PHASE I AND PHASE II GEOTECHNICAL ASSESSMENT
for the site at
3 BELSIZE CRESCENT, LONDON, NW3 5QU
for
XUL ARCHITECTURE
on behalf of
DAVID TEMPLER

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Title:	**PHASE I AND PHASE II GEOTECHNICAL ASSESSMENT**	
Project:	**3 BELSIZE CRESCENT, LONDON, NW3 5QU**	
Agent:	**XUL ARCHITECTURE**	
Client:	**DAVID TEMPLER**	
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EXECUTIVE SUMMARY			
Appointment	Geotechnical ground investigation. The intrusive investigation included one window sampler borehole (WS1) with a standpipe installation, to be monitored on one return visit, two hand excavated trial pits to expose the existing foundations (TP1/TP2) and geotechnical and geo environmental testing as appropriate.		
Existing Site	The site contained a three storey property with an existing basement.		
Development	The existing basement was to be lowered by approximately 1.0m and possible additional floors were to be added to the existing building.		
Ground Conditions	Strata	Base depth m	Summary
	Hardstanding	0.07 to 0.10	Carpet over concrete
	Made Ground	0.65 to 0.75	Brick over brown mottled grey/orange/red gravelly sandy CLAY / clayey SAND with brick, concrete and pottery fragments.
	London Clay	2.00+	Stiff brown mottled grey/orange silty CLAY, rare very fine selenite crystals.
Groundwater	A very slight groundwater seepage was encountered during the excavation of TP2 at the base of the Made Ground at a depth of 0.73m. Furthermore, groundwater was recorded in the return monitoring visit at the base of WS1 at a depth of 1.88m. This is anticipated to be perched water at the top of the London Clay.		
Foundations	It was anticipated that the basement would be constructed by underpinning existing foundations, excavating the basement, and constructing a reinforced concrete raft slab. Design parameters are given. The formation should be treated as being High volume change potential.		
Excavations	The Made Ground is unlikely to remain stable. The London Clay should remain generally stable. Risk assessment and appropriate safety measures should be prepared for excavation works.		
Building Materials	DS3 and AC2s in accordance with BS8005. Water supply pipe work will not require protection from aggressive soil contaminants.		
Ground gases and Radon	No issues with respect to ground gases (including Radon) have been identified.		
Waste Disposal	The Made Ground and Natural Soils should be treated as being Inert Waste for disposal purposes.		
Discovery strategy	A discovery strategy should be employed, so that any evidence of possible unidentified contamination can be dealt with appropriately		
Further Action	No immediate requirements for further investigation have been identified. This report should be submitted to relevant regulatory bodies and warranty providers in good time for approval.		
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 main report.			

1.0 INTRODUCTION

1.1 General

Land Science was instructed by Xul Architecture on behalf of David Templer to undertake a phase I and phase II geotechnical investigation in relation to the proposed redevelopment of the site at 3 Belsize Crescent, London, NW3 5QU. The location of the site is shown on Figure 1, and is located at approximate National Grid Reference (NGR) TQ 26827 84959.

1.2 The Site

The site contained a three storey property with a basement with no outside space. The layout of the existing site is indicated on Figure 2, and a site walkover survey is presented in section 3.0. The site area was approximately 0.01 hectares.

It was understood that the Client was in ownership of the site; this assessment was not a pre-purchase appraisal.

Land Science was not aware of any previous desk studies or ground investigation(s) undertaken on the site.

1.3 Form of Development

It was understood that the existing basement was to be lowered by approximately 1.0m and additional floors may be added to the existing building.

1.4 Scope of Works

In accordance with the Agents scope, the investigation comprised the following:

- A desk based study.
- One window sampler borehole (WS1) drilled to a depth of 2.00m below basement floor level.
- A standpipe installation, to be monitored on one return visit.
- Two hand excavated trial pits to expose the existing foundations (TP1/TP2).
- Geotechnical and geo environmental testing as appropriate.

The fieldwork was conducted on 14/01/2016 under the supervision of Land Science.

1.5 Geotechnical Objectives

A geotechnical investigation was required to provide an interpretation of ground conditions with respect to foundations, concrete specification, excavations, basement construction and soil classification for waste disposal purposes.

1.6 Standards

Where practicable, the investigation was undertaken in accordance with the following documents and guidance:

- BS 5930:1990 Code of Practice for Site Investigations
- BS 1377:1990 Soils for Civil Engineering Purposes

Other technical sources have been cited in respect of specific aspects of the investigation, as referenced throughout the text.

2.0 PHASE I DESK STUDY

2.1 General

A basic geotechnical and geo-environmental desk study was prepared, and included a review of:

- Maps and historical borehole records from the British Geological Survey
- Information publically available online from the Environment Agency
- Historical Ordnance Survey maps
- A review of an Radon data report obtained from Public Health England

Copies of relevant data are presented in Appendix F and G.

2.2 Geological Setting

Based on mapping published online by the British Geological Survey (BGS), the geology of the site was anticipated to comprise the following succession:

Strata	Generic description
London Clay Formation	Stiff grey fissured clay, weathering to brown near surface, with nodular argillaceous limestone ("Claystones"), gypsum (Selenite) crystals and a basal sandy bed with black rounded gravel ("Basement Beds").

Published Geological Mapping

2.3 Historical Borehole Records

Records of boreholes drilled historically held by the BGS were inspected. A relevant borehole record was identified 500m to the north east of the site at Belsize Park Underground Station (Ref TQ28NE38), and a summary is given on the following table.

Strata	Base Depth (m)	Summary Description
Made Ground	1.22m	'Made Ground'
London Clay	6.10m	'Clay'

Summary of Borehole record TQ28NE48

2.4 Hydrogeology

The BGS borehole records did not identify water to a depth of 6.10m. Water may be expected within the Made Ground perched on the surface of the London Clay.

2.5 Aquifer Designations

The Environment Agency classifies geological units across England and Wales into different designations as Aquifers. The designations for strata beneath the site are given below, which corresponds to an overall designation as an Unproductive Strata.

Strata	Classification	Details
Superficial	None	No superficial strata was classified
Bedrock	Unproductive Strata	Low permeability strata that have negligible significance for water supply or river base flow

EA groundwater vulnerability data

2.6 Source Protection Zones

A groundwater Source Protection Zone (SPZ) is an area of protection placed around a well or borehole that supplies groundwater of potable quality. The following data has been identified on and within 250m of the site according to Environment Agency mapping:

Location	Classification	Details
Within 250m	No SPZ	No groundwater Source Protection Zones were identified.

Summary of Source Protection Zones within 250m

2.7 Drinking Water Protection Zones

A Drinking Water Protection Zone is similar to a SPZ. The following data has been identified on and within 250m of the site according to Environment Agency mapping:

Location	Classification	Details
Within 250m	Surface water	No protection zone identified
	Groundwater	

Summary of Drinking Water Protection Zones within 250m

2.8 Water Abstractions

Water abstractions identified as part of the desk study within a radius of 1000m of the site are summarised below.

Location	Purpose	Details
None	N/A	No groundwater abstractions were identified within 1000m of the site.

Summary of local groundwater abstractions

2.9 Hydrology

No significant surface water features were identified within the immediate vicinity of the site.

The Environment Agency identifies land potentially susceptible to flooding from seas, rivers and surface water. Current mapping indicates that the site does not lie within an area classified as being susceptible to significant flooding and does not lie within an area benefiting from flood defences. Mapping also indicate that the site did not appear to be at risk of flooding from surface water, however this was difficult to determine due to the scale of available mapping.

2.10 Industrial Sources

No discharge consents or pollution incidents were identified within a radius of 250m.

2.11 Waste Management Facilities

No waste management facilities were identified within 500m of the site.

2.12 Radon Gas

The requirement for Radon Protection Measures (RPM) has been assessed in accordance with BRE 211:2007[1]. The following data obtained from Public Health England applies to the site:

Aspect	Classification	Details
Probability	Not at risk	Less than 1% of homes are estimated by PHE to exceed the threshold for Radon gas in residential dwellings.
Protection Measures	No RPM required	No Radon Protection Measures (RPM) are required for new dwellings or extensions constructed at this location.

Summary of PHE Radon data

2.13 Historical Maps

Large scale (e.g. 1:2,500) historical maps dating back to 1871 were obtained.

The site comprised part of an open field in 1871, by 1896 the site had been develop with a building across the whole footprint of the site. The site remained unchanged until present day and was anticipated to be commercial with residential above.

The key apparent features noted off site in the surrounding area (within 100m) are summarised below.

Location	Dates	Description
75m N	1871 to 2016	• An underground train tunnel was identified 75m north and corresponded to a line linking West Hampstead Station (west) to stations to the east.
100m NE	1871	• A pond was noted 100m NE of the site.
	1896	• By 1896 this area had been developed into residential properties suggesting it was infilled.
Immediately S and E	1896 to 1934	• The area immediately to the south and east of the site had been developed with properties that did not have any private gardens and were assumed to be commercial.
	1954	• By 1954 the area had been redeveloped with the building in the south west spilt into four smaller units (detailed as being Burdetts Garage) with a yard area to the south west.
	1967	• By 1967 the yard had been renamed Burdett Mews.

Smaller scale (e.g. 1:10,000) maps were reviewed, but did not provide further relevant historical information. Given the size of these files sizes, larger scale maps are not appended and are available separately.

As part of the historical research, the London County Council Bomb Damage Maps (1939-45) were reviewed. The site itself was shown to be undamaged, however the area immediately to the south was shown to have been seriously damaged (doubtful if repairable). This corresponded to the possible redevelopment of this area between the 1934 and 1954 OS maps.

3.0 SITE WALKOVER

3.1 General

A site walkover was undertaken as part of the fieldwork on 14/01/2016. Photographs of the site are provided in Appendix A.

3.2 Site Layout

In summary, the area under investigation comprised a three storey property with a basement (the footprint of the building occupied the whole of the site.

The basement was accessed by a set of stairs in the south eastern corner and the area was currently being used by the client to store household items and furniture. The brick walls had been lined with plasterboard, the distance between the wall and plasterboard was noted to vary from between 0.05m to 0.75m. A boiler and electrical switchboard were located in the western corner. The floor of the basement was carpeted. No evidence of any tanking or dampness was noted.

3.3 Elevation and Topography

The site was on the slope of a hill heading moderately downwards towards the south east, and was located at an approximate elevation of 74.40m aOD. The basement was approximately 2.00m bgl.

3.4 Ground Conditions

No evidence of existing soil conditions was observed, such as existing excavations or the like.

No immediate evidence of significant structural movement was observed, although the inspection was cursory and a full inspection was outside the scope of this report.

3.5 Surface Water and Groundwater

No surface water features were identified on site or in the immediate vicinity. No evidence of shallow groundwater, such as boggy waterlogged soils or water loving plants etc., were noted.

3.6 Vegetation

No trees were noted on site. A number of unidentified trees were located within the front garden areas of the properties to the north west.

3.7 Local Information

The site was bordered to the north east by Belsize Crescent and by Burdett Mews to the south east.

The site was located within a predominantly residential area with scattered commercial properties that included retail, food outlets and a laundrette / dry cleaners.

4.0 INTRUSIVE INVESTIGATION

A factual record of the conditions encountered during the physical investigation of the site is presented in the following sections.

4.1 Investigation Strategy

Based on the geotechnical factors identified as part of the desk study, the following scope of works for the phase II intrusive investigation was agreed with the Client.

Aspect	Position	Depth	Location	Notes
Windowless Sampler boreholes.	WS1	2.00m	Eastern corner of basement.	Standpipe installed for monitoring.
Foundation exposures.	TP1	0.80m	Same location as WS1.	
	TP2	0.80m	South-western corner of basement.	

Completed fieldwork

4.2 Soils Encountered

Generally the investigation confirmed the anticipated geological succession, comprising a layer of Made Ground to near the base of the foundations at both positions followed by the London Clay Formation. A summary of the encountered conditions is presented below. The identification of materials encountered as specific geological strata is tentative and should be used as a guide.

Base Depth (m)		Strata	Summary description
WS1*	TP2		
0.07	0.10	Hardstanding	Carpet over a CONCRETE hardstanding.
0.15	-	Made Ground	Brick rubble.
0.65	-		Brown mottled grey/orange slightly sandy gravelly CLAY. Frequent brick and pottery fragments.
-	0.28		Grey very gravelly SAND, gravels comprised of brick and concrete fragments.
-	0.75		Brown/ red clayey very sandy GRAVEL, abundant brick fragments throughout.
>2.00	>0.80	London Clay	Stiff brown mottled grey/orange silty CLAY, rare very fine selenite crystals.

Summary of encountered soils

*- TP1 in same location as WS1 to a depth of 0.90m

No visual, olfactory or organoleptic (staining, malodours, or brightly coloured soils) evidence of possible soil contamination was identified in the field.

No roots or rootlets were identified in the boreholes.

4.3 Foundation Exposures

A summary of the excavations made to expose and log existing foundations is presented below. Sketches are shown in Appendix B.

Position	Depth	Projection	Materials	Formation strata
TP1	0.65m	0.27m	Stepped bricks	London Clay
TP2	0.75m	0.11m	Brick	London Clay

Foundation Exposures

4.4 Groundwater

A very slight groundwater seepage was encountered during the excavation of TP2 at the base of the Made Ground at a depth of 0.73m. Furthermore, groundwater was recorded in the return monitoring visit at the base of WS1 at a depth of 1.88m. This is anticipated to be perched water at the top of the London Clay.

Groundwater conditions may vary significantly with seasonal variations in rainfall. Water may also become perched upon cohesive strata or around buried features such as foundations, and may also occur from leaking drains and water mains etc.

4.5 Ground gases

The results of the ground gas monitoring are summarised on the following table.

Measurement	Range	WS1
Carbon Dioxide %	Maximum	0.0
Methane %	Maximum	0.0
Oxygen %	Minimum	20.5
VOCs ppm	Maximum	0.0
Flow rate l/hr	Full range	0.0-0.0

Summary of gas readings

Below is a summary of the atmospheric pressure conditions during the monitoring visit:

Visit	Pressure (recorded on site)	Published pressure trend
21/01/2016	1013mB	Fluctuating High

Atmospheric Conditions

4.6 Geochemical Laboratory Analysis

The sample of Made Ground at TP2 0.50m was submitted for laboratory analysis to provide information for waste classification purposes. The following suites were scheduled:

Suite	Description	Definition
LS1	Screening suite	pH, fraction of organic carbon, Metals and Non Metals, water soluble Sulphate, Sulphide, total Cyanide, total Phenols, speciated PAH's.
LS2	Waste Acceptance Criteria	Total Organic Carbon, Loss on Ignition, BTEX, speciated PCB's, Mineral Oil (EC10 – EC40), pH, Acid Neutralisation Capacity, speciated PAH's, 10:1 leachable Metals and Non Metals.

Geochemical analytical suites

The results of geochemical analysis are discussed in section 6.0.

4.7 Geotechnical Laboratory Testing

Summaries of the laboratory geotechnical testing undertaken are presented on the following tables. The testing was undertaken in accordance with the relevant British Standards in BS1377 following documented quality procedures.

Atterberg Limit tests were undertaken on selected samples of cohesive soils, as summarised below. A modified plasticity index (PI') was calculated following the NHBC methodology, to account for any non-shrinkable percentage not passing the 425µm sieve, and a mean PI' value is shown in brackets.

Strata	No. tests	Plasticity index (PI) %	% Passing 0.425µm	PI' %
London Clay	4	52-57 (mean 54)	98-100	52.0-55.9 (mean 53.5)

Summary of Atterberg (consistency) limit results

Moisture content determinations were undertaken in combination with various classification tests, and the results are summarised below.

Strata	No. of tests	Moisture content %
London Clay	5	31-34 (mean 32.2)

Summary of moisture content results

Geochemical testing for water soluble Sulphate and pH were undertaken, and the results are summarised on the following table.

Strata	No. of tests	Water soluble Sulphate (SO_4 g/l)	pH (value)
Made Ground	1	0.82	9.2
London Clay	3	0.42-2.70	7.7-8.1

Summary of Sulphate and pH determinations

5.0 GEOTECHNICAL ASSESSMENT

The following recommendations have been made with respect to geotechnical design.

5.1 General Foundation Design

The following adverse geotechnical factors were identified:

The site lies in an area which may be close to or above the underground tunnel linking West Hampstead Thames Link to Kentish Town and Upper Holloway. Appropriate searches should be made with London Underground in order to confirm any restrictions on foundation design for the proposed scheme.

Water was recorded standing at approximately 0.73mbgl to 1.88mbgl was encountered. This is considered to be perched water. After initial pumping out it is likely that excavations will predominantly remain dry.

The proposed development included lowering the existing basement over the entire existing building footprint and the possible addition of further floors above ground level. It was anticipated that the deepening of the basement would be formed by underpinning the existing footings using traditional mass concrete techniques. Based on the ground and groundwater conditions encountered, it is considered that such as scheme would be appropriate.

5.2 Volume Change Potential

Soil shrinkability has been assessed following the NHBC Standards Chapter 4.2 (April 2014 version). It is recommended that the advice of this publication (or similar guidance) is taken when designing and constructing foundations in the zone of influence of trees and hedgerows that currently exist, are to be planted, or have recently been felled.

Strata	% passing 425µm sieve	Modified Plasticity Index	Shrinkability classification
London Clay	-	>40%	High volume change potential

Checks should be made to ensure that the proposed basement is below the zone of influence of trees in accordance with the NHBC Standards, as it may still be necessary to take further precautions.

5.3 Basement Construction

It was anticipated that the basement would be constructed by underpinning existing foundations, excavating the basement, and constructing a reinforced concrete slab. The basement should be constructed on the stiff clays of the London Clay.

Such foundations may be designed based on a maximum safe bearing capacity of up to 175kN/m^2. This assessment includes an appropriate factor of safety against shear failure.

However, the allowable bearing capacity will depend on the overall net change in loading, the

dimensions of the footings and the allowable settlement. Assuming a 0.60m wide strip on stiff clays an additional loading of say 20kN/m^2 will cause an estimated settlement in the order of 1-2mm, whilst 120kN/m^2 may cause an estimated settlement in the order of 10-15mm. Approximately half of the settlement will be immediate, with the remainder occurring at a diminishing rate as long term creep.

Heave caused by the removal of overburden may occur in two phases; immediate and long term. Immediate heave will occur fully during excavation phase and is unlikely to be problematic. Heave of 2-3mm is estimated, which will begin to occur immediately and diminish gradually with time. The basement excavation should be checked before casing the slab and trimmed if necessary. The slab should be designed to either accommodate heave or resist uplift forces; in the case of the latter, for instance, consideration might be given to linking reinforcement across the slab into the underpinning, using columns to transfer loads onto the slab, or using tension piles, etc. overall heave is not considered to be an issue.

Care should be taken to ensure that the adjacent properties are not adversely affected. The works are likely to fall under the remit of the Party Wall Act and specialist advice should be sought accordingly. Where the basement excavation is properly designed and undertaken in a controlled manner, no risk will be posed to adjacent properties. Lateral restraint to the underpinning (either propping passive soil resistance) may need to be considered.

The basement is to be constructed into the London Clay and therefore standing water is unlikely to be an issue. However, the basement should still be afforded an appropriate degree of protection against moisture; due consideration should be given to the provisions of the Building Regulations in this respect. Any openings such as light-wells or vents etc. should be carefully positioned, and construction joints should be detailed appropriately.

The London Clay will soften rapidly when exposed to free water. Should water be encountered, the final 50mm of any foundation trench should not be excavated until immediately before concreting.

The basement is to be constricted wholly into London Clay, a low permeability strata with no groundwater table detected. The development will not impact on groundwater flows.

5.4 Retaining Walls

The following design values are suggested as a guide to assist in the design of retaining walls. The values have been obtained from BS8002 and BS EN 1997-1:2004 (Eurocode 7 – Geotechnical Design). The values are based on a level ground surface. The ratio of δ/ϕ' will depend on retaining wall construction.

Parameter	**Stiff Clays**		
	$\delta/\phi' = 0$	**$\delta/\phi' = 0.66$**	**$\delta/\phi' = 1.0$**
Critical state angle of shearing resistance (ϕ')	20		
Effective Cohesion kN/m^2	0		
Saturated Bulk Weight (γ_{sat}) kN/m^3	19.0		
Passive Resistance K_p	2.1	2.7	2.9
Active Pressure K_a	0.50	0.43	0.41

Retaining Wall Soil Design Parameters

5.5 Excavations

The risks arising from excavation works should be properly assessed and appropriate safety precautions should be adopted. Reference may be made to various guidance including BS8000-1:1989, BS0631:2009 and CIRIA C97.

The likelihood of excavation instability through different strata has been assessed as summarised below. It should be noted that all open unsupported excavations have the potential to collapse.

Strata	Stability
Made Ground	Generally unstable. May be battered or trench support used.
London Clay	Should remain generally stable in the short to medium term.

Excavation Stability

Water seepages may be encountered at shallow depth, particularly during wetter climatic conditions, and therefore some localised dewatering and trench support may be required.

It is considered that normal-rated plant and machinery will be sufficient for undertaking excavations. Breakers will be required for breaking-up any former foundations, retaining walls etc. Care should be taken so as not to undermine existing structures or adjacent property.

5.6 Building Materials

Based on BS8005-1:2006, the results of the Sulphate and pH analyses fell into Class DS-3 and an ACEC class AC-2s is deemed appropriate. The advice of this publication should be taken for the design and specification of all sub surface concrete.

Buried plastics used for potable water supplies should not require any special specification in order to resist chemical contamination. No pipework should be laid where there is evidence of hydrocarbons or free product.

6.0 WASTE ASSESSMENT

6.1 General

Waste may be defined as any substance or object in Annex 1 of the Waste Framework Directive[2] which the holder discards, intends to discard, or is required to discard. Subject to certain provisions, soils may either be handled as either:

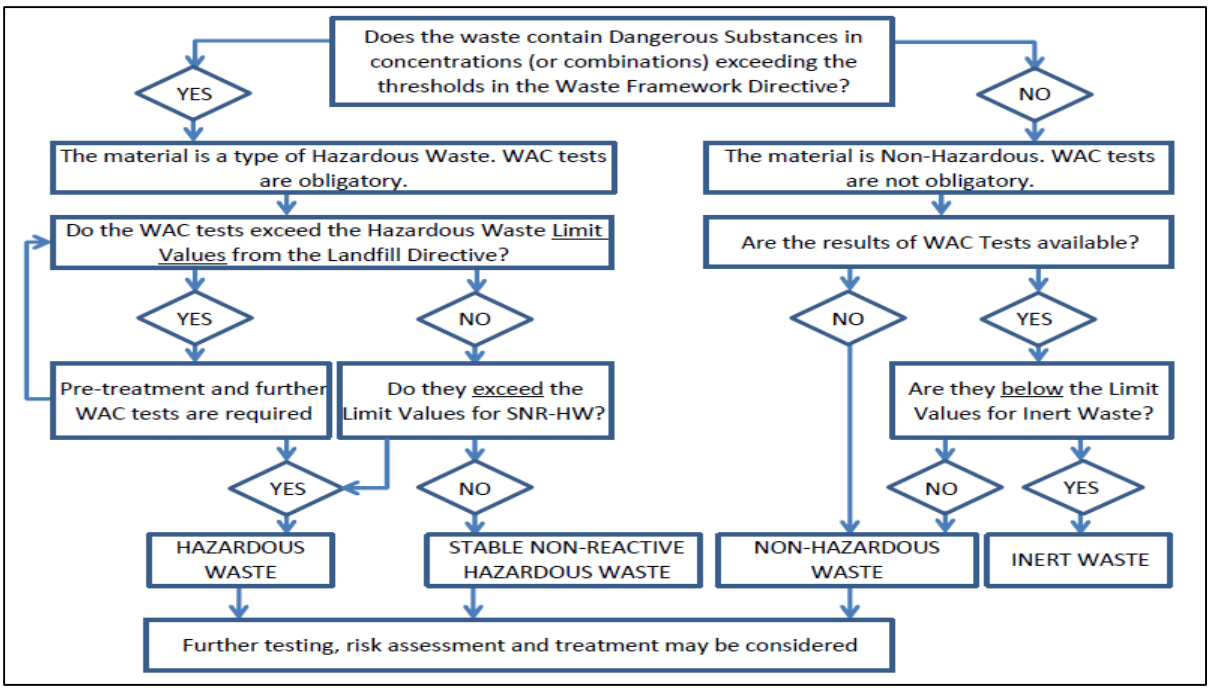
- Non-Waste, and re-used (on or off-site), or
- Waste, and disposed of (to a waste management facility).

6.2 Non-Waste

Given the confines of the site, it was anticipated that all materials would be disposed of from site as waste.

6.3 Waste Disposal

Where materials are not to be re-used they must be handled as Waste, and the materials must be sent to a licenced waste management facility (e.g. transfer station, landfill, cluster or treatment hub). The classification of waste is prescribed under the Waste Framework Directive and the Landfill Directive[3], and a summary of the waste classification protocol is presented below. Different facilities may also have specific acceptance criteria.



Waste Classification

The results of the soil analysis have accordingly been classified as follows:

Soil	Sample	Hazardous		Non Hazardous	
		Hazardous	Stable Non-Reactive	Non-Hazardous	Inert
Made Ground	TP2 0.50m	-	-	-	Yes

Summary Waste Classification

The underlying natural soils are also expected to meet the Inert Waste criteria.

With reference to the current List of Wastes (formerly European Waste Catalogue), waste soils and stone derived from construction and demolition sites may be disposed of under either of the following codes as appropriate:

Waste	Code	Description
Hazardous	17 05 03*	soil and stones containing dangerous substances
Non-Hazardous	17 05 04	soil and stones other than those mentioned in 17 05 03

Waste classification codes for soil arisings

REPORT CONDITIONS

Interpretation of ground conditions inherently depends on the conditions revealed by a limited data set. Whilst we take all reasonable care in interpreting such data, any spatial or temporal extrapolation or inference is conjectural and no liability can be accepted for its accuracy. In particular the concentrations or levels of mobile liquid and gaseous materials are likely to vary over time, and conditions may vary between or below points of investigation.

Furthermore, we do not accept liability for the means of interpreting such data, such as the validity of published assessment criteria or methodologies. We accept no liability for the design of the investigation or any other work carried-out by other parties. We do not accept liability for data not identified in any desk study, or through the absence of a desk study, such as previously unidentified historical land uses or water abstractions.

This report exclusively relates to ground issues and makes no representation in respect of other matters such as topographic layout, ecology, arboriculture, or hazardous materials such as chemicals or asbestos in buildings. No aspect of this report should be taken as a guarantee that a site is free of hazardous or potentially contaminative materials.

Whilst every effort is made to tailor the investigation to suit within practical constraints as works progress, it may become necessary to undertake additional investigation work. It is an inherent aspect of any investigation that areas of concern not previously anticipated are identified as the works progress. Furthermore, elements of the project design may vary during or after completion of the investigation, which may require reappraisal.

Information contained in this report is intended for the use of the Client and his agents for the purposes set-out in the text, and Land Science makes no warranty or representation whatsoever express or implied with respect to the use of this information by any other party or for uses other than those described. We do not indemnify the Client or any third parties against any dispute, claim or consequential losses arising from any finding or other result of this investigation report.

GLOSSARY OF TERMS

BGS	British Geological Survey
BH	Borehole
BRE	Building Research Establishment
BSI	British Standards Institute
CBR	California Bearing Ratio
CDM	Construction Design and Management regulations
CEH	Centre for Ecology and Hydrology
CFA	Continual Flight Auger
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment model
CLR	Contaminated Land Remediation report
CLR11	Model Procedures for the Management of Land Contamination, DEFRA & EA, 2004
COSHH	Control of Substances Hazardous to Human Health regulations
COMAH	Control of Major Accident Hazards regulations
CSM	Conceptual Site Model
DEFRA	Department for Environment, Food and Rural Affairs
DETR	Department for Environment, Transport and the Regions
DQRA	Detailed Quantitative Risk Assessment
DP	Dynamic Probe
EA	Environment Agency
EQS	Environmental Quality Standards
F.O.C	Fraction of Organic Carbon
GAC	Generic Assessment Criterion
GQRA	Generic Quantitative Risk Assessment
HSE	Health and Safety Executive
ICRCL	Inter-departmental Committee for the Redevelopment of Contaminated Land
IPC	Integrated Pollution Control
IPPC	Integrated Pollution Prevention and Control
MBGL	Meters Below Ground Level
NHBC	National House Building Council
NIHHS	Notification of Installations Handling Hazardous Substances
OD	Ordnance Datum
PAH's	Polycyclic Aromatic Hydrocarbons
PBET	Physiological Based Extraction Testing
PHE	Public Health England
PID	Photo-Ionisation Detector
PQRA	Preliminary Quantitative Risk Assessment
PSD	Particle Size Distribution Test
RMS	Remediation Method Statement
SGV	Soil Guideline Value
SOM	Soil Organic Matter
SPZ	Source Protection Zone
SPT	Standard Penetration Test
SSSI	Sites of Special Scientific Interest
ST-WEL	Short Term Workplace Exposure Limit
SVOC's	Semi-Volatile Organic Compounds
TP	Trial Pit
TPH	Total Petroleum Hydrocarbons
TRRL	Transport Road Research Laboratory
TWA-WEL	Time Weighted Average Workplace Exposure Limit
UK HBF	United Kingdom House Building Federation
VOC's	Volatile Organic Compounds
WAC	Waste Acceptance Criteria
WS	Window (or windowless) Sampler

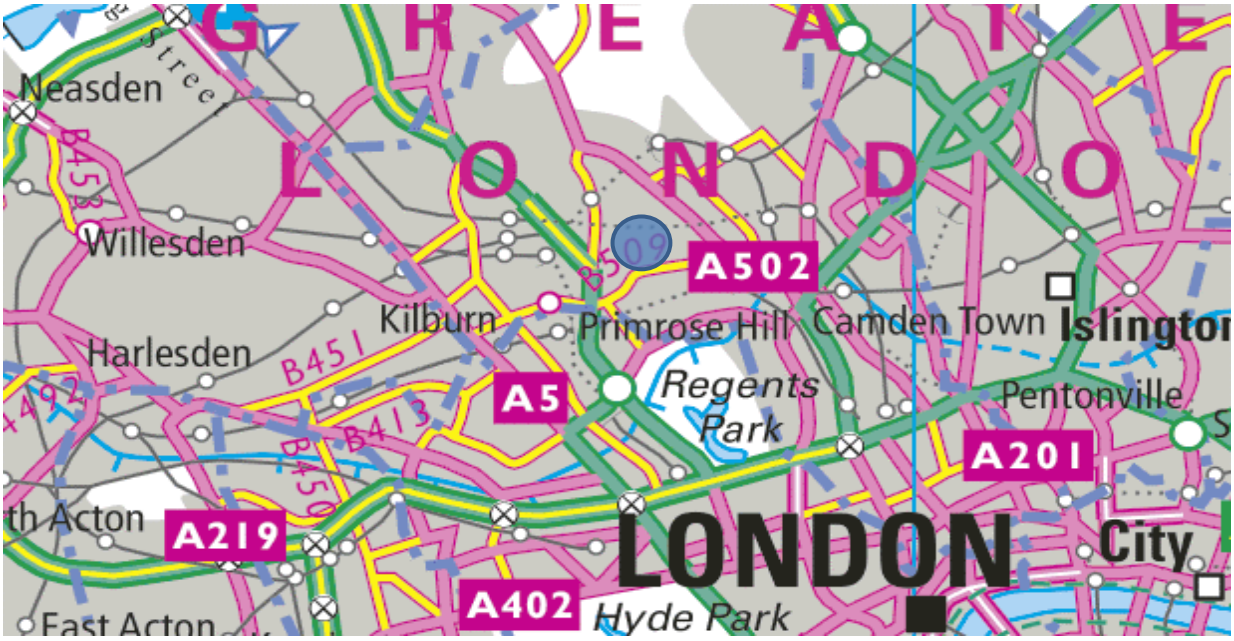
REFERENCES

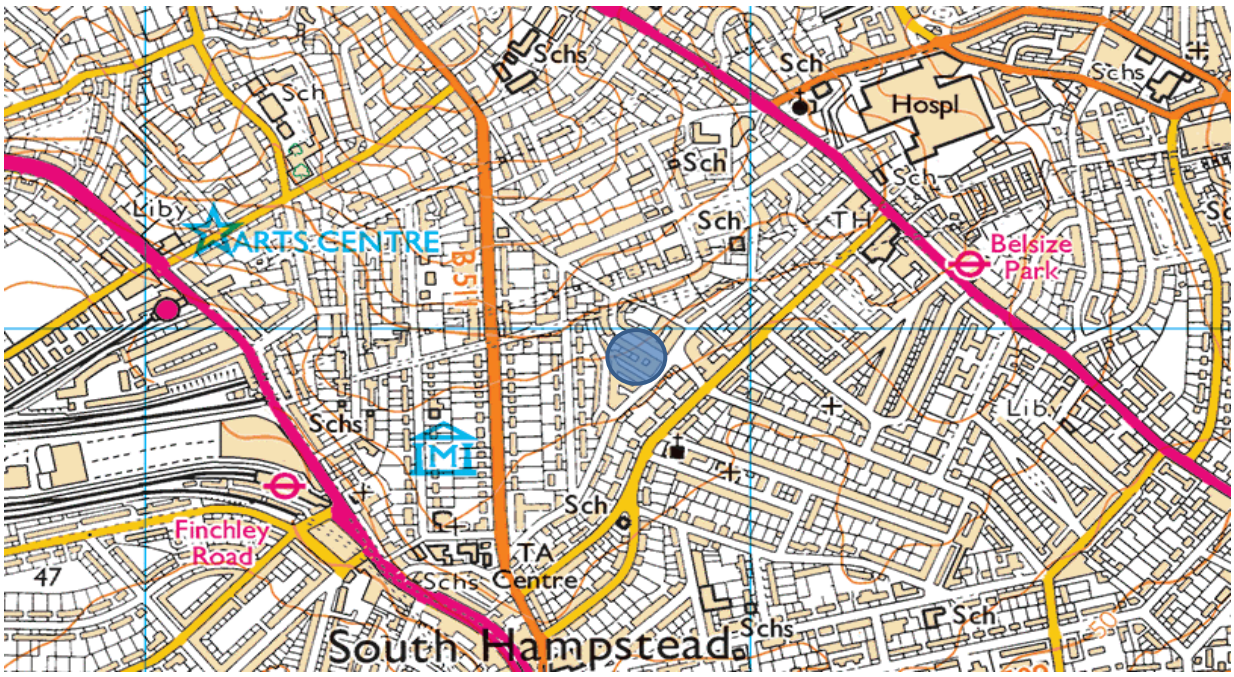
1 Radon: Guidance on protective measures for new buildings, BRE Report BR 211, 2007 2ND edition

2 Revised EU Waste Framework Directive 2008 2008/98/EC [transposed into English law under The Waste (England and Wales) Regulations 2011]

3 European Community (EC) Directive 1999/31/EC [transposed into English law under the Landfill (England and Wales) Regulations 2002]

North





Site Location

Locations are indicative. Not to scale.

TITLE:	Site Location			**REF:** LS 1985
PROJECT:	3 Belsize Crescent, London, NW3 5QU			**VERSION** v1
CLIENT:	David Templer			**FIGURE:** 1
PREPARED: JH		**CHECK:** ET	**DATE:** 17/12/2015	**SHEET No:** page: 1 of 1

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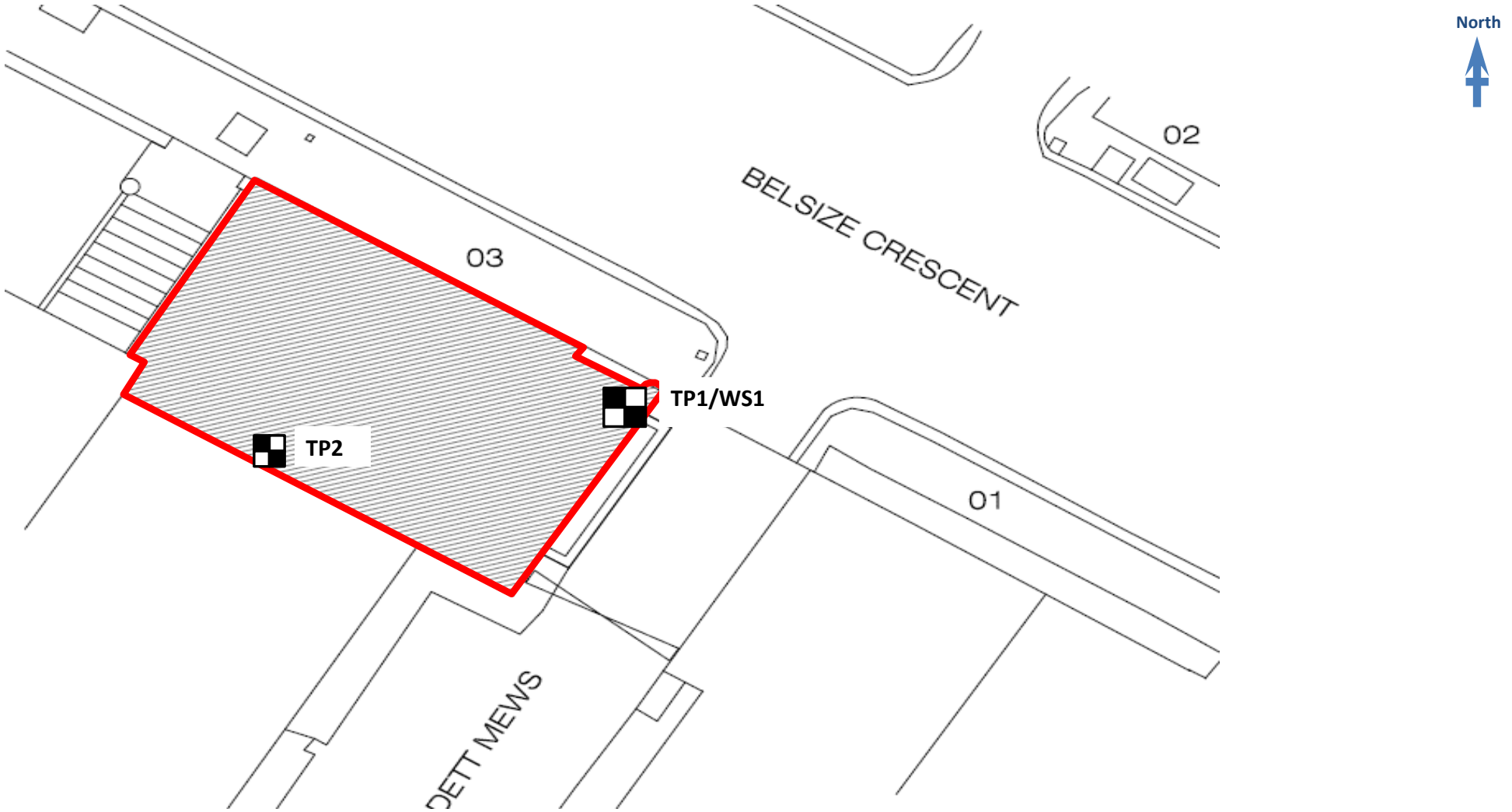

Locations are indicative. Not to scale.

TITLE:	Existing Layout / Investigation Layout	**REF:**	LS 1985	**PREPARED:**	JH
PROJECT:	3 Belsize Crescent, London, NW3 5QU	**VERSION:**	v1	**CHECKED:**	ET
CLIENT:	David Templer	**FIGURE:**	2	**DATE:**	14/01/2016

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APPENDIX A

Photograph 1 and 2 - View of the north eastern elevation of No 3 Belsize Crescent

TITLE:	Photographs			**REF:**	**LS1985**
PROJECT:	3 Belsize Crescent, London, NW3 5qu			**VERSION**	v1
CLIENT:	David Templer			**Photos**	1 to 2
PREPARED:	JB	**CHECK:** MR	**DATE:** 15/01/2016	**SHEET No:**	page: 1 of 2

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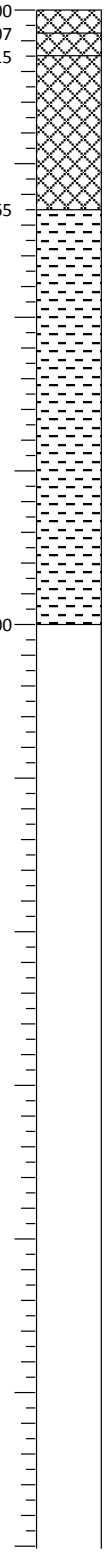
APPENDIX B

FIELD DESCRIPTION		FIELD TESTING	SAMPLING		WATER	FILL
Carpet over concrete. (MADE GROUND)	0.00					
Brick. (MADE GROUND)	0.07					
Brown mottled grey/orange slightly sandy gravelly CLAY. Frequent brick and pottery fragments. (MADE GROUND)	0.15		0.30 - 0.30	D		
			0.50 - 0.50	D		
Brown mottled grey/orange silty CLAY, rare fine selenite crystals. (LONDON CLAY)	0.65		0.80 - 0.80	D		
			1.00 - 1.00	D		
			1.50 - 1.50	D		
Borehole complete at 2.00m	2.00		2.00 - 2.00	D		



REMARKS

Stability: No instability encountered

Groundwater: No groundwater encountered.

Chiselling: Not applicable

Casing/dia: Not applicable

Backfilling: 1.90m of pipe installed:Plain pipe from 0.00-0.90m, slotted pipe from 0.90-1.90m.

Notes: Hand excavated to 0.80mbgl.
TP1 incorporated in first 0.80m of WS1 log.

TITLE: **Window Sampler Log**		REFERENCE: **LS1985**	POSITION: **WS1**
PROJECT: **3 Belsize Crescent, London, NW3 5QU**		ELEVATION: **N/A**	CO-ORDINATES: **Not to scale**
CLIENT: **David Templer**		METHOD: **Archway "Dart" Windowless**	
DRILLED BY: **OSI**	LOGGED BY: **JB**	STARTED: **14/01/2016**	SCALE: **Not to scale**
INPUTTED BY: **JB**	CHECKED BY: **MR**	COMPLETED: **14/01/2016**	SHEET No: **Page: 1 of 1**

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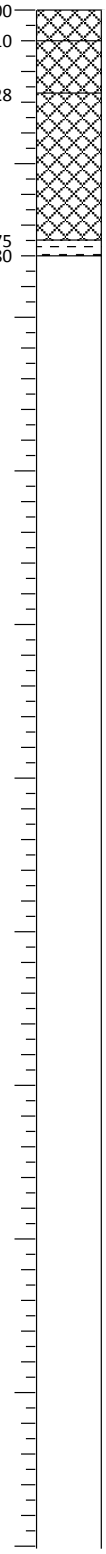
FIELD DESCRIPTION		FIELD TESTING	SAMPLING		WATER	FILL
Carpet over concrete (MADE GROUND)	0.00					
Grey very gravelly SAND, gravels comprised of brick and concrete fragments. (MADE GROUND)	0.10		0.20 - 0.20	D		
Brown / red clayey very sandy GRAVEL, abundant brick fragments. (MADE GROUND)	0.28		0.50 - 0.50	D	0.73	
Brown mottled grey/orange silty CLAY, rare fine selenite crystals. (LONDON CLAY)	0.75		0.80 - 0.80	D		
Trial pit complete at 0.80m	0.80					



REMARKS		TITLE:		REFERENCE:	POSITION:
Stability:	No instability encountered	**Hand Dug Pit**		**LS1985**	**TP2**
Groundwater:	Seepage of water observed, standing at 0.73m.	PROJECT:		ELEVATION:	CO-ORDINATES:
Chiselling:	Not applicable	**3 Belsize Crescent, London, NW3 5QU**		**N/A**	**Not to scale**
Casing/dia:	Not applicable	CLIENT:		METHOD:	
Backfilling:	Position backfilled with arisings	**David Templer**		**Archway "Dart" Windowless**	
Notes:	Hand excavated to 0.80m	DRILLED BY:	LOGGED BY:	STARTED:	SCALE:
		OSI	**JB**	**14/01/2016**	**Not to scale**
		INPUTTED BY:	CHECKED BY:	COMPLETED:	SHEET No:
		JB	**MR**	**14/01/2016**	**Page: 1 of 1**

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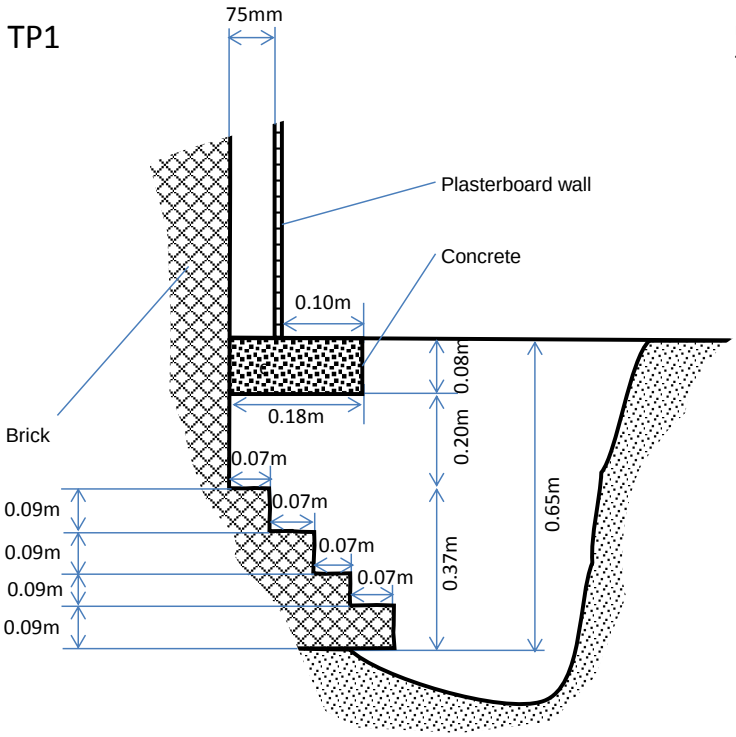
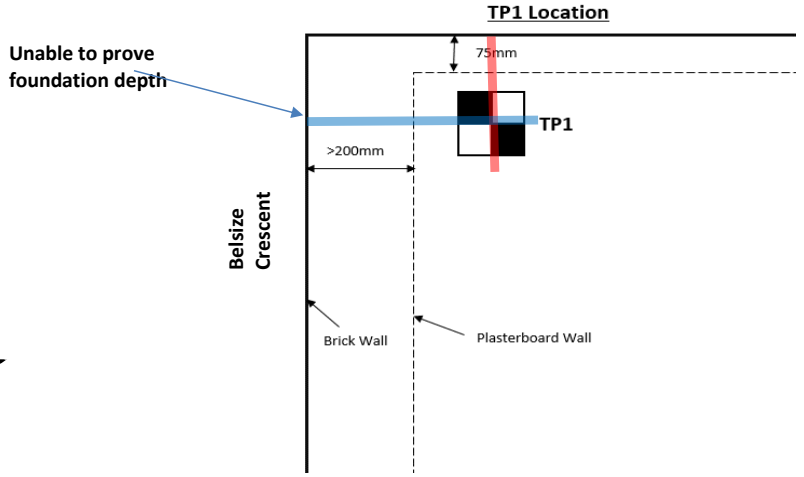
TP1





0.00-0.08m - Carpet over concrete (MADE GROUND)

0.08-0.15m - Brick (MADE GROUND)

0.15-0.65- Brown mottled grey/orange slightly sandy gravelly CLAY. Frequent brick and pottery fragments. (MADE GROUND)

0.65-0.80m-Brown mottled grey/orange silty CLAY, rare fine selenite crystals. (LONDON CLAY)

TITLE:	Foundation Exposures	**REF:**	LS1985	**PREPARED:**	JB
PROJECT:	3 Belsize Crescent, London, NW3 5QU	**VERSION:**	v1	**CHECKED:**	MR
CLIENT:	David Templer	**FIGURE:**	TP1	**DATE:**	15/01/2016

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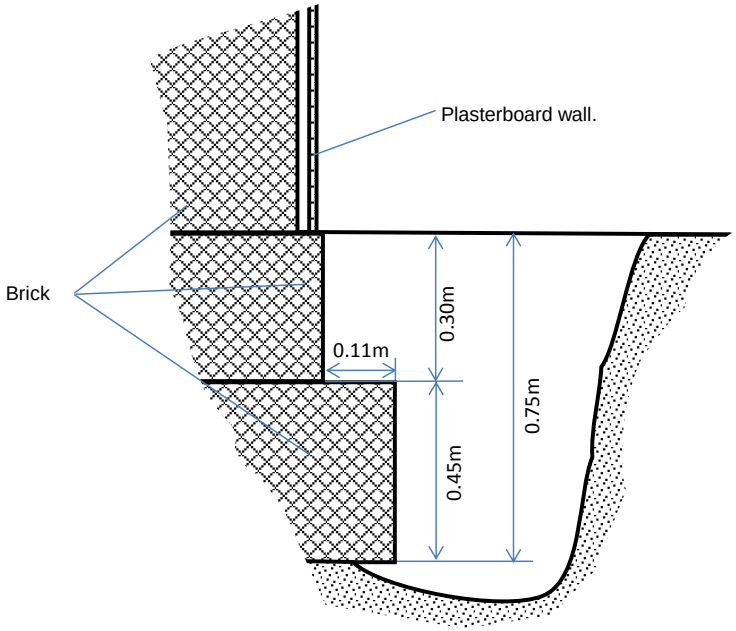
TP2



0.00-0.10 Carpet over concrete. (MADE GROUND)

0.10-0.28 Grey very gravelly SAND. (MADE GROUND)

0.28-0.75 Brown/ red clayey very sandy GRAVEL, abundant brick fragments. (MADE GROUND)

... Slow water seepage, standing at 0.73m

0.75-0.80 Brown mottled grey/orange silty CLAY, rare fine selenite crystals. (LONDON CLAY)

TITLE:	Foundation Exposures	**REF:**	LS 1985	**PREPARED:**	JB
PROJECT:	3 Belsize Crescent, London, NW3 5QU	**VERSION:**	v1	**CHECKED:**	MR
CLIENT:	David Templer	**FIGURE:**	TP2	**DATE:**	15/01/2016

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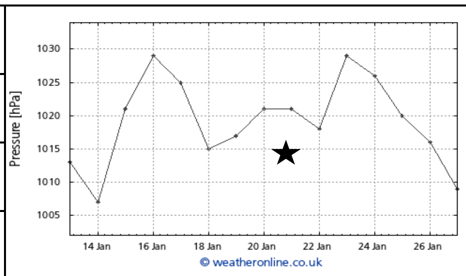
APPENDIX C

SITE INFORMATION

Project: 3 Belsize Crescent, London	**Reference:** LS1985
Date: 21/01/2016	**Visit number:** 1 of 1
Engineer: J. Bowen	**Checked By:** M. Rose
Equipment: GFX 430, Phocheck PID, Dipmeter	**Sheet Number:** 1 of 1



General Remarks:	Pressure Trend:	Atmospheric Pressure:
None	Fluctuating High (London)	1013mB (measured on site)

MONITORING DATA

Position	Flow (l/hr)		Common Gases (%)				VOC's (ppm)	Groundwater (m)				Remarks
	High	Low	Time	CO2	CH4	O2		LNAPL	Water	DNAPL	Base	
Calibration Check	0.0	0.0	15s	0.0	0.0	20.4	0.0	-	-	-	-	Calibration check passed
			30s	0.0	0.0	20.5						
			60s	0.0	0.0	20.5						
WS1	0.0	0.0	15s	0.0	0.0	20.5	0.0	-	1.88m	-	1.90m	
			30s	0.0	0.0	20.5						
			60s	0.0	0.0	20.5						
Calibration Check	0.0	0.0	15s	0.0	0.0	20.5	0.0	-	-	-	-	Calibration check passed
			30s	0.0	0.0	20.4						
			60s	0.0	0.0	20.5						

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APPENDIX D

SUMMARY OF MOISTURE CONTENT AND ATTERBERG LIMIT DETERMINATIONS		Land Science	
Site Name:	Belsize Crescent	**Samples Received:**	15.01.2015
Reference:	LS 1985	**Reported:**	28.01.2015

Position	Depth m	Sample Description	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing 425µm %
WS1	1.00	Brown mottled grey/orange silty CLAY, rare fine selenite crystals.	31				
WS1	1.50	Brown mottled grey/orange silty CLAY, rare fine selenite crystals.	32	80	28	52	100%
WS1	2.00	Brown mottled grey/orange silty CLAY, rare fine selenite crystals.	31	81	29	52	100%
TP1	0.80	Brown mottled grey/orange silty CLAY, rare fine selenite crystals.	34	80	26	54	100%
TP2	0.80	Brown mottled grey/orange silty CLAY, rare fine selenite crystals.	33	82	25	57	98%

BS 1377 : Part 2 : Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method
BS 1377 : Part 2 : Clause 5 : 1990 Determination of the plastic limit and plasticity index
BS 1377 : Part 2 : Clause 3.2 : 1990 Determination of the moisture content by the oven-drying method.
Test Results relate only to the sample numbers shown above.

Prepared:
D Yeomans
Checked:
E Toms

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APPENDIX E

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e: james.bowen@landscience.co.uk

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Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

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

Analytical Report Number : 16-85966

Project / Site name:	Belsize Crescent	**Samples received on:**	18/01/2016
Your job number:	LS1985	**Samples instructed on:**	18/01/2016
Your order number:		**Analysis completed by:**	25/01/2016
Report Issue Number:	1	**Report issued on:**	25/01/2016
Samples Analysed:	3 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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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Analytical Report Number: 16-85966

Project / Site name: Belsize Crescent

Lab Sample Number				525631	525632	525633		
Sample Reference				WS1	TP1	TP2		
Sample Number				D3	D3	D3		
Depth (m)				1.00	0.80	0.80		
Date Sampled				14/01/2016	14/01/2016	14/01/2016		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	16	14	18		
Total mass of sample received	kg	0.001	NONE	0.24	0.53	0.33		
General Inorganics								
pH	pH Units	N/A	MCERTS	7.7	8.0	8.1		
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.7	0.42	0.66		

Analytical Report Number : 16-85966

Project / Site name: Belsize Crescent

* 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 *
525631	WS1	D3	1.00	Light brown clay.
525632	TP1	D3	0.80	Light brown clay.
525633	TP2	D3	0.80	Light brown clay.

Analytical Report Number : 16-85966

Project / Site name: Belsize Crescent

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.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	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.

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Analytical Report Number : 16-86231

Project / Site name:	Belsize Crescent	**Samples received on:**	21/01/2016
Your job number:	LS1985	**Samples instructed on:**	21/01/2016
Your order number:		**Analysis completed by:**	28/01/2016
Report Issue Number:	1	**Report issued on:**	28/01/2016
Samples Analysed:	1 leachate sample - 1 soil sample		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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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Analytical Report Number: 16-86231

Project / Site name: Belsize Crescent

Lab Sample Number				527011				
Sample Reference				TP2				
Sample Number				D2				
Depth (m)				0.50				
Date Sampled				20/01/2016				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	14				
Total mass of sample received	kg	0.001	NONE	1.5				
General Inorganics								
pH	pH Units	N/A	MCERTS	9.2				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.82				
Sulphide	mg/kg	1	MCERTS	1.0				
Fraction Organic Carbon (FOC)	N/A	0.00001	NONE	< 0.00001				
Total Organic Carbon (TOC)	%	0.1	MCERTS	< 0.1				
Loss on Ignition @ 450°C	%	0.2	MCERTS	3.5				
Acid Neutralisation Capacity	+/- mol/kg	-100	NONE	14				
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10				
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10				
Fluorene	mg/kg	0.1	MCERTS	< 0.10				
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10				
Anthracene	mg/kg	0.1	MCERTS	< 0.10				
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Pyrene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Chrysene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				
Coronene	mg/kg	0.05	NONE	< 0.05				
Total PAH								
Total WAC-17 PAHs	mg/kg	1.6	NONE	< 1.6				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.9				
Barium (aqua regia extractable)	mg/kg	1	MCERTS	78				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.9				
Boron (water soluble)	mg/kg	0.2	MCERTS	4.1				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	70				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	54				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	57				

Analytical Report Number: 16-86231

Project / Site name: Belsize Crescent

Lab Sample Number				527011				
Sample Reference				TP2				
Sample Number				D2				
Depth (m)				0.50				
Date Sampled				20/01/2016				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
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				
Total BTEX	µg/kg	10	MCERTS	< 10				
Petroleum Hydrocarbons								
Mineral Oil (C10 - C40)	mg/kg	10	NONE	< 10				
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				

Analytical Report Number: 16-86231

Project / Site name: Belsize Crescent

Lab Sample Number				527012				
Sample Reference				TP2				
Sample Number				D2				
Depth (m)				0.50				
Date Sampled				20/01/2016				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
10:1 WAC Leachate								
Arsenic	mg/l	0.0011	ISO 17025	0.0074				
Barium	mg/l	0.00005	ISO 17025	0.0477				
Cadmium	mg/l	0.00008	ISO 17025	< 0.0001				
Chromium	mg/l	0.0004	ISO 17025	0.0063				
Copper	mg/l	0.0007	ISO 17025	0.0018				
Mercury	mg/l	0.0005	ISO 17025	< 0.0005				
Molybdenum	mg/l	0.0004	ISO 17025	0.0017				
Nickel	mg/l	0.0003	ISO 17025	0.0068				
Lead	mg/l	0.001	ISO 17025	0.0027				
Antimony	mg/l	0.0017	ISO 17025	< 0.0017				
Selenium	mg/l	0.004	ISO 17025	< 0.0040				
Zinc	mg/l	0.0004	ISO 17025	0.020				
Chloride	mg/l	0.15	ISO 17025	16				
Fluoride	mg/l	0.05	NONE	0.35				
Sulphate	mg/l	0.1	ISO 17025	85				
Total dissolved solids	mg/l	4	NONE	190				
Total monohydric phenols	mg/l	0.01	ISO 17025	< 0.010				
Dissolved organic carbon	mg/l	0.1	NONE	2.35				
10:1 WAC Leachate								
Arsenic	mg/kg	0.011	NONE	0.0706				
Barium	mg/kg	0.0005	NONE	0.457				
Cadmium	mg/kg	0.0008	NONE	< 0.0008				
Chromium	mg/kg	0.004	NONE	0.061				
Copper	mg/kg	0.007	NONE	0.017				
Mercury	mg/kg	0.005	NONE	< 0.0050				
Molybdenum	mg/kg	0.004	NONE	0.0163				
Nickel	mg/kg	0.003	NONE	0.065				
Lead	mg/kg	0.01	NONE	0.026				
Antimony	mg/kg	0.017	NONE	< 0.017				
Selenium	mg/kg	0.04	NONE	< 0.040				
Zinc	mg/kg	0.004	NONE	0.19				
Chloride	mg/kg	1.5	NONE	150				
Fluoride	mg/kg	0.5	NONE	3.3				
Sulphate	mg/kg	1	NONE	810				
Total dissolved solids	mg/kg	40	NONE	1800				
Total monohydric phenols	mg/kg	0.1	NONE	< 0.10				
Dissolved organic carbon	mg/kg	1	NONE	22.5				

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* 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 *
527011	TP2	D2	0.50	Light brown gravelly loam.

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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
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-UK	W	NONE
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
BTEX in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033-PL	D	NONE
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-UK	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Mineral Oil (Soil)	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	in-house method	L064/76-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
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
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 electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated WAC-17 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	NONE

Analytical Report Number : 16-86231

Project / Site name: Belsize Crescent

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
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
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 based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
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 dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-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.