Ground Investigation Report

11 Lansdowne Crescent
London W11

Client  Pauline Heerema
Engineer  Franks and Lewin

J12149

October 2012
Document Control

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EXECUTIVE SUMMARY

This executive summary contains an overview of the key findings and conclusions. No reliance should be placed on any part of the executive summary until the whole of the report has been read. Other sections of the report may contain information that puts into context the findings that are summarised in the executive summary.

BRIEF

This report describes the findings of a ground investigation carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Franks and Lewin, on behalf of Mrs Pauline Heerema, with respect to the extension of the existing house, including the excavation of a basement beneath the front garden, and a single storey extension at the rear. The purpose of the investigation has been to determine the ground conditions, to provide a preliminary assessment of the presence of ground contamination and to provide information for the design of shallow foundations and retaining walls. A desk study did not form part of the brief for this investigation.

GROUND CONDITIONS

The Geological Survey map of the area indicates that the site is underlain by London Clay. The investigation encountered the expected ground conditions in that, beneath a moderate thickness of made ground, London Clay was encountered and proved to the full depth of investigation. The made ground extended to a depth of approximately 0.4 m in Borehole Nos 1 and 2 in the west of the site, and 1.18 m in Trial Pit No 4, in the east of the site. The London Clay extended to the maximum depth investigated of 6.45 m and comprised firm becoming stiff light brown fissured clay with veins of bluish grey silty clay, occasional pockets of orange-brown silt and selenite crystals.

Ground water was not encountered during the investigation.

The results of contamination testing indicated no contaminant concentrations elevated above the guideline values in the samples tested.

RECOMMENDATIONS

Given the light loads anticipated for the extension at lower ground floor level, strip foundations bearing at a minimum depth of 1.0 m in the firm clay of the London Clay may be designed to apply a net allowable bearing pressure of 110 kN/m².

It is understood that the preferred design for the basement is to utilise contiguous bored pile walls to support the excavation and final structural loads.

On the basis of the test results, remediation of contamination is not considered necessary and no special precautions should be required in this respect.
Part 1: INVESTIGATION REPORT

This section of the report details the objectives of the investigation, the work that has been carried out to meet these objectives and the results of the field and laboratory tests. Interpretation of the findings is presented in Part 2.

1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been commissioned by Franks and Lewin Consulting Engineers on behalf of Mrs Pauline Heerema, to carry out a ground investigation at 11 Lansdowne Crescent, London W11 2NJ.

1.1 Proposed Development

Consideration is being given to the excavation of a single level basement to the front of the existing property and the construction of a single storey extension to the rear at ground level.

This report is specific to the proposed development and the advice herein should be reviewed if the development proposals are amended.

1.2 Purpose of Work

The principal technical objectives of the work carried out were as follows:

- to determine the ground conditions and their engineering properties;
- to provide advice on the design of spread foundations and retaining walls; and
- to provide a preliminary assessment of the presence of soil contamination

1.3 Scope of Work

In order to meet the above objectives, a ground investigation was carried out which comprised, in summary, the following activities:

- a review of readily available geology maps;
- two opendrive percussive sampler boreholes to a depth of 6.45 m;
- four manually excavated trial pits to expose the existing foundations;
- standard penetration tests (SPTs), carried out at regular intervals in the boreholes, to provide additional quantitative data on the strength of the soils;
- testing of selected soil samples for contamination and geotechnical purposes; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

A desk study did not form part of the brief for this investigation.
1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted and the number of locations where the ground was sampled. No liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

2.0 THE SITE

2.1 Site Description

The site lies approximately 700 m to the north of Holland Park London Underground Station in a predominantly residential area of Notting Hill. It fronts onto Lansdowne Crescent to the west and is bounded by a communal private garden area to the east and houses fronting onto Lansdowne Crescent to the north and south. The site may additionally be located by National Grid Reference 524503, 180731.

The site forms a rectangular area, reducing in width towards the rear of the property, measuring approximately 20 m by 10 m in maximum dimension, and is currently occupied by a four storey house, with a two storey extension on the southern side.

The existing ground level is at pavement level, with steps leading up to a raised ground floor level, whilst the rear garden comprises a small patio also at ground floor level adjacent to the house, with steps up to an area of soft landscaping with planting around the perimeter, situated approximately 1.5 m above ground floor level. A lightwell has been excavated to approximately 1.0 m depth from the raised garden level, and currently forms an area of loose shingle.

The front garden comprises a small area of shingle with a small tree and shrubs in the north, with a raised flower bed around the northern and western boundaries. An ash tree, approximately 15m high, is located towards the centre of the western boundary whilst the southern half of the front garden comprises a parking area, formed of bonded shingle. A number of horizontal and vertical cracks were observed in the façade of the existing house, some of which had been repaired.

2.2 Other Information

The Geological Survey map of the area indicates the site to be underlain by the London Clay Formation.

The London Clay is classified as an unproductive stratum according to the Environment Agency Groundwater Vulnerability Map.
3.0 EXPLORATORY WORK

In order to meet the objectives described in section 1.2, two boreholes were advanced to a maximum depth of 6.45 m using an open-drive percussive sampler. In addition, four trial pits were hand excavated to a maximum depth of 1.5 m to allow the inspection of the existing foundations. All of the work was carried out under the supervision of a geotechnical engineer from GEA.

Disturbed samples were taken at regular intervals and Standard Penetration Tests (SPTs) have also been undertaken at 1m intervals in each of the boreholes. A selection of the samples recovered from the boreholes and trial pits was submitted to a soil mechanics laboratory for a programme of geotechnical testing and an analytical laboratory for a programme of contamination testing.

The borehole and trial pit records and results of the laboratory analyses are appended, together with a site plan indicating the exploratory positions.

3.1 Sampling Strategy

The boreholes were located by GEA in accessible external areas whilst avoiding buried services. The trial pit locations were specified by the structural engineers. Trial Pit No 1 was excavated at the front of the house from ground level. Trial Pit Nos 2 and 3 were also excavated from ground level in the rear garden, whilst Trial Pit No 4 was excavated within the small rear lightwell, about approximately 1.0 m below the raised area of rear garden.

Three samples recovered from the made ground were subjected to analysis for a range of common industrial contaminants and contamination indicative parameters. For this investigation the analytical suite for the soil included a range of metals, total cyanide and total phenols.

The soil samples were selected to provide a general view of the chemical conditions of the soils that are likely to be involved in a human exposure or groundwater pathway and to provide advice for waste disposal classification. The contamination analyses were carried out at an MCERTs accredited laboratory with the majority of the testing suite accredited to MCERTs standards. Details of the MCERTs accreditation and test methods are included in the Appendix together with the analytical results.

4.0 GROUND CONDITIONS

The investigation has confirmed the expected ground conditions in that, beneath a variable thickness of made ground, London Clay was encountered.

4.1 Made Ground

The made ground generally extended to depths of between 0.38 m and 0.65 m below lower ground floor level. It extended to 1.18m in Trial Pit No 3 in the east of the site, due to the elevated ground level at this location in the rear garden. The made ground generally comprised blackish brown silty clay with gravel, concrete, brick and charcoal fragments and occasional roots.

Three samples of made ground were selected for laboratory contamination tests and the results are presented in Section 4.4.
4.2 **London Clay**

This stratum comprised firm becoming stiff brown silty fissured clay with grey veins, occasional pockets of orange-brown silt, roots and selenite crystals, and extended to the maximum depth investigated, of 6.45m.

4.3 **Ground Water**

Ground water was not encountered during the investigation.

4.4 **Soil Contamination**

The following table sets out the values measured within three samples analysed; all concentrations are in mg/kg unless otherwise stated.

<table>
<thead>
<tr>
<th>Determinant</th>
<th>BH2 0.35m</th>
<th>TP1 0.5m</th>
<th>TP5 0.5m</th>
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<td>pH</td>
<td>8.3</td>
<td>8.3</td>
<td>8.8</td>
</tr>
<tr>
<td>Arsenic</td>
<td>14</td>
<td>9.6</td>
<td>12</td>
</tr>
<tr>
<td>Cadmium</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
</tr>
<tr>
<td>Chromium</td>
<td>32</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Copper</td>
<td>170</td>
<td>58</td>
<td>77</td>
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<tr>
<td>Mercury</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
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<td>&lt;0.20</td>
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<td>Lead</td>
<td>22</td>
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<tr>
<td>Selenium</td>
<td>40</td>
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<tr>
<td>Zinc</td>
<td>130</td>
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<td>110</td>
</tr>
<tr>
<td>Total Cyanide</td>
<td>&lt;0.50</td>
<td>&lt;0.50</td>
<td>&lt;0.50</td>
</tr>
<tr>
<td>Total Phenols</td>
<td>&lt;0.3</td>
<td>&lt;0.3</td>
<td>&lt;0.3</td>
</tr>
<tr>
<td>PAH</td>
<td>4.4</td>
<td>11</td>
<td>&lt;2</td>
</tr>
<tr>
<td>naphthalene</td>
<td>&lt;0.1</td>
<td>0.39</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>benzo(a)pyrene</td>
<td>0.1</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>TPH</td>
<td>19</td>
<td>&lt;10</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Sulphide</td>
<td>3.0</td>
<td>1.9</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Note: Figure in bold indicates concentration in excess of risk-based soil guideline values, as discussed below*

The results of the testing indicate ‘typical’ soil concentrations of the listed contaminants from across the site.
4.4.1 **Generic Quantitative Risk Assessment**

The use of a risk-based approach has been adopted to provide an initial screening of the test results to assess the need for subsequent site-specific risk assessments. To this end the table below indicates those contaminants of concern that have values in excess of a generic human health risk based guideline values which are either that of the CLEA¹ Soil Guideline Value where available, or is a Generic Guideline Value calculated using the CLEA UK Version 1.06 software assuming a residential end use. The key generic assumptions for this end use are as follows:

- that groundwater will not be a critical risk receptor;
- that the critical receptor for human health will be young female children aged zero to six years old;
- that the exposure duration will be six years;
- that the critical exposure pathways will be direct soil and indoor dust ingestion, consumption of homegrown produce, consumption of soil adhering to homegrown produce, skin contact with soils and indoor dust, and inhalation of indoor and outdoor dust and vapours; and
- that the building type equates to a two-storey small terraced house.

It is considered that these assumptions are acceptable for this generic assessment of this site. The tables of generic screening values derived by GEA and an explanation of how each value has been derived are included in the Appendix.

Where contaminant concentrations are measured at concentrations below the generic screening value it is considered that they pose an acceptable level of risk and thus further consideration of these contaminant concentrations is not required. However where concentrations are measured in excess of these generic screening values there is considered to be a potential that they could pose an unacceptable risk and thus further action will be required which could include:

- additional testing to zone the extent of the contaminated material and thus reduce the uncertainty with regard to its potential risk;
- site specific risk assessment to refine the assessment criteria and allow an assessment to be made as to whether the concentration present would pose an unacceptable risk at this site; or
- soil remediation or risk management to mitigate the risk posed by the contaminant to a degree that it poses an acceptable risk.

None of the concentrations of contaminants were above the generic guideline values.

¹ Updated Technical Background to the CLEA Model (Science Report SC050021/SR3) Jan 2009 and Soil Guideline Value reports for specific contaminants; all DEFRA and Environment Agency.
4.5 Existing Foundations

The existing foundations of the house comprise brick corbels, underlain by concrete footings that extended to a depth of approximately 0.73 m at the rear of the property and 0.63 m at the front.

Within Trial Pit No 4, excavated from the rear light-well, the footing was found to extend to a depth of 1.17 m, whilst the foundation of the existing garden wall along the northern boundary was found to comprise a concrete footing extending to a depth of 0.4 m.

All foundations were found to bear within the London Clay and groundwater was not encountered within any of the trial pits.
Part 2: DESIGN BASIS REPORT

This section of the report provides an interpretation of the findings detailed in Part 1, in the form of a ground model, and then provides advice and recommendations with respect to the proposed development.

5.0 INTRODUCTION

Consideration is being given to the excavation of a basement approximately 3.4 m below ground floor level, located to the front of the site, and a small single storey extension to the rear, also at ground floor level. Proposed loads have not been finalised but are expected to be between 30 kN/m and 40 kN/m.

6.0 GROUND MODEL

On the basis of the findings of the investigation the ground conditions at this site can be characterised as follows.

- Beneath a moderate thickness of made ground, London Clay is present and was proved to the full depth of the investigation;
- made ground is present across the site and generally extends to depths of between 0.38 m and 0.65 m;
- the made ground generally comprises blackish brown silty clay with gravel, concrete, brick and charcoal fragments and occasional roots;
- the underlying London Clay comprises firm or stiff brown silty clay with grey veins, occasional pockets of orange silt, roots and selenite crystals;
- groundwater was not encountered during the investigation; and
- no elevated concentrations of contaminants have been measured in the shallow soil;
7.0 ADVICE AND RECOMMENDATIONS

Given the nature of the proposed development, loads are anticipated to be relatively light and as such it is likely that spread foundations will be suitable for the proposed extension. It is understood that a contiguous pile wall is the preferred method of support for the basement excavation.

7.1 Basement Excavation

It is understood that the new basement will be excavated to a depth of approximately 4.5 m below existing front garden level. Therefore formation level is likely to be within the firm or stiff clay of the London Clay Formation.

Groundwater was not encountered during the investigation, and as a result, it is unlikely that groundwater control will be required during excavation of the basement.

The design of basement support in the temporary and permanent conditions needs to take account of the need to maintain the stability of both the excavation, and the surrounding structures, namely the existing house and neighbouring properties to the north and south.

For the ground conditions at this site sheet piles could be considered but the noise and vibrations associated with their installation is likely to be unacceptable to neighbouring properties.

The use of a bored pile wall is likely to be the best method of constructing and supporting the basement excavation, which could have the advantage of being incorporated into the permanent works and will be able to provide support for structural loads.

As groundwater was not encountered during the investigation, it should be possible to adopt a contiguous bored pile wall with the use of sump pumping to deal with any groundwater inflows from perched water tables within the made ground.

The ground movements associated with the basement excavation will depend on the method of excavation and support and the overall stiffness of the basement structure in the temporary condition. Thus in addition to the above, a suitable amount of propping will be required to provide the necessary rigidity. In this respect the timing of the provision of support to the wall will have an important effect on movements.

7.1.2 Basement Retaining Walls

The following parameters are suggested for the design of the permanent basement retaining walls.

<table>
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<tr>
<th>Stratum</th>
<th>Bulk Density (kg/m³)</th>
<th>Effective Cohesion (c – kN/m²)</th>
<th>Effective Friction Angle (° – degrees)</th>
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<tbody>
<tr>
<td>Made Ground</td>
<td>1800</td>
<td>Zero</td>
<td>26</td>
</tr>
<tr>
<td>London Clay</td>
<td>1900</td>
<td>Zero</td>
<td>25</td>
</tr>
</tbody>
</table>

Although groundwater was not encountered during the investigation, consideration will need to be given to the possibility of perched water collecting behind the new retaining walls. At this stage, it is recommended that the basement is designed with a water level assumed to be
two-thirds of the retained height, unless a fully effective drainage system can be ensured. It may, however, be possible to review this requirement following additional investigation by means of trial excavations and the advice in BS8102:2009² should be followed in this respect.

7.1.3 **Basement Heave**

The excavation of approximately 4.5 m of soil will result in an unloading of approximately 90 kN/m². This unloading will result in heave of the underlying London Clay, which will comprise short term elastic movement and longer term swelling that will continue over a number of years. The anticipated heave will be mitigated to some extent by the proposed load of the new basement but the effects of this movement on the existing house should be considered in more detail once the levels and loads have been finalised.

7.2 **Spread Foundations**

For the proposed single storey extension, moderately sized strip or pad foundations bearing on the firm London Clay should be placed at a minimum depth of 1.0 m, assuming that restrictions are applied on planting of shrubs in the vicinity of foundations, or at a depth of 1.5 m if there is unrestricted planting of shrubs in the new development, subject also to the further restrictions on new tree planting as detailed in the NHBC guidelines. The foundations may be designed to apply a net allowable bearing pressure of 110 kN/m². This value incorporates an adequate factor of safety against bearing capacity failure and should ensure that settlement remains within normal tolerable limits.

Foundations will need to be deepened in the vicinity of existing and proposed trees and National House Building Council (NHBC) guidelines should be followed in this respect. High shrinkability clays should be assumed.

Where trees are to be removed the required founding depth should be determined on the basis of the existing tree height if it is less than 50% of the mature height and on the basis of full mature height if the current height is more than 50% of the mature height. Where a tree is to be retained the final mature height should be adopted. Notwithstanding NHBC guidelines, all foundations should extend beyond the zone of desiccation. In this respect it would be prudent to have all foundation excavations inspected by a suitably experienced engineer. Due allowance should be made for future growth of the trees.

Following the excavation of the basement at the front of the site it would also be possible to utilise spread foundations constructed from basement level and a slightly higher bearing pressure of 150 kN/m² may be adopted in this respect.

7.3 **Shallow Excavations**

Shallow excavations should remain stable for short periods but if the excavations are to remain open for long periods or, where personnel are required to enter excavations that extend below 1.2 m, temporary lateral support or battering of the excavation sides, will be required in order to comply with normal safety requirements.

Significant inflows of ground water are not anticipated but inflows may be encountered from perched water tables within the made ground. Any such occurrences can be adequately dealt with by sump pumping.

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² BS8102 (2009) *Code of practice for protection of below ground structures against water from the ground*
7.4 **Ground Floor Slab and Basement Floor Slab**

Consideration will need to be given to designing the basement floor slab to accommodate heave movements and a suspended basement slab is likely to be required. It may be necessary to incorporate a void but this should be the subject of additional consideration once the proposals have been finalised.

For the ground floor slab of the proposed extension, it is likely that a ground bearing floor slab may be utilised for the proposed extension, bearing on the firm London Clay. This area is likely to fall outside of the zone of influence of any trees currently planted in the raised area of soft landscaping in the west of the rear garden. However if trees are to be planted in close vicinity to the new extension then the floor slab may need to be suspended over a void in accordance with NHBC guidelines.

7.5 **Effect of Sulphates**

The results of chemical analyses of selected soil samples have indicated that the concentrations of soluble sulphates vary widely across the site with the highest being recorded at a depth of 4.40 m in Borehole No 2. This concentration of soluble sulphate corresponds to Class DS-4 of Table C2 of BRE Special Digest 1 Part C (2005). The guidelines contained in the above digest should be followed in the design of any new foundation concrete.

7.6 **Contamination Risk Assessment**

The results of contamination tests did not indicate any contamination to be present in the made ground and therefore, it is considered that no remedial measures will be required.

7.7 **Waste Disposal**

Any spoil arising from excavations or landscaping works, which is not to be re-used in accordance with the CL:AIRE guidance[^3], will need to be disposed of to a licensed tip. Under the European Waste Directive, waste is classified as being either Hazardous or Non-Hazardous and landfills receiving waste are classified as accepting hazardous or non-hazardous wastes or the non-hazardous sub-category of inert waste in accordance with the Waste Directive. Waste going to landfill is subject to landfill tax at either the standard rate of £64 per tonne (about £120 per m³) or at the lower rate of £2.50 per tonne (roughly £5 per m³). However, the classifications for tax purposes and disposal purposes differ and currently all made ground and topsoil is taxable at the ‘standard’ rate and only naturally occurring rocks and soils, which are accurately described as such in terms of the 2011 Order[^4], would qualify for the ‘lower rate’ of landfill tax.

Based upon on the technical guidance provided by the Environment Agency[^5] it is considered likely that the made ground from this site, as represented by the three chemical analyses carried out, would be classified as NON-HAZARDOUS waste under the waste code 17 05 04 (soils and stones not containing dangerous substances) and would be taxable at the standard rate. It is likely that the natural soils, if separated out, could be classified as an INERT waste also under the waste code 17 05 04. This material would be taxable at the lower rate, if accurately described as naturally occurring clay in terms of the 2011 Order on the waste disposal.

[^4]: Landfill Tax (Qualifying Material) Order 2011
transfer note. As the site has never been developed or used for the storage of potentially hazardous materials, it is likely that WAC leaching tests would not be required for such inert waste going to landfill. This would however need to be confirmed by the receiving landfill site.

Under the requirements of the European Waste Directive all waste needs to be pre-treated prior to disposal. The pre-treatment process must be physical, thermal, chemical or biological, including sorting. It must change the characteristics of the waste in order to reduce its volume, hazardous nature, facilitate handling or enhance recovery. The waste producer can carry out the treatment but they will need to provide documentation to prove that this has been carried out. Alternatively, the treatment can be carried out by an approved contractor. The Environment Agency has issued a position paper\(^6\) which states that in certain circumstances, segregation at source may be considered as pre-treatment and thus excavated material may not have to be treated prior to landfilling if the soils can be “segregated” on site by sufficiently characterising the soils in-situ prior to excavation.

The above opinion with regard to the classification of the excavated soils and its likely landfill taxable rate is provided for guidance only and should be confirmed by the receiving landfill once the soils to be discarded have been identified.

The local waste regulation department of the Environment Agency (EA) should be contacted to obtain details of tips that are licensed to accept the soil represented by the test results. The tips will be able to provide costs for disposing of this material but may require further testing.

If consideration were to be given to the re-use of the soil as a structural fill on this or another site, in accordance with the Code of Practice for the definition of waste, it would be necessary to confirm its suitability for use, its certainty of use and to confirm that only as much material is to be used as is required for the specific purpose for which it was being used. A materials management plan could then be formulated and a tracking system put in place such that once placed the material would no longer be regarded as being a waste and thus waste management licensing and landfill tax would not apply.

### 8.0 OUTSTANDING RISKS AND ISSUES

This section of the report aims to highlight areas where further work is required as a result of limitations on the scope of this investigation, or where issues have been identified by this investigation that warrant further consideration. The scope of risks and issues discussed in this section is by no means exhaustive, but covers the main areas where additional work is considered to be required.

The ground is a heterogeneous natural material and variations will inevitably arise between the locations at which it is investigated. This report provides an assessment of the ground conditions based on the discrete points at which the ground was sampled. The ground conditions should be subject to review as the work proceeds to ensure that any variations from the Ground Model that are revealed are properly assessed by a suitably qualified person.
APPENDIX

Borehole Records

Trial Pit Records

Laboratory Test Results
  : Plasticity Index
  : Sulphate Analyses

Chemical Analyses

SPT & Cohesion / Depth Graph

Site Plan
### Excavation Details

**Excavation Method**
Opendrive Percussive Sampler (Terrier Rig)

**Dimensions**

**Ground Level (mOD)**

**Location**

**Dates**
27/06/2012

**Client**
Mrs Pauline Heerema

**Engineer**
Franks and Lewin

**Sheet**
1/1

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<th>Depth (m)</th>
<th>Sample / Tests</th>
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<th>Field Records</th>
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<th>Depth (m) (Thickness)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.03)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TARMAC</td>
</tr>
<tr>
<td>(0.03)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CONCRETE</td>
</tr>
<tr>
<td>(0.20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Made Ground (brown silty sandy clay with gravel, brick, wood and concrete fragments)</td>
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<tr>
<td>0.23</td>
<td></td>
<td></td>
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<td>0.29</td>
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</tr>
<tr>
<td>0.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Terminated at 0.52m</td>
</tr>
</tbody>
</table>

---

**Remarks**
Borehole terminated on concrete obstruction at 0.52 m.
Borehole moved to position 1A

---

**Scale (approx)**
1:50

**Logged By**
AT

**Figure No.**
J12149.BH1

Produced by the GEOtechnical DAtabase SYstem (GEODASY) (C) all rights reserved
<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Sample / Tests</th>
<th>Water Depth (m)</th>
<th>Field Records</th>
<th>Level (mOD)</th>
<th>Depth (Thickness)</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.04)</td>
<td>0.04</td>
<td>TARMAC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.14)</td>
<td>0.18</td>
<td>CONCRETE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.09)</td>
<td>0.27</td>
<td>Made Ground (clayey silty gravel)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.35)</td>
<td>0.62</td>
<td>Made Ground (brown sandy silty clay with gravel and brick fragments)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Terminated at 0.62 m</td>
</tr>
</tbody>
</table>

Remarks:
Borehole terminated on concrete obstruction at 0.62 m.
<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Sample / Tests</th>
<th>Water Depth (m)</th>
<th>Field Records</th>
<th>Level (mOD)</th>
<th>Depth (m) (Thickness)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.35</td>
<td>D</td>
<td></td>
<td></td>
<td>(0.14)</td>
<td></td>
<td>Made Ground (yellowish brown clayey sandy gravel)</td>
</tr>
<tr>
<td>0.40</td>
<td>D</td>
<td></td>
<td></td>
<td>(0.14)</td>
<td>(0.16)</td>
<td>Made Ground (orange-brown and with gravel)</td>
</tr>
<tr>
<td>1.00-1.45</td>
<td>SPT N=10</td>
<td>1,1/2,3,2,3</td>
<td></td>
<td>(0.30)</td>
<td>(0.08)</td>
<td>Made Ground (black-brown silty clay with gravel, concrete, brick, charcoal fragments and roots)</td>
</tr>
<tr>
<td>1.40</td>
<td>D</td>
<td></td>
<td></td>
<td>(0.33)</td>
<td>(0.72)</td>
<td>Firm brown slightly silty fissured CLAY with grey partings and roots</td>
</tr>
<tr>
<td>2.00-2.45</td>
<td>SPT N=11</td>
<td>2,2/2,3,4</td>
<td></td>
<td>1.10</td>
<td></td>
<td>Firm brown slightly silty fissured CLAY with occasional pockets of orange-brown and dark brown staining and selenite crystals</td>
</tr>
<tr>
<td>2.40</td>
<td>D</td>
<td></td>
<td></td>
<td>(1.20)</td>
<td></td>
<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
</tr>
<tr>
<td>3.00-3.45</td>
<td>SPT N=14</td>
<td>2,2/3,3,4,4</td>
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<td>2.30</td>
<td></td>
<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
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<tr>
<td>3.40</td>
<td>D</td>
<td></td>
<td></td>
<td>(4.15)</td>
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<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
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<tr>
<td>4.00-4.45</td>
<td>SPT N=14</td>
<td>2,2/3,3,4,5</td>
<td></td>
<td>5.00</td>
<td></td>
<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
</tr>
<tr>
<td>4.40</td>
<td>D</td>
<td></td>
<td></td>
<td>(5.15)</td>
<td></td>
<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
</tr>
<tr>
<td>5.00-5.45</td>
<td>SPT N=15</td>
<td>1,2/3,4,4</td>
<td></td>
<td>6.45</td>
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<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
</tr>
<tr>
<td>5.40</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
</tr>
<tr>
<td>6.00-6.45</td>
<td>SPT N=17</td>
<td>2,3/3,4,5,5</td>
<td></td>
<td></td>
<td></td>
<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
</tr>
<tr>
<td>6.10</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Firm becoming stiff brown slightly silty fissured CLAY with grey partings and selenite crystals</td>
</tr>
</tbody>
</table>

**Remarks**

Groundwater not encountered.

**Scale (approx)**

1:50

**Logged By**

AT

**Figure No.**

J12149.BH2
## Geotechnical Report

**Excavation Method**: Open drive Percussive Sampler (Terrier Rig)

**Dimensions**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Sample / Tests</th>
<th>Water Depth (m)</th>
<th>Field Records</th>
<th>Level (mOD)</th>
<th>Depth (m) (Thickness)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td>(0.05)</td>
<td>Made Ground (loose pea shingle)</td>
</tr>
<tr>
<td>0.50</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td>(0.35)</td>
<td>Made Ground (brown sandy clay with gravel, brick, cement, coal and charcoal fragments)</td>
</tr>
<tr>
<td>1.00-1.45</td>
<td>SPT N=9</td>
<td>0.1/2.2,2.3</td>
<td></td>
<td>(0.85)</td>
<td></td>
<td>Firm light brown fissured CLAY with partings of orange-brown silt</td>
</tr>
<tr>
<td>1.40</td>
<td>D</td>
<td></td>
<td></td>
<td>1.25</td>
<td></td>
<td>Firm becoming stiff light brown fissured CLAY with partings of bluish grey silty clay, occasional pockets of orange-brown silt and selenite crystals</td>
</tr>
<tr>
<td>2.00-2.45</td>
<td>SPT N=14</td>
<td>2.2/3,3,4,4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.40</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.00-3.45</td>
<td>SPT N=16</td>
<td>2.2/3,4,4,5</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3.40</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.00-4.45</td>
<td>SPT N=17</td>
<td>2.2/3,4,5,5</td>
<td></td>
<td></td>
<td>(5.20)</td>
<td></td>
</tr>
<tr>
<td>4.40</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.00-5.45</td>
<td>SPT N=17</td>
<td>2.2/3,4,5,5</td>
<td></td>
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</tr>
<tr>
<td>5.40</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.00-6.45</td>
<td>SPT N=18</td>
<td>2.2/3,5,5,5</td>
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<td></td>
<td>6.45</td>
<td>Complete at 6.45m</td>
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<tr>
<td>6.10</td>
<td>D</td>
<td></td>
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<td></td>
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</tbody>
</table>

**Remarks**: Groundwater not encountered.

**Engineer**: Franks and Lewin

**Client**: Mrs Pauline Heerema

**Site**: 11 Lansdowne Crescent, London, W11 2NJ

**Dimensions**: 27/08/2012

**Location**: 1/1
Plan:

- Drainage pipe (approx. 100 mm in diameter)
- Brick wall (main house)

Section A - A:

- Drainage pipe (approx. 100 mm in diameter)
- Brick wall (main house)
- Brick corbel
- Concrete footing
- Made Ground (loose gravel)
- Made Ground (brown clay with pockets of sand, gravel, brick, coal and shell fragments)
- Firm light brown fissured silty CLAY

Remarks:
All dimensions in millimetres
Sides of trial pit remained stable during excavation
Groundwater: Not encountered

Scale: 1:20
Logged by: AT
Plan:

- Drainage pipe (approx. 100 mm in diameter)

Section A - A:

- Brick wall (main house)
- Brick corbel
- Concrete casing
- Concrete footing
- Paving slab
- Made Ground (brown clayey silt with gravel, brick and charcoal fragments)
- Firm light-brown fissured silty CLAY

Remarks:
- All dimensions in millimetres
- Sides of trial pit remained stable during excavation
- Groundwater: Not encountered

Scale: 1:20
Logged by: AT
**Excavation Method Manual**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Ground Level (mOD)</th>
<th>Client</th>
<th>Job Number</th>
<th>Sheet</th>
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<tbody>
<tr>
<td>1510 x 600 x 520</td>
<td></td>
<td>Mrs Pauline Heerema</td>
<td>J12149</td>
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<table>
<thead>
<tr>
<th>Location</th>
<th>Dates</th>
<th>Engineer</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ground Floor</td>
<td>27/06/2012</td>
<td>Franks and Lewin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Plan:**

- garden wall

---

**Section A - A:**

- garden wall
- concrete footing
- paving slab
- Made Ground (dark grey slightly silty clay with brick and cement fragments)
- Firm to stiff light brown slightly silty CLAY with partings of grey silty clay and pockets of orange brown silt

**Remarks:**
- All dimensions in millimetres
- Sides of trial pit remained stable during excavation
- Ground water not encountered

**Scale:**

1:20

**Logged by:**

AT
Plan:

Section A - A:

brick wall (main house)

Brick covered in black membrane

Concrete footing covered in blue

Concrete footing

Made Ground (brown clay with gravel, brick and charcoal fragments)

Firm brown fissured CLAY with occasional partings of greyish brown silt

Remarks:
All dimensions in millimetres
Sides of trial pit remained stable during excavation
Groundwater: Not encountered

Scale: 1:20
Logged by: AT
<table>
<thead>
<tr>
<th>Bonehole</th>
<th>Depth (m)</th>
<th>No.</th>
<th>Type</th>
<th>Description</th>
<th>MC (%)</th>
<th>LL (%)</th>
<th>PL (%)</th>
<th>PI (%)</th>
<th>Bulk Density (g/cm³)</th>
<th>Dry Density (g/cm³)</th>
<th>Deviator Stress (kPa)</th>
<th>Shear Stress (kPa)</th>
<th>pH</th>
<th>2:1 WS</th>
<th>SO4 (g/l)</th>
<th>Magnesium Water Soluble (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH2</td>
<td>0.40</td>
<td>-</td>
<td>D</td>
<td>MADE GROUND: (Mottled brown silty clay with rare fine gravel, concrete and brick fragments)</td>
<td>27</td>
<td>62</td>
<td>24</td>
<td>38</td>
<td>98</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>BH2</td>
<td>3.40</td>
<td>-</td>
<td>D</td>
<td>Brown silty CLAY with rare grey staining and selenite crystals</td>
<td>28</td>
<td>70</td>
<td>26</td>
<td>44</td>
<td>100</td>
<td></td>
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</tr>
<tr>
<td>BH2</td>
<td>4.40</td>
<td>-</td>
<td>D</td>
<td>Brown silty CLAY with rare selenite crystals</td>
<td>29</td>
<td>71</td>
<td>27</td>
<td>44</td>
<td>100</td>
<td></td>
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</tr>
<tr>
<td>BH3</td>
<td>0.50</td>
<td>-</td>
<td>D</td>
<td>Brown silty CLAY with rare grey staining and selenite crystals</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>BH3</td>
<td>2.40</td>
<td>-</td>
<td>D</td>
<td>Brown silty CLAY with rare grey staining and selenite crystals</td>
<td>28</td>
<td>67</td>
<td>25</td>
<td>42</td>
<td>100</td>
<td></td>
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<tr>
<td>BH3</td>
<td>3.40</td>
<td>-</td>
<td>D</td>
<td>Brown and orange silty CLAY with rare selenite crystals</td>
<td>30</td>
<td>77</td>
<td>28</td>
<td>49</td>
<td>100</td>
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</table>

**SUMMARY OF GEOTECHNICAL TESTING**

Test Report by: GEOLABS Limited
Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX
Authorised Signatories: J R Masters (Qual Mgr) • C F Wallace (Tech Mgr) • J Sturges (Ops Mgr) • X Simon Burk (Snr Tech) • J J M Powell (Tech Dir)
Client: Geotechnical & Environmental Associates Limited, Tyttenhanger House, Courses Road, St Albans, Hertfordshire AL4 0PG
# Laboratory Test Report

Results of analysis of 3 samples received 5 July 2012


<table>
<thead>
<tr>
<th>Login Batch No</th>
<th>208917</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemtest LIMS ID</td>
<td>AH50088</td>
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<tr>
<td>Sample ID</td>
<td>BH2</td>
</tr>
<tr>
<td>Sample No</td>
<td>27/6/2012</td>
</tr>
<tr>
<td>Sampling Date</td>
<td>0.35m</td>
</tr>
<tr>
<td>Depth</td>
<td>SOIL</td>
</tr>
<tr>
<td>Matrix</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Determinand</th>
<th>CAS No</th>
<th>Units</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>%</td>
<td>n/a</td>
<td>18.5</td>
</tr>
<tr>
<td>Stones content (&gt;50mm)</td>
<td>%</td>
<td>n/a</td>
<td>&lt;0.02</td>
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<tr>
<td>Soil colour</td>
<td>n/a</td>
<td>brown</td>
<td>brown</td>
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<tr>
<td>Soil texture</td>
<td>n/a</td>
<td>loam</td>
<td>loam</td>
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<tr>
<td>Other material</td>
<td>n/a</td>
<td>stones</td>
<td>stones</td>
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<tr>
<td>pH</td>
<td>M</td>
<td>8.3</td>
<td>8.3</td>
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<tr>
<td>Cyanide (total)</td>
<td>57125</td>
<td>mg kg⁻¹</td>
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<td>Sulfide (Easily Liberatable)</td>
<td>18496258</td>
<td>mg kg⁻¹</td>
<td>M</td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>%</td>
<td>M</td>
<td>1.2</td>
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<tr>
<td>Chloride (extractable)</td>
<td>16887006</td>
<td>g l⁻¹</td>
<td>M</td>
</tr>
<tr>
<td>Sulfate (total) as SO4</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td>400</td>
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<td>Arsenic</td>
<td>7440382</td>
<td>mg kg⁻¹</td>
<td>M</td>
</tr>
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<td>Cadmium</td>
<td>7440439</td>
<td>mg kg⁻¹</td>
<td>M</td>
</tr>
<tr>
<td>Chromium</td>
<td>7440473</td>
<td>mg kg⁻¹</td>
<td>M</td>
</tr>
<tr>
<td>Copper</td>
<td>7440508</td>
<td>mg kg⁻¹</td>
<td>M</td>
</tr>
<tr>
<td>Mercury</td>
<td>7439976</td>
<td>mg kg⁻¹</td>
<td>M</td>
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<tr>
<td>Nickel</td>
<td>7440020</td>
<td>mg kg⁻¹</td>
<td>M</td>
</tr>
<tr>
<td>Lead</td>
<td>7439928</td>
<td>mg kg⁻¹</td>
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<tr>
<td>Selenium</td>
<td>7782492</td>
<td>mg kg⁻¹</td>
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<td>Zinc</td>
<td>7440666</td>
<td>mg kg⁻¹</td>
<td>M</td>
</tr>
<tr>
<td>TPH &gt;C5-C6</td>
<td>mg kg⁻¹</td>
<td>U</td>
<td>&lt; 0.1¹²</td>
</tr>
<tr>
<td>TPH &gt;C6-C7</td>
<td>mg kg⁻¹</td>
<td>U</td>
<td>&lt; 0.1¹²</td>
</tr>
<tr>
<td>TPH &gt;C7-C8</td>
<td>mg kg⁻¹</td>
<td>M</td>
<td>&lt; 0.1¹²</td>
</tr>
</tbody>
</table>

¹The sample container/fill level was not appropriate for the specified analysis - these results may be compromised and will not be accredited (UKAS/MCerts)
²The stability time for this analyte has been exceeded - these results may be compromised and will not be accredited (UKAS/MCerts)

All tests undertaken between 05/07/2012 and 12/07/2012

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.
# LABORATORY TEST REPORT

Results of analysis of 3 samples received 5 July 2012


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<thead>
<tr>
<th>208917</th>
<th>AH50086</th>
<th>AH50087</th>
<th>AH50088</th>
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<tbody>
<tr>
<td></td>
<td>BH2</td>
<td>TP1</td>
<td>TP5</td>
</tr>
<tr>
<td>27/6/2012</td>
<td>0.35m</td>
<td>0.50m</td>
<td>0.50m</td>
</tr>
<tr>
<td>SOIL</td>
<td>SOIL</td>
<td>SOIL</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>2670</th>
<th>TPH &gt;C8-C10</th>
<th>mg kg(^{-1})</th>
<th>M</th>
<th>&lt; 0.1 (^{+2})</th>
<th>&lt; 0.1 (^{+2})</th>
<th>&lt; 0.1 (^{+2})</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPH &gt;C10-C12</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.17 (^{+1})</td>
<td>&lt; 0.1 (^{+2})</td>
<td>&lt; 0.1 (^{+2})</td>
<td></td>
</tr>
<tr>
<td>TPH &gt;C12-C16</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>2.7 (^{+1})</td>
<td>1.4 (^{+1})</td>
<td>0.94 (^{+1})</td>
<td></td>
</tr>
<tr>
<td>TPH &gt;C16-C21</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>5.7 (^{+1})</td>
<td>4.4 (^{+1})</td>
<td>3.1 (^{+1})</td>
<td></td>
</tr>
<tr>
<td>TPH &gt;C21-C35</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>10 (^{+1})</td>
<td>3.5 (^{+1})</td>
<td>1.8 (^{+1})</td>
<td></td>
</tr>
<tr>
<td><strong>Total Petroleum Hydrocarbons</strong></td>
<td>mg kg(^{-1})</td>
<td>U</td>
<td>19 (^{+2})</td>
<td>&lt; 10 (^{-2})</td>
<td>&lt; 10 (^{-2})</td>
<td></td>
</tr>
</tbody>
</table>

2700 | Naphthalene | mg kg\(^{-1}\) | M | < 0.1 | 0.39 | < 0.1 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acenaphthylene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.15</td>
<td>2.1</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Acenaphthene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.62</td>
<td>2.4</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Fluorene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>&lt; 0.1</td>
<td>0.3</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Phenanthrene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.27</td>
<td>2.6</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Anthracene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>&lt; 0.1</td>
<td>1.2</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Fluoranthene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.97</td>
<td>0.76</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Pyrene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.6</td>
<td>0.6</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Benzo[a]anthracene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.34</td>
<td>0.46</td>
<td>&lt; 0.1</td>
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</tr>
<tr>
<td>Chrysene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.38</td>
<td>0.56</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Benzo[b]fluoranthene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.35</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Benzo[k]fluoranthene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.23</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Benzo[a]pyrene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.1</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Dibenz[a,h]anthracene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Indeno[1,2,3-cd]pyrene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>0.42</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>Benzo[g,h,i]perylene</td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td></td>
</tr>
<tr>
<td><strong>Total (of 16) PAHs</strong></td>
<td>mg kg(^{-1})</td>
<td>M</td>
<td>4.4</td>
<td>11</td>
<td>&lt; 2</td>
<td></td>
</tr>
</tbody>
</table>

| 2920 | Phenols (total) | mg kg\(^{-1}\) | N | <0.3 | <0.3 | <0.3 |

\(^{1}\) The sample container/fill level was not appropriate for the specified analysis - these results may be compromised and will not be accredited (UKAS/MCerts)

\(^{2}\) The stability time for this analyte has been exceeded - these results may be compromised and will not be accredited (UKAS/MCerts)

All tests undertaken between 05/07/2012 and 12/07/2012

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.
Site: 11 Lansdowne Crescent, London, W11 2NJ
Client: Mrs Pauline Heerema
Engineer: Franks and Lewin

SPT & Cohesion / Depth Graph

Cohesion kN/m²

Depth (m)

Cu = 5 N
○ cohesion
+ SPT N Value
Geotechnical & Environmental Associates (GEA) is an engineer-led and client-focused independent specialist providing a complete range of geotechnical and contaminated land investigation, analytical and consultancy services to the property and construction industries.

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