LMB GEOSOLUTIONS LTD

GROUND INVESTIGATION & ASSESSMENT

52 DELANCEY STREET, LONDON NW1

June 2017

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	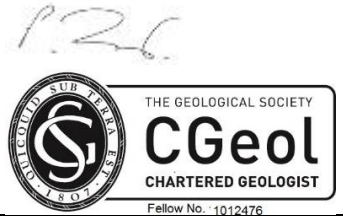

Ground Investigation
Land Contamination
Hydrogeology
Engineering Geology

LMB Geosolutions Ltd

Company No. 8303397
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Executive Summary

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Proposed Development	It is proposed to redevelop the existing ground and lower ground floor of the three-storey terrace property into 2no. residential apartments. It is understood that they will achieve this by extending the existing lower ground floor of the property into the rear garden area.
Ground & Groundwater Conditions	Made Ground overlying the London Clay Formation. Groundwater was not recorded during drilling but was recorded during return monitoring at a depth of 4.89m.
Assessment of Soil Analytical Results	Concentrations of Lead were recorded above relevant assessment criteria concentration but it is considered unlikely that this will pose a potential risk to future site users as Made Ground soils in this area will be removed and disposed of off-site to facilitate development. Maintenance and construction workers should adopt appropriate management procedures to prevent direct contact with Made Ground soils. A basic waste characterisation suggests that the Made Ground would be listed as a non-hazardous waste and the natural soils as inert waste. However, this will need to be confirmed by the receiving facility. The Made Ground meets non-hazardous Waste Acceptance Criteria.
Geotechnical Advice	For traditional spread foundations placed within the London Clay at the assumed formation level (2.80m bgl) a net safe bearing pressure of 125kN/m² should be available. This assumes that the proposed basement development and in particular foundations would not be within the influence of any trees or tree routes. There is potential for short term and long term heave and inward yielding and for differential heave between the area of the existing lower ground floor and proposed extension. Open cut excavations are the preferred option. However, it is possible that temporary support (e.g. sheet piles) will be required for construction at some locations. Coefficient of active earth pressure: Made Ground: 0.30. London Clay: 0.42 Coefficient of passive earth resistance: Made Ground: 3.5. London Clay: 2.5 Buried concrete: Made Ground. DS-1, AC-1s. London Clay DS-1, AC-1s.
This executive summary is not a stand alone document and should be read in conjunction with the full report text, including conclusions and recommendations.	

INTRODUCTION

Introduction

AUTHORISATION

LMB Geosolutions Ltd (LMB) was instructed by Oliver Gershfield and Natasha Gershfield (the Client) in May 2017 to undertake ground investigation and assessment works in relation to the proposed development at 52 Delancey Street, London NW1 7RY (the Site).

PROJECT AND SITE DETAILS

Site Address	52 Delancey Street, London NW1 7RY. A Site Location Plan is provided as **Figure 1**.
Proposed Development	The site comprises a three storey residential terrace property with a lower ground floor. It is proposed to redevelop the existing ground and lower ground floor of the three-storey terrace property into 2no. residential apartments. It is understood that they will achieve this by extending the existing lower ground floor of the property into the rear garden area. The Structural Engineers for the project (Davies Maguire) have indicated that it is proposed to '*use traditional underpinning locally on part of the existing garden wall, where foundations will be undermined by the new extension*.' No excavation beneath the existing lower ground floor will be undertaken.
Background	It is understood that the following existing Basement Impact Assessment (BIA) has been issued to London Borough of Camden (LBC): • Ashton Bennett (December 2016, ref. MOG 3286). Screening & Scoping for Basement Impact Assessment at 52 Delancey Street, Camden, London. It is understood that following audit additional information was required to satisfy LBC planning.

AIMS & OBJECTIVES

This report aims to provide information sufficient to aid in the structural design of the proposed basement extension and also to provide information to aid in completion of a Basement Impact Assessment.

SCOPE OF WORKS

The following scope of works has been completed:

- Site set up including liaison with Consultant Engineers, Client and appointment of sub-contractors;

INTRODUCTION

- Mobilisation to site and transport of the rig to the proposed location;
- Completion of 1No. borehole to a depth of 8.00m bgl with insitu SPTs and collection of disturbed and samples for laboratory testing;
- Completion of 2no. hand excavated trial pits to a maximum depth of 0.50m bgl to inspect and log the existing building foundations. Hand shear vane tests were completed near the base of the excavation;
- Supervision and geological logging of the soil arisings in accordance with BS5930 by an appropriately experienced geo-environmental engineer;
- Installation of a monitoring well to a depth of 5.0m below ground level and return monitoring of groundwater levels on 1no. occasion;
- Geotechnical laboratory testing of the soil samples for an appropriate suite of determinands (including pH, sulphate, atterberg limits and moisture content);
- Chemical analysis of 2no. samples of Made Ground, including Waste Acceptance Criteria (WAC);
- Completion of a factual and interpretive report that includes;
    - Details of the ground and groundwater conditions encountered;
    - Schematic sections detailing the existing foundations;
    - Presentation of chemical analytical results and assessment in accordance with generic assessment criteria considering a residential end use;
    - Geotechnical laboratory testing and provision of advice on the material properties of the shallow soil horizon including parameters to aid in retaining wall design and foundation options; &
    - Conclusions and recommendations.

LIMITATIONS

LMB has prepared this report solely for the use of the named Client and those parties with whom a warranty agreement and/or assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from LMB and the Client.

LMB accepts no responsibility or liability for:

a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and

b) issue of this document to any third party with whom an agreement has not been executed.

The risk assessment and opinions provided, among other things, take in to consideration currently available guidance and best available techniques relating to acceptable contamination concentrations and interpretation of these values. No liability can be accepted for the retrospective effects of any future changes or amendments to these value.

Ground Investigation & Findings

INTRODUCTION

The ground investigation works were undertaken on 5th May 2017 and comprised the progression of 1no. borehole to a depth of 8.00m bgl using a modular dynamic (windowless) sampler rig and completion of 2no. hand excavated trial pit, with sampling of soil for laboratory testing (see Figure 2).

Groundwater monitoring was undertaken following completion of site works on 6th June 2017.

Details of the ground investigation completed, along with the findings of the investigation, are provided in the following sections. The exploratory hole logs and laboratory results are presented in **Appendix A, B** and **C** respectively.

Guidance Documents

Details of the best practice guidance documents and reference information used in undertaking the ground investigation and assessment are provided at the end of this report (see REFERENCES & GUIDANCE).

INVESTIGATION STRATEGY

The ground investigation was designed based on the information supplied by the Client in relation to the proposed development and with reference to relevant guidance documents (see ref. 3 & 4).

Soil Chemical Analysis & Geotechnical Laboratory Testing

Soil samples were submitted to the UKAS and MCERTS accredited laboratories of i2 Analytical for chemical analysis and geotechnical testing.

All geotechnical testing was undertaken in accordance with BS 1377:1990 'Methods of test for soils for civil engineering purposes' or other current best practice standards, as appropriate.

GROUND & GROUNDWATER CONDITIONS

Ground Conditions

The table below provides a summary of ground conditions encountered with full descriptions provided in the associated exploratory hole logs provided in **Appendix A**:

GROUND INVESTIGATION & FINDINGS

Strata	Depth Range to Top (m bgl)	Depth Range to (Base (m bgl)	Summary Description
Made Ground	Ground Level	0.10 – 1.05	The ground surface at the level of the lower ground floor area (TP1 & TP2) was found to comprise concrete hardstanding. In rear garden area (BH1), the ground surface was found to comprise floor pavers and soft surfacing (soil). The Made Ground soils were generally found to comprise gravelly and locally sandy clay and gravelly sand with varying proportions of brick, brick cobbles and flint.
London Clay Formation	0.10 – 1.05	8.00(1)	In the borehole, the London Clay was found to comprise an frim becoming stiff closely and very closely fissured clay. A thin mudstone unit was encountered between approximately 5.60m and 5.70m bgl.

(1) Base not determined.

Visual and Olfactory Observations

No visual or olfactory evidence of contamination was observed during the ground investigation works. However, Made Ground soils were encountered in exploratory hole locations and can be indicative of the presence of contaminants.

Groundwater Conditions

No groundwater strikes were observed during drilling. During return monitoring groundwater was recorded at a depth of 4.89m bgl i.e. 0.11m of water at the base of the monitoring well.

Groundwater is commonly recorded within the London Clay during monitoring. However, rather than being representative of a permanent and laterally continuous aquifer unit, the groundwater is present as discrete units within (for example) micro fissures and local mudstone horizons and the recorded groundwater level will most likely be reflective of the pore water pressures within these discrete features.

Existing Foundations

The hand excavated trial pits completed suggest that the existing structure is supported on traditional shallow footings.

Sections, photographs and descriptions of the observations described above are provided in **Appendix A**.

GROUND INVESTIGATION & FINDINGS

Characteristic Values of Soil Parameters

A summary of the geotechnical properties of the strata based on the field and laboratory testing is provided in the table below.

Soil Property	**Stratum**	
	Made Ground	London Clay
SPT 'N' Value	-	7 – >50
Shear Strength (kN/m^2)	-	50 – 125
Bulk Density (mg/m^3)	1.70(1)	1.83 – 2.35 (2)
Moisture Content (%)	18 – 19	32 – 36
Plasticity Index (%)	-	50 – 51
pH	7.70	8.30
Sulphate (g/l)	0.0162	0.252

(1) Value based on BS8002
(2) Literature values taken from Forster (1997)

A plot of SPT 'N' value against depth is provided in **Appendix D.** The plot indicates that there is a general increase in relative density (SPT N Value) with depth.

Geotechnical Advice

INTRODUCTION

It is understood that the proposed development will include extension of the existing lower ground floor into the rear garden area to form 2no. residential apartments over the ground and lower ground floors. The existing lower ground floor will not be excavated/deepened as part of the development.

On this basis, the following assumptions have been made:

- The formation level for the floor of the basement extension will be at the same level as the existing lower ground floor i.e. approximately 2.80m bgl;
- The load from the existing three storey structure will be in the region of 30-45KN/m^2 which is not anticipated to significantly alter following basement deepening and extension. No additional loads are envisaged;
- For a three storey structure (including the roof) the existing wall load is estimated at approximately 60-80kN/m run, which is not anticipated to significantly alter following lower ground floor extension.
- There will be no significant changes in elevation over the proposed basement development.
- Foundations will not be eccentrically loaded.

GROUND CONDITIONS SUMMARY AND ENGINEERING PARAMETERS

The ground conditions encountered in the exploratory holes are broadly consistent with the geological sequence as described in the BGS Geological Map (Sheet 256, North London) with Made Ground soils overlying the London Clay Formation.

Groundwater was not encountered during the drilling works but was recorded during return monitoring at a depth of 4.89m bgl.

Groundwater is commonly recorded within the London Clay during monitoring. However, rather than being representative of a permanent and laterally continuous aquifer unit, the groundwater is present as discrete units within (for example) micro fissures and local mudstone horizons and the recorded groundwater level will most likely be reflective of the pore water pressures within these discrete features.

FOUNDATION SOLUTIONS

Spread Foundations

Based on the findings of the ground investigation and the subsequent laboratory testing it has been concluded that for traditional spread foundations (placed on the competent firm to stiff London Clay) at the assumed formation level of 2.80m bgl a net safe bearing pressure of 125kN/m^2 should be available.

GEOTECHNICAL ADVICE

It is recommended that the undrained shear strength of soils at formation level be confirmed using a hand shear vane and should exceed 60kN/m^2.

The bearing pressure is based on a factor of safety of 3 to ensure that settlement remains within normally acceptable limits.

The above advice assumes that the proposed basement development and in particular foundations would not be within the influence of any trees or tree routes.

Piled Foundations

Based on the proposed development and the ground conditions encountered it is considered unlikely that a piled foundation would be the most feasible solution. However, it is possible that sheet piling may be considered as part of the temporary works.

GROUND STABILITY & RETAINING STRUCTURES

Retaining walls constructed in open cut would be the preferred solution, but given the adjacent and nearby residential structures it is possible that temporary support (sheet piles or similar) will be needed for construction.

Although no groundwater was encountered over the anticipated excavation depth (2.80m bgl), the stability of unsupported excavations at the site should not be relied upon.

A discussion of potential heave, settlement and inward yielding is provided in the next section, however it is likely that any excavations will need to be trimmed back following heave of clay at formation level.

Zones loosened by the removal of existing and relict construction may be particularly unpredictable and liable to collapse.

It may be beneficial to install the retaining wall and floor slab sequentially to provide propping and lateral restraint, which could help to minimise deflections. It is likely that this will need to be given particular consideration beneath the party walls of the adjoining properties.

Safe working conditions should be ensured where persons are required to work in excavations. It is recommended that reference be made to CIRIA Report No. 97,"Trenching Practice" 1992.

The parameters presented in the table below may be considered within the design of the retaining walls for the extension:

Strata	Depth Range (m bgl)		Angle of Shearing Resistance(2)	Coefficient of Active Earth Pressure (Ka) (2)	Coefficient of Passive Earth Resistance (Kp) (2)	Bulk Density
	Top	Base				
Made Ground	Ground Level	0.10 – 1.05	30	0.30	3.5	1.70(1)
London Clay Formation	0.10 – 1.05	8.00	21	0.42	2.5	1.83 – 2.35 (3)

(1) Values based on BS8002
(2) Based on soil properties and reference to BS8002 & Tomlinson, M.J. (1986)
(3) Literature values taken from Forster (1997)

BURIED CONCRETE

The laboratory testing results summarised in the Ground Investigation & Findings section and presented in **Appendix C** and **D** have been reviewed in accordance with BRE Special Digest 1 (2005).

The results indicate that the design sulphate class and corresponding Aggressive Chemical Environment for Concrete (ACEC) class (static groundwater conditions) are as follows:

- Made Ground: DS1 & AC-1s.
- London Clay Formation: DS1 & AC-1s.

ADDITIONAL CONSIDERATIONS

Existing Structures

If feasible, it is recommended that any existing buried construction is broken out and removed in a safe manner. However, if buried construction (such as existing foundations) are to remain close to the new basement structure, then care should be taken to avoid interaction i.e. to prevent the slab 'breaking its back' over the existing construction.

Potential for Settlement & Inward Yielding

The London Clay is known to have high plasticity indices with a high volume change potential.

The removal of the overburden during the excavation of the basement is likely to result in heave and inward yielding of the London Clay soils at formation level and possibly a subsequent settlement of the soils outside the excavation. Based on the ground investigation data, the London Clay at formation level is anticipated to comprise firm to stiff soils and so the potential effects may be limited by their relatively low compressibility (as compared to soft clay soils). Inward yielding in firm to stiff clays is typically in the range of 5-40mm (Tomlinson, M.J. (1986).

GEOTECHNICAL ADVICE

The total uplift will be a function of the soil heave pressure and water pressure, it is anticipated that almost half of this will be immediate upon excavation, while the remainder would be long term. The estimated depth of excavation is 2.80m below current ground level. However, this is only over a limited area in the rear garden. Assuming an unsaturated unit weight of 20kN/m^3 and accounting for groundwater, the estimated unload due excavation would be in the order of 45-55kN/m^2.

It is anticipated that following excavation and construction of the basement, the load imposed by the new sub-structure will be less than the overburden pressure at formation prior to excavation.

However, it is anticipated the basement slab would not be loaded if strip footings are adopted. In this case, a suspended basement floor slab would be appropriate, constructed with suitable compressible void formers that can accommodate the expected ground heave.

As outlined, the excavation will only be in the rear garden area and as such, there could be differential heave and/or settlement over the long term between the area of the excavation and the existing lower ground floor.

Groundwater

As outlined, groundwater was not encountered at the anticipated formation level. However, it would be prudent to adopt a conservative approach in relation to the basement design and account for groundwater at a depth of approximately 1.00m bgl.

Management of Formation Level

Should pockets of inferior material be present during the inspection of the foundation excavation, they should be removed and replaced with well graded, well compacted hardcore or lean mix concrete.

The excavated surface should be protected from deterioration and a blinding layer of concrete used where foundations are not completed without delay. Any surface or perched water should not be allowed to collect in the base of excavations.

Groundwater Management

Significant dewatering is not anticipated during the construction of these foundations, but some groundwater seepages and/or surface water infiltration into the excavation should be anticipated. It is anticipated that any seepages or rates of inflow of groundwater would be slow and it is recommended that seepages be dealt with by pumping from sumps.

Potential Project Risk

Based on the information presented above, it is recommended that the basement design takes into account the following:

GEOTECHNICAL ADVICE

- The potential for short term and long term heave and inward yielding during construction and following construction.
- The potential for differential heave and/or settlement that will occur in the area beneath the existing lower ground floor and the new area of excavation in the rear garden.
- The potential for groundwater / surface water ingress into the lower ground floor following construction.

It should be noted that the excavation of the lower ground floor extension may undermine adjacent/nearby properties and could lead to settlement and damage to buildings and below ground services. It is recommended that the principal contractor should allow for suitable mitigation measures that may include:

- A survey of existing ground levels and buildings;
- A survey of existing below ground services;
- Monitoring of adjacent buildings during construction; and
- Monitoring of adjacent ground levels during construction.

Assessment of Soil Analytical Results

INTRODUCTION

As outlined, the lower ground floor extension will be in a small section of the rear garden area and as such, a proportion of the Made Ground soils over this area will be removed to facilitate development.

Notwithstanding this, a conservative approach has been adopted and a Generic Quantitative Risk Assessment (GQRA) and preliminary waste characterisation have been completed. No statistical analysis has been completed and recorded concentrations have been compared directly to Generic Assessment Criteria (GAC) considering a residential (with plant uptake) end use.

In addition to the GAC the provisional Category 4 Screening Levels (pC4SL) developed by CL:AIRE for DEFRA in response to the new definitions within the Contaminated Land Statutory Guidance (ref. DEFRA, April 2012) have also been considered within the assessment.

RISK ASSESSMENT

Assessment of Potential Risks to Future Site Users (Soil Contamination)

Two samples of the Made Ground soils were collected during the ground investigation (BH1, 0.70m & TP2, 0.20m) and analysed for a range of determinands including, heavy metals, petroleum hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH) and asbestos screening.

The majority of the recorded concentrations of determinands were found to be either below the limit of detection for the laboratory method applied or below relevant below relevant GAC or pC4SL considering a residential end use.

In the sample of Made Ground from the rear garden area (TP2, 0.20m) concentrations of Lead were recorded at 680mg/kg, which is above the GAC and pC4SL for Lead.

Although concentrations of Lead were recorded above relevant criteria, this needs to be assessed in the context of the Contaminated Land Statutory Guidance (April 2012), which outlines that C4SL should be used as a guide for establishing when land does not pose a significant possibility of significant harm rather than actual threshold values. Additionally, the Contaminated Land Statutory Guidance (April 2012) emphasises the importance of considering 'Normal Background Concentrations' (NBC).

Reference to British Geological Survey (BGS) and Defra document: Normal Background Concentrations of Contaminants in English Soils (Johnson CC et al 2012) indicates that the NBC for Lead in an urban domain in England is 820mg/kg.

This is consistent with the comments received from the Contaminated Land Officer at LBC who suggested that the, '*Camden soil profile tends to exhibit high levels of Lead (see BGS data)*.' In addition, Made Ground soils in this area of the site will be excavated for off-site disposal.

On this basis, it is considered unlikely that concentrations of Lead recorded in the soils in the rear garden will pose a potential risk to future site users

Maintenance and construction workers should adopt appropriate management procedures to prevent direct contact with Made Ground soils.

Asbestos in Soils

The sample of the Made Ground soil from BH1 (0.70m) were screened for the presence of Asbestos Containing Materials (ACM). No ACM were detected.

WASTE CHARACTERISATION

The Landfill (England and Wales) Regulations (2002, as amended), the Hazardous Waste (England and Wales) Regulations (2005, as amended) and the Waste (England and Wales) Regulations (2011) have changed the way in which waste materials have traditionally been managed (i.e. landfill disposal). If materials are to be discarded from site, appropriate characterisation and classification are required prior to disposal, to determine whether a waste should be described as either non-hazardous or hazardous. The process of classification is based around the List of Wastes (England) Regulations in conjunction with the Environment Agency Guidance Document WM3 (edition 1, 2015). Waste Acceptance Criteria (WAC) are often confused as a means of classification when, in actuality, they represent criteria that wastes must satisfy for disposal in target landfill types (i.e. non-hazardous waste may be described as inert if it satisfies the appropriate WAC; however, hazardous waste can never be classified as inert even if it satisfies the WAC for an inert landfill).

Certain categories of waste material are termed 'absolute entries' within the List of Wastes Regulations (2005) and are automatically classified as inert or hazardous e.g. glass packaging and acid tars respectively.

Source of Potential Wastes

The waste materials on site are considered to comprise the Made Ground soils that occupy (typically) the upper 0.50 – 1.00m below ground level. In general, the majority of this material could be thought of as 'Construction and Demolition Wastes (including Excavated Soil from Contaminated Sites)' and such soils could be described as inert, non-hazardous or hazardous, dependant on its source and chemical characteristics.

The source of the Made Ground materials is not known but based on the ground conditions encountered it appears to primarily comprise reworked and possible demolition material that is considered to have been derived from historical, local demolition and construction.

ASSESSMENT OF SOIL ANALYTICAL RESULTS

BASIC WASTE CHARACTERISATION

Made Ground

On a purely visual basis, the majority of the Made Ground would appear to conform with 'soils and stones' excluding topsoil, peat and excluding soil and stones from contaminated sites (European Waste Catalogue Code 17 05 04), which would be an inert waste material. However, where soil and stones are not automatically classified as inert they will always be treated as so called 'mirror entries' of the List of Waste Regulations (European Waste Catalogue Code 17 05 03 mirror hazardous or 17 05 03 mirror non-hazardous). An assessment of the composition of the soil is required to determine the concentrations of potentially dangerous substances that maybe present in the soils to allow the waste to be classified accordingly.

As such, chemical analysis has been completed on two samples of Made Ground (BH1, 0.70m & TP2, 0.20m) in general accordance with the Environment Agency document Waste Sampling and Testing for Disposal to Landfill (ref. EBPRI 11507B, March 2013). The results have been used to aid in basic waste characterisation utilising the information presented within the WM3 document for Hazardous wastes.

In addition, the samples of Made Ground were tested for the presence of Asbestos Containing Materials with none detected.

Reference to the WM3 document suggests that based on the chemical analysis completed, the majority of the Made Ground materials will be listed as non-hazardous wastes. Any basic waste characterisation will need to be confirmed by the receiving facility.

Natural Ground Deposits

The natural soils (London Clay Formation) are likely to be listed as inert (soils and stones, European Waste Catalogue Code 17 05 04), again this will need to be confirmed by the receiving landfill facility.

In addition, given the scarcity of inert landfill cells it may be more appropriate (depending on timescales and feasibility etc) to source an alternative use for the soils (such as fill materials or daily cover) or to dispose to non-hazardous landfill.

Waste Acceptance Criteria (WAC) Testing

WAC testing has been undertaken on the sample of Made Ground collected from BH1 (0.70m), with the results presented in **Appendix C**.

The results indicate that Made Ground soils would meet the non-hazardous landfill waste acceptance criteria.

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22. Environment Agency (2009c), Updated Technical Background to the CLEA Model, Report SC050021/SR3, January 2009;

[1] This document has been withdrawn but is considered to remain useful in proving technical background for designing ground investigation works.

[2] This document has been withdrawn but is considered to remain useful in proving technical background for designing ground investigation works.

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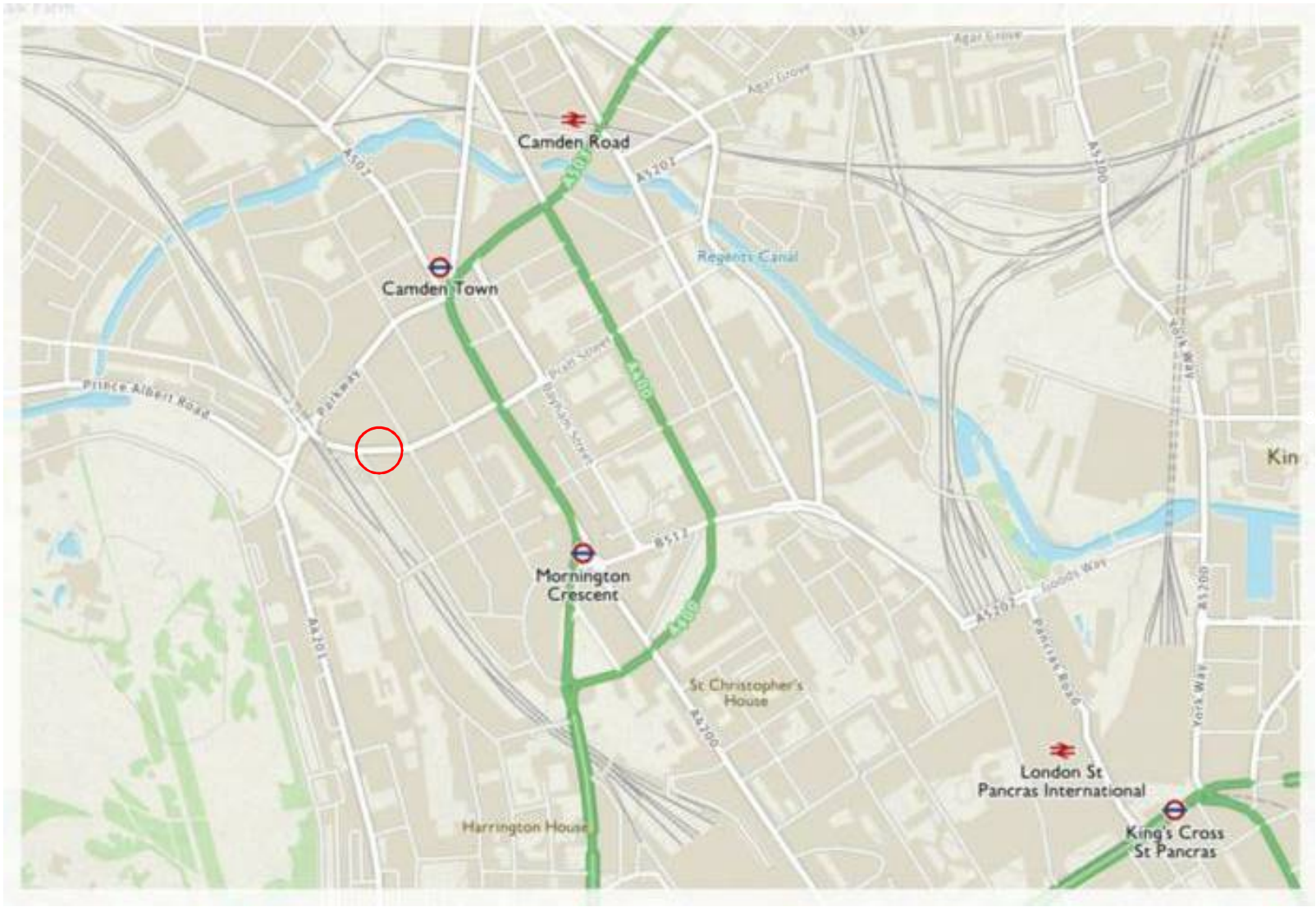
FIGURES



Key:

Approximate site location

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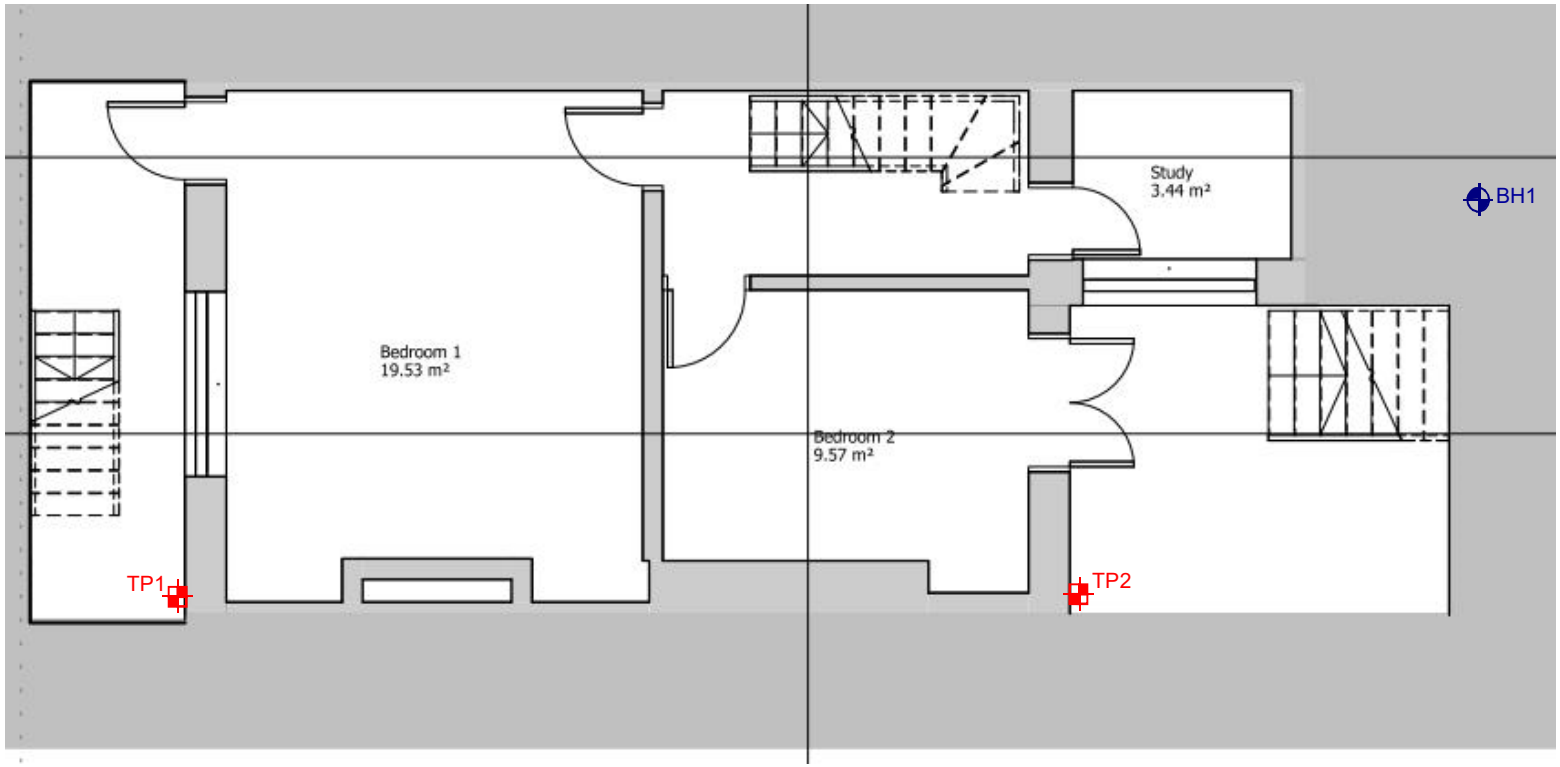
Site: 52 Delancey Street, London NW1

Figure Number: Figure 1

Title: Site Location Plan

Project No:	Created By:	Date:
	PIL	May 2017

Client: Natasha & Oliver Gershfield



Key:

BH — Dynamic Sampler Borehole location

TP — Hand excavated trial pit location

IMPORTANT – Please Read

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Site: 52 Delancey Street, London NW1

Figure Number: Figure 2

Title: Exploratory Hole Location Plan

Project No:	Created By:	Date:
	PIL	May 2017

Client: Natasha & Oliver Gershfield

APPENDICES

Appendices

APPENDIX A EXPLORATORY HOLE LOGS

Borehole Log

Borehole No. **BH1**

Sheet 1 of 2

Project Name: 52 Delancey St	Project No. LMB_Delancey	Co-ords: -	Hole Type WLS
Location: London, NW1		Level:	Scale 1:25
Client: N & O Gershfield		Dates: 15/05/2017 - 15/05/2017	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.04			Floor pavers.	
					0.24			MADE GROUND: brown slightly sandy gravelly clay. Gravel sub-angular to sub-rounded fine to coarse flint and brick.	
		0.40	D					MADE GROUND: red/orange to grey gravelly sand with sub-angular concrete and brick cobbles.	
		0.70	ES		0.60			MADE GROUND: firm brown with orange/brown mottling clay with occasional flint brick and charcoal gravel. Occasional rootlets.	
		1.00		N=8 (1,2/2,2,2,2)					1
		1.10	D		1.05			Firm brown with occasional orange/brown mottling CLAY. Rootlets in top 0.1m of unit. (LONDON CLAY FORMATION).	
				HVP=60					
					1.70			*white/brown silty parting.*	
								Firm becoming stiff brown with occasional grey/ blue veining CLAY. Rare relict root traces. (LONDON CLAY FORMATION).	
		2.00	D					*becomes closely fissured with frequent blue/grey veining.*	2
		2.00		N=8 (3,2/1,2,2,3)					
				HVP=75				*becomes very closely fissured.*	
		3.00	D		3.00			Stiff brown with blue/grey veining CLAY. Very closely fissured. (LONDON CLAY FORMATION).	3
		3.00		N=12 (2,3/2,3,4,3)					
				HVP=80					
		4.00	D						4
		4.00		N=20 (3,3/4,4,5,7)					
				HVP=100					
		5.00	D						5
								Continued on next sheet	

Remarks

AGS

Borehole Log

Borehole No. **BH1**
Sheet 2 of 2

Project Name: 52 Delancey St	Project No. LMB_Delancey	Co-ords: -	Hole Type WLS
Location: London, NW1		Level:	Scale 1:25
Client: N & O Gershfield		Dates: 15/05/2017 - 15/05/2017	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		5.00		N=19 (3,3/4,4,5,6)				*no noticeable veining and rare fine selenite crystals.*
				HVP=110				
		5.60		N=25 (20,5/5,6,7,7)	5.60			Weak to moderately weak light brown MUDSTONE. (LONDON CLAY FORMATION).
					5.70			Stiff brown CLAY. Very closely fissured with occasional selenite crystals. (LONDON CLAY FORMATION).
		6.00		N=32 (6,5/7,7,8,10)				
				HVP=125				
		7.00	D					
		7.00		N=53 (7,9/10,13,14,16)				
		7.50		N=60 (17,8/60 for 245mm)				
					8.00			End of borehole at 8.45 m

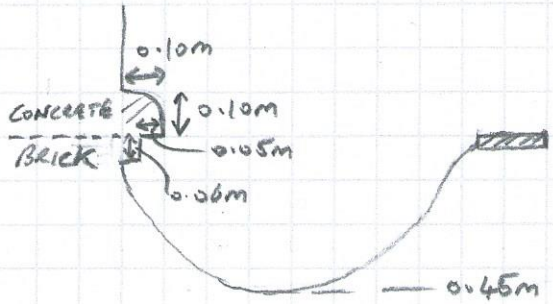
Remarks

Project: 52 Delancey Street, London NW1

Description: Foundation Inspection Pit Sections
Made: PIL
Date: June 2017

LMB
Ground Investigation
Land Contamination
Hydrogeology
Engineering Geology

TP1



0.10 - 0.13m - CONCRETE

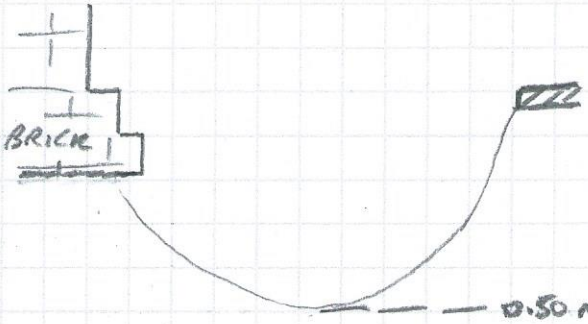
0.13 - 0.10m - MADE GROUND: brown slightly gravelly clay. Gravel sub-angular brick and rare flint.

0.10 - 0.45m - Firm brown CLAY (LONDON CLAY).

HAND SHEAR VANE (0.45m) 50 kN/m²

N.B. POSSIBLE GAS PIPE OBSERVED AT EDGE OF PIT (SEE PHOTOS).

TP2



0 - 0.105m - CONCRETE

0.105 - 0.25m - MADE GROUND: grey/brown gravelly sand. Gravel sub-angular brick & concrete.

0.25 - 0.50m - Firm brown to orange/brown with grey mottling CLAY. (LONDON CLAY).

HAND SHEAR VANE (0.50m) 65 kN/m²

Plate 1: TP1

Plate 2: TP2

LMB
Ground Investigation
Land Contamination
Hydrogeology
Engineering Geology

Photographic Record

Project: 52 Delancey St

Plates 1 & 2

APPENDICES

APPENDIX B GEOTECHNICAL LABORATORY RESULTS

TEST CERTIFICATE

Determination of Moisture Content

Tested in Accordance with BS 1377-2:1990: Clause 3.2

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

Client:	LMB Geosolutions Ltd	Client Reference:	17-48478
Client Address:	28 Dresden Road London N19 3BD	Job Number:	17-48478
		Date Sampled:	15/05/2017
		Date Received:	15/05/2017
Contact:	Philip Lewis	Date Tested:	22/05/2017
Site Name:	Delaney Street	Sampled By:	PIL
Site Address:	Not Given		

Test results

Laboratory Reference	Sample Reference	Location	Depth Top [m]	Depth Base [m]	Sample Type	Description	Moisture Content [%]
749628	Not Given	BH1	1.1	Not Given	D	Yellowish brown slightly gravelly CLAY	36
749629	Not Given	BH1	3	Not Given	D	Yellowish brown CLAY	32

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 26/05/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

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

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

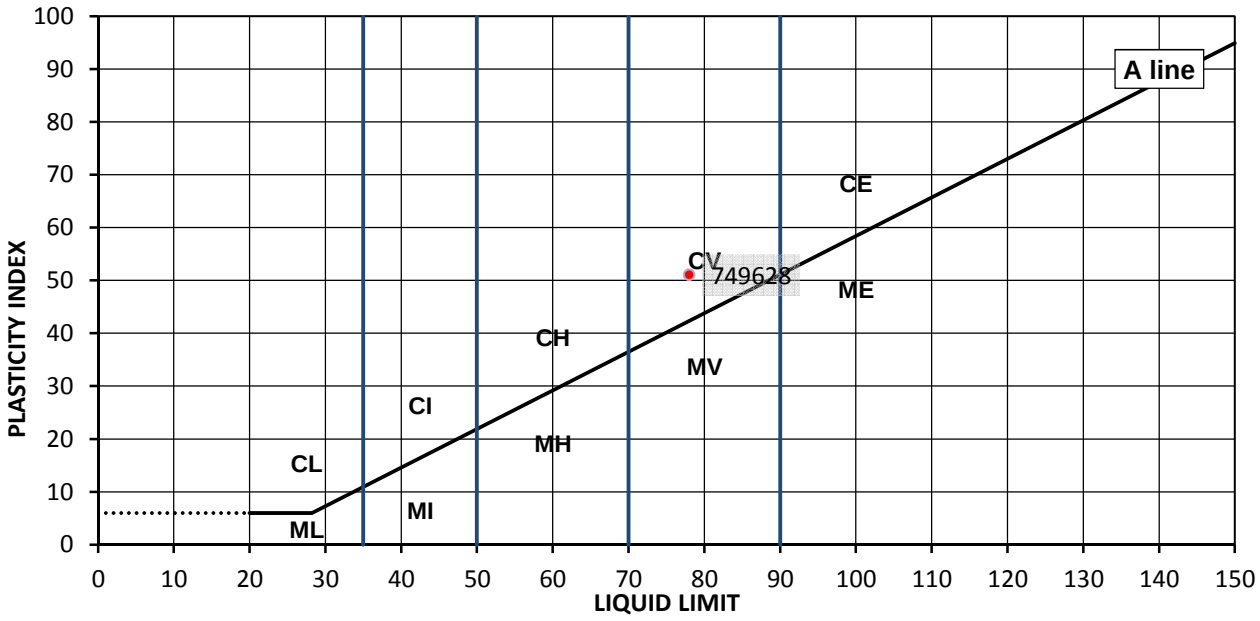
Client:	LMB Geosolutions Ltd	Client Reference:	17-48478
Client Address:	28 Dresden Road London N19 3BD	Job Number:	17-48478
		Date Sampled:	15/05/2017
		Date Received:	15/05/2017
Contact:	Philip Lewis	Date Tested:	22/05/2017
Site Name:	Delaney Street	Sampled By:	PIL
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 749628
Sample Reference: Not Given

Description:	Yellowish brown slightly gravelly CLAY	Sample Type:	D
Location:	BH1	Depth Top [m]:	1.1
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
36	78	27	51	96



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 26/05/2017

Signed:

Sushil Sharda
Technical Manager (Geotechnical Division)

for and on behalf of i2 Analytical Ltd

GF 105.11

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

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

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

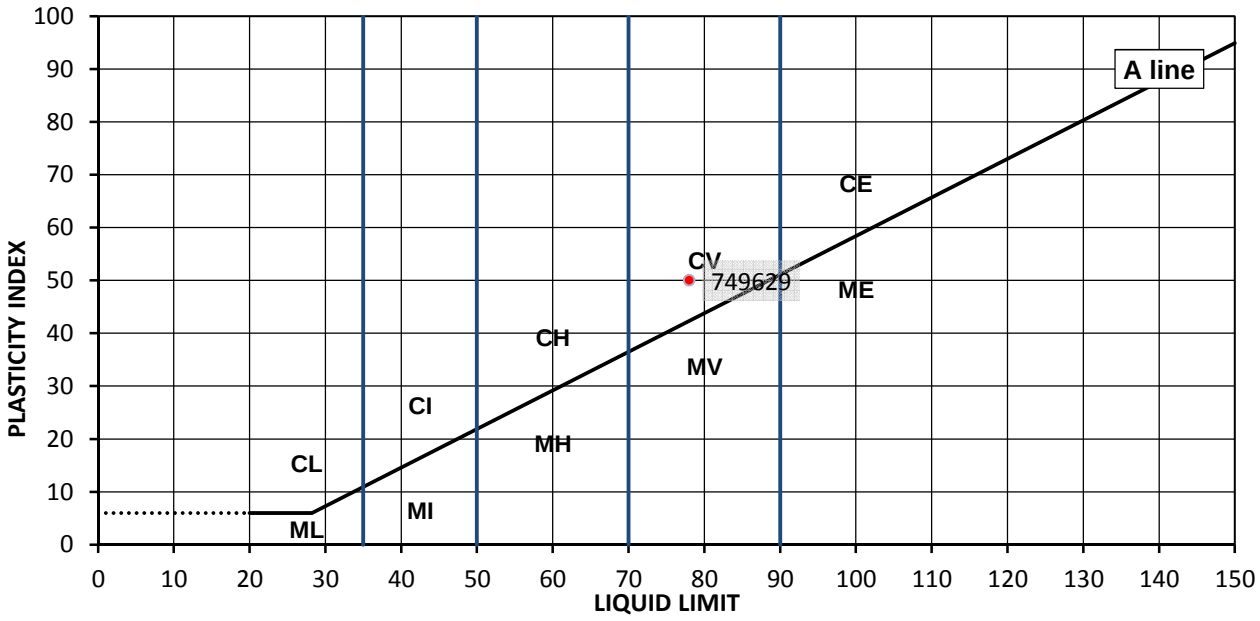
Client:	LMB Geosolutions Ltd	Client Reference:	17-48478
Client Address:	28 Dresden Road London N19 3BD	Job Number:	17-48478
		Date Sampled:	15/05/2017
		Date Received:	15/05/2017
Contact:	Philip Lewis	Date Tested:	22/05/2017
Site Name:	Delaney Street	Sampled By:	PIL
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 749629
Sample Reference: Not Given

Description:	Yellowish brown CLAY	Sample Type:	D
Location:	BH1	Depth Top [m]:	3
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
32	78	28	50	100



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 26/05/2017

Signed:

Sushil Sharda
Technical Manager (Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Summary of Classification Test Results

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

Client: LMB Geosolutions Ltd
Client Address: 28 Dresden Road
London
N19 3BD
Contact: Philip Lewis
Site Name: Delaney Street
Site Address: Not Given

Client Reference: 17-48478
Job Number: 17-48478
Date Sampled: 15/05/2017
Date Received: 15/05/2017
Date Tested: 22/05/2017
Sampled By: PIL

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	Density		M/C	Atterberg				PD
		Reference	Top depth [m]	Base depth [m]	Type		bulk Mg/m3	dry Mg/m3	%	% Passing 425um %	LL %	PL %	PI %	Mg/m3
749628	BH1	Not Given	1.10	Not Given	D	Yellowish brown slightly gravelly CLAY			36	96	78	27	51	
749629	BH1	Not Given	3.00	Not Given	D	Yellowish brown CLAY			32	100	78	28	50	

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Date Reported: 26/05/2017

Signed:

Sushil Sharda
Technical Manager (Geotechnical Division)

for and on behalf of i2 Analytical Ltd

APPENDICES

APPENDIX C CHEMICAL LABORATORY TESTING RESULTS

Philip Lewis
LMB Geosolutions Ltd
28 Dresden Road
London
N19 3BD

e: philip@lmbgeosolutions.com

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7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

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

Analytical Report Number : 17-48407

Project / Site name:	Delancey Street	**Samples received on:**	15/05/2017
Your job number:		**Samples instructed on:**	15/05/2017
Your order number:		**Analysis completed by:**	24/05/2017
Report Issue Number:	1	**Report issued on:**	24/05/2017
Samples Analysed:	4 soil samples		

Signed:

Emma Winter
Assistant Reporting Manager
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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Analytical Report Number: 17-48407

Project / Site name: Delancey Street

Lab Sample Number				749129	749130	749131	749132	
Sample Reference				BH1	BH1	BH1	TP2	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.40	0.70	3.00	0.20	
Date Sampled				15/05/2017	15/05/2017	15/05/2017	15/05/2017	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	-	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	-	18	19	19	
Total mass of sample received	kg	0.001	NONE	-	0.41	0.36	0.41	
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	-	-	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	8.3	-	
Water Soluble SO4 as SO4 (2:1) Gallery 16h extraction	g/l	0.00125	MCERTS	-	0.0162	0.252	-	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	< 0.80	-	-	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	11	
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	1.7	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	0.7	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	20	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	57	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	680	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	0.7	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	16	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	< 1.0	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	470	
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	-	-	-	17	

Analytical Report Number : 17-48407

Project / Site name: Delancey Street

* 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 *
749129	BH1	None Supplied	0.40	-
749130	BH1	None Supplied	0.70	Brown clay and sand with vegetation.
749131	BH1	None Supplied	3.00	Brown clay and sand.
749132	TP2	None Supplied	0.20	Light brown loam and sand with gravel and rubble.

Analytical Report Number : 17-48407

Project / Site name: Delancey Street

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
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
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 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 automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
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 by Gallery 16hr	Determination of water soluble Sulphate by discrete analyser (precipitation method).	In house method based on BS1377-3: 1990.	L082B-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding.	L076-PL	W	MCERTS

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

Philip Lewis
LMB Geosolutions Ltd
28 Dresden Road
London
N19 3BD

e: philip@lmbgeosolutions.com

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

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

Analytical Report Number : 17-48409

Project / Site name:	Dalencey Street	**Samples received on:**	15/05/2017
Your job number:		**Samples instructed on:**	15/05/2017
Your order number:		**Analysis completed by:**	30/05/2017
Report Issue Number:	1	**Report issued on:**	30/05/2017
Samples Analysed:	1 WAC 10:1 Sample		

Signed:

Rexona Rahman
Reporting Manager
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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i2 Analytical
7 Woodshots Meadow
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Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**17-48409**						
					Client:	**LMBGEOSOL**	
Location	**Dalencey Street**						
Lab Reference (Sample Number)	749205 / 749206				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	15/05/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH1						
Depth (m)	0.70						
Solid Waste Analysis							
TOC (%)**	1.7				3%	5%	6%
Loss on Ignition (%) **	-				--	--	10%
BTEX (µg/kg) **	-				6000	--	--
Sum of PCBs (mg/kg) **	-				1	--	--
Mineral Oil (mg/kg)	-				500	--	--
Total PAH (WAC-17) (mg/kg)	-				100	--	--
pH (units)**	7.7				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.2				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:01	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0056			0.0864	0.5	2	25
Barium *	0.0321			0.494	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0030			0.046	0.5	10	70
Copper *	0.018			0.28	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0008			0.0122	0.5	10	30
Nickel *	0.0023			0.036	0.4	10	40
Lead *	0.038			0.59	0.5	10	50
Antimony *	0.0032			0.050	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.012			0.18	4	50	200
Chloride *	0.52			8.0	800	4000	25000
Fluoride	0.40			6.2	10	150	500
Sulphate *	0.88			14	1000	20000	50000
TDS	48			740	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	3.29			50.7	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.41						
Dry Matter (%)	82						
Moisture (%)	18						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation ** = MCERTS accrediited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 17-48409

Project / Site name: Dalencey Street

* 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 *
749205	BH1	None Supplied	0.70	Brown clay and sand with vegetation.

Analytical Report Number : 17-48409

Project / Site name: Dalencey Street

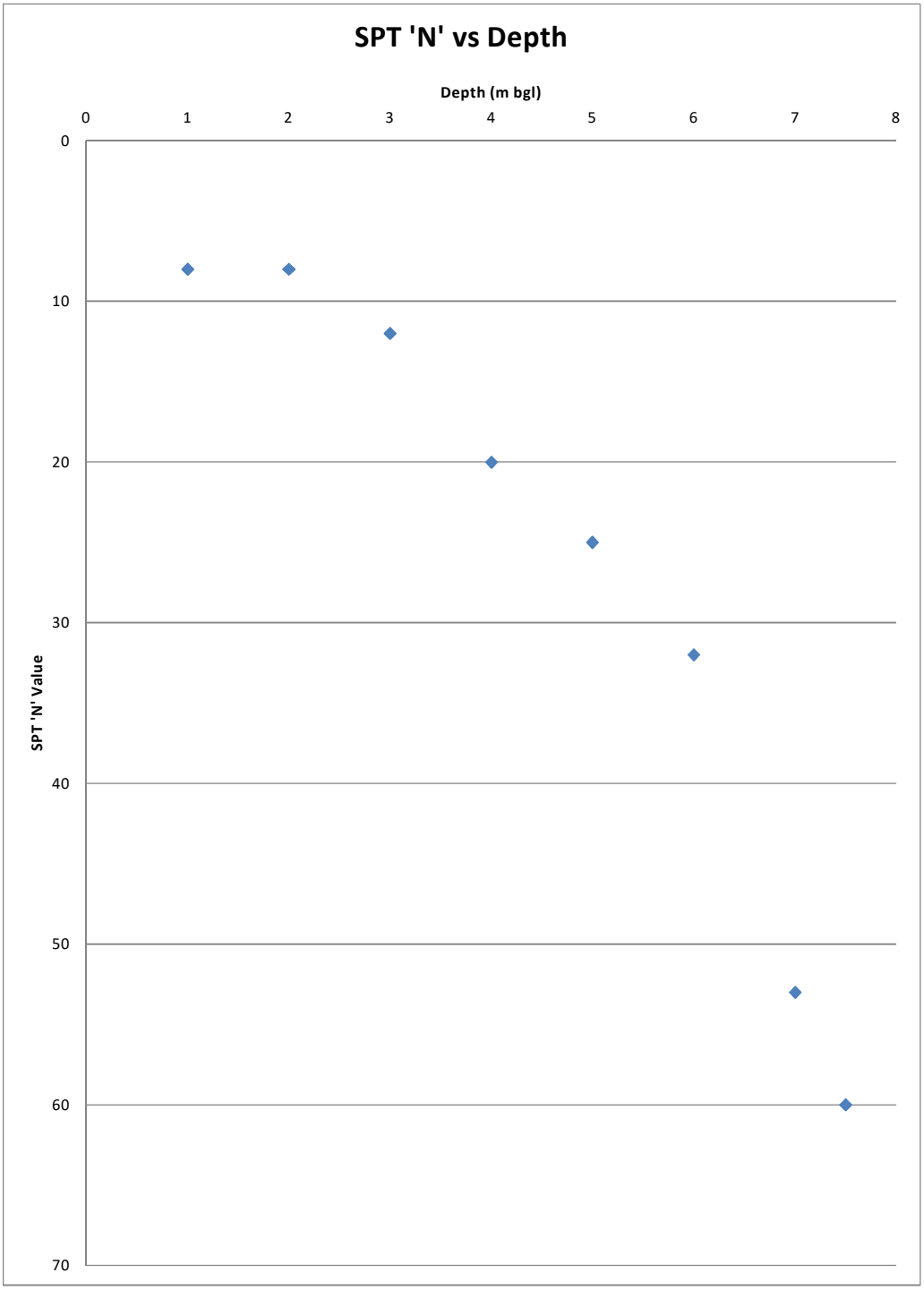
Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
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	W	NONE
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-PL	W	ISO 17025
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 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
pH in soil	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	L005-PL	W	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 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
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 (Automated) 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""	L009-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.

APPENDICES

APPENDIX D PLOT OF SPT ‘N’ VLAUE VS DEPTH



LMB GEOSOLUTIONS LTD

SPT N DEPTH PLOT

Project: 52 Delancey St
Client: Natasha Gersfield & Oliver Gershfield
Logged By: PIL