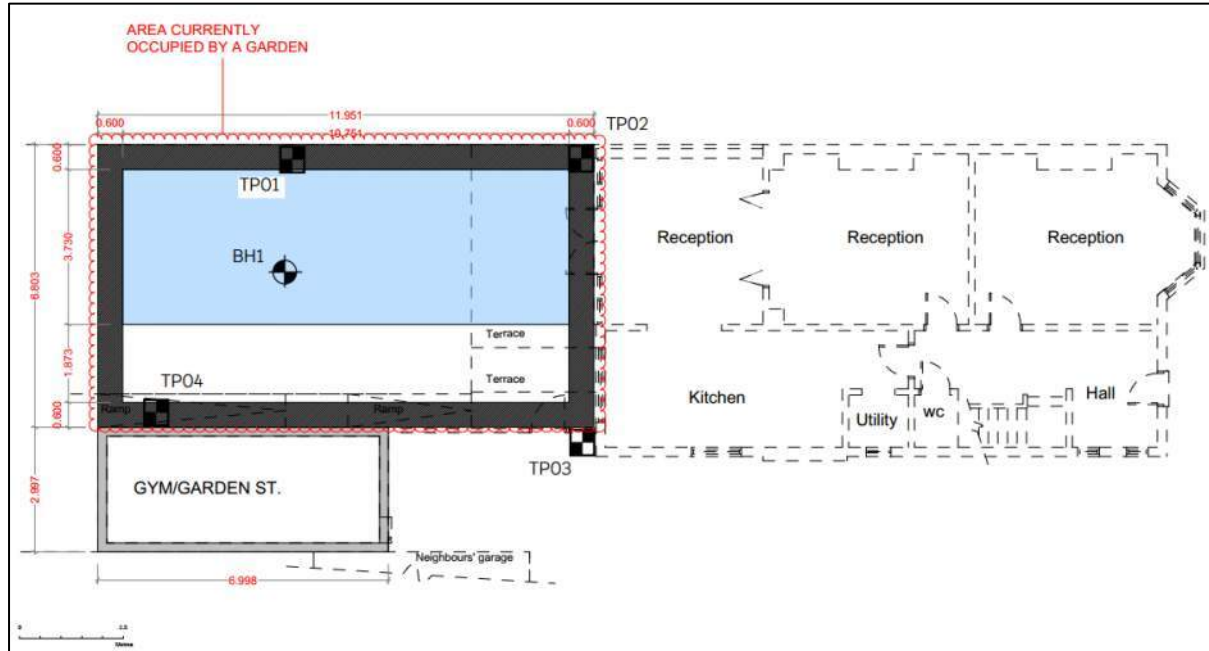


Figure 1. Site Sketch Plan

The borehole revealed ground conditions that were generally consistent with the geological records and known history of the area and comprised Made Ground up to 0.60m in thickness resting on the London Clay Formation at depth.

These ground conditions are summarised in the following table. For detailed information on the ground conditions encountered in the borehole, reference should be made to the exploratory hole records presented in Appendix A.

Strata	Depth to top of strata (mbgl)	Depth to base of strata (mbgl)	Description
Made Ground	0.00	0.60	Grass over silty sandy clayey topsoil containing occasional brick and concrete fragments.
London Clay Formation	0.60	12.00 (maximum depth of drilling)	Stiff silty sandy clay containing partings of silty fine sand and gypsum crystals.

Table A. Summary of Ground Conditions in Exploratory Holes

4.3 Groundwater

Groundwater was not encountered in Borehole 1 and the material remained essentially dry throughout.

It must be noted that the speed of excavation is such that there may well be insufficient time for further light seepages of groundwater to enter the borehole and hence be detected, particularly within more cohesive soils.

Groundwater was encountered at a depth of 0.85m below ground level in Borehole 1 after a period of approximately two weeks. However, as the London Clay Formation is a non-aquifer, the water encountered is not groundwater, but instead, is surface water which has become trapped within the monitoring pipe.

Isolated pockets of groundwater may also be present perched within any less permeable material found at shallower depth on other parts of the site especially within any Made Ground.

It should be noted that the comments on groundwater conditions are based on observations made at the time of the investigation (April and May 2021) and that changes in the groundwater level could occur due to seasonal effects and also changes in drainage conditions.

5.0 In-Situ and Laboratory Tests

5.1 In-Situ Tests

In the essentially cohesive natural soils encountered at the site, in-situ shear vane tests were made at regular depth increments in order to assess the undrained shear strength of the materials. The results indicate that the natural soils are of a generally medium becoming high strength in accordance with BS 5930 (2015).

The results of the in-situ tests are shown on the appropriate exploratory hole records contained in Appendix A.

5.2 Classification Tests

Atterberg Limit tests were conducted on three selected samples taken from the cohesive portion of the natural soils in Borehole 1 and showed the samples tested to fall into Classes CH and CV according to the British Soil Classification System.

These are fine grained silty clay soils of high to very high plasticity and as such generally have a low permeability and a high susceptibility to shrinkage and swelling movements with changes in moisture content, as defined by the NHBC Standards, Chapter 4.2. The results indicated Plasticity Index values of between 43% and 49%, with all samples being above the 40% boundary between soils assessed as being of medium swelling and shrinkage potential and those assessed as being of high swelling and shrinkage potential.

The results of the tests are presented on Table 1, contained in Appendix B.

5.3 Sulphate and pH Analyses

The results of the sulphate and pH analyses made on three soil samples are presented within the i2 Analytical Limited Report Number: 21-72885, contained in Appendix B. The results show the soil samples tested to have water soluble sulphate contents of up to 2.4g/litre associated with near neutral to slightly alkaline pH values.

6.0 Waste Acceptance Criteria Testing

6.1 Waste Acceptance Criteria Analysis

A sample was obtained from 0.50m depth below ground level in Borehole 1 made at the location indicated on the site sketch plan (Figure 1).

The sample selected for analysis was sub-contracted to DETS Limited (a UKAS and MCERTS accredited laboratory) and their report is contained in Appendix B.

The sample was analysed using the Catwastesoil assessment tool, which concluded that the sample was non-hazardous in nature.

The sample was analysed for Waste Acceptance Criteria Testing in order to classify soils on site for disposal purposes.

For the purpose of waste disposal, the soil sample would be classified as:

BH1 @ 0.50m Inert Waste

7.0 Foundation Design

7.1 General

It is proposed to construct a basement beneath the rear garden of the existing property on-site. Details of the structures, layouts etc. have been provided, although details of the loadings were not available at the time of preparation of this report.

7.2 Site Preparation Works

The main contractor should be informed of the site conditions and risk assessments should be undertaken to comply with the Construction Design Management (CDM) regulations. Site personnel are to be made aware of the site conditions. It is recommended that extensive searches of existing man-made services are undertaken over the site prior to final design works.

7.3 Conventional Spread Foundations

A result of the inherent variability of uncontrolled fill, (Made Ground) is that it is usually unpredictable in terms of bearing capacity and settlement characteristics. Foundations should, therefore, be taken through any Made Ground and either into, or onto a suitable underlying natural stratum of adequate bearing characteristics.

Based on the ground and groundwater conditions encountered in the borehole, it could, in theory, be possible to support the proposed new development on conventional strip foundations taken down below the Made Ground and any weak superficial soils and placed in the natural stiff silty sandy clay deposits which occur at a depth of 0.60m across the site.

Using theory from Terzaghi (1943), strip foundations placed within natural soils may be designed to allowable net bearing pressures of approximately 165kN/m² at 1.00m depth below ground level increasing to 250kN/m² at 3.00m depth below ground level in order to allow for a factor of safety of 2.5 against general shear failure. The actual allowable bearing pressure applicable will depend on the form of foundation, its geometry and depth in accordance with classical analytical methods, details of which can be obtained from "Foundation Design and Construction", Seventh Edition, 2001 by M J Tomlinson (see references) or similar texts.

Any soft or loose pockets encountered within otherwise competent formations should be removed and replaced with well compacted granular fill.

In addition, foundations may need to be taken deeper should they be within the zones of influence of both existing or recently felled trees and any proposed tree planting. The depth of foundation required to avoid the zone likely to be affected by the root systems of trees is shown in the recommendations given in NHBC Standards, Chapter 4.2, April 2010, "Building near Trees" and it is considered that this document is relevant in this situation.

7.4 Piled Foundations

In the event that the use of conventional spread foundations proves either impracticable or uneconomical due to the size and depth of foundation required, then a piled foundation will be required. In these ground conditions, it is considered that some form of bored and in-situ cast concrete piled foundation with reinforced concrete ground beams should prove satisfactory.

The construction of a piled foundation is a specialist activity and the advice of a reputable contractor, familiar with the type of soil and groundwater conditions encountered at this site should be sought prior to finalising the foundation design. The actual pile working load will depend on the particular type of pile chosen and method of installation adopted.

To achieve the full bearing value a pile should penetrate the bearing stratum by at least five times the pile diameter.

Where piles are to be constructed in groups the bearing value of each individual pile should be reduced by a factor of about 0.8 and a calculation made to check the factor of safety against block failure.

Driven piles could also be used and would develop much higher working loads approximately 2.5 to 3 times higher than bored piles of a similar diameter at the same depth. However, the close proximity of adjacent buildings will in all probability preclude their use due to noise and vibration.

7.5 Retaining Walls

Several methods of retaining wall construction could be considered. These may include retaining structures cast in an underpinning sequence, or the use of temporary or sacrificial works to facilitate the retaining structure's construction. The excavation of the basement must not compromise the integrity of adjacent structures.

The full design of temporary and permanent retaining structures is beyond the scope of this report. However, the following design parameters for each element of soil recorded in the relevant exploratory holes are provided in the table below to assist the design of these structures.

Stratum	Depth to top	Bulk Density (Mg/m ³) (γ)	Effective Angle of Internal Friction (Φ)
London Clay Formation	0.60	2.00	23

Retaining Wall Design Parameters

The designer should use these parameters to derive the active and passive earth pressure coefficients k_a and k_p . The determination of appropriate earth pressure coefficients, together with factors such as the pattern of the earth pressure distribution, will depend upon the type/geometry of the wall and overall design factors.

7.6 Floor Slabs

Due to the presence of soils assessed to be of high swelling and shrinkage potential below, it is recommended that ground slabs should be fully suspended.

Within the zone of influence of trees, either retained or removed, floor slabs should incorporate either underfloor voids or suitable depths of compressible material in accordance with NHBC requirements, for soils with high volume change potential.

7.7 Excavations

Given the presence of a non-aquifer below the site it is likely that the groundwater recorded within these soils relates to perched water within the Made Ground and is recharged via intermittent seepages from surface water associated with weather conditions rather than any large-scale subterranean groundwater flow. As a result, the impact on excavations carried out at the site from this perched water is expected to be minimal.

However, it may still be necessary to control this water during the construction period and consideration could be given to conventional internal pumping methods from open sumps.

It is recommended that the water levels in the monitoring borehole be periodically measured immediately prior to and during, the development. Should groundwater levels rise to within the excavation volume, or should significant groundwater inflow be observed during excavation, professional advice should be sought.

7.8 Chemical Attack on Buried Concrete

The results contained in Appendix B show the natural soil samples tested to have water soluble sulphate contents of up to 2.40g/litre associated with near neutral to slightly alkaline pH values. The Made Ground sample selected for contamination analysis indicated a water-soluble sulphate content of 0.03g/litre associated with a slightly alkaline pH value.

In these conditions, it is considered that deterioration of buried concrete due to sulphate or acid attack is likely to occur. The final design of buried concrete according to Tables C1 and C2 of BRE Special Digest 1:2005 should be in accordance with Class DS-3 conditions. The measured pH values of the samples show that an ACEC class of AC-2s would be appropriate, assuming a static water condition.

In addition, segregations of gypsum were noted within the London Clay and scattered small gypsum crystals were also noted at depth. Consequently, it is considered that any buried concrete at depth may be attacked by such sulphates in solution and that it would be prudent to design any such deep buried concrete in accordance with full Class DS-3 conditions.

8.0 List of Appendices

Appendix A – Borehole Logs

Appendix B – Laboratory Test & Groundwater Monitoring Data

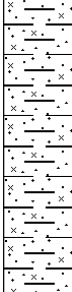
9.0 References

1. British Standards Institution, 1986. Code of practice for foundations, BS 8004, BSI, London.
2. British Standards Institution, 1990. Methods for test for soils for civil engineering purposes, BS1377, BSI, London
3. British Standards Institution, 1994. Code of practice for earth retaining structures, BS8002, BSI, London
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7. Driscoll, R (1983) "The influence of vegetation on the shrinking and swelling of clay soils in Great Britain", Geo-technique 33, 93-107
8. Eurocode 1: Actions on structures – BS EN 1991-1-1:2002: General actions – Densities, self weight and imposed loads, BSI, London
9. Nathanail C.P., McCaffrey, C., Ashmore, M.H., Cheng, Y.Y., Gillet, A., Ogden, R. & Scott, D., 2009. The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd edition). Land Quality Press, Nottingham.
10. NHBC Standards, Chapter 4.1, "Land Quality - managing ground conditions", September 1999.
11. NHBC Standards, Chapter 4.2, "Building near Trees", April 2010.
12. Stroud M.A. and Butler F.G. (1975) Symposium on the Engineering Behaviour of Glacial Materials; the Midland Soil Mechanics and Foundation Engineering Society; pgs 124 et seq.
13. Tomlinson, M J, 2001. "Foundation Design and Construction", Seventh Edition, Prentice Hall (ISBN 0-13-031180-4).

APPENDIX A

Borehole Logs

Site Analytical Services Ltd.							Site 139 CRANLEY GARDENS, MUSWELL HILL, LONDON, N10 3AG	Borehole Number BH1		
Boring Method CONTINUOUS FLIGHT AUGER		Casing Diameter 100mm cased to 0.00m			Ground Level (mOD)		Client LEE DOHERTY		Job Number 2133613	
		Location TQ292890			Dates 30/04/2021		Architect CRAWFORD PARTNERSHIP		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.25	D1					(0.60)	MADE GROUND: Grass over dark brown silty slightly clayey topsoil containing occasional brick and concrete			
0.50	D2					0.60	Firm becoming stiff, mottled light brown silty CLAY			
0.75	D3									
1.00	D4									
1.00	V1 64					(1.40)				
1.50	D5									
1.50	V2 81									
2.00	D6					2.00	Stiff, brown silty sandy CLAY			
2.00	V3 102									
2.50	D7									
2.50	V4 123									
3.00	D8									
3.00	V5 130+									
3.50	D9									
3.50	V6 130+									
4.00	D10									
4.00	V7 130+									
4.50	D11									
4.50	V8 130+									
5.00	D12									
5.00	V9 130+									
6.00	D13					(8.00)				
6.00	V10 130+									
7.00	D14									
7.00	V11 130+									
8.00	D15									
8.00	V12 130+									
9.00	D16									
9.00	V13 130+									
Remarks Groundwater was not encountered during boring/excavation V= Vane Test - Results in kPa D= Disturbed Sample Excavating from 0.00m to 1.00m for 1 hour.								Scale (approx)	Logged By	
								1:50	EW	
								Figure No. 2133613.BH1		

Site Analytical Services Ltd.							Site 139 CRANLEY GARDENS, MUSWELL HILL, LONDON, N10 3AG		Borehole Number BH1	
Boring Method CONTINUOUS FLIGHT AUGER		Casing Diameter 100mm cased to 0.00m			Ground Level (mOD)		Client LEE DOHERTY		Job Number 2133613	
		Location TQ292890			Dates 30/04/2021		Architect CRAWFORD PARTNERSHIP		Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
10.00 10.00	D17 V14 130+					10.00	Stiff, dark grey blue silty sandy CLAY containing partings of silty fine grained sand and occasional gypsum crystals			
11.00 11.00	D18 V19 130+					(2.00)				
12.00 12.00	D15 V20 130+					12.00	Complete at 12.00m			
Remarks Groundwater was not encountered during boring/excavation V= Vane Test - Results in kPa D= Disturbed Sample								Scale (approx)	Logged By	
								1:50	EW	
								Figure No. 2133613.BH1		

Site Analytical Services Ltd.

Site

139 CRANLEY GARDENS, MUSWELL HILL, LONDON,
N10 3AG

Borehole Number	BH1
-----------------	-----

Installation Type
Single Installation

Dimensions

Internal Diameter of Tube [A] = 50 mm
Diameter of Filter Zone = 100 mm

Client

LEE DOHERTY

**Job
Number**
2133613

Location

TQ292890

Ground Level (mOD)

Architect

CRAWFORD PARTNERSHIP

Sheet
1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling									
				1.00	Bentonite Seal	Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)
											5 min	10 min	15 min	20 min	
				1.00	Bentonite Seal										
															
				1.00	Bentonite Seal										
															
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				1.00	Bentonite Seal										

Remarks

Remarks
Lockable cover set in cement

APPENDIX B

Laboratory Test & Groundwater Monitoring Data

PLASTICITY INDEX & MOISTURE CONTENT DETERMINATIONS

BH/TP No.	Depth (m)	Natural Moisture (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 μ m (%)	Modified Plasticity Index (%)	Class
BH1	1.00	40	76	29	47	100	47	CV
	2.00	30	73	24	49	100	49	CV
	3.00	30	69	26	43	100	43	CH

Table 1

GROUNDWATER MONITORING

GROUNDWATER MONITORING RECORD			
Date	Weather Conditions	Ground Conditions	Temperature (°C)
13/05/2021	Raining	Wet	12.0
Monitoring Point Location	Depth to water (mBGL)		Depth to Base of well (mBGL)
BH1	0.85		5.12

Table 2



Aubrey Davidson
Site Analytical Services Ltd
Units 14 -15
River Road Business Park
33 River Road
Barking
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IG11 0EA

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Herts,
WD18 8YS

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

Analytical Report Number : 21-72885

Project / Site name:	139 Cranley Gardens Muswell Hill London N10 JA9	Samples received on:	05/05/2021
Your job number:	21 33613	Samples instructed on/ Analysis started on:	05/05/2021
Your order number:	8610	Analysis completed by:	12/05/2021
Report Issue Number:	1	Report issued on:	12/05/2021
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: 21-72885

Project / Site name: 139 Cranley Gardens Muswell Hill London N10 JA9

Your Order No: 8610

Lab Sample Number				1859504	1859505	1859506
Sample Reference				BH1	BH1	BH1
Sample Number				D5	D10	D14
Depth (m)				1.50	4.00	7.00
Date Sampled				Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Moisture Content	%	0.01	NONE	22	20	19
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.2
Whole Sample Crushed				Crushed	Crushed	Crushed

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.0	7.5	7.7
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.39	1.7	2.4

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



Analytical Report Number : 21-72885

Project / Site name: 139 Cranley Gardens Muswell Hill London N10 JA9

* 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 *
1859504	BH1	D5	1.5	Brown clay.
1859505	BH1	D10	4	Brown clay.
1859506	BH1	D14	7	Brown clay.

Analytical Report Number : 21-72885

Project / Site name: 139 Cranley Gardens Muswell Hill London N10 JA9

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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Crush Whole Sample	Either: Client specific preparation instructions - sample(s) crushed whole prior to analysis; OR Sample unsuitable for standard preparation and therefore crushed whole prior to analysis.	In house method, applicable to dry samples only.	L019-PL	D	NONE

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

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

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

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 : 21-72885

Project / Site name: 139 Cranley Gardens Muswell Hill London N10 JA9

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH1	D10	S	1859505	a	None Supplied	None Supplied	None Supplied
BH1	D14	S	1859506	a	None Supplied	None Supplied	None Supplied
BH1	D5	S	1859504	a	None Supplied	None Supplied	None Supplied



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DETS Report No: 21-05858

Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 JA9

Project / Job Ref: 21/33613

Order No: 8609

Sample Receipt Date: 06/05/2021

Sample Scheduled Date: 06/05/2021

Report Issue Number: 1

Reporting Date: 12/05/2021

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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

For Topsoil and WAC analysis the expanded uncertainty measurement should be considered while evaluating results against compliance values.



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Soil Analysis Certificate						
DETS Report No: 21-05858	Date Sampled	None Supplied				
Site Analytical Services Ltd	Time Sampled	None Supplied				
Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 JA9	TP / BH No	BH1				
Project / Job Ref: 21/33613	Additional Refs	D2				
Order No: 8609	Depth (m)	0.50				
Reporting Date: 12/05/2021	DETS Sample No	541636				

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected			
pH	pH Units	N/a	MCERTS	8.0			
Total Cyanide	mg/kg	< 2	NONE	< 2			
Complex Cyanide	mg/kg	< 2	NONE	< 2			
Free Cyanide	mg/kg	< 2	NONE	< 2			
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	557			
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.06			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	27			
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.03			
Sulphide	mg/kg	< 5	NONE	< 5			
Organic Matter	%	< 0.1	MCERTS	2.1			
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	1.2			
Arsenic (As)	mg/kg	< 2	MCERTS	13			
W/S Boron	mg/kg	< 1	NONE	1.1			
Cadmium (Cd)	mg/kg	< 0.2	NONE	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	32			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	42			
Lead (Pb)	mg/kg	< 3	MCERTS	114			
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	18			
Selenium (Se)	mg/kg	< 2	MCERTS	< 3			
Zinc (Zn)	mg/kg	< 3	MCERTS	83			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-05858	Date Sampled	None Supplied				
Site Analytical Services Ltd	Time Sampled	None Supplied				
Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 JA9	TP / BH No	BH1				
Project / Job Ref: 21/33613	Additional Refs	D2				
Order No: 8609	Depth (m)	0.50				
Reporting Date: 12/05/2021	DETS Sample No	541636				

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1			
Coronene	mg/kg	< 0.1	NONE	< 0.1			
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	< 1			
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	< 1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6			
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	< 1.7			



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 21-05858	Date Sampled	None Supplied				
Site Analytical Services Ltd	Time Sampled	None Supplied				
Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 JA9	TP / BH No	BH1				
Project / Job Ref: 21/33613	Additional Refs	D2				
Order No: 8609	Depth (m)	0.50				
Reporting Date: 12/05/2021	DETS Sample No	541636				

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01			
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05			
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10			
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21			
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01			
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05			
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2			
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2			
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2			
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3			
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10			
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21			
Total >C5 - C35	mg/kg	< 42	NONE	< 42			



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-05858	Date Sampled	None Supplied				
Site Analytical Services Ltd	Time Sampled	None Supplied				
Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 JA9	TP / BH No	BH1				
Project / Job Ref: 21/33613	Additional Refs	D2				
Order No: 8609	Depth (m)	0.50				
Reporting Date: 12/05/2021	DETS Sample No	541636				

Determinand	Unit	RL	Accreditation				
Benzene	ug/kg	< 2	MCERTS	< 2			
Toluene	ug/kg	< 5	MCERTS	< 5			
Ethylbenzene	ug/kg	< 2	MCERTS	< 2			
p & m-xylene	ug/kg	< 2	MCERTS	< 2			
o-xylene	ug/kg	< 2	MCERTS	< 2			
MTBE	ug/kg	< 5	MCERTS	< 5			



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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3									
DETS Report No: 21-05858		Date Sampled	None Supplied		Landfill Waste Acceptance Criteria Limits				
Site Analytical Services Ltd		Time Sampled	None Supplied						
Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 JA9		TP / BH No	BH1						
Project / Job Ref: 21/33613		Additional Refs	D2						
Order No: 8609		Depth (m)	0.50						
Reporting Date: 12/05/2021		DETS Sample No	541636						
Determinand	Unit	MDL			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill		
TOC ^{MU}	%	< 0.1	1.2		3%	5%	6%		
Loss on Ignition	%	< 0.01	6.30		--	--	10%		
BTEX ^{MU}	mg/kg	< 0.05	< 0.05		6	--	--		
Sum of PCBs	mg/kg	< 0.1	< 0.1		1	--	--		
Mineral Oil ^{MU}	mg/kg	< 10	< 10		500	--	--		
Total PAH ^{MU}	mg/kg	< 1.7	< 1.7		100	--	--		
pH ^{MU}	pH Units	N/a	8.0		--	>6	--		
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1		--	To be evaluated	To be evaluated		
Eluate Analysis			2:1 mg/l	8:1 mg/l		Cumulative 10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic ^U		< 0.01	< 0.01		< 0.2	0.5	2	25	
Barium ^U		< 0.02	< 0.02		0.1	20	100	300	
Cadmium ^U		< 0.0005	< 0.0005		< 0.02	0.04	1	5	
Chromium ^U		< 0.005	< 0.005		< 0.20	0.5	10	70	
Copper ^U		< 0.01	< 0.01		< 0.5	2	50	100	
Mercury ^U		< 0.0005	< 0.0005		< 0.005	0.01	0.2	2	
Molybdenum ^U		0.008	0.004		< 0.1	0.5	10	30	
Nickel ^U		< 0.007	< 0.007		< 0.2	0.4	10	40	
Lead ^U		< 0.005	< 0.005		< 0.2	0.5	10	50	
Antimony ^U		< 0.005	< 0.005		< 0.05	0.06	0.7	5	
Selenium ^U		< 0.005	< 0.005		< 0.05	0.1	0.5	7	
Zinc ^U		< 0.005	0.009		< 0.2	4	50	200	
Chloride ^U		4	2		19	800	15000	25000	
Fluoride ^U		0.7	0.7		7	10	150	500	
Sulphate ^U		21	5		58	1000	20000	50000	
TDS		113	47		516	4000	60000	100000	
Phenol Index		< 0.01	< 0.01		< 0.5	1	-	-	
DOC		28.6	14.5		155	500	800	1000	
Leach Test Information									
Sample Mass (kg)			0.22						
Dry Matter (%)			78.7						
Moisture (%)			27.2						
Stage 1									
Volume Eluate L2 (litres)			0.30						
Filtered Eluate VE1 (litres)			0.12						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion

Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepancies with current legislation

M Denotes MCERTS accredited test

U Denotes ISO17025 accredited test



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 21-05858	
Site Analytical Services Ltd	
Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 3A9	
Project / Job Ref: 21/33613	
Order No: 8609	
Reporting Date: 12/05/2021	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 541636	BH1	D2	0.50	21.3	Light brown clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/S}

Unsuitable Sample ^{u/S}

^ no sampling date provided; unable to confirm if samples are within acceptable holding times



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-05858

Site Analytical Services Ltd

Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 1A9

Project / Job Ref: 21/33613

Order No: 8609

Reporting Date: 12/05/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-05858

Site Analytical Services Ltd

Site Reference: 139 Cranley Gardens, Muswell Hill, London, N10 JA9

Project / Job Ref: 21/33613

Order No: 8609

Reporting Date: 12/05/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detection	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Parameter	Matrix Type	Suite Reference	Expanded Uncertainty Measurement	Unit
TOC	Soil	BS EN 12457	20.0	%
Loss on Ignition	Soil	BS EN 12457	35.0	%
BTEX	Soil	BS EN 12457	14.0	%
Sum of PCBs	Soil	BS EN 12457	23.0	%
Mineral Oil	Soil	BS EN 12457	9.0	%
Total PAH	Soil	BS EN 12457	11.6	%
pH	Soil	BS EN 12457	0.28	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Arsenic	Leachate	BS EN 12457	18.7	%
Barium	Leachate	BS EN 12457	11.6	%
Cadmium	Leachate	BS EN 12457	20.3	%
Chromium	Leachate	BS EN 12457	18.3	%
Copper	Leachate	BS EN 12457	24.3	%
Mercury	Leachate	BS EN 12457	23.7	%
Molybdenum	Leachate	BS EN 12457	14.7	%
Nickel	Leachate	BS EN 12457	16.1	%
Lead	Leachate	BS EN 12457	15.7	%
Antimony	Leachate	BS EN 12457	17.9	%
Selenium	Leachate	BS EN 12457	22.0	%
Zinc	Leachate	BS EN 12457	17.4	%
Chloride	Leachate	BS EN 12457	15.3	%
Fluoride	Leachate	BS EN 12457	16.4	%
Sulphate	Leachate	BS EN 12457	20.6	%
TDS	Leachate	BS EN 12457	12.0	%
Phenol Index	Leachate	BS EN 12457	14.0	%
DOC	Leachate	BS EN 12457	10.0	%
Clay Content	Soil	BS 3882: 2015	15.0	%
Silt Content	Soil	BS 3882: 2015	14.0	%
Sand Content	Soil	BS 3882: 2015	13.0	%
Loss on Ignition	Soil	BS 3882: 2015	35.0	%
pH	Soil	BS 3882: 2015	0.14	Units
Carbonate	Soil	BS 3882: 2015	16.0	%
Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Zinc	Soil	BS 3882: 2015	14.9	%
Copper	Soil	BS 3882: 2015	16.0	%
Nickel	Soil	BS 3882: 2015	17.7	%
Available Sodium	Soil	BS 3882: 2015	23.0	%
Available Calcium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity	Soil	BS 3882: 2015	10.0	%