# BASIC GEOTECHNICAL GROUND INVESTIGATION REPORT

**FOR**

**23 LYNCROFT GARDENS**
**LONDON**
**NW6 1LB**



JOMAS ASSOCIATES LTD

SITE INVESTIGATION & SURVEYS
LAND DEVELOPMENT SUPPORT

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**Report Title:** Geotechnical Assessment Report for 23 Lyncroft Gardens, London, NW6 1LB

**Report Status:** Final v1.0

**Job No:** P1899J1585/AMM

**Date of Issue:** 16 January 2019

**QUALITY CONTROL - REVISIONS**

| | | |
|---|---|---|
| Final v1.1 | 22/01/2018 | AM |
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| | | |

**Prepared by: JOMAS ASSOCIATES LTD For: MR & MRS RAJA**

| Prepared by | Reviewed by | Approved by |
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# 1 INTRODUCTION

## 1.1 Terms of Reference

1.1.1 Mr & Mrs Raja ("The Client") has commissioned Jomas Associates Ltd, to obtain ground parameters at a site located at 23 Lyncroft Gardens, London, NW6 1LB, to enable preliminary foundation recommendations to be offered, prior to redevelopment of the site.

1.1.2 Jomas have been provided with a previously produced Basement Impact Assessment (BIA) for the site. The intrusive investigation detailed within this report was designed by the Clients' structural engineer in support of the previously produced BIA.

1.1.3 The intrusive investigation was undertaken in accordance with Jomas proposal dated 12 December 2018.

## 1.2 Proposed Development

1.2.1 The proposed development is understood to comprise the vertical and lateral extension of the existing basement towards the rear of the structure. The vertical deepening of the basement is understood to comprise an additional 1.0m below the existing basement.

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

- Conventional structures.
- Quantitative investigation and analysis.
- Normal risk.
- No difficult soil and site conditions.
- No difficult loading conditions.
- Routine design and construction methods.

## 1.3 Objectives

1.3.1 The objectives of Jomas' investigation were as follows:

- To assess ground conditions and obtain geotechnical parameters to inform foundation design, which is to be undertaken by the structural engineer.

## 1.4 Scope of Works

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

- Basic intrusive ground investigation to determine shallow ground conditions;
- Laboratory geotechnical and chemical testing on soil samples collected from the site; and,
- The compilation of this report, which provides data above, and indicative recommendations for foundation design.

## 1.5 Supplied Documentation

1.5.1 A number of reports previously prepared by third parties were supplied to Jomas Associates at the commencement of this investigation. Table 1.1 details the documents supplied:

**Table 1.2: Supplied Reports**

| Title | Author | Reference | Date |
|---|---|---|---|
| 23 Lyncroft Gardens, NW6 1LB, Basement Impact Assessment (BIA) | CRE8 structures | 2018/023/RP01 | 18 September 2018 |

## 1.6 Limitations

1.6.1 Jomas Associates Ltd has prepared this report for the sole use of Mr & Mrs Raja, in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas Associates Limited. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

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

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

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

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

***1.6.6 This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.***

# 2 SITE SETTING

## 2.1 Site Information

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

**Table 2.1: Site Information**

| | |
|---|---|
| **Name of Site** | - |
| **Address of Site** | 23 Lyncroft Gardens<br>London<br>NW6 1LB |
| **Approx. National Grid Ref.** | 525400 185412 |
| **Site Area (Approx)** | 0.05ha |
| **Site Occupation** | Residential |
| **Local Authority** | London Borough of Camden |
| **Proposed Site Use** | Vertical and lateral extension of existing basement |

## 2.2 Solid and Drift Geology

2.2.1 Information provided by the British Geological Survey (BGS) indicates that the site is directly underlain by solid deposits of the London Clay Formation. No superficial or artificial deposits are reported to underlie the site.

2.2.2 The BGS describes the London Clay Formation as consisting of

> *"bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite."*

2.2.3 In addition to this, a profile of Made Ground should be anticipated within the vicinity of the main building on site.

## 2.3 Previous Reports

2.3.1 A BIA report has been produced for the site by CRE8 structures (September 2018) and provided to Jomas. A brief overview of the BIA is presented below, reference should be made to the full report for detailed information.

2.3.2 The site consists of a three-storey terraced residential building with existing lower ground floor. A private garden area is located to the rear of the main building.

2.3.3 Desk study information included in the BIA notes that the site is understood to have been constructed around 1896 with the site vicinity comprising residential developments.

2.3.4 As part of a preliminary investigation 2No trial pits were completed to expose existing foundations. Brick footings were exposed to a depth of 0.70m bgl, water seepage was noted from a depth of 0.50m bgl within one of the trial pits.

2.3.5 Information obtained from the Environment Agency indicates that the site is located within a Floor Zone 1 and is therefore classified as being 'very low risk'. The site is located 6km from the nearest open water course.

2.3.6 A ground movement assessment has been completed. The impact of anticipated ground movement to adjacent buildings is considered no higher than category 1 – 2 of the Burland Scale, 'very slight to slight' risk of damage to neighbouring properties.

# 3 GROUND INVESTIGATION

## 3.1 Rationale for Ground Investigation

3.1.1 The ground investigation was designed in order to gather data representative of the ground conditions within the vicinity of the proposed building.

## 3.2 Scope of Ground Investigation

3.2.1 The ground investigation was undertaken on 18th December 2018.

3.2.2 The investigation focused on collecting data on the following:

- Quality of Made Ground/ natural ground within the site boundaries;
- Presence of groundwater beneath the site (if any), perched or otherwise;
- Obtaining geotechnical parameters to allow initial design to take place.

3.2.3 A summary of the fieldwork carried out at the site, with justifications for exploratory hole positions, are offered in Table 3.1 below.

**Table 3.1: Scope of Intrusive Investigation**

| Investigation Type | Number of Exploratory Holes Achieved | Exploratory Hole Designation | Depth Achieved (m BGL) | Justification |
|---|---|---|---|---|
| Hand Held Window Sample Boreholes | 2 | WS1 – WS2 | Up to 4.00m bgl | Obtain shallow samples for laboratory chemical and geotechnical testing.<br>To allow in-situ geotechnical testing. |
| Monitoring Wells | 2 | WS1 – WS2 | Up to 3.49m bgl | Groundwater monitoring wells, response zone in clays. |

3.2.4 The exploratory holes were completed to allow soil samples to be taken in the areas of interest identified in Table 3.1 above. In all cases, all holes were logged in accordance with BS5930:2015.

3.2.5 Exploratory hole positions were located approximately with reference to known features on site as shown in the exploratory hole location plan presented in Figure 2. The exploratory hole records are included in Appendix 2.

## 3.3 In-situ Geotechnical Testing

3.3.1 In-situ geotechnical testing included Perth Penetrometer and Hand Penetrometer tests.

3.3.2 The Perth Penetrometer is a lightweight instrument used to measure the relative density of granular soils; the results of which can be closely compared to that of the SPT (Standard Penetration Test). Correlations have been used between SPT 'N' and undrained shear strength have been used to allow this data to supplement the geotechnical interpretation.

3.3.3 The Hand Penetrometer is used to record the compressive strength of soil and rock. As the tests were carried out in cohesive soils the results have been converted to provide a value for undrained shear strength.

3.3.4 The results of the individual tests are on the appropriate exploratory hole logs in Appendix 2.

### 3.4 Groundwater Monitoring

3.4.1 Where encountered, groundwater strikes noted during drilling, are recorded within the exploratory hole records in Appendix 2.

### 3.5 Sampling Limitations

3.5.1 Both of the exploratory holes were completed in their proposed positions using restricted access hand held drilling equipment.

3.5.2 Both holes were terminated at 4.00m bgl due to refusal on very high strength clays.

### 3.6 Laboratory Analysis

3.6.1 Soil samples were submitted to the UKAS Accredited laboratory of i2 Analytical Ltd. for a series of analysis.

3.6.2 This testing was specifically designed to:

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

3.6.3 The following laboratory geotechnical testing (as summarised in Table 3.4) was carried out:

**Table 3.4 Laboratory Geotechnical Analysis**

| BS 1377 (1990) Test Number | Test Description | Number of tests |
|---|---|---|
| **Part 2** | | |
| 3.2 | Moisture Content Determination | 6 |
| 4.3 and 5.3 | Liquid and Plastic Limit Determination (Atterberg Limits) | 6 |

3.6.4 The water soluble sulphate and pH results obtained as part of the chemical analysis was used in combination with BRE Special Digest 1 to allow buried concrete to be classified.

# 4 GROUND CONDITIONS

## 4.1 Soil

4.1.1 Ground conditions were logged in accordance with the requirements of BS5930:2015. Detailed exploratory hole logs are provided in Appendix 2. The ground conditions encountered are summarised in Table 4.1 below, based on the strata observed during the investigation.

**Table 4.1: Ground Conditions Encountered**

| Stratum and Description | Encountered from (m bgl) | Base of strata (m bgl) | Thickness range (m) |
|---|---|---|---|
| Paving slab underlain by sandy gravel. Sand is medium. Gravel consists of brick and concrete. (MADE GROUND) | 0.0 | 0.20 – 0.65 | 0.20 – 0.65 |
| Brown mottled orange to grey medium becoming very high strength CLAY. (LONDON CLAY FORMATION) | 0.20 – 0.65 | 4.00 | 3.35 – 3.80 |

4.1.2 Given the likely ground strata profile identified and BGS descriptions in Section 2, it is considered that the encountered strata represents a profile of Made Ground, underlain by solid clay deposits considered to represent the London Clay Formation.

## 4.2 Hydrogeology

4.2.1 Groundwater strike were not reported during completion of the exploratory holes.

4.2.2 Standing groundwater levels recorded during return groundwater monitoring are summarised below in Table 4.2. A total of 2No return visits have been completed.

**Table 4.2: Groundwater Monitoring Records**

| Exploratory Hole ID | Depth Encountered (m bgl) | Depth to Base of Well (m bgl) | Strata targeted by response zone |
|---|---|---|---|
| WS1 | 2.26 – 2.47 | 3.49 | London Clay Formation |
| WS2 | 1.20 – 1.50 | 3.04 | London Clay Formation |

4.2.3 The noted difference in levels of the groundwater would suggest that these represent surface waters that have infiltrated into the wells rather than being representative of standing ground water levels.

## 4.3 Physical and Olfactory Evidence of Contamination

4.3.1 Visual or olfactory evidence of contamination was not observed during the course of the investigation.

# 5 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

## 5.1 Ground Investigation Summary

5.1.1 No detailed structural engineering design information, with respect to the type of construction and associated structural loadings, was provided at the time of preparing this report. Consequently, a detailed discussion of all the problems that may arise during the proposed redevelopment scheme is beyond the scope of this report.

5.1.2 Practical solutions to the difficulties encountered, both prior to, and during construction, are frequently decided by structural constraints or economic factors. For these reasons, this discussion is predominantly confined to remarks of a general nature, which are based on site conditions encountered during the intrusive investigations.

5.1.3 The proposed development is understood to comprise the vertical and lateral extension of the existing basement towards the rear of the structure.

5.1.4 The relative vertical locations of the exploratory holes are shown on Figure 3 in Appendix 1.

5.1.5 From a purely visual assessment undertaken on site and confirmed using the cross section provided by the client, the level of the basement / lower ground floor appears to be approximately 1.25m below the exiting ground level (taken to be the road). As the vertical deepening of the basement is understood to comprise an additional 1.0m below the existing basement this would place the proposed basement level at approximately 2.25m below the existing ground level, taken as the road level.

5.1.6 The boreholes were completed at different depths relative to the existing development. WS1 was completed within the front driveway located below pavement/ground level but above the existing basement level. WS2 was completed within the rear garden area, located above pavement/ground level and above existing basement level. The approximate vertical difference between the top of the boreholes is approximately 0.50m.

## 5.2 Geotechnical Classification

5.2.1 At the start of this phase of works it was considered that the development should be classed as a GC2 development in accordance with BS: 1997.

5.2.2 The findings of the investigation undertaken and discussed previously does not change this assessment.

## 5.3 Data Summary

5.3.1 The results of the ground investigation revealed a ground profile comprising a variable thickness of Made Ground up to 0.65m bgl depth, overlying clay deposits considered to represent the London Clay Formation to the terminal depth of both boreholes at 4.00m bgl.

5.3.2 A summary of ground conditions obtained from the ground investigation and the derived geotechnical parameters, is provided in Table 5.1 below.

5.3.3 It should be noted that all depths are quoted in metres below ground level (m bgl) and relate to the local ground level unless stated otherwise.

**Table 5.1: Ground Conditions and Derived Geotechnical Parameters**

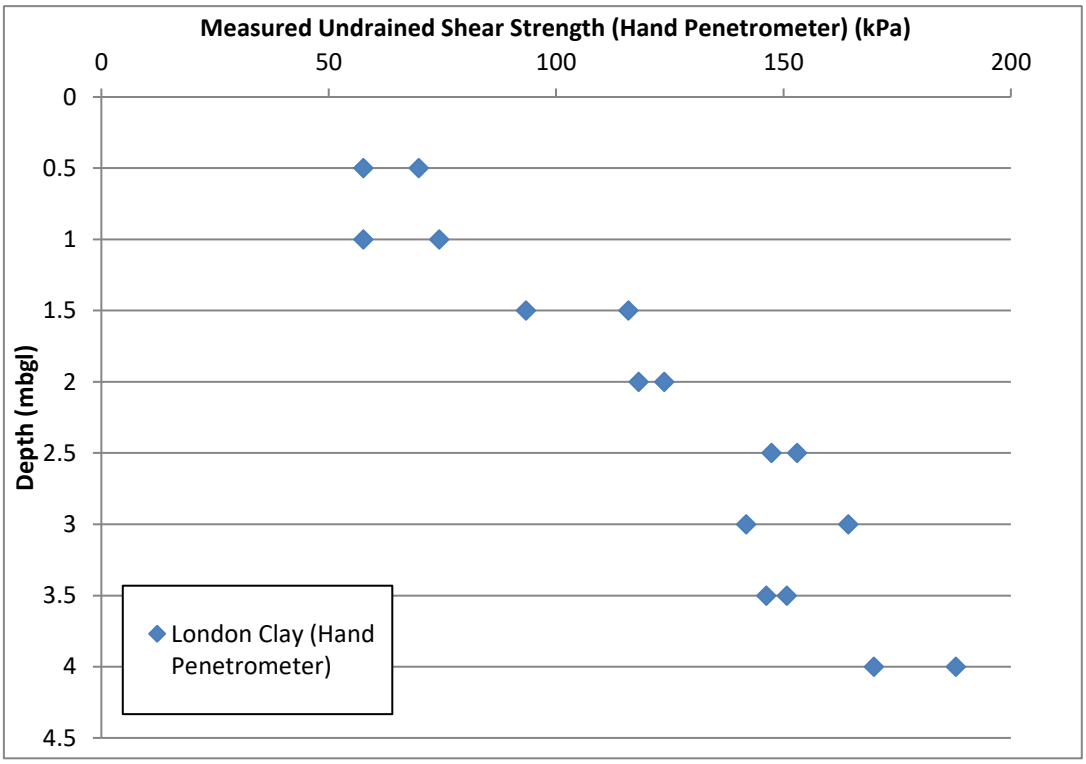
| Strata | Depth Encountered (from-to) (mbgl) | Measured Shear Strength (kPa) | Moisture content (%) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (corrected plasticity) (%) | NHBC Volume Change Classification |
|---|---|---|---|---|---|---|---|
| Paving slab underlain by sandy gravel. Sand is medium. Gravel consists of brick and concrete. (MADE GROUND) | GL to 0.20 – 0.65 | - | - | - | - | - | - |
| Brown mottled orange to grey medium becoming very high strength CLAY. (LONDON CLAY FORMATION) | 0.20 – 0.65 to 4.00 | 62 - 167 | 28 – 34 | 79 – 83 | 31 – 35 | 45 – 51 (45 – 51) | High |

## 5.4 Undrained Shear Strength

5.4.1 Hand penetrometer tests were undertaken within the London Clay Formation throughout both windowless sampler boreholes. The hand penetrometer measures unconfined compressive strength which has then been converted to a undrained shear strength.

5.4.2 Figure 5.1 below shows the undrained shear strength profile for the London Clay Formation encountered at the site, based on the converted hand penetrometer results.

**Figure 5.1: Undrained Shear Strength v Depth**




## 5.5 Building Near Trees

5.5.1 The underlying soil conditions have been shown to be of high volume change potential.

5.5.2 Using the geotechnical testing obtained (summarised in Table 9.1) and with reference to NHBC Chapter 4.2 it can be seen that a minimum founding depth of 1.50m will be required. This would allow for restricted new planting.

5.5.3 Given that there is an existing lower ground floor then this minimal depth will have been exceeded.

5.5.4 Presence of existing and proposed trees may increase this minimum depth. It is recommended that a tree survey that should include: location, species and height of all trees on and near to the proposed development is recommended.

5.5.5 Guidance is also given in relation to other aspects of construction where the shrink / swell potential of the soils may be needed to take into consideration. This guidance is summarised in the appropriate sections below.

## 5.6 Foundations

5.6.1 Foundations should not be formed in either the Made Ground or the Topsoil due to the unacceptable risk of total and differential settlement.

5.6.2 It should be noted that the demolition and removal of existing structures, foundations and services may increase the depth of Made Ground on the site.

5.6.3 It is understood that the basement will be formed using traditional underpinning techniques to the party walls and RC retaining walls along the front and rear of the basement.

5.6.4 Based upon the information obtained to date, it is considered that a cantilever retaining wall installed using underpinning type construction methods may be constructed with an allowable bearing pressure of 200kPa at 1.0 below existing lower ground floor / basement level (approximately 2.25m below existing ground level).

5.6.5 The exact allowable bearing capacity that could be achieved would need to be reviewed on receipt of foundation design details. This should include a check against sliding failure. This may alter the above recommendations.

5.6.6 The above comments are indicative only based on limited ground investigation data. Foundations should be designed by a suitably qualified Engineer. Once structural loads have been fully determined a full design check in accordance with BS EN 1997 should be undertaken to confirm suitability of foundation choice.

## 5.7 Concrete in the Ground

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

5.7.2 In accordance with BRE Special Digest 1, as there are less than 10 results in the data set the highest value has been taken.

5.7.3 Table 9.3 summarises the analysis of the aggressive nature of the ground for each of the strata encountered within the ground investigation.

**Table 9.3: Concrete in the Ground Classes**

| Stratum | No. Samples | pH range | Highest WS Sulphate (mg/l) | Design Sulphate Class | ACEC Class |
|---|---|---|---|---|---|
| Made Ground | 2 | 8.3 – 10.7 | 1600 | DS-3 | AC-3 |
| London Clay Formation | 2 | 8.0 – 8.2 | 2600 | DS-3 | AC-3 |

## 5.8 Ground Floor Slabs

5.8.1 Due to the presence of cohesive ground with a high volume change potential, in accordance with NHBC Chapter 4.2 a suspended floor slab will be required. The depth of clear void beneath the suspended floor slab will be dependent on the floor type used.

5.8.2 Under suspended in-situ concrete ground floor a minimum void of 150mm is required. Whilst under suspended precast concrete and timber floors a minimum of 300mm is required.

5.8.3 The loadings from the suspended floor slab will need to be carried by the foundations, which will need to be designed to not only carry the structural loadings but the additional floor loadings.

5.8.4 Such a floor slab would also need to be suitably reinforced, not only to distribute the structural loading but also to ensure that the floor slab can prop the retaining walls and does not buckle from the lateral pressures imposed by the cantilever retaining walls.

5.8.5 The floor slab (and basement walls) would need to be constructed to conform to BS: 8102 (2009).

## 5.9 Excavations

5.9.1 It is likely that some shallow excavations will be required at the site for services etc, in addition to larger excavations during the remediation and construction works. These are anticipated to remain stable for the short term only.

5.9.2 The stability of all excavations should be assessed during construction. The sides of any excavations into which personnel are required to enter, should be assessed and where necessary fully supported or battered back to a safe angle.

5.9.3 Any vertically sided excavations require support to provide safe man access and to support the sides of the excavation. Supports should be installed as excavation proceeds. For service excavations, overlapping trench sheets could be used as close support in the Made Ground deposits to minimise ground loss. Alternatively, consideration could be given to the use of trench boxes provided excavations take place within the boxes.

5.9.4 Attention is also drawn to the provisions of the Health and Safety at Work Regulations, which state that the sides of any excavations greater than 1.2m depth, into which personnel are required to enter, should be fully supported or battered back to a safe angle.

## 5.10 Retaining Walls

5.10.1 It is understood that the retaining walls to form the basement will be of the cast in-situ cantilever type. These will be formed in sections of maximum 1200mm length to help prevent instability issues.

5.10.2 These walls would need to be designed to both withstand the earth pressures and to be able to transfer the above loading successfully i.e. the retaining wall should be designed to act as a foundation for the structure.

5.10.3 A check against sliding failure would need to be made to the retaining wall design. This may alter the above recommendations regarding allowable bearing capacities.

5.10.4 Given the obtained information it is considered that a friction angle for the materials could be as 0° in its undrained state (Meyerhoff, 1956). This allows for a conservative assessment.

5.10.5 Given the proposed final depth of the basement it is considered that heave precautions will not be required at the base of the underpinned walls. However, where underpinning extends up above 3.0m bgl it would be recommended that heave precautions are included. Given the high volume change potential of the underlying clays these should consist of 35mm void or the equivalent thickness of compressible material adjacent to the foundation.

## 5.11 Groundwater Control

5.11.1 No groundwater was struck during the intrusive works, but was recorded during return visits between 1.20m and 2.47m bgl. Extensive groundwater would not be anticipated within the London Clay Formation and this water may, therefore, represent surface water ingress or localised water perched within the Made Ground.

5.11.2 Subject to seasonal variations, any groundwater encountered during site works could be readily dealt with by conventional pumping from a sump used to collate waters.

5.11.3 Surface water or rainfall ingress could be similarly dealt with.

# 6 REFERENCES

Code of Practice for Site Investigations BS5930: 2015

NHBC Standards Chapter 4: 2011

## APPENDICES

## APPENDIX 1 – FIGURES

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| | | | |
|---|---|---|---|
| **Project Name** | 23 Lyncroft Gardens, London | **Client** | Mr & Mrs Raja |
| **Project No.** | P1899J1585 | **Date** | 10/01/2019 |
| **Title** | Site Location Plan | **Figure No** | Figure 1 |

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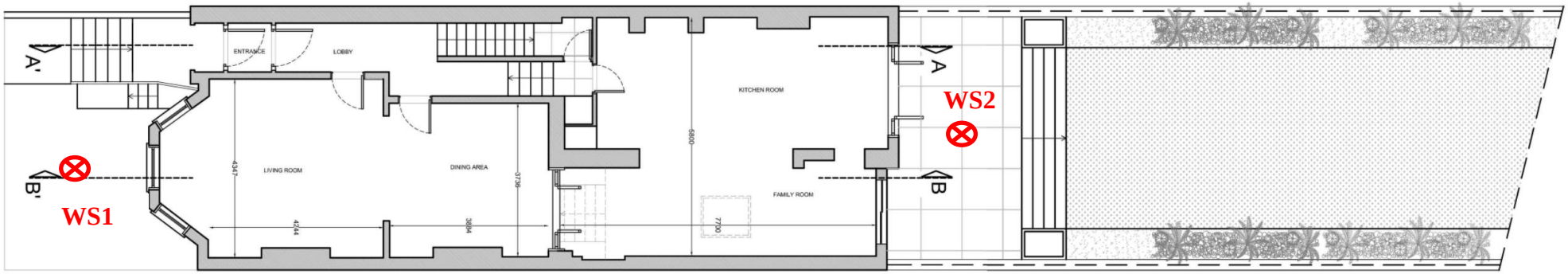
| | | | |
|---|---|---|---|
| **Project Name** | 23 Lyncroft Gardens, London | **Client** | Mr & Mrs Raja |
| **Title** | Completed Exploratory Hole Location Plan | **Project No** | P1899J1585 |
| **Date** | 17 December 2018 | **Figure No** | Figure 2 |



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| | | | |
|---|---|---|---|
| **Project Name** | 23 Lyncroft Gardens, London | **Client** | Mr & Mrs Raja |
| **Project No.** | P1899J1585 | **Date** | 10/01/2019 |
| **Title** | Site Cross Section | **Figure No** | Figure 3 |

## APPENDIX 2 – EXPLORATORY HOLE RECORDS

# WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

| | | | |
|---|---|---|---|
| Exploratory Hole No: | WS1 | | |
| Site Address: | 23 Lyncroft Gardens, London, NW6 1LB | Project No: | P1899J1585 |
| Client: | Mr & Mrs Raja | Ground Level: | |
| Logged By: | MJ | Date Commenced: | 18/01/2019 |
| Checked By: | | Date Completed: | 18/01/2019 |
| Type and diameter of equipment: | Hand-held Windowless Sampler | Sheet No: | 1 Of 1 |

**Water levels recorded during boring, m**

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

**Remarks**

1: No water reported.

2: HP = Hand Penetrometer test - results have been converted to undrained shear strength.

3:

4:

| Sample or Tests | | | | | | | | | | Strata | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Depth (mbgl) | Result | | | | | | | | Legend | Depth (mbgl) | Water Strikes (mbgl) | Strata Description | Installation |
| | | 75 | 75 | 75 | 75 | 75 | 75 | N | | | | | | |
| | | | | | | | | | 0.00 | | | | | |
| | | | | | | | | | | | 0.07 | | Paving slab. (MADE GROUND) | |
| | | | | | | | | | | | | | Sandy gravel. Gravel consists of concrete. (MADE GROUND) | |
| | | | | | | | | | | | 0.25 | | | |
| ES | 0.30 | | | | | | | | | | | | Red gravelly sand with medium cobble content. Sand is medium. Gravel consists of fine to coarse brick. (MADE GROUND) | |
| HP | 0.50 | | | | | | | | 0.50 | | | | | |
| ES | 64kPa 0.60 | | | | | | | | | | 0.65 | | | |
| | | | | | | | | | | | | | Brown mottled orange to grey medium becoming high strength CLAY. (LONDON CLAY FORMATION) | |
| D | 1.00 | | | | | | | | 1.00 | | | | | |
| HP | | | | | | | | | | | | | | |
| | 64kPa | | | | | | | | | | | | | |
| HP | 1.50 | | | | | | | | 1.50 | | | | | |
| | 83kPa | | | | | | | | | | | | | |
| D | 2.00 | | | | | | | | 2.00 | | | | | |
| HP | 2.50 | | | | | | | | 2.50 | | | | | |
| | 105kPa | | | | | | | | | | | | | |
| D | 3.00 | | | | | | | | 3.00 | | | | | |
| HP | | | | | | | | | | | | | | |
| | 146kPa | | | | | | | | | | | | | |
| HP | 3.50 | | | | | | | | 3.50 | | | | | |
| | 134kPa | | | | | | | | | | | | | |
| D | 4.00 | | | | | | | | 4.00 | | 4.00 | | | |
| HP | | | | | | | | | | | | | | |
| | 167kPa | | | | | | | | | | | | | |
| | | | | | | | | | 4.50 | | | | | |
| | | | | | | | | | 5.00 | | | | | |

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

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# WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

| | | | |
|---|---|---|---|
| | | Exploratory Hole No: | WS2 |
| Site Address: | 23 Lyncroft Gardens, London, NW6 1LB | Project No: | P1899J1585 |
| Client: | Mr & Mrs Raja | Ground Level: | |
| Logged By: | MJ | Date Commenced: | 18/01/2019 |
| Checked By: | | Date Completed: | 18/01/2019 |
| Type and diameter of equipment: | Hand-held Windowless Sampler | Sheet No: | 1 Of 1 |

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

**Remarks**

1: No water reported.

2: HP = Hand Penetrometer test - results have been converted to undrained shear strength.

3:

4:

| Sample or Tests | | | | | | | | | | Strata | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Depth (mbgl) | Result | | | | | | | | Legend | Depth (mbgl) | Water Strikes (mbgl) | Strata Description | Installation |
| | | 75 | 75 | 75 | 75 | 75 | 75 | N | | | | | | |
| | | | | | | | | | 0.00 | | | | | |
| | | | | | | | | | | | 0.07 | | Paving slab. (MADE GROUND) | |
| | | | | | | | | | | | 0.10 | | Concrete. (MADE GROUND) | |
| ES | 0.25 | | | | | | | | | | 0.20 | | Sand. Sand is medium. (MADE GROUND) | |
| ES | 0.50 | | | | | | | | | | | | Brown mottled grey to orange medium becoming high strength CLAY. (LONDON CLAY FORMATION) | |
| HP | | | | | | | | | | | | | | |
| | 62kPa | | | | | | | | | | | | | |
| | | | | | | | | | 0.50 | | | | | |
| D | 1.00 | | | | | | | | | | | | | |
| HP | | | | | | | | | | | | | | |
| | 66kPa | | | | | | | | | | | | | |
| | | | | | | | | | 1.00 | | | | | |
| HP | 1.50 | | | | | | | | | | | | | |
| | 103kPa | | | | | | | | | | | | | |
| | | | | | | | | | 1.50 | | | | | |
| D | 2.00 | | | | | | | | | | | | | |
| HP | | | | | | | | | | | | | | |
| | 110kPa | | | | | | | | | | | | | |
| | | | | | | | | | 2.00 | | | | | |
| HP | 2.50 | | | | | | | | | | | | | |
| | 136kPa | | | | | | | | | | | | | |
| | | | | | | | | | 2.50 | | | | | |
| D | 3.00 | | | | | | | | | | | | | |
| HP | | | | | | | | | | | | | | |
| | 130kPa | | | | | | | | | | | | | |
| | | | | | | | | | 3.00 | | | | | |
| HP | 3.50 | | | | | | | | | | | | | |
| | 130kPa | | | | | | | | | | | | | |
| | | | | | | | | | 3.50 | | | | | |
| D | 4.00 | | | | | | | | | | 4.00 | | | |
| | 151kPa | | | | | | | | | | | | | |
| | | | | | | | | | 4.00 | | | | | |
| | | | | | | | | | 4.50 | | | | | |
| | | | | | | | | | 5.00 | | | | | |

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

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

## APPENDIX 3 – GEOTECHNICAL LABORATORY TEST RESULTS

# TEST CERTIFICATE

## Liquid and Plastic Limits

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

4041

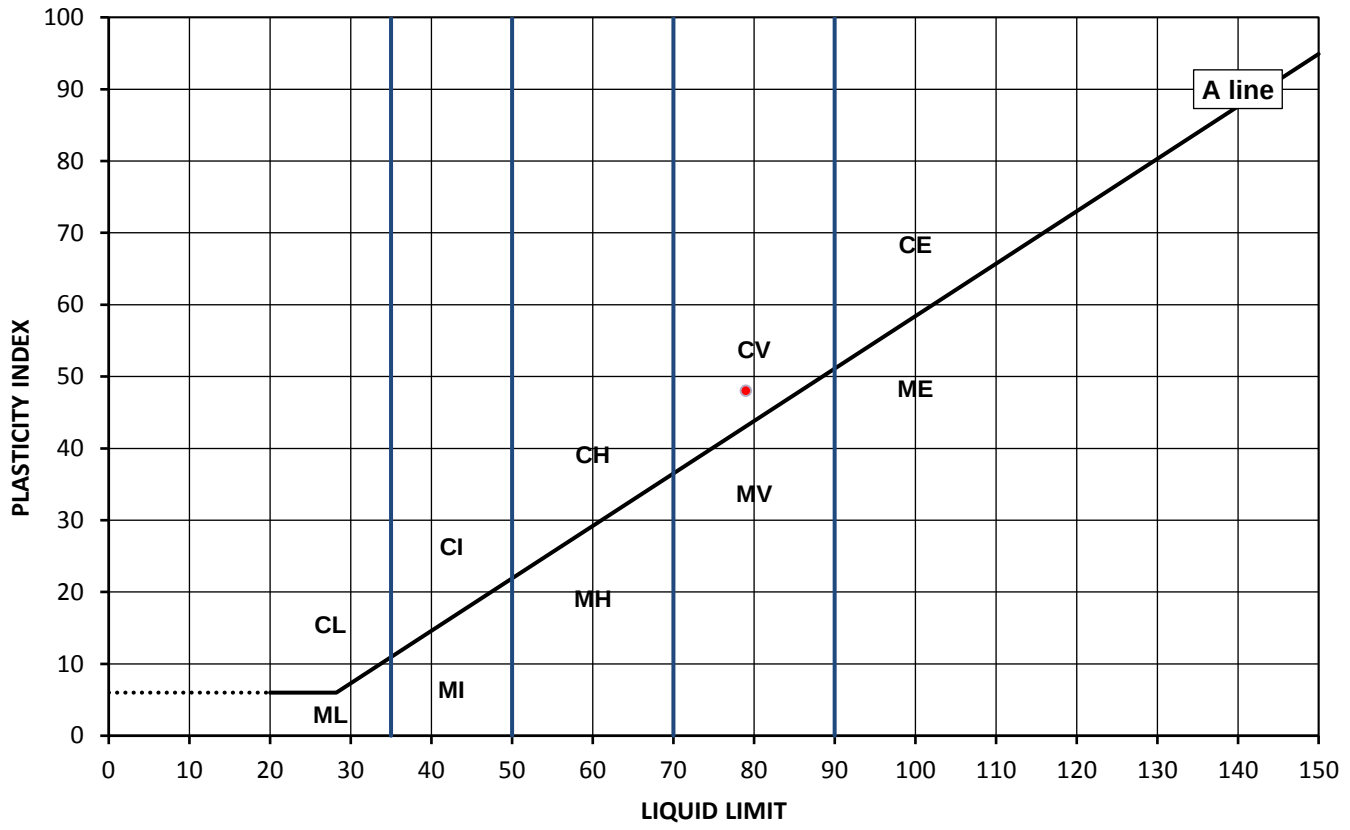
Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

| | | | |
|---|---|---|---|
| Client: | Jomas Associates Ltd | Client Reference: | JJ1585 |
| Client Address: | Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD | Job Number: | 19-23596 |
| | | Date Sampled: | Not Given |
| | | Date Received: | 19/12/2018 |
| Contact: | Emma Hucker | Date Tested: | 09/01/2019 |
| Site Name: | 23 Lyncroft Gardens | Sampled By: | Not Given |
| Site Address: | 23 Lyncroft Gardens | | |

**Test Results**

| | | | |
|---|---|---|---|
| Laboratory Reference: | 1123458 | Depth Top [m]: | 1.00 |
| Hole No.: | WS1 | Depth Base [m]: | Not Given |
| Sample Reference: | Not Given | Sample Type: | D |
| Soil Description: | Brown CLAY with fragments of chalk | | |
| Sample Preparation: | Tested in natural condition | | |

| As Received Moisture Content [%] | Liquid Limit [%] | Plastic Limit [%] | Plasticity Index [%] | % Passing 425µm BS Test Sieve |
|---|---|---|---|---|
| 28 | 79 | 31 | 48 | 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 Geotechnical Laboratory Manager
**Date Reported:** 15/01/2019

**Signed:** Maria Chandler
Geotechnical Site Manager Northampton

**GF 236.3**





**for and on behalf of i2 Analytical Ltd**

# TEST CERTIFICATE

## Liquid and Plastic Limits

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

4041

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

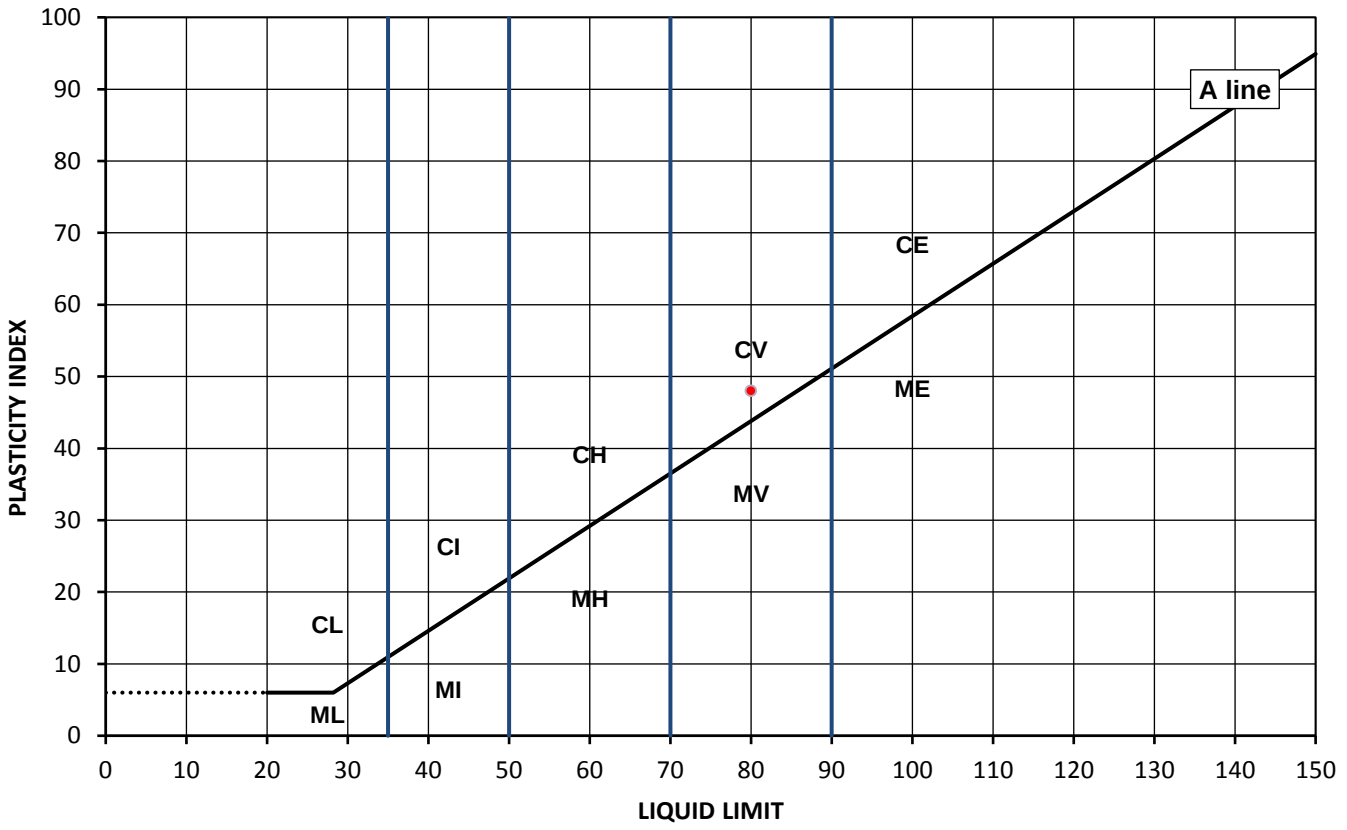
| | | | |
|---|---|---|---|
| Client: | Jomas Associates Ltd | Client Reference: | JJ1585 |
| Client Address: | Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD | Job Number: | 19-23596 |
| | | Date Sampled: | Not Given |
| | | Date Received: | 19/12/2018 |
| Contact: | Emma Hucker | Date Tested: | 09/01/2019 |
| Site Name: | 23 Lyncroft Gardens | Sampled By: | Not Given |
| Site Address: | 23 Lyncroft Gardens | | |

**Test Results**

| | | | |
|---|---|---|---|
| Laboratory Reference: | 1123459 | Depth Top [m]: | 2.00 |
| Hole No.: | WS1 | Depth Base [m]: | Not Given |
| Sample Reference: | Not Given | Sample Type: | D |
| Soil Description: | Brown CLAY | | |

Sample Preparation: Tested in natural condition

| As Received Moisture Content [%] | Liquid Limit [%] | Plastic Limit [%] | Plasticity Index [%] | % Passing 425µm BS Test Sieve |
|---|---|---|---|---|
| 34 | 80 | 32 | 48 | 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 Geotechnical Laboratory Manager
**Date Reported:** 15/01/2019

**Signed:** Maria Chandler
Geotechnical Site Manager Northampton

**GF 236.3**





**for and on behalf of i2 Analytical Ltd**

# TEST CERTIFICATE

## Liquid and Plastic Limits

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

4041

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

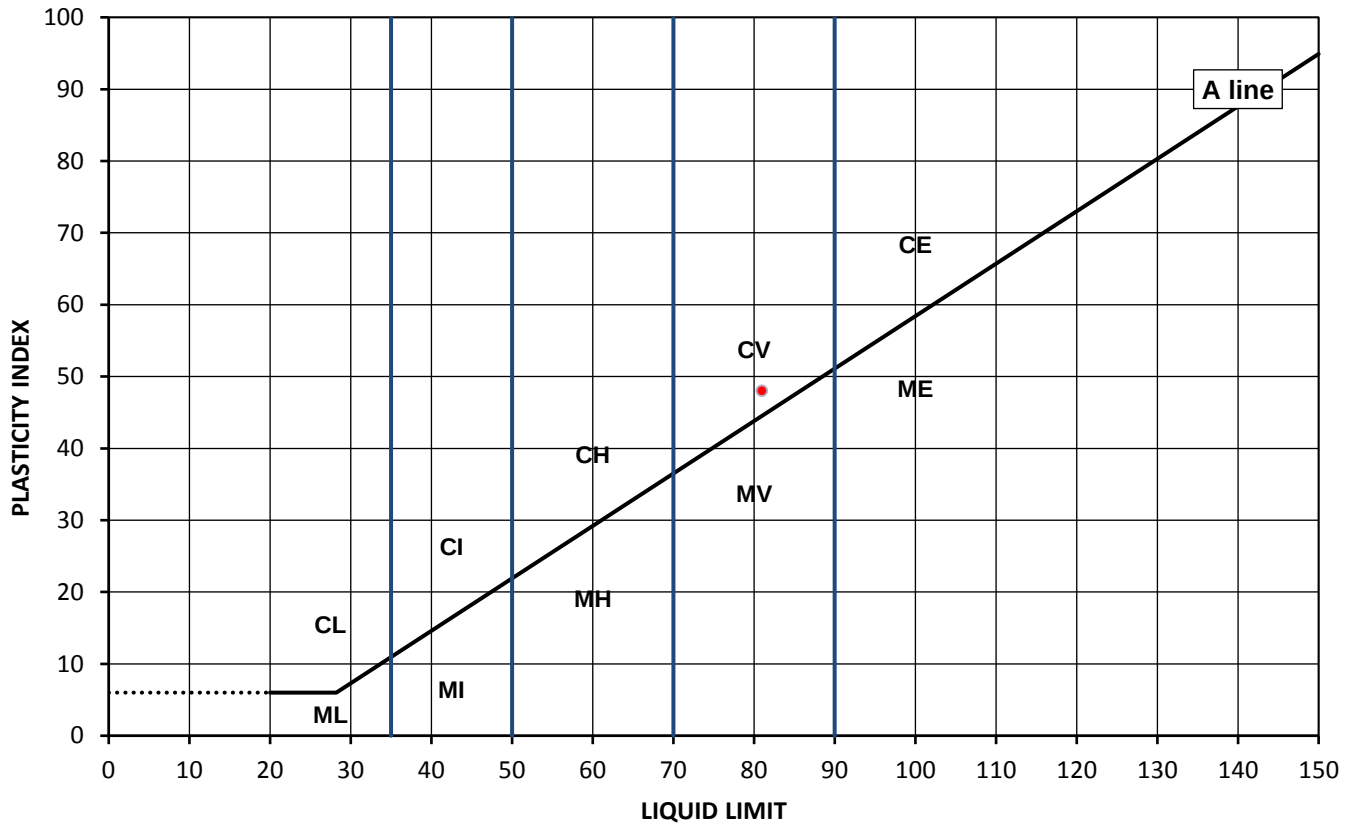
| | | | |
|---|---|---|---|
| Client: | Jomas Associates Ltd | Client Reference: | JJ1585 |
| Client Address: | Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD | Job Number: | 19-23596 |
| | | Date Sampled: | Not Given |
| | | Date Received: | 19/12/2018 |
| Contact: | Emma Hucker | Date Tested: | 09/01/2019 |
| Site Name: | 23 Lyncroft Gardens | Sampled By: | Not Given |
| Site Address: | 23 Lyncroft Gardens | | |

**Test Results**

| | | | |
|---|---|---|---|
| Laboratory Reference: | 1123460 | Depth Top [m]: | 3.00 |
| Hole No.: | WS1 | Depth Base [m]: | Not Given |
| Sample Reference: | Not Given | Sample Type: | D |
| Soil Description: | Brown CLAY | | |

Sample Preparation: Tested in natural condition

| As Received Moisture Content [%] | Liquid Limit [%] | Plastic Limit [%] | Plasticity Index [%] | % Passing 425µm BS Test Sieve |
|---|---|---|---|---|
| 34 | 81 | 33 | 48 | 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 Geotechnical Laboratory Manager
**Date Reported:** 15/01/2019

**Signed:** Maria Chandler
Geotechnical Site Manager Northampton

**GF 236.3**





**for and on behalf of i2 Analytical Ltd**

# TEST CERTIFICATE

## Liquid and Plastic Limits

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

4041

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

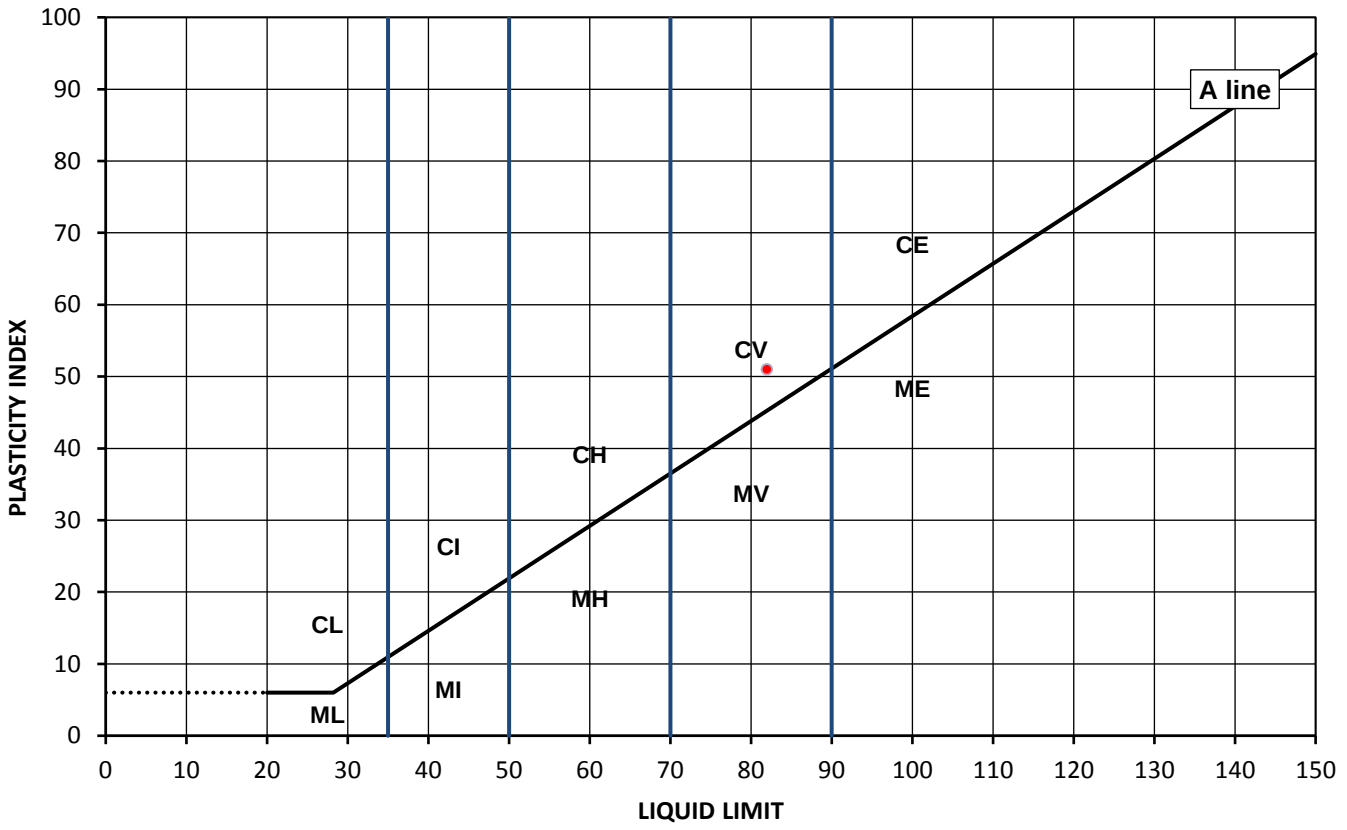
| | | | |
|---|---|---|---|
| Client: | Jomas Associates Ltd | Client Reference: | JJ1585 |
| Client Address: | Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD | Job Number: | 19-23596 |
| | | Date Sampled: | Not Given |
| | | Date Received: | 19/12/2018 |
| Contact: | Emma Hucker | Date Tested: | 09/01/2019 |
| Site Name: | 23 Lyncroft Gardens | Sampled By: | Not Given |
| Site Address: | 23 Lyncroft Gardens | | |

**Test Results**

| | | | |
|---|---|---|---|
| Laboratory Reference: | 1123461 | Depth Top [m]: | 2.00 |
| Hole No.: | WS2 | Depth Base [m]: | Not Given |
| Sample Reference: | Not Given | Sample Type: | D |
| Soil Description: | Brown CLAY | | |

Sample Preparation: Tested in natural condition

| As Received Moisture Content [%] | Liquid Limit [%] | Plastic Limit [%] | Plasticity Index [%] | % Passing 425µm BS Test Sieve |
|---|---|---|---|---|
| 34 | 82 | 31 | 51 | 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 Geotechnical Laboratory Manager
**Date Reported:** 15/01/2019

**Signed:** Maria Chandler
Geotechnical Site Manager Northampton

**GF 236.3**





**for and on behalf of i2 Analytical Ltd**

# TEST CERTIFICATE

## Liquid and Plastic Limits

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

4041

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

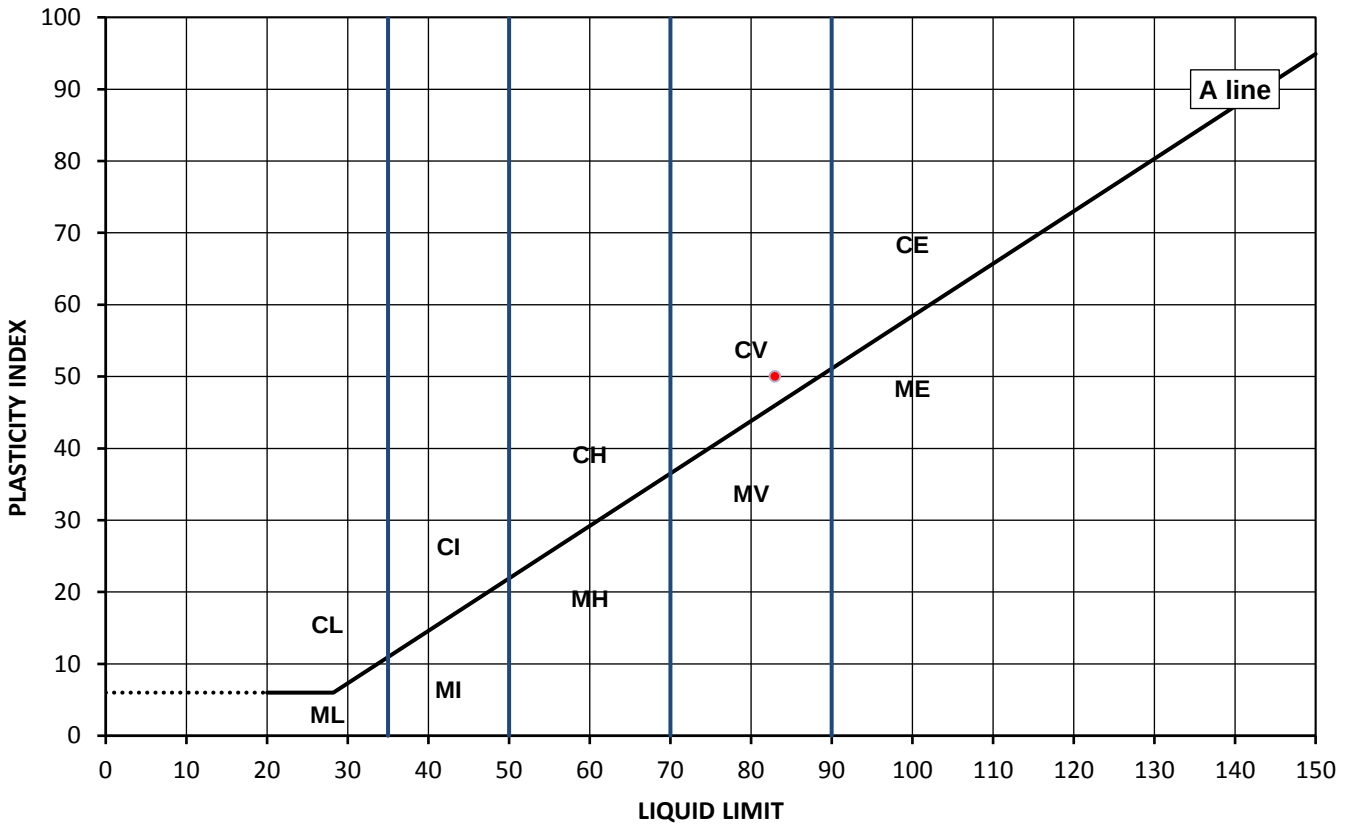
| | | | |
|---|---|---|---|
| Client: | Jomas Associates Ltd | Client Reference: | JJ1585 |
| Client Address: | Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD | Job Number: | 19-23596 |
| | | Date Sampled: | Not Given |
| | | Date Received: | 19/12/2018 |
| Contact: | Emma Hucker | Date Tested: | 09/01/2019 |
| Site Name: | 23 Lyncroft Gardens | Sampled By: | Not Given |
| Site Address: | 23 Lyncroft Gardens | | |

**Test Results**

| | | | |
|---|---|---|---|
| Laboratory Reference: | 1123462 | Depth Top [m]: | 3.00 |
| Hole No.: | WS2 | Depth Base [m]: | Not Given |
| Sample Reference: | Not Given | Sample Type: | D |
| Soil Description: | Brown CLAY | | |

Sample Preparation: Tested in natural condition

| As Received Moisture Content [%] | Liquid Limit [%] | Plastic Limit [%] | Plasticity Index [%] | % Passing 425µm BS Test Sieve |
|---|---|---|---|---|
| 33 | 83 | 33 | 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 Geotechnical Laboratory Manager
**Date Reported:** 15/01/2019

**Signed:** Maria Chandler
Geotechnical Site Manager Northampton

**GF 236.3**





**for and on behalf of i2 Analytical Ltd**

# TEST CERTIFICATE

## Liquid and Plastic Limits

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

4041

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

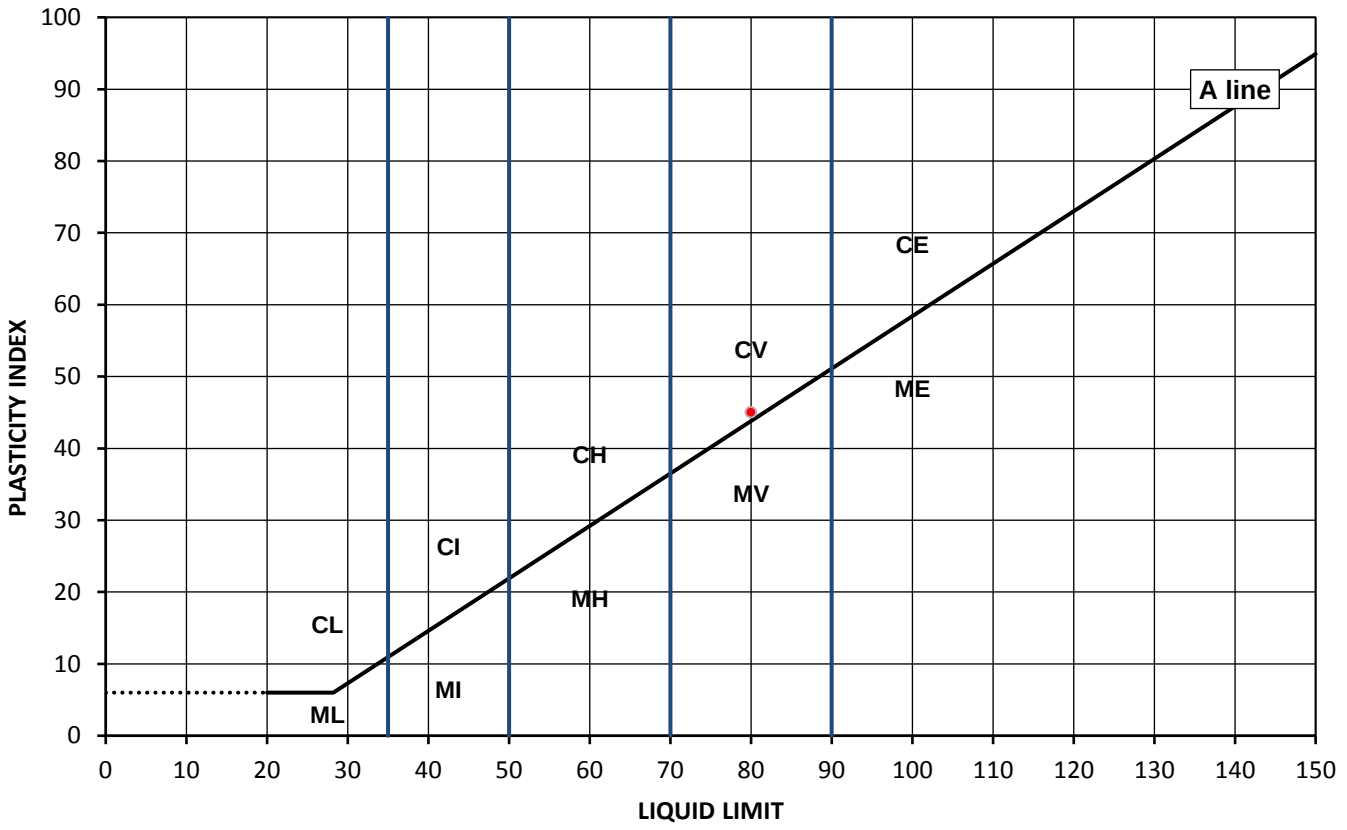
| | | | |
|---|---|---|---|
| Client: | Jomas Associates Ltd | Client Reference: | JJ1585 |
| Client Address: | Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD | Job Number: | 19-23596 |
| | | Date Sampled: | Not Given |
| | | Date Received: | 19/12/2018 |
| Contact: | Emma Hucker | Date Tested: | 09/01/2019 |
| Site Name: | 23 Lyncroft Gardens | Sampled By: | Not Given |
| Site Address: | 23 Lyncroft Gardens | | |

**Test Results**

| | | | |
|---|---|---|---|
| Laboratory Reference: | 1123463 | Depth Top [m]: | 4.00 |
| Hole No.: | WS2 | Depth Base [m]: | Not Given |
| Sample Reference: | Not Given | Sample Type: | D |
| Soil Description: | Brown CLAY | | |

Sample Preparation: Tested in natural condition

| As Received Moisture Content [%] | Liquid Limit [%] | Plastic Limit [%] | Plasticity Index [%] | % Passing 425µm BS Test Sieve |
|---|---|---|---|---|
| 34 | 80 | 35 | 45 | 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 Geotechnical Laboratory Manager
**Date Reported:** 15/01/2019

**Signed:** Maria Chandler
Geotechnical Site Manager Northampton

**GF 236.3**





**for and on behalf of i2 Analytical Ltd**

# SUMMARY REPORT

## Summary of Classification Test Results

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

4041

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Jomas Associates Ltd

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

Contact: Emma Hucker

Site Name: 23 Lyncroft Gardens

Site Address: 23 Lyncroft Gardens

Client Reference: JJ1585

Job Number: 19-23596

Date Sampled: Not Given

Date Received: 19/12/2018

Date Tested: 09/01/2019

Sampled By: Not Given

### Test results

| Laboratory Reference | Hole No. | Sample | | | | Description | Remarks | MC# | Atterberg# | | | | Density | | Total Porosity | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reference | Depth Top | Depth Base | Type | | | | % Passing 425um | LL | PL | PI | bulk | PD | | | | | |
| | | | m | m | | | | % | % | % | % | % | Mg/m3 | Mg/m3 | % | | | | |
| 1123458 | WS1 | Not Given | 1.00 | Not Given | D | Brown CLAY with fragments of chalk | Atterberg 4 Point | 28 | 100 | 79 | 31 | 48 | | | | | | | |
| 1123459 | WS1 | Not Given | 2.00 | Not Given | D | Brown CLAY | Atterberg 4 Point | 34 | 100 | 80 | 32 | 48 | | | | | | | |
| 1123460 | WS1 | Not Given | 3.00 | Not Given | D | Brown CLAY | Atterberg 4 Point | 34 | 100 | 81 | 33 | 48 | | | | | | | |
| 1123461 | WS2 | Not Given | 2.00 | Not Given | D | Brown CLAY | Atterberg 4 Point | 34 | 100 | 82 | 31 | 51 | | | | | | | |
| 1123462 | WS2 | Not Given | 3.00 | Not Given | D | Brown CLAY | Atterberg 4 Point | 33 | 100 | 83 | 33 | 50 | | | | | | | |
| 1123463 | WS2 | Not Given | 4.00 | Not Given | D | Brown CLAY | Atterberg 4 Point | 34 | 100 | 80 | 35 | 45 | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

Note: # UKAS accredited; NP - Non plastic

Comments:

**Approved:** Dariusz Piotrowski
PL Geotechnical Laboratory Manager
**Date Reported:** 15/01/2019

**Signed:** Maria Chandler
Geotechnical Site Manager Northampton

**GF 238.5**





**for and on behalf of i2 Analytical Ltd**

## APPENDIX 4 – CHEMICAL LABORATORY TEST RESULTS

**Emma Hucker**
Jomas Associates Ltd
Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD

**e:** Jomas Associates -

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

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

# Analytical Report Number : 19-23611

| | | | |
|---|---|---|---|
| **Project / Site name:** | 23 Lyncroft Gardens, NW6 1LB | **Samples received on:** | 19/12/2018 |
| **Your job number:** | JJ1585 | **Samples instructed on:** | 19/12/2018 |
| **Your order number:** | P1899JJ1585.2 | **Analysis completed by:** | 09/01/2019 |
| **Report Issue Number:** | 1 | **Report issued on:** | 09/01/2019 |
| **Samples Analysed:** | 4 soil samples | | |

**Signed**

Jordan Hill
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 |

Excel copies of reports are only valid when accompanied by this PDF certificate.

**Analytical Report Number: 19-23611**

**Project / Site name: 23 Lyncroft Gardens, NW6 1LB**
**Your Order No: P1899JJ1585.2**

| **Lab Sample Number** | | | | 1123512 | 1123513 | 1123514 | 1123515 | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | WS1 | WS1 | WS2 | WS2 | |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied | None Supplied | |
| **Depth (m)** | | | | 0.30 | 1.00 | 0.25 | 3.00 | |
| **Date Sampled** | | | | 18/12/2018 | 18/12/2018 | 18/12/2018 | 18/12/2018 | |
| **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 | < 0.1 | |
| Moisture Content | % | N/A | NONE | 10 | 18 | 22 | 20 | |
| Total mass of sample received | kg | 0.001 | NONE | 0.98 | 0.35 | 1.1 | 0.30 | |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 10.7 | 8.2 | 8.3 | 8.0 | |
| Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent) | g/l | 0.00125 | MCERTS | 1.6 | 0.48 | 0.066 | 2.6 | |

**Analytical Report Number : 19-23611**

**Project / Site name: 23 Lyncroft Gardens, NW6 1LB**

* 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 * |
|---|---|---|---|---|
| 1123512 | WS1 | None Supplied | 0.30 | Light brown sand with rubble and brick. |
| 1123513 | WS1 | None Supplied | 1.00 | Brown clay with vegetation. |
| 1123514 | WS2 | None Supplied | 0.25 | Brown clay. |
| 1123515 | WS2 | None Supplied | 3.00 | Brown clay. |

**Analytical Report Number : 19-23611**

**Project / Site name: 23 Lyncroft Gardens, NW6 1LB**

**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 |
|---|---|---|---|---|---|
| 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 |
| 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 (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 based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES. | L038-PL | D | MCERTS |

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