



BASEMENT IMPACT ASSESSMENT

Ref: 23/36497-2 | Date: March 2023

**63 Mountview Road
Crouch End
London
N4 4SR**

Prepared for:
Dominic Lamb Architects





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1.0 INTRODUCTION

1.1 Project Objectives

The purpose of this assessment is to consider the effects of a proposed basement construction on the local slope stability, surface water and groundwater regime at the residential property at 63 Mountview Road, Crouch End, London, N4 4SR.

The recommendations and comments given in this report are based on the information contained from the sources cited and may include information provided by the Client and other parties, including anecdotal information. It must be noted that there may be special conditions prevailing at the site which have not been disclosed by the investigation and which have not been taken into account in the report. No liability can be accepted for any such conditions.

This report does not constitute a full environmental audit of either the site or its immediate environs.

1.2 Planning Policy Context

This document follows specific guidance on basements from Haringey Council document Development Management DPD from 2016. This document also follows current planning procedure for basements and lightwells adopted by other London Borough's, including Camden, Westminster, Kensington and Chelsea and Islington.

These policies require proposed subterranean developments to mitigate against the effects of ground and surface water flooding and to include drainage systems that do not impact neighbouring property of the site or the water environment by way of changing the groundwater regime.

This report is intended to address the issues set out in the planning policies by the other London Boroughs. It will review existing site investigation data and provide a preliminary assessment of the issues identified by the Site Analytical Services Limited screening process.

This report also provides an impact assessment of the geo-environmental impacts on adjacent structures and the surrounding area based on available site investigation data.

As part of this guidance a subterranean (groundwater) flow screening chart is provided.

1.3 Qualifications

The report has been prepared by Mr Thomas Murray, a Fellow of the Geological Society (FGS) with over 9 years' experience.

2.0 SITE DETAILS

(National Grid Reference: TQ 306 880)

2.1 Site Location

The site is located on the northern side of Mount View Road and the eastern side of Womersley Road at approximate postcode N4 4SR. The site consists of a two-storey residential dwelling with private garden to the front and rear. The site is located in an area of predominantly residential use, with Harringay Train Station located approximately 730m to the east of the site.

The site is a rectangle shape and covers an approximate area of 0.05 Hectares with the general area being under the authority of the London Borough of Haringey.

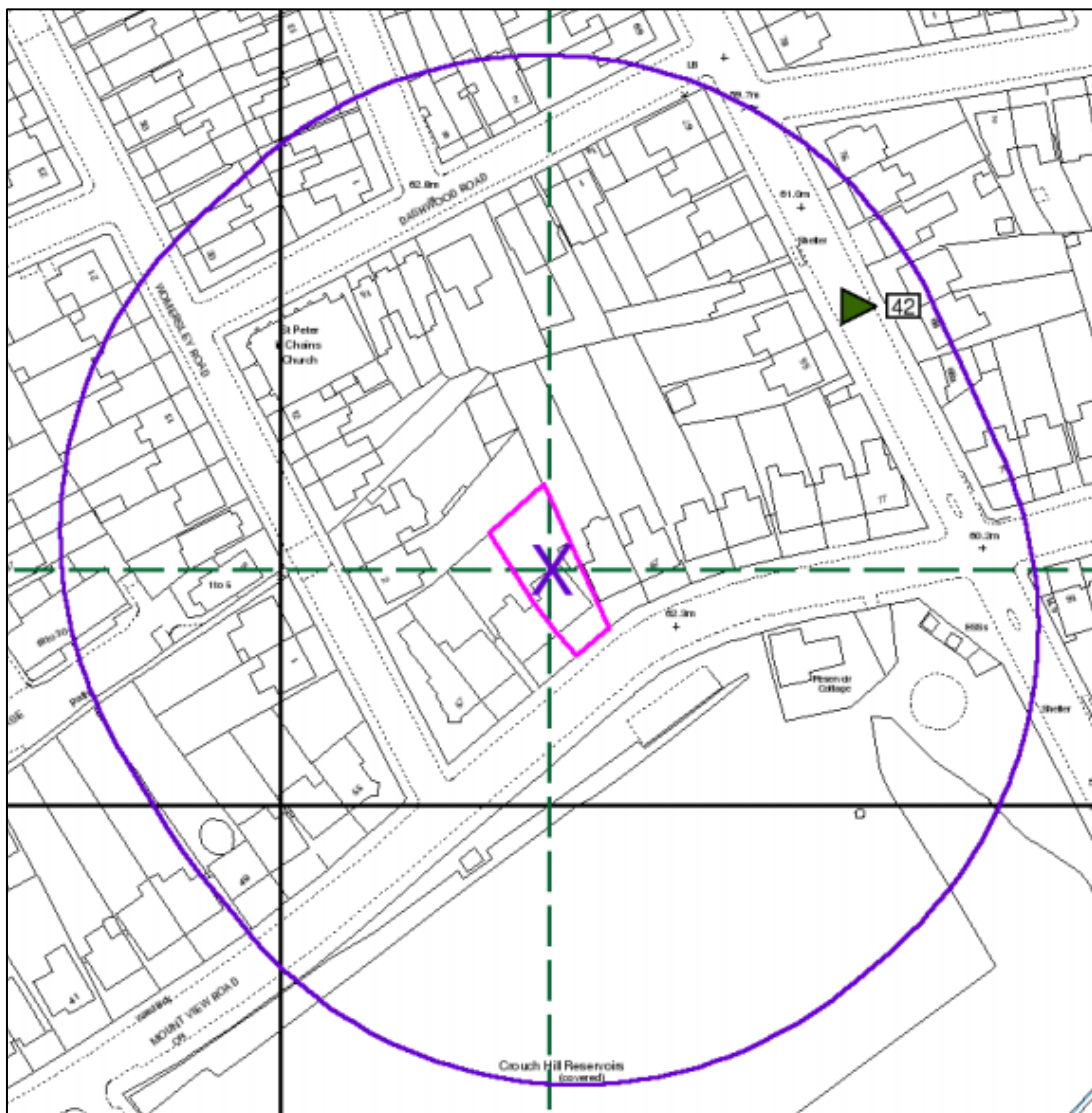


Figure 1. Site Location Plan

2.2 Site Layout

The site was attended on 8th March 2023 for the purposes of conducting the site walkover.

The site is currently a two-storey residential dwelling with a private garden in the front and rear of the property. There is a brick/concrete workshop/storage building on the eastern boundary with a small wooden shed located behind it. The main building has a conservatory on the north-eastern corner.

Site is accessed via a vehicle and pedestrian entrance from Mount View Road.

The site is predominantly covered in hardstanding.

The site consists of planted borders in the front garden, with planted areas in the rear garden with a lawn in the middle. Made Ground associated with the current development is unlikely to be extensive. No evidence of significant thicknesses of Made Ground or raised/filled ground was observed.

The site appears to be sloped gently in the east direction in the front of the property and sloped gently in the south-east direction at the rear of the property.

From the site walkover, there were no obvious potentially contaminating activities on the site.

From historical map evidence, it would appear that the site comprised undeveloped land prior to 1863, with the surrounding areas mainly comprising undeveloped land in all directions, with some areas of residential use located north-west of the site. In 1896 the site comprises a semi-detached residential dwelling, with the surrounding area increasing significantly in residential use in all directions. Between 1952 to 1955 the conservatory to the rear of the property was demolished, but a conservatory was observed during the site visit. In addition the site visit has identified a small structure on the eastern boundary of the site.

2.3 Geology

The 1:50000 Geological Survey of Great Britain (England and Wales) covering the area (Sheet 256, 'North London', Solid and Drift Edition) indicates the site to be underlain the London Clay Formation at depth.

The British Geological Survey maintains an archive of historical exploratory borehole logs throughout the UK. SAS Limited has searched the database and have not found a borehole within 250m of the site. However, there is a borehole located 385m to the south-west of the site, under the name 'THE HIGHLANDS, ISLINGTON 4' and reference number 'TQ38NW375'.

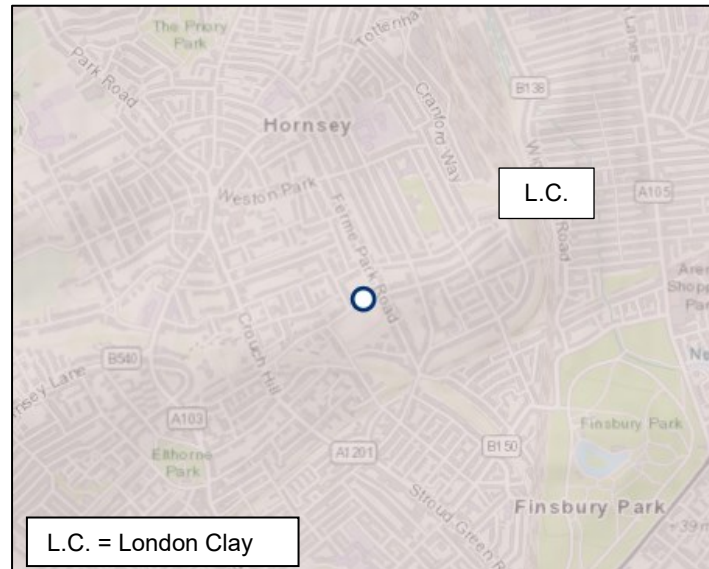


Figure 2. Geology of the Site (Ref. BGS Geoindex)

2.4 Hydrology and drainage

2.4.1 Rainfall and run-off

According to Mayes (1997) rainfall in the local area averages around 610mm/year and is significantly less than the national average of around 900mm/year.

Evapotranspiration is typically 450mm/year resulting in about 160mm/year as 'hydrologically effective' rainfall which is available to infiltrate into the ground or run-off as surface water flow.

With reference to Camden Geological, Hydrogeological and Hydrological Study (1999), Talling (2011) and Barton (1992) the site is not located within 100m of a former 'lost river'. The closest surface water feature is a river (New River) located 920m to the east of the site.

The area located immediately around the site is highly developed with approximately 60% of the surface covered with hardstanding. Most of the rainfall in the area will run-off hard surface areas and be collected by the local sewer network.

2.4.2 Drainage

Surface drainage from the site is assumed to be directed to drains flowing to the south-west along Mount View Road.

2.4.3 Flood Risk

River or Tidal flooding

The site is currently not located within 1 kilometre of an area at risk from extreme flooding from rivers or sea without defences (Zone 2) or an area at risk from rivers or sea without defences (Zone 3).

Surface water flooding

According to the Envirocheck Surface Water Flood maps of the area (obtained from data supplied by the Environment Agency) the site is at very low risk from surface water flooding, (Figure 3).

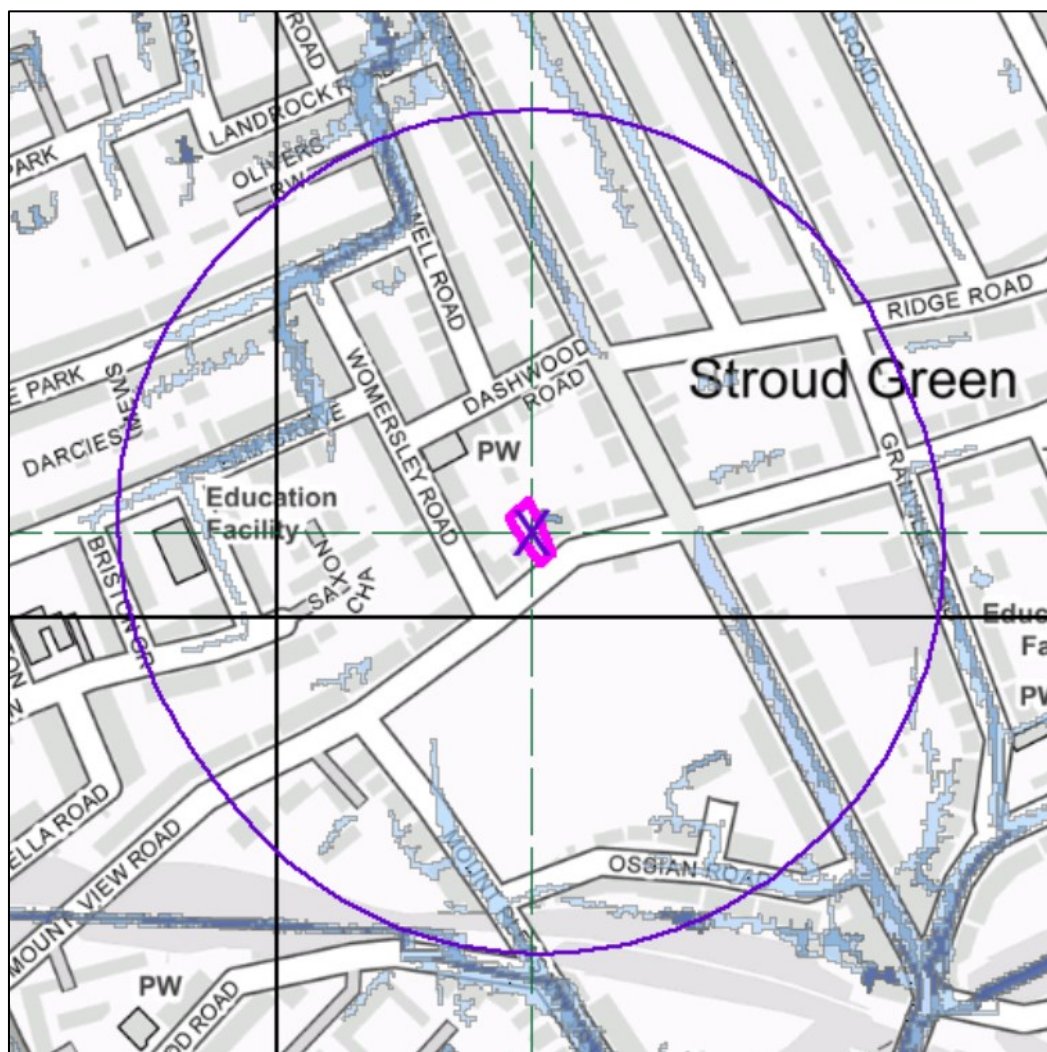


Figure 3. Extract from the Environment Agency's 'Risk of Flooding from Surface Water'. Ordnance Survey Crown copyright 2015. All rights reserved.

Sewer flooding

The London Regional Flood Risk Appraisal (2009) advises that foul sewer flooding is most likely to occur where properties are connected to the sewer system at a level below the hydraulic level of the sewage flow, which in general are often basement flats or premises in low lying areas. There is no record of sewer flooding having occurred at Mount View Road and therefore the risk of sewer flooding is considered low.

2.5 Hydrogeology

The Environment Agency Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) and also their role in supporting surface water flows and wetland ecosystems.

The Bedrock geology underlying the site (London Clay) has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Other hydrogeological data obtained from the Phase 1 Preliminary Risk Assessment (PRA) (SAS Report Ref: 23/36497) for the site include:

- The site is located within 1km of a source protection zone with a Zone II (Outer Protection Zone) located 499m east of the site.

2.6 Previous Reports

The results from a Phase 1 Preliminary Risk Assessment and Factual Intrusive Investigation are presented under separate cover in Site Analytical Services Limited report (Project Nos. 23/36497 and 23/36497-1, dated March 2023). The findings from the Factual Report are described in this basement impact assessment, whilst a copy of the report is included as Appendix A.

2.7 Proposed Development

It is proposed to extend the existing basement beneath the footprint of the existing property to approximately 3.00m below ground level. Details of the structure and layout were provided, however, loadings were not available at the time of preparation of this report.

2.8 Results of Basement Impact Assessment Screening

A screening process has been undertaken for the site and the results are summarised in Table 1 below:

**Table 1: Summary of screening results**

Item	Description	Response	Comment
Sub-terranean (Ground water Flow)	1a. Is the site located directly above an aquifer.	No	The site has been classified as being situated above an unproductive (negligibly permeable) formation (London Clay) that is generally regarded as containing insignificant quantities of groundwater.
	1b. Will the proposed basement extend beneath the water table surface.	Unlikely – to be confirmed by Ground Investigation	Given the presence of a non-aquifer below the site it is unlikely that groundwater will be encountered during any excavations for the proposed basement, however this will be confirmed by the ground investigation.
	2. Is the site within 100m of a watercourse, well (used / disused) or potential spring line.	No	With reference to Camden Geological, Hydrogeological and Hydrological Study (1999), Talling (2011) and Barton (1992) the site is not located within 100m of a former 'lost river'. The closest surface water feature is the drain located 156m to the south-east of the site. From the British Geological Society 'Geoindex' the nearest water well is located approximately 650m south-east of the site.
	3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas.	No	The amount of hardstanding on-site is not expected to change due to the basement construction.
	4. As part of site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS).	No	Existing drainage paths are to be utilised where possible. Whether soakaways/SUDS are used on the proposed development is to be confirmed (beyond the scope of this report). An appropriately qualified engineer should be engaged to ensure mandatory requirements are met.
	5. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond or spring line.	No	With reference to Camden Geological, Hydrogeological and Hydrological Study (1999), Talling (2011) and Barton (1992) the site is not located within 100m of a former 'lost river'. The closest surface water feature is the drain located 156m to the south-east of the site. From the British Geological Society 'Geoindex' the nearest water well is located approximately 650m south-east of the site.



Item	Description	Response	Comment
Slope Stability	1. Does the existing site include slopes, natural or man-made greater than 7 degrees (approximately 1 in 8).	No	A gentle slope towards the south-west was noted, however this is considerably less than 7 degrees.
	2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees (approximately 1 in 8).	No	Re-profiling of landscaping at the site is not proposed.
	3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees (approximately 1 in 8).	No	The immediate surrounding area is gently (below 7 degrees) sloping towards the south-west.
	4. Is the site within a wider hillside setting in which the general slope is greater than 7 degrees (approximately 1 in 8).	No	There is a general slope across the surrounding area from north-east to south-west, but this is less than 1 in 8.
	5. Is the London Clay the shallowest strata at the site.	Yes	With reference to available BGS records, the London Clay Formation is expected to be encountered from ground level.
	6. Will any trees be felled as part of the development and/or are any works proposed within any tree protection zones where trees are to be retained.	No	It is understood that no trees are to be felled as part of this development
	7. Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site.	Yes	The site lies above the London Clay Formation, well known as having a high tendency to shrink and swell.
	8. Is the site within 100m of a watercourse or a potential spring line.	No	With reference to Camden Geological, Hydrogeological and Hydrological Study (1999), Talling (2011) and Barton (1992) the site is not located within 100m of a former 'lost river'. The closest surface water feature is the drain located 156m to the south-east of the site. From the British Geological Society 'Geoindex' the nearest water well is located approximately 650m south east of the site.
	9. Is the site within an area of previously worked ground.	No	According to the records held by the BGS the site is not underlain by any worked ground, Made Ground, infilled ground or landscaped ground.



Item	Description	Response	Comment
	10. Is the site within an aquifer. If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction.	Unknown – to be confirmed by Ground Investigation	The site has been classified as being situated above an unproductive (negligibly permeable) formation (London Clay) that is generally regarded as containing insignificant quantities of groundwater.
	11. Is the site within 5m of a highway or pedestrian right of way.	Yes	The site lies within 5m from Mount View Road.
	12. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.	Yes	The development will increase the depths of foundation at the site, although the foundation depths of adjacent properties are not known.
	13. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines.	Unknown / outside scope of report	A full statutory service search was outside the scope of this report and must be completed prior to any excavations.
Surface Water and Flooding	1. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route.	No	The amount of hardstanding on-site is not changing therefore surface water will not be impacted by the development.
	2. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas.	No	The amount of hardstanding on-site is not expected to increase.
	3. Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses.	No	All surface water for the site will be contained within the site boundaries and collected as described above; hence there will be no change from the development on the quantity or quality of surface water being received by adjoining sites. The basement will be beneath the footprint of the dwelling therefore the 1m distance between the roof of the basement and ground surface as recommended by Chapter 5 of the Arup report does not apply across these areas.



Item	Description	Response	Comment
	4. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses.	No	The surface water quality will not be affected by the development, as in the permanent condition collected surface water will generally be from roofs, domestic hard landscaping.
	5. Is the site in an area known to be at risk from surface water flooding.	No	According to Environment Agency Surface Water Flood maps the site is not at risk from surface water flooding.

The Screening Exercise has identified the following potential issues which will be carried forward to the Scoping Phase

Subterranean Groundwater Flow

- Will the proposed basement extend beneath the water table surface.

Slope Stability

- Is the London Clay the shallowest strata at the site.
- Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site.
- Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.

3.0 SCOPING PHASE

This purpose of the scoping phase is to assess in more detail the factors to be investigated in the impact assessment. Potential impacts are assessed for each of the identified impact factors and recommendations are stated.

A conceptual ground model is usually compiled at the scoping stage however, because the ground investigation has already been undertaken for this project, the conceptual ground model, including the findings of the ground investigation is described under Chapter 4.

Subterranean (Groundwater Flow)

Potential Issue (Screening Question)		Potential impacts and actions
1b	Will the proposed basement extend beneath the water table surface?	Potential impact: Local restriction of groundwater flows (perched groundwater or below groundwater table). Action: Ground investigation required, then review.

Slope Stability

5	Is the London Clay the shallowest strata at the site?	Potential impact: The London Clay is prone to seasonal shrink-swell (subsidence and heave). Action: Ground investigation required, then review.
7	Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site?	Potential Impact: Ground movements will occur during and after the basement construction. Action: Ground investigation required, then review.
12	Will the proposed basement substantially increase the differential depth of foundations relative to neighbouring properties?	Potential impact: Loss of support to the ground beneath the foundations to the surrounding properties if basement excavations are inadequately supported. Action: Ensure adequate temporary and permanent support by use of best practice methods.

These potential impacts have been further assessed through the ground investigation, as detailed in Section 4 below.

4.0 EXISTING SITE INVESTIGATION DATA

4.1 Records of site investigations

Ground conditions at the site were investigated by Site Analytical Services Limited in February to March 2023 (Report Reference 23/36497-1, dated March 2023). The ground conditions revealed by the investigation are summarised in the following table.

Strata	Depth to top of strata (mbgl)	Depth to base of strata (mbgl)	Description
Made Ground	0.00	0.40	Shingle over sandy clay containing brick fragments.
London Clay Formation	0.40	10.00 (maximum depth of drilling)	Stiff silty sandy clay containing partings of silty fine sand and gypsum crystals.

Summary of Ground Conditions in Exploratory Hole

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

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

Groundwater was encountered at 3.54m below ground level within the standpipe installed in Borehole 1 after a period of approximately four weeks. As the London Clay was encountered below site, the water recorded is not true ground water and is purely surface water that is trapped within the standpipe.

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

It should be noted that the comments on groundwater conditions are based on observations made at the time of the investigation (February and March 2023) and that changes in the groundwater level could occur due to seasonal effects and also changes in drainage conditions.

5.0 FOUNDATION DESIGN

5.1 General

It is proposed to construct a single storey basement to approximately 3.00m maximum depth beneath the footprint of the existing property. Details of the structures, layouts etc. have been provided, although details of the loadings were not available at the time of preparation of this report.

5.2 Site Preparation Works

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

5.3 Conventional Spread Foundations

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

Based on the ground and groundwater conditions encountered in the borehole, it should be possible to support the proposed new development on conventional strip or basement raft foundations taken down below the Made Ground and any weak superficial soils and placed in the natural stiff silty sandy clay deposits which occur at depths of approximately 0.40m below ground level. Foundations should be placed at a minimum depth of 1.00m below final ground level in order to avoid the zone affected by seasonal moisture content changes.

Using theory from Terzaghi (1943), strip foundations placed within natural soils may be designed to allowable net bearing pressures of approximately 270kN/m² at 3.00m depth in order to allow for a factor of safety of 2.5 against general shear failure. The actual allowable bearing pressure applicable will depend on the form of foundation, its geometry and depth in accordance with classical analytical methods, details of which can be obtained from "Foundation Design and Construction", Seventh Edition, 2001 by M J Tomlinson (see references) or similar texts.

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

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

5.4 Piled Foundations

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

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

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

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

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

5.5 Retaining Walls

5.5.1 General

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

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

Stratum	Depth to top	Bulk Density (Mg/m ³) (γ)	Effective Angle of Internal Friction (Φ)
London Clay Formation	0.40	2.00	23

Retaining Wall Design Parameters

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

5.5.2 Ground Movement

The upward movement of the base of an excavation occurs as a result of unloading and may be considered as consisting of two parts:

1. A short term movement called heave which occurs as a result of elastic rebound and may typically occur during the construction period
2. A long term movement called swell which occurs as a result of the absorption of water into the pores of the soils as the ground adjusts to new stress conditions.

The site lies above the London Clay Formation known to have a medium susceptibility to shrinkage and swelling movements with changes in moisture content, as defined by the NHBC Standards, Chapter 4.2 (2010).

Excavations will encounter the London Clay and the contractor should account for these upward ground movements such as providing heave protection measures to the floor slab.

The actual amount of movement will depend upon a number of factors including the construction timetable, ultimate loads and critically, the depth of the final excavation.

5.6 Chemical Attack on Buried Concrete

Using the results contained in Appendix B, the following table provides the highest values encountered for the BRE SD1 Suite D specification and the equivalent DS and ACEC classes, based on a static groundwater:

Strata	pH	2:1 Water Soluble SO_4 (g/l)	2:1 Water Soluble Chloride (mg/l)	2:1 Water Soluble Nitrate (mg/l)	Total Sulphate (%)	Magnesium (mg/l)	DS Class	ACEC Class
London Clay Formation	7.3-7.9	4.1	36	<2.0	0.731	550	DS-4	AC-4

Worst case DS and ACEC classes based on the BRE SD1 Suite D results

6.0 BASEMENT IMPACT ASSESSMENT

6.1 Summary

The screening identified a number of potential impacts. The table below summarises the previously identified potential impacts and the additional information that is now available from the site investigation in consideration of each impact.

Potential Impact	Site Investigation conclusions	Impact sufficiently addressed without further justification?
The proposed basement extends beneath the water table surface.	Groundwater was encountered at a depth of 3.54m below ground level in the monitoring standpipe installed to 8.50m depth. As the London Clay was encountered below site, the water recorded is not true ground water and is purely surface water that is trapped within the standpipe and therefore the impact on the groundwater is likely to be minimal.	Yes
The London Clay the shallowest strata at the site.	The London Clay has been proven to be the shallowest strata at the site.	Yes
There a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site.	The London Clay was proven below the site and was recorded as having a high susceptibility to shrinkage and shrinkage. However, the base of proposed basement will extend well below the potential depth of root action.	Yes
The proposed basement will significantly increase the differential depth of foundations relative to neighbouring properties.	The development will result in the extension of the foundation depth of the basement relative to neighbouring properties.	No – see below for further details.

6.2 Outstanding Risks and Issues

The significant impacts which require further information have been described in detailed below in order to assess the likelihood of them occurring and the scope for reasonable engineering mitigation.

- a. The proposed basement will significantly increase the differential depth of foundations relative to neighbouring properties.

The excavation and construction of the basement at the site has the potential to cause some movements in the surrounding ground if not properly managed. However, it is understood that ground movements and/or instability will be managed through the proper design and construction of mitigation measures during the works. This will require close collaboration with the appointed contractor's temporary works coordinator.

The Party Wall Act (1996) will apply to this development because neighbouring houses lie within a defined space around the proposed building works. The party wall process should be followed and adhered to during this development.

A monitoring plan should be set out at design stage and should include a monitoring strategy, instrumentation and monitoring plans and action plans. Trigger levels on movements will need to be defined. Precise levelling or reflective survey targets should be installed at the garden walls and neighbouring buildings. Monitoring should take place in advance of the proposed works as a base-line survey, during the works and for a period following the completion of the works, to understand the long term effects.

7.0 BIA CONCLUSIONS

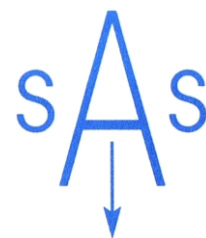
1. It is proposed to construct a single storey basement to approximately 3.00m maximum depth beneath the footprint of the existing property. Details of the structure and layout were provided, however, loadings were not available at the time of preparation of this report.
2. Conditions at the site were investigated by Site Analytical Services Limited in February and March 2023 (SAS Report Reference 23/36497-1). The borehole revealed ground conditions that were generally consistent with the geological records and known history of the area and comprised up to 0.40m thickness of Made Ground, underlain by the London Clay Formation.
3. As proven from the site investigation, the Bedrock geology underlying the site (solid permeable formations) has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
4. Groundwater was encountered at a depth of 3.54m below ground level in the monitoring standpipe installed to 8.50m depth. As the London Clay was encountered below site, the water recorded is not true groundwater and is purely surface water that is trapped within the standpipe and therefore the impact on the groundwater is likely to be minimal.
5. A monitoring plan will be set out at design stage and will include a monitoring strategy, instrumentation and monitoring plans and action plans.
6. The excavation and construction of the basement at the site has the potential to cause some movements in the surrounding ground if not properly managed. However, it is understood that ground movements and/or instability will be managed through the proper design and construction of mitigation measures during the works.
7. The proposed development will not increase flood risk at the site or the surrounding area. Also since the development is on already developed land covered in hardstanding, it will not adversely impact the Council's sustainability objectives.

8.0 REFERENCES

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9.0 APPENDIX A – FACTUAL GROUND INVESTIGATION REPORT



Factual Report on a **GEOTECHNICAL GROUND INVESTIGATION**

Ref: 23/36497-1 | Date: March 2023

**63 Mountview Road
Crouch End
London
N4 4SR**

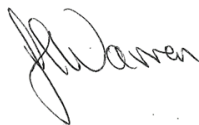
Prepared for:
Dominic Lamb Architects

DOCUMENT CONTROL

<i>Project</i>	63 Mountview Road, Crouch End, London, N4 4SR
<i>Document Type</i>	Factual Report on a Ground Investigation
<i>Document Reference</i>	SAS 23/36497-1
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<i>Changes</i>	-
<i>Date</i>	March 2023
<i>Document Version</i>	V1.0 – 3/21

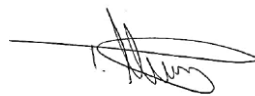
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APPENDIX A

BOREHOLE LOGS

APPENDIX B

LABORATORY TEST & GROUNDWATER MONITORING DATA

1.0 Introduction

1.1 Outline and Limitations of Report

At the request of Dominic Lamb Architects, a ground investigation was carried out in connection with a proposed residential basement development at the above site. A Phase 1 Preliminary Risk Assessment is presented under separate cover in Site Analytical Services Limited Report Reference 23/36497, dated March 2023.

The information was required for the design and construction of foundations and infrastructure for the proposed development at the existing site which includes the construction of a single storey basement to approximately 3.00m maximum depth beneath the footprint of the existing property.

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

2.0 Site Details

(National Grid Reference: TQ 306 880)

2.1 Site Location

The site is located on the northern side of Mount View Road and the eastern side of Womersley Road at approximate postcode N4 4SR. The site consists of a two-storey residential dwelling with private garden to the front and rear. The site is located in an area of predominantly residential use, with Harringay Train Station located approximately 730m to the east of the site.

The site is a rectangle shape and covers an approximate area of 0.05 Hectares with the general area being under the authority of the London Borough of Haringey.

2.2 Published Geology

The Geological Survey of Great Britain (England and Wales) covering the area indicates the site to be underlain by the London Clay Formation.

3.0 Scope of Work

3.1 Site Works

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

- The drilling of one continuous flight auger borehole to a depth of 10.00m below ground level (Borehole 1).
- The installation of a groundwater monitoring standpipe to a depth of 8.50m depth in Borehole 1, together with two return monitoring visits.
- Sampling and in-situ testing as appropriate to the ground conditions encountered in the borehole.
- Laboratory testing to determine the engineering properties of the soils encountered in the exploratory hole.

3.2 Ground Conditions

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

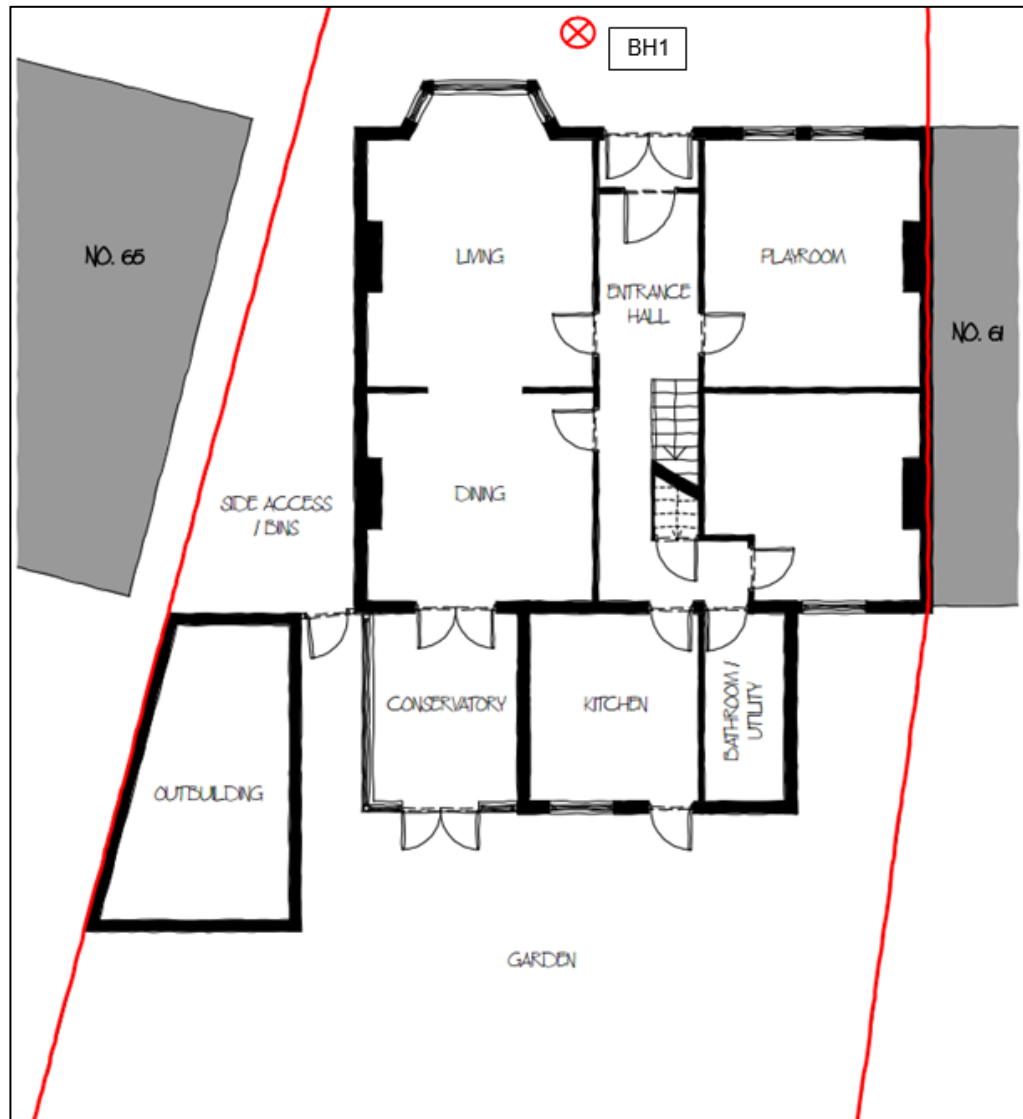


Figure 1. Site Sketch Plan

The borehole revealed ground conditions that were generally consistent with the geological records and known history of the area and comprised Made Ground up to 0.40m in thickness resting on the London Clay Formation at depth.

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

Strata	Depth to top of strata (mbgl)	Depth to base of strata (mbgl)	Description
Made Ground	0.00	0.40	Shingle over sandy clay containing brick fragments.
London Clay Formation	0.40	10.00 (maximum depth of drilling)	Stiff silty sandy clay containing partings of silty fine sand and gypsum crystals.

Summary of Ground Conditions in Exploratory Hole

3.3 Groundwater

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

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

Groundwater was encountered at 3.54m below ground level within the standpipe, installed in Borehole 1 after a period of approximately four weeks. As the London Clay was encountered below site, the water recorded is not true groundwater and is purely surface water that is trapped within the standpipe.

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

It should be noted that the comments on groundwater conditions are based on observations made at the time of the investigation (February and March 2023) and that changes in the groundwater level could occur due to seasonal effects and also changes in drainage conditions.

4.0 In-Situ and Laboratory Tests

4.1 In-Situ Tests

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

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

4.2 Classification Tests

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

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

4.3 Sulphate and pH Analyses

Using the results contained in Appendix B, the following table provides the highest values encountered for the BRE SD1 Suite D specification and the equivalent DS and ACEC classes, based on a static ground water:

Strata	pH	2:1 Water Soluble SO ₄ (g/l)	2:1 Water Soluble Chloride (mg/l)	2:1 Water Soluble Nitrate (mg/l)	Total Sulphate (%)	Magnesium (mg/l)	DS Class	ACEC Class
London Clay Formation	7.3-7.9	4.1	36	<2.0	0.731	550	DS-4	AC-4

Worst case DS and ACEC classes based on the BRE SD1 Suite D results

5.0 List of Appendices

Appendix A – Borehole Logs

Appendix B – Laboratory Test & Groundwater Monitoring Data

6.0 References

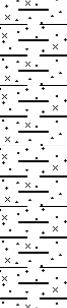
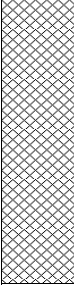
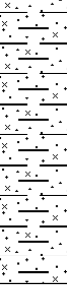
1. British Standards Institution, 2015. Code of practice for foundations, BS 8004, BSI, London.
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4. British Standards Institution, Code of Practice for Site Investigations, BS5930: 2015, BSI, London
5. British Standards Institution, 2004. Geotechnical Design, BS EN 1997-1 BSI, London
6. NHBC Standards, Chapter 4.1, "Land Quality - managing ground conditions", September 1999.

APPENDIX A

Borehole Logs

Site Analytical Services Ltd.							Site 63 MOUNT VIEW ROAD, LONDON, N4 4SR		Borehole Number BH1	
Boring Method CONTINUOUS FLIGHT AUGER		Casing Diameter 100mm cased to 0.00m			Ground Level (mOD)		Client DOMINIC LAMB ARCHITECTS		Job Number 2336497	
		Location TQ306880			Dates 21/02/2023		Engineer		Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.25	D1					(0.40)	MADE GROUND: Shingle over dark brown silty sandy clay containing brick and concrete fragments			
						0.40	Firm becoming stiff, brown orange silty CLAY			
0.50	D2									
0.75	D3									
1.00	D4									
1.00	V1 68					(1.50)				
1.50	D5									
1.50	V2 109									
2.00	D6					1.90	Stiff, medium brown silty CLAY			
2.00	V3 121									
2.50	D7									
2.50	V4 140+									
3.00	D8									
3.00	V5 140+									
3.50	D9									
3.50	V6 140+					(3.90)				
4.00	D10									
4.00	V7 140+									
4.50	D11									
4.50	V8 140+									
5.00	D12									
5.00	V9 140+									
6.00	D13					5.80	Stiff, dark brown grey silty CLAY containing partings of silty fine grained sand			
6.00	V10 140+									
7.00	D14									
7.00	V11 140+									
8.00	D15					(4.20)				
8.00	V12 140+									
9.00	D16									
9.00	V13 140+									
10.00	D17					10.00				
10.00	V14 140+									
Remarks Groundwater was not encountered during boring/excavation V= Vane Test - Results in kPa D= Disturbed Sample Excavating from 0.00m to 1.00m for 1 hour.								Scale (approx)		Logged By
								1:50		EW
								Figure No. 2336497.BH1		

Site Analytical Services Ltd.			Site 63 MOUNT VIEW ROAD, LONDON, N4 4SR	Borehole Number BH1
Installation Type Single Installation	Dimensions Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 100 mm		Client DOMINIC LAMB ARCHITECTS	Job Number 2336497
	Location TQ306880	Ground Level (mOD)	Engineer	Sheet 1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling															
				1.00	Bentonite Seal	Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)						
										5 min	10 min	15 min	20 min								
						Groundwater Observations During Drilling															
						Date	Start of Shift					End of Shift									
							Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)					
						Instrument Groundwater Observations															
						Inst. [A] Type : Slotted Standpipe															
						Date	Instrument [A]			Remarks											
Time	Depth (m)	Level (mOD)																			
				6.00	Bentonite Seal																
						Instrument Groundwater Observations															
						Inst. [A] Type : Slotted Standpipe															
						Date	Instrument [A]			Remarks											
							Time	Depth (m)	Level (mOD)												
										7.00	General Backfill										
Instrument Groundwater Observations																					
Inst. [A] Type : Slotted Standpipe																					
Date	Instrument [A]			Remarks																	
	Time	Depth (m)	Level (mOD)																		
				10.00	General Backfill																
						Instrument Groundwater Observations															
						Inst. [A] Type : Slotted Standpipe															
						Date	Instrument [A]			Remarks											
							Time	Depth (m)	Level (mOD)												

Remarks
Lockable cover set in cement

APPENDIX B

Laboratory Test & Groundwater Monitoring Data

PLASTICITY INDEX & MOISTURE CONTENT DETERMINATIONS

BH/TP No.	Depth (m)	Natural Moisture (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 µm (%)	Modified Plasticity Index (%)	Class
BH1	1.00	33	68	23	45	11	45	CH
	2.00	29	70	26	44	100	44	CH/CV
	3.00	28	69	26	43	100	13	CH
	4.00	29	61	22	39	100	39	CH

Table 1

GROUNDWATER MONITORING

GROUNDWATER MONITORING RECORD			
Date	Weather Conditions	Ground Conditions	Temperature (°C)
08/03/2023	Rain and Sleet	Wet	3.0
Monitoring Point Location	Depth to water (mBGL)		Depth to Base of well (mBGL)
BH1	5.74		8.46

Table 2

GROUNDWATER MONITORING RECORD			
Date	Weather Conditions	Ground Conditions	Temperature (°C)
21/03/2023	Cloudy	Dry	12.0
Monitoring Point Location	Depth to water (mBGL)		Depth to Base of well (mBGL)
BH1	3.54		8.46

Table 2a

Steve Barrett

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

t: 0208 5948134
f: 0208 5948072
e: SAS -

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 : 23-21088

Project / Site name:	63 Mount View Road London N4 4SR	Samples received on:	06/03/2023
Your job number:	23-36497	Samples instructed on/ Analysis started on:	06/03/2023
Your order number:	11555	Analysis completed by:	13/03/2023
Report Issue Number:	1	Report issued on:	13/03/2023
Samples Analysed:	3 soil samples		

**Signed:**

Elżbieta Suchy
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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

Analytical Report Number: 23-21088
 Project / Site name: 63 Mount View Road London N4 4SR
 Your Order No: 11555

Lab Sample Number				2606199	2606200	2606201
Sample Reference				BH1	BH1	BH1
Sample Number				D5	D9	D14
Depth (m)				1.50	3.50	7.00
Date Sampled				21/02/2023	21/02/2023	21/02/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	20	17
Total mass of sample received	kg	0.001	NONE	1	1	1
Whole Sample Crushed				N/A	NONE	Crushed
				Crushed	Crushed	Crushed

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.3	7.9	7.7
Total Sulphate as SO ₄	%	0.005	MCERTS	0.056	0.699	0.731
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.2	4.1	3.2
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	200	4110	3250
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	16	23	36
Total Sulphur	%	0.005	MCERTS	0.026	0.312	0.468
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	36	1100	930
Magnesium (leachate equivalent)	mg/l	2.5	NONE	18	550	460

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-21088

Project / Site name: 63 Mount View Road London N4 4SR

* 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 *
2606199	BH1	D5	1.5	Brown clay and sand.
2606200	BH1	D9	3.5	Brown clay and sand.
2606201	BH1	D14	7	Brown clay and sand.

Analytical Report Number : 23-21088
Project / Site name: 63 Mount View Road London N4 4SR

Water matrix abbreviations:

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

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

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

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

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

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