# Desk Study and Ground Investigation Report

## 30a Highgate Road
## London NW5

PART 1 OF 2

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| Client | Mr Colin Serlin |
| Engineer | Elliott Wood Partnership |

J12041

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GEA Geotechnical & Environmental Associates

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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 site investigation carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Elliott Wood Partnership, on behalf of Mr Colin Serlin, with respect to the redevelopment of the site through demolition of the existing buildings and construction of two-storey and three-storey mews houses and apartment blocks. A communal courtyard is also proposed in the centre of the site. The purpose of the investigation has been to determine the site history, to investigate the ground conditions, to assess the extent of any contamination and to provide information to assist with the design of foundations and for the proposed development.

## DESK STUDY FINDINGS

Information from a Site Constraint Report prepared by Elliott Wood indicates that the site was shown as vacant on the 1871 map, with the surrounding area occupied by houses and a park to the south. The historical map dated 1895 shows some buildings in the northwest corner of the site, and a smithy in the southeastern corner. The smithy is no longer present on the 1915 map, which shows what appear to be the existing buildings to have been constructed. The buildings are later labelled as works and engineering works from around 1954 and appear to have remained unchanged to the present day; they are currently in use as a carpentry and piano maker. A 4 m deep sewer is known to pass through the centre of the site.

## GROUND CONDITIONS

Beneath a generally moderate but apparently locally significant thickness of made ground the London Clay Formation extended to the full depth investigated, of 15.0 m. The made ground typically comprised dark brown to brown clayey gravelly sand or a brown sandy gravelly clay with fragments of brick, concrete, clinker, metal, ash and coal which generally extended to depths of between 0.3 m and 1.4 m, with the exception of Borehole No 2, where it extended to 3.9 m presumably associated with the sewer. A slight hydrocarbon odour was noted in the made ground at three locations. The underlying London Clay initially comprised soft orange-brown mottled grey sandy occasionally gravelly clay in the trial pits and became firm and stiff fissured high strength brown mottled grey, then grey fissured high strength silty clay with occasional selenite crystals and sandy silt partings to the maximum depth investigated of 15.0 m.

Groundwater was not encountered in the boreholes but was encountered in a trial pit at a depth of 1.0 m. Chemical analysis has revealed elevated concentrations of metals, polyaromatic hydrocarbons and total petroleum hydrocarbons in samples of made ground tested.

## RECOMMENDATIONS

The investigation has indicated that spread foundations should generally be feasible, but will be uneconomical in proximity to the sewer unless the sewer is diverted or can be spanned; alternatively a piled foundation solution could be considered as an alternative. It should be possible to adopt spread foundations bearing within the firm London Clay for the anticipated light to moderate loads. Moderate width strip or pad foundations could be designed to apply a net allowable bearing pressure of 120 kN/m$^2$ bearing at a minimum depth of 1.0 m. Founding depths will need to be increased within the zone of influence of trees in accordance with NHBC guidelines.

Following the demolition of the buildings it would be prudent to conduct further investigation to confirm remediation options. At this stage it would be prudent to assume that it will be necessary to remove some of the TPH contamination. Vapour barriers may also need to be included in the buildings and imported clean topsoil will be required in soft landscaped areas.

# 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 investigation. Interpretation of the findings is presented in Part 2.

## 1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been commissioned by Elliott Wood Partnership, on behalf of Mr Colin Serlin, to carry out a desk study and ground investigation at 30a Highgate Road, London, NW5 1NS.

A Site Constraints Report (ref 211429 dated 23 September 2011 revision P1) has previously been prepared by the consulting engineers and includes a review of historical maps relating to the site. A copy of the report has been provided and is referred to as necessary.

### 1.1 Proposed Development

The existing buildings will be demolished and the site will be redeveloped through the construction of two-storey and three-storey mews houses and apartment blocks. It is understood that there will be a communal central courtyard with some soft landscaping; the layout will be similar to existing although it is proposed to lower the level of the entire site by approximately 300 mm.

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 check the history of the site with respect to previous contaminative uses;
- to determine the ground conditions and their engineering properties;
- to provide advice with respect to the design of spread and piled foundations;
- to provide an indication of the degree of soil contamination present; and
- to assess the risk that any such contamination may pose to the proposed development, its users or the wider environment.

### 1.3 Scope of Work

In order to meet the above objectives, a brief desk study was carried out, followed by a ground investigation. The desk study comprised:

- a review of readily available geological maps;
- a review of historical Ordnance Survey (OS) maps provided by Elliott Wood

Partnership and environmental searches sourced from the Envirocheck database; and

- a walkover survey of the site during the field work.

In the light of this desk study, an intrusive ground investigation was carried out which comprised, in summary, the following activities:

- two boreholes drilled to a depth of 15.00 m by means of a cable percussion rig;
- standard penetration tests (SPTs), carried out at regular intervals in the cable percussion boreholes, to provide quantitative data on the strength of the soils;
- the installation of two standpipes to facilitate subsequent groundwater monitoring;
- seven trial pits, manually excavated in order to investigate the configuration of existing foundations;
- laboratory testing of selected soil samples for geotechnical purposes and for the presence of contamination; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

This report includes a contaminated land assessment which has been undertaken in accordance with the methodology presented in Contaminated Land Report (CLR) 11[1] and involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the United Kingdom. The risk assessment is thus divided into three stages comprising Preliminary Risk Assessment, Generic Quantitative Risk Assessment, and Site-Specific Risk Assessment.

### 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, the number of locations where the ground was sampled and the number of soil, gas or groundwater samples tested; 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.

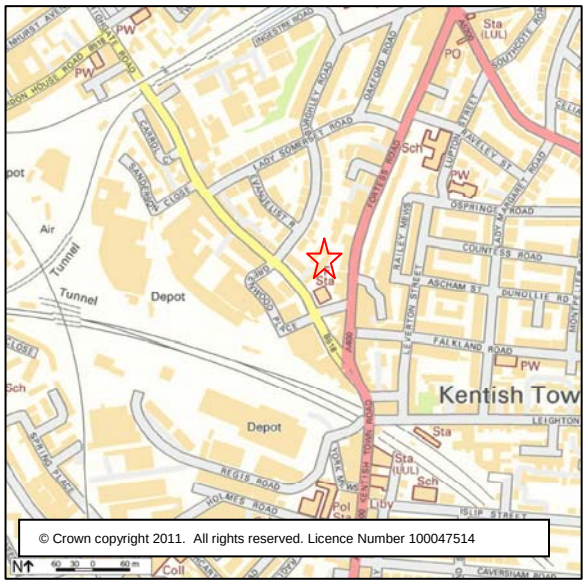
## 2.0 THE SITE

### 2.1 Site Description

The site is located approximately 300 m north of Kentish Town London Underground station and is reached by a narrow access road that extends from Highgate Road to the south. A fire station, small retail units and residential properties border the site to the east, while a four-storey block of flats is present to the west, with houses to the north. The site is shown on the map below and may be additionally located by National Grid Reference 528932, 185453.

1 *Model Procedures for the Management of Land Contamination* issued jointly by the Environment Agency and the Department for Environment, Food and Rural Affairs (DEFRA) Sept 2004

The site forms an irregular shape and has maximum dimensions of approximately 50 m north to south by 55 m east to west, whilst the access road is about 35 m long. The site is occupied by single storey and two-storey buildings in a horseshoe arrangement around a central courtyard. A carpentry workshop occupies the western and northern buildings, a piano maker occupies the eastern building and the first floor of the northern building is in use as offices. There is a single storey meeting room in the east of the site and the brick wall on the southern elevation, as viewed from inside, has several diagonal cracks which have been in-filled.




The four-storey apartment block that borders the site to the west has a basement car park that abuts the western boundary of the site. The site is entirely covered by buildings and tarmac hardstanding, and is devoid of vegetation. The site slopes gently down towards the south in the courtyard area and becomes slightly steeper on the access road, towards Highgate Road.

An old metal tank is located close to the western boundary of the site, positioned on a concrete slab which is covered by an open fronted brick shed, as shown below. The tank contains liquid hydrocarbon fuel, although the exact contents are not known. It is not known if the tank is still in use but it appears to be in a good condition and there are no obvious stains on the ground around the tank. .

Photograph showing green coloured metal tank containing hydrocarbon

Photograph showing general arrangement of the site, looking northeast from access road

An asset location search provided by Thames Water, indicates the presence of a 229 mm diameter sewer entering the site along the access road into the centre of the site and then running eastwards below the building on the eastern boundary. An inspection of the manhole chamber whilst on site has indicated the invert level of the sewer to be about 4.0 m below ground level.

## 2.2 Site History

The site history has been researched by reference to historical Ordnance Survey (OS) maps provided by Elliott Wood Partnership and publicly available data provided by the Envirocheck database.

Information from a Site Constraint Report indicates that the site was shown as vacant on the 1871 map, with the surrounding area occupied by houses and a park to the south. The historical map dated 1895 shows some buildings in the northwest corner of the site, and a smithy in the southeastern corner. A fire station is also shown to the east of the site on this map. The smithy is no longer present on the 1915 map, which shows what may be the existing buildings to have been constructed. The buildings are labelled as works and engineering works from around 1954 and appear to have remained unchanged to the present day; they are currently in use as a carpentry and piano maker.

## 2.3 Other Information

A search of public registers and databases has been made via the Envirocheck database and relevant extracts from the search are appended. Full results of the search can be provided if required.

The search has revealed no records of any landfills, waste treatment, management or disposal sites within 250 m of the site. There have been no pollution incidents to controlled waters within 100 m of the site.

The Geological Survey map of the area indicates that the site is underlain by the London Clay Formation from the surface. The London Clay is classified as Unproductive strata, which is defined by the Environment Agency (EA) as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The site is not at risk of flooding.

Reference to the National Radiological Protection Agency (NRPB, now part of the Health Protection Agency) Radon Atlas of England and Wales, indicates that the site falls within an area where less than 1% of homes are affected by radon emissions and therefore radon protective measures will not be necessary.

## 2.4 Preliminary Risk Assessment

Part IIA of the Environmental Protection Act 1990, which was inserted into that Act by Section 57 of the Environment Act 1995, provides the main regulatory regime for the identification and remediation of contaminated land. The determination of contaminated sites is based on a "suitable for use" approach which involves managing the risks posed by contaminated land by making risk-based decisions. This risk assessment is carried out on the basis of a source-pathway-receptor approach.

### 2.4.1 Source

The historical usage of the site that has been established by the desk study and the site walkover indicates that the site has a potentially contaminative history by virtue of it having been initially occupied by a smithy or blacksmith and an 'engineering works', and also a carpentry workshop and piano maker.

The site walkover indicated the presence of an above ground tank, containing a hydrocarbon liquid; however there were no signs of leakage and the tank appeared to be in a good

condition.

### 2.4.2 Receptor

The new residential buildings will represent a relatively high sensitivity end-use. Buried services are likely to come into contact with any contaminants present within the soils through which they pass and site workers are likely to come into contact with any contaminants present in the soils during demolition and construction works. Being underlain by Unproductive strata, groundwater is not considered to be a receptor. The adjacent sites are considered as potential moderately sensitive receptors.

### 2.4.3 Pathway

There is a potential for a pathway to exist through direct contact between end users and any contaminants present within the near-surface soils in areas of public open space, there is no proposed gardens. There is not considered to be a pathway to the deep chalk aquifer due to the presence of the London Clay Formation. Buried services will be exposed to any contaminants present within the soil through direct contact and site workers will come into contact with the soils during construction works.

### 2.4.4 Preliminary Risk Appraisal

On the basis of the above it is considered that there is a moderate to low risk of there being a significant contaminant linkage at this site, the site investigation sampling and testing will indicate the amount, if any, of site remediation necessary.

## 3.0 EXPLORATORY WORK

In order to meet the objectives described in Section 1.2, two boreholes were advanced to a depth of 15.0 m by a cable percussion rig, set up in the central courtyard area. Standard Penetration Tests (SPTs) were carried out at regular intervals in the boreholes and disturbed and undisturbed samples were recovered for subsequent laboratory examination and testing. Seven trial pits were manually excavated adjacent to walls to expose and allow the inspection of the existing foundations.

Groundwater monitoring standpipes were installed to a depth of 4.0 m in the boreholes to facilitate subsequent groundwater monitoring. These have not been monitored to date.

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 and trial pit positions were specified by Elliott Wood Partnership and set out on site by GEA while avoiding areas of known services. The site was occupied at that time of the investigation and the businesses remained in operation. The borehole and trial pit positions were therefore confined to external areas and a single unit in the southeast of the site which was unoccupied. The scope of the investigation was limited by the restricted access and budgetary constraints which meant that a number of trial pits and a day of window sampling were omitted.

Eight samples recovered from the made ground were subject 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 petroleum hydrocarbons (TPH), polyaromatic hydrocarbons (PAH), total cyanide and monohydric

phenols. In addition to the above, four samples were subject to aliphatic/aromatic TPH speciation testing.

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 in respect of re-use or 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.

Laboratory Californian Bearing Ratio (CBR) tests were carried out on representative re-compacted samples of made ground and natural soil.

## 4.0 GROUND CONDITIONS

The investigation has confirmed the expected ground conditions in that, below a locally significant thickness of made ground, the London Clay Formation extended to the full depth of the investigation.

### 4.1 Made Ground

The made ground comprised either a dark brown occasionally mottled grey and blackish brown very clayey silty gravelly sand with fragments of brick and occasional clinker, ash, slate, tile, concrete, metal and coal or an orange brown sandy gravelly clay with occasional brick fragments. The made ground generally extended to depths of between 0.30 m and 1.40 m. but in Borehole No 2, located closest to the line of the sewer, it extended to a depth of 3.90 m, presumably indicating that the borehole was drilled through the backfill within the trench that would have been dug to lay the sewer. A layer of orange brown and reddish brown clayey sandy gravel of brick was found to a depth of 0.77 m in Trial Pit No 7.

A hydrocarbon odour was noted throughout the full depth of made ground in Borehole No 1 and Trial Pit No 1, and to a depth of 0.5 m in Trial Pit No 5. The groundwater in Trial Pit No 5 was also noted to have a slight oily sheen. With the exception of the above no visual or olfactory evidence of contamination was observed within these soils, although extraneous material such as fragments of brick, clinker, ash, slate, tile, concrete, metal and coal were present. However, eight samples of the made ground were analysed for a range of contaminants and the results are summarised in Section 4.4.

### 4.2 London Clay

In the trial pits The London Clay was noted to initially comprise a weathered layer of soft orange-brown mottled grey sandy occasionally gravelly clay, below which in the boreholes firm becoming stiff brown mottled grey silty fissured clay with selenite crystals extended to depths of 9.3 m and 9.8 m in Borehole Nos 1 and 2 respectively. It then comprised stiff grey fissured silty clay with occasional sandy silt partings and selenite crystals to the maximum depth of investigation, of 15.0 m.

Laboratory triaxial strength tests indicate the London Clay in Borehole No 1 to be initially high strength to 4.5 m, becoming generally very high strength; the clay in Borehole No 2 was high strength throughout.

Laboratory plasticity index tests indicate the clay to be of high shrinkability.

No visual or olfactory evidence of contamination was observed within these soils.

## 4.3 Groundwater

Groundwater was not encountered while drilling the boreholes, however a four meter standpipe was installed in each borehole to allow future monitoring; they have not been monitored to date.

A slow inflow of groundwater was recorded in Trial Pit No 5 at a depth of 1.0 m; a small pump was required to manage the inflow of the water while the trial pit was completed and logged. After completion of the pit, water was noted to inflow again from the sides of the pit while it was backfilled.

## 4.4 Soil Contamination

The table below sets out the values measured within eight samples of made ground that have been analysed for contaminant concentrations; all concentrations are in mg/kg unless otherwise stated.

| Determinant | Maximum concentration recorded (mg/kg) | Minimum concentration recorded (mg/kg) | Number of samples below detection limit | Normalised upper bound $US_{95}$ |
|---|---|---|---|---|
| Arsenic | **38** | 9.8 | none | 25.5 |
| Cadmium | 0.5 | <0.1 | three | 0.3 |
| Chromium | 51 | 21 | none | 42.2 |
| Copper | 160 | 26 | none | 125.7 |
| Mercury | 1.6 | <0.1 | one | 1.1 |
| Nickel | 58 | 25 | none | 44.3 |
| Lead | **680** | 56 | none | **460** |
| Selenium | 0.48 | <0.2 | seven | 0.3 |
| Zinc | 700 | 73 | none | 389 |
| Total Cyanide | <0.5 | <0.5 | eight | 0.5 |
| Total Phenols | <0.3 | <0.3 | eight | 0.3 |
| Sulphide | **370** | 5.6 | none | **185.5** |
| Total TPH | **5500** | <10 | two | **2531.4** |
| Naphthalene | 2.8 | 0.8 | none | 2.1 |
| Benzo(a)pyrene | **54** | <0.1 | one | **27.7** |
| Total PAH | **740** | 6.7 | none | **402.9** |
| Total organic carbon % | 5.7 | 0.75 | none | 4.3 |

*Note:* The use of the normalised upper bound for 95th percentile confidence aims to remove some of the uncertainty associated with calculation of an arithmetic sample mean of a relatively small number of samples. The US95 value is the upper bound of the range within which it can be stated with 95% confidence that the true mean concentration of the data set will fall.
Figure in bold indicates concentration in excess of risk-based soil guideline values, as discussed below

Four samples triggered speciated TPH testing and the results show only the sample from Trial Pit No 1 to have elevated concentrations of aromatic C16-C21 and C21-C35 carbon compounds which possibly indicate it to be diesel.

### 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 contaminants of concern are those that have values in excess of a generic human health risk based guideline values which are either that of the CLEA[2] Soil Guideline Value where available, or is a Generic Guideline Value calculated using the CLEA UK Version 1.06 software assuming a residential with plant uptake 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, although conservative given that there will be no gardens, only areas of public open space mainly covered in hardstanding. 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.

A comparison of the measured concentrations against the generic screening values has

2 *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.

indicated elevated concentrations of sulphide, arsenic, lead, TPH, benzo(a)pyrene and PAH.

| Contaminant of Concern | Maximum concentration recorded (mg/kg) | Location(s) where elevated concentration recorded | Generic Risk-Based Screening Value |
|---|---|---|---|
| Sulphide | 370 | BH2, TP1, TP5 | 50 |
| Arsenic | 38 | TP4 | 32 |
| Lead | 680 | TP1, TP4 | 450 |
| TPH | 5500 | BH1, BH2, TP1, TP2 | 500 |
| Benzo(a)pyrene | 54 | BH1, BH2, TP1, TP4, TP5, TP7 | 1.0 |
| PAH | 740 | BH1, BH2, TP1, TP4, TP5, TP7 | 6.7 |

The significance of these results is considered further in Part 2 of the report.

# 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 foundation options and contamination issues.

## 5.0 INTRODUCTION

The proposed redevelopment comprises demolition of the existing buildings and construction of two-storey and three-storey mews houses and residential apartments. It is understood that there will be a central courtyard area, similar to the exiting and the whole site will be lowered by approximately 300 mm to suit proposed finished levels.

Foundation loads have not been provided but they are expected to be light to moderate.

## 6.0 GROUND MODEL

Historical maps indicate the site to have been developed as a smithy, a carpenters and piano makers. On the basis of the fieldwork, the ground conditions at this site can be characterised as follows.

- In general a moderate thickness of made ground, extending to a maximum depth of 1.40 m, is present, but it is apparent that a much more significant thickness, of up to about 4 m, is present along the line of a sewer that passes below the site;
- the made ground generally comprises dark brown sometimes mottled grey and blackish brown very clayey silty gravelly sand with fragments of brick and occasional clinker, ash, slate, tile, concrete, metal and coal or an orange brown sandy gravelly clay with occasional brick fragments;
- a weathered layer of the London Clay was noted in the trial pits and comprised soft orange-brown mottled grey sandy occasionally gravelly clay;
- the boreholes encountered the London Clay to comprise firm becoming stiff fissured high strength brown mottled grey silty clay to depths of 9.30 m and 9.80 m where it becomes stiff fissured high and very high strength silty clay with occasional selenite crystals and sandy silt partings to 15.0 m;
- laboratory tests have indicated the clay to be of high shrinkability;
- groundwater was not encountered in the boreholes but was encountered in Trial Pit No 5 at a depth of 1.0 m; and
- elevated concentrations of sulphide, arsenic, lead, TPH, and a range of PAHs were recorded in samples of made ground tested.

# 7.0 ADVICE AND RECOMMENDATIONS

The investigation has indicated that below much of the site there is a moderate thickness of made ground and spread foundations supporting the anticipated light to moderate loads could be feasible bearing in the firm clay. However, deeper made ground has been encountered, apparently along the line of the sewer, such that spread foundations are unlikely to be appropriate in this zone unless the sewer can be spanned. In any case foundations in this area may need to be deep and a piled foundation solution may be more practical.

Elevated concentrations of a range of metal and hydrocarbon contaminants have been recorded in samples of made ground and remedial measures will be required.

## 7.1 Spread Foundations

Where it is feasible to bypass the made ground, moderate width 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. Notwithstanding the guidance the foundation depths should be increased subject to further restrictions on new tree planting as detailed in NHBC guidelines. The foundations may be designed to apply a net allowable bearing pressure of 120 kN/m$^2$. This value incorporates an adequate factor of safety against bearing capacity failure and should ensure that settlement remains within normal tolerable limits.

Consideration will need to be given to bridging the sewer in the east of the site and an increased net allowable bearing pressure of 150 kN/m$^2$ may be adopted below a depth of 2.0 m. Additional investigation will however be required to determine the profile of the backfilled sewer trench, which it is assumed would have been formed as a battered excavation.

Foundations will need to be deepened in the vicinity of proposed trees or trees on adjacent sites, in accordance with NHBC guidelines and high shrinkability clays should be used in calculations. 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. Due allowance should be made for future growth of the trees. The requirement for compressible material alongside foundations should be determined by reference to the NHBC guidelines.

Water maybe encountered within the made ground soils and the groundworks contractor may need to use some sump pumping to keep foundation excavations dry.

## 7.2 Piled Foundations

For the ground conditions at this site, driven or bored piles could be adopted. Driven piles would have the advantage of minimising the spoil that is generated, but consideration would need to be given to the effects of noise and vibrations on neighbouring sites and the deep sewer. Some form of bored pile may therefore be more appropriate. A conventional rotary augered pile could be considered, but temporary casing installed into the London Clay would be required to protect against groundwater inflows and instability from within the made ground. Therefore, to avoid the requirement for casing, bored piles installed using continuous flight auger (cfa) techniques may be more appropriate.

The following table of ultimate coefficients may be used for the preliminary design of bored piles, for retaining walls and for any structural loads, based on the measured SPT and cohesion / depth graph in the appendix. For the purposes of preliminary design, groundwater has been assumed to be at a depth of 1.00 m and all depths are show relative to a ground level where the boreholes were drilled.

| ***Ultimate Skin Friction*** | | ***kN/m²*** |
|---|---|---|
| Made ground | GL to 4.0 m | Ignore |
| London Clay ($\alpha = 0.5$) | 4.0 m to 15 m | Increasing linearly from 35 to 100 |
| ***Ultimate End Bearing*** | | ***kN/m²*** |
| London Clay | 10.0 m to 15.0 m | Increasing linearly from 1260 to 1755 |

In the absence of pile tests, guidance from the London District Surveyors Association[3] (LDSA) suggests that a factor of safety (FOS) of 2.6 should be applied to the above coefficients in the computation of safe theoretical working loads. The table below indicates the safe working loads for piles with diameters of 300 mm, 400 mm and 500 mm extending to depths of 10 m and 15 m while using a FOS of 2.6, as requested by the consulting engineers.

| Pile diameter mm | Pile length m | Safe Working Load kN |
|---|---|---|
| 300 | 10 | 150 |
| | 15 | 320 |
| 400 | 10 | 215 |
| | 15 | 360 |
| 500 | 10 | 285 |
| | 15 | 580 |

The above examples are not intended to constitute any form of recommendation with regard to pile size or type, but merely serve to illustrate the use of the above coefficients. Specialist piling contractors should be consulted with regard to the design of an appropriate piling scheme, and their attention should be drawn to the presence of groundwater within the made ground and London Clay and also the presence of sand partings within the clay.

## 7.3 Excavations

The investigation indicated that made ground should generally stand unsupported for a short period of time. It is however recommended that support is used in excavations or that excavations are battered to suitable angles if excavations are required to remain open. Where personnel are required to enter excavations, a risk assessment should be carried out and temporary lateral support or battering of the excavation sides considered in order to comply with normal safety requirements.

Inflows of perched groundwater may be encountered in shallow excavations, particularly in the vicinity of existing foundations and other buried structures, although these should be suitably dealt with by sump pumping.

[3] LDSA (2009) *Foundations No 1 – Guidance notes for the design of straight shafted bored piles in London Clay*. LDSA Publications

## 7.4 Ground Floor Slab

Following the lowering of site levels by approximately 300 mm, it should be possible to adopt a ground bearing floor slab bearing on the natural soils or made ground. This advice is based upon the assumption that the new slab will not impose any higher load than the existing slabs and that they have performed satisfactorily. It would be prudent to proof roll the formation level to identify any soft spots which should be removed and replaced with suitably compacted granular fill. Once proposals are finalised a check should be made that any load from ground bearing floor slabs is not transferred onto the sewer.

It would be prudent to carry out a survey of trees on adjacent sites to determine if the proposed slabs will be within the zone of influence of any trees. If so, ground floor slabs should be suspended over a void in accordance with NHBC guidelines.

The requirement for gas protection measures is discussed in Section 7.8.

## 7.5 Pavement Design

On the basis of laboratory tests on recompacted samples of made ground, a CBR value of around 2% to 3% could be adopted in the made ground. If the formation level is within the London Clay then a higher value of around 5% to 8% could be adopted.

## 7.6 Effect of Sulphates

Chemical analyses have revealed relatively high concentrations of soluble sulphate and neutral to alkaline pH conditions in accordance with Class DS-4 conditions of Table C2 of BRE Special Digest 1:SD Third Edition (2005). The measured pH values of the samples show that the ACES class of AC-3s would be appropriate for the site. This assumes a static water condition at the site.

The guidelines contained in the above digest should be followed in the design of foundation concrete.

## 7.7 Contamination Risk Assessment

The site has most recently been occupied by a carpentry and piano maker and was historically occupied by a smithy and an engineering works. A fuel tank was identified during the site walkover and a hydrocarbon odour was noted in the made ground in the east of the site. No odours were note din the natural soil.

The results of contamination testing have indicated elevated concentrations of sulphide, arsenic, lead, TPH, a range of constituent PAHs and total PAH in the made ground.

The maximum concentration of TPH was recorded in the malodorous soil from Trial Pit No 5. The other elevated concentrations of TPH were found in the samples from the eastern side of the courtyard, within Borehole Nos 1 and 2, and Trial Pit Nos 1, 2 and 5. Lead and arsenic were only elevated in Trial Pit Nos 1 and 4, in close proximity to the position of the former smithy. Other contamination generally consisting of PAH concentrations, were found to be across the site with no specific distribution.

The made ground across the site was noted to contain fragments of ash, coal, clinker and metal which may have given rise to the elevated concentrations of PAH and other

contamination. The presence of TPH may be attributed to localised spilling or leakage from drains, but a definitive source has not been identified.

The proposals include lowering of the site level by 300 mm and a large amount of made ground will be removed by the site strip, however some made ground will remain and will pose a risk to end users.

The following table provides a summary of the risk assessment and indicates where a pollution linkage has been established for which remedial action will be required. This assessment is based upon the existing environmental situation, with a view to carrying out remediation prior to redevelopment for residential purposes.

| SOURCE | RECEPTOR | PATHWAY | COMMENTS |
|---|---|---|---|
| Inorganic and organic contamination within near surface soils | end users | vapours | the risk of even low concentrations of hydrocarbon vapours entering the proposed residential development will need to be prevented. Protection measures and remedial action will be required. |
| | | direct contact | end users will potentially come into contact with shallow surface soils in areas of soft landscaping. Precautions will be necessary in areas of soft landscaping |
| | groundwater | percolation | the presence of buildings and hardstanding will prevent percolation of surface run-off. The proposals will introduce areas of soft landscaping and localised remediation will be required |
| | | groundwater | the London Clay will inhibit downward percolation to the groundwater at depth within the chalk principal aquifer |
| | site workers during construction | ingestion of contaminated soil or dust, skin contact, inhalation | appropriate protective equipment and working practices required during demolition and ground work |
| | adjacent sites | migration of mobile contamination, along sewer that crosses the site | the risk of lateral migration of contamination will need to be minimised. |
| | plastic services | direct contact | protection from hydrocarbon contaminants may be necessary |
| | foundation concrete | direct contact | protection from hydrocarbon and sulphate contaminants may be required if the retardation of setting cannot be tolerated |
| | vegetation | uptake via soil, ground water or vapour | provision of a suitable growing medium will be required in areas of public open space. This is likely to be dealt with in association with the protection of end users. |

Each of the potential pollution linkages is considered in more detail below.

### 7.7.1 End Users

The investigation has encountered contamination which appears to be restricted to the made ground, which was encountered to be generally shallow, but of significant depth in Borehole No 2. The source of contamination has not been identified and it is recommended that further investigation is carried out, once access becomes available, to determine the extent of any remediation required.

At this stage it is considered that the most cost-effective approach to remediation of the contamination may be to simply remove the made ground in areas where a pathway would be present between the contamination and sensitive receptors, especially as removal will be required in any case in areas of public open space where a suitable thickness of appropriate subsoil and topsoil will be required.

Following the initial site strip it is recommended that all malodorous or stained soils present at formation level should be removed from site; it may be appropriate to leave the soil below the access road but any contaminated soils should be removed from areas of proposed services.

Within soft landscaped areas end users will need to be protected from the identified contaminants within the made ground. At this stage it is recommended that a cover thickness of imported subsoil and topsoil of 600 mm in thickness should be specified to ensure successful plant growth and protect end users, in accordance with recommendations from BRE[4]. It may be possible to reduce the final thickness of cover required, but this will need to be determined once final levels have been established and the concentrations of potential contaminants within the imported material are known.

Elevated concentrations of hydrocarbons have been encountered which can pose a vapour risk to end users within buildings. If the remediation strategy does not remove all the potential hydrocarbon contamination it would be prudent to allow for the inclusion of vapour resistant membranes within the new buildings. Alternatively additional investigation and / or monitoring could be carried out to assess the level of risk associated with hydrocarbon vapours.

As noted above, further investigation is however required to confirm that these proposals are sufficient.

### 7.7.2 Groundwater

Perched groundwater was encountered in one of the trial pits and the introduction of soft landscaped areas will create a pathway for surface runoff to percolate through the made ground and mobilise contamination. However, the measures noted above will remove the significant contamination from the made ground and hence there will be no risk to groundwater.

### 7.7.3 Adjacent Sites

As noted above, the measures to protect end users will inhibit the pathway for migration of contamination to adjacent sites.

### 7.7.4 Site Workers

Concentrations of potentially toxic and carcinogenic metals, sulphides, PAH and TPH have been measured in the soils. Site workers should be made aware of the contamination and a programme of working should be identified to protect workers handling any soil. The method of site working should be in accordance with guidelines set out by HSE[5] and CIRIA[6] and the requirements of the Local Authority Environmental Health Officer.

4 BRE (2004) *Cover systems for land regeneration. Thickness of cover systems for contaminated land.* BRE pub 465
5 HSE (1992) HS(G)66 *Protection of workers and the general public during the development of contaminated land* HMSO
6 CIRIA (1996) *A guide for safe working on contaminated sites* Report 132, Construction Industry Research and Information Association

### 7.7.5 Services and Foundations

Consideration may need to be given to the protection of buried plastic services laid within the made ground. Details of the proposed protection measures for buried plastic services will in any case need to be approved by the EHO and the relevant service authority prior to the adoption of any scheme. It is possible that barrier pipe will be required or additional testing will need to be carried out.

Foundations may need to be protected if placed in soil contaminated with hydrocarbons and sulphates. The concrete mix should be designed in accordance to best practice and in relation to contamination recorded at the site. Alternatively, barriers around the foundations could be used.

As with any previously developed site, there may be contamination in areas that have not been investigated and it should be noted that only a limited number of samples have been subject to contamination testing. A watching brief should be maintained during groundworks and if any suspicious soils are encountered they should be the subject of further investigation.

## 7.8 Waste Disposal

Any spoil arising from excavations or landscaping works will need to be disposed of to a licensed tip. Under the European Waste Directive landfills are classified as accepting inert, non-hazardous or hazardous wastes in accordance with the EU waste Directive.

Based upon on the technical guidance provided by the Environment Agency[7] it is considered likely that the made ground from this site, as represented by the eight chemical analyses carried out, would be classified as Hazardous waste, which is due to the high concentrations of TPH. It should be possible to segregate or zone material containing high concentrations of TPH to keep hazardous waste to a minimum; if this is done the majority of the made ground could be classified as non-hazardous waste. Natural soils may be classified as an Inert waste.

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[8] 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 onsite prior to excavation by sufficiently characterising the soils insitu prior to excavation.

The above opinion with regard to the classification of the excavated soils 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.

7 Environment Agency May 2008. Hazardous Waste: Interpretation of the definition and classification of hazardous waste. Technical Guidance WM2 Second Edition Version 2.2

8 Regulatory Position Statement *Treating non-hazardous waste for landfill - Enforcing the new requirement* Environment Agency 23 Oct 2007

## 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 has provided an assessment of the ground conditions based on the discrete points at which the ground was sampled, but the ground conditions should be subject to review as the work proceeds to ensure that any variations from the Ground Model are properly assessed by a suitably qualified person.

Significant concentrations of contamination have been recorded at the site. Further investigation is required to determine the extent of the contamination and the scope of remediation required.

Depending on the layout of the proposed buildings with respect to the line of the deep sewer and associated zone of deep made ground, it may be feasible to adopt spread foundations. Additional investigation is likely to be required to profile the thickness of the made ground either side of the sewer.

# APPENDIX

Borehole Records

Trial Pit Records

SPT & Cohesion Depth Graph

**Laboratory Test Results**
:Geotechnical Results Summary
:Chemical Analyses (Soil)

Generic Guideline Values

Envirocheck Analysis

Site Plan

| Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>AL4 0PG | Site<br>30a Highgate Road, London, NW5 1NS | Borehole Number<br>BH1 |
|---|---|---|---|

| Boring Method | Casing Diameter | Ground Level (mOD) | Client | Job Number |
|---|---|---|---|---|
| Cable Percussion | 150mm to 1.50m | | Mr Colin Serlin | J12041 |
| | **Location** | **Dates**<br>08/03/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>1/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (0.10) | Tarmac | | |
| | | | | | | 0.10 | | | |
| | | | | | | (0.10) | Concrete | | |
| | | | | | | 0.20 | | | |
| 0.50 | D1 | | | | | (0.40) | MADE GROUND (brown clayey gravelly sand with concrete fragments) | | |
| | | | | | | 0.60 | | | |
| 1.00 | D2 | | | | | (0.80) | MADE GROUND (brown and grey silty sandy gravelly clay with brick and chalk fragments and hydrocarbon odour) | | |
| 1.20-1.65<br>1.20 | CPT N=9<br>B1 | 1.20 | DRY | 1,2/1,2,3,3 | | 1.40 | | | |
| 2.00-2.45 | U1 | | | | | | Firm becoming stiff brown mottled grey fissured high to very high strength silty CLAY with selenite crystals | | |
| 2.50 | D3 | | | | | | | | |
| 2.70 | D4 | | | | | | | | |
| 3.00-3.45<br>3.00 | SPT N=9<br>S1 | 1.20 | DRY | 1,2/2,2,2,3 | | | | | |
| 3.80 | D5 | | | | | | | | |
| 4.00-4.45 | U2 | | | | | | | | |
| 4.50 | D6 | | | | | | | | |
| 4.80 | D7 | | | | | | | | |
| 5.00-5.45<br>5.00 | SPT N=15<br>S2 | 1.20 | DRY | 2,2/3,3,4,5 | | (7.90) | | | |
| 6.00-6.45 | U3 | | | | | | | | |
| 6.50 | D8 | | | | | | | | |
| 7.50-7.95<br>7.50 | SPT N=19<br>S3 | 1.20 | DRY | 2,3/4,5,5,5 | | | | | |
| 9.00-9.45 | U4 | | | | | | | | |
| | | | | | | 9.30 | | | |
| 9.50 | D9 | | | | | | Stiff brownish grey fissured high and very high strength silty CLAY with selenite crystals | | |

**Remarks**
Starter pit excavated to 1.2 m, 1 hr 15 mins
Groundwater not encountered
Standpipe installed to a depth of 4.0 m
Tidying borehole position, 45 mins

| Scale (approx) | Logged By |
|---|---|
| 1:50 | ME |

**Figure No.**
J12041.BH1

| Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>AL4 0PG | Site<br>30a Highgate Road, London, NW5 1NS | Borehole Number<br>BH1 |
|---|---|---|---|

| Boring Method | Casing Diameter | Ground Level (mOD) | Client | Job Number |
|---|---|---|---|---|
| Cable Percussion | 150mm to 1.50m | | Mr Colin Serlin | J12041 |
| | **Location** | **Dates**<br>08/03/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>2/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|---|---|---|---|---|---|---|---|---|---|
| 10.50-10.95<br>10.50 | SPT N=22<br>S4 | 1.20 | DRY | 3,4/5,5,5,7 | | | | | |
| 12.00-12.45 | U5 | | | | | | | | |
| 12.50 | D10 | | | | | (5.70) | | | |
| 13.50-13.95<br>13.50 | SPT N=26<br>S5 | 1.20 | DRY | 4,4/5,6,7,8 | | | | | |
| 14.50-14.95 | U6 | | | | | | | | |
| 15.00 | D11 | | | | | 15.00 | Complete at 15.00m | | |

| Remarks | Scale (approx) | Logged By |
|---|---|---|
| | 1:50 | ME |
| | Figure No.<br>J12041.BH1 | |

| Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>AL4 0PG | **Site**<br>30a Highgate Road, London, NW5 1NS | **Borehole Number**<br>**BH2** |
|---|---|---|---|

| **Boring Method** | **Casing Diameter** | **Ground Level (mOD)** | **Client** | **Job Number** |
|---|---|---|---|---|
| Cable Percussion | 150mm to 1.50m | | Mr Colin Serlin | J12041 |
| | **Location** | **Dates**<br>08/03/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>1/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (0.10) | Tarmac | | |
| | | | | | | 0.10 | | | |
| | | | | | | (0.15) | Concrete | | |
| | | | | | | 0.25 | | | |
| 0.60 | D1 | | | | | (1.15) | MADE GROUND (brown clayey gravelly sand with brick and concrete fragments) | | |
| 1.20-1.65<br>1.20 | CPT N=5<br>B1 | 1.20 | DRY | 1,1/1,1,1,2 | | 1.40 | | | |
| 2.00-2.45<br>2.00 | CPT N=5<br>B2 | 1.50 | DRY | 1,0/1,1,2,1 | | | MADE GROUND (brown mottled dark brown silty sandy gravelly clay with occasional brick fragments) | | |
| | | | | | | (2.50) | | | |
| 2.80 | D2 | | | | | | | | |
| 3.00-3.45<br>3.00 | CPT N=6<br>B3 | 1.50 | DRY | 1,1/1,2,1,2 | | | | | |
| 3.90 | D3 | | | | | 3.90 | | | |
| 4.00-4.45<br>4.10 | SPT N=12<br>S1 | 1.50 | DRY | 2,2/2,3,3,4 | | | Firm becoming stiff brown mottled grey fissured high stregth silty CLAY with occasional selenite crystals | | |
| 5.00-5.45 | U1 | | | | | | | | |
| 5.50 | D4 | | | | | | | | |
| 6.00-6.45<br>6.00 | SPT N=18<br>S2 | 1.50 | DRY | 2,3/3,4,5,6 | | | | | |
| | | | | | | (5.90) | | | |
| 7.50-7.95 | U2 | | | | | | | | |
| 8.00 | D5 | | | | | | | | |
| 9.00-9.45<br>9.00 | SPT N=19<br>S3 | 1.50 | DRY | 3,3/4,4,5,6 | | | | | |
| | | | | | | 9.80 | | | |
| 9.90 | D6 | | | | | | Stiff brownish grey fissured high strength silty CLAY with | | |

**Remarks**
Starter pit excavated to 1.2 m, 1 hr 30 mins
Groundwater not encountered
Standpipe installed to a depth of 4.0 m
Cleaning, tidying borehole position and bagging excess spoil, 45 mins

| **Scale (approx)** | **Logged By** |
|---|---|
| 1:50 | ME |

**Figure No.**
J12041.BH2

| Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>AL4 0PG | **Site**<br>30a Highgate Road, London, NW5 1NS | **Borehole Number**<br>**BH2** |
|---|---|---|---|

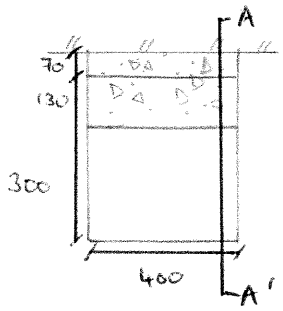
| **Boring Method** | **Casing Diameter** | **Ground Level (mOD)** | **Client** | **Job Number** |
|---|---|---|---|---|
| Cable Percussion | 150mm to 1.50m | | Mr Colin Serlin | J12041 |
| | **Location** | **Dates**<br>08/03/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>2/2 |

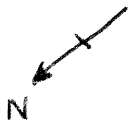
| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | selenite crystals and occasional fine sandy silt partings | | |
| 10.50-10.95 | U3 | | | | | | | | |
| 11.00 | D7 | | | | | | | | |
| 12.00-12.45<br>12.00 | SPT N=21<br>S4 | 1.50 | DRY | 3,4/4,5,6,6 | | (5.20) | | | |
| 13.50-13.95 | U4 | | | | | | | | |
| 14.00 | D8 | | | | | | | | |
| 14.50-14.95<br>14.50 | SPT N=28<br>S5 | 1.50 | DRY | 4,5/6,6,8,8 | | 15.00 | Complete at 15.00m | | |

| **Remarks** | **Scale (approx)** | **Logged By** |
|---|---|---|
| | 1:50 | ME |
| | **Figure No.** | J12041.BH2 |

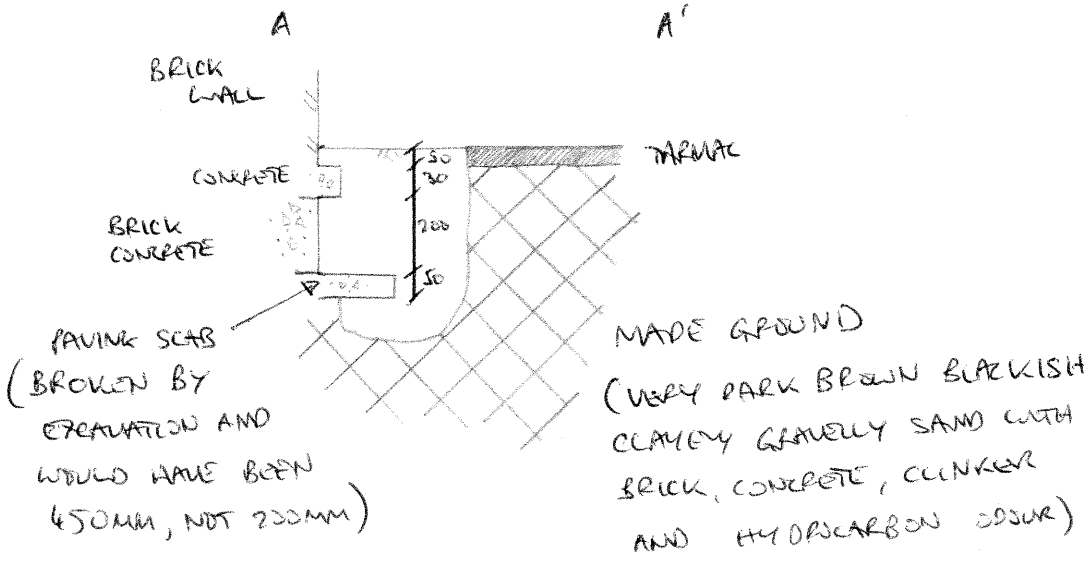
| | | | | |
|---|---|---|---|---|
| GEA Geotechnical & Environmental Associates<br>Tyttenhanger House<br>Coursers Road<br>St Albans<br>Herts AL4 0PG | | | **Site**<br>30a Highgate Road, London, NW5 1NS | **Trial Pit Number**<br>1 |
| **Excavation Method**<br>Manual | **Dimensions (mm)** | **Ground Level (mOD)** | **Client**<br>Mr Colin Serlin | **Job Number**<br>J12041 |
| | **Location** | **Dates**<br>12-13/3/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>1 / 1 |

PLAN




SECTION

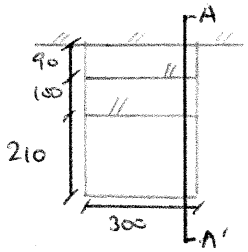



| | |
|---|---|
| Remarks:<br>All dimensions in millimetres<br>Sides of trial pit remained stable during excavation<br>Groundwater not encountered | Scale:<br>1:20<br>Logged by:<br>ME |

| GEA Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>Herts AL4 0PG | **Site**<br>30a Highgate Road, London, NW5 1NS | **Trial Pit Number**<br>2 |
|---|---|---|---|

| **Excavation Method**<br>Manual | **Dimensions (mm)** | **Ground Level (mOD)** | **Client**<br>Mr Colin Serlin | **Job Number**<br>J12041 |
|---|---|---|---|---|
| | **Location** | **Dates**<br>12-13/3/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>1 / 1 |

PLAN





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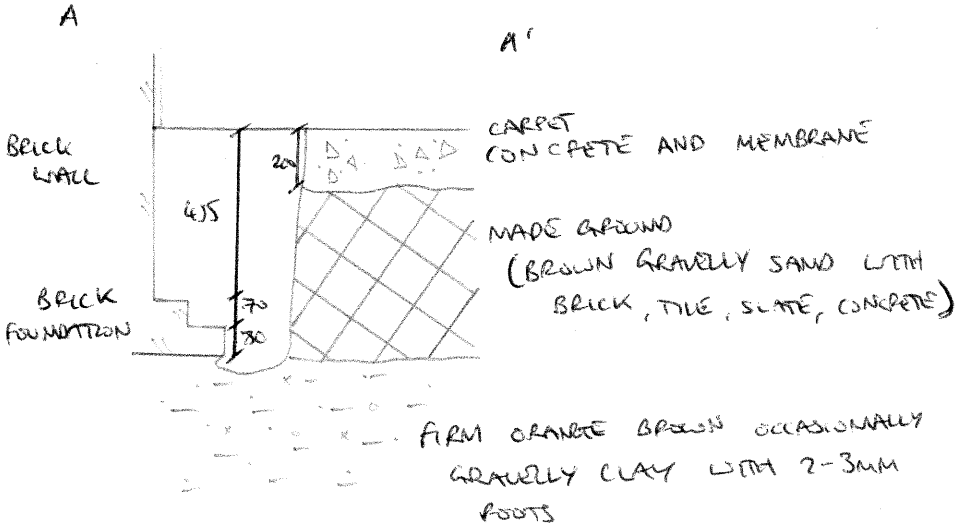
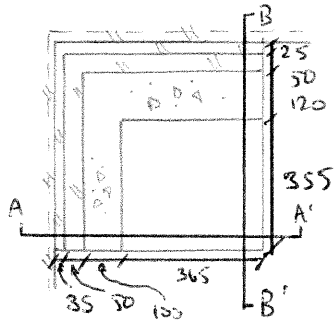



| Remarks: | Scale: |
|---|---|
| All dimensions in millimetres | 1:20 |
| Sides of trial pit remained stable during excavation | Logged by: |
| Groundwater not encountered | ME |

| Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>Herts AL4 0PG | **Site**<br>30a Highgate Road, London, NW5 1NS | **Trial Pit Number**<br>3 |
|---|---|---|---|

| **Excavation Method**<br>Manual | **Dimensions (mm)** | **Ground Level (mOD)** | **Client**<br>Mr Colin Serlin | **Job Number**<br>J12041 |
|---|---|---|---|---|
| | **Location** | **Dates**<br>12-13/3/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>1 / 1 |

PLAN





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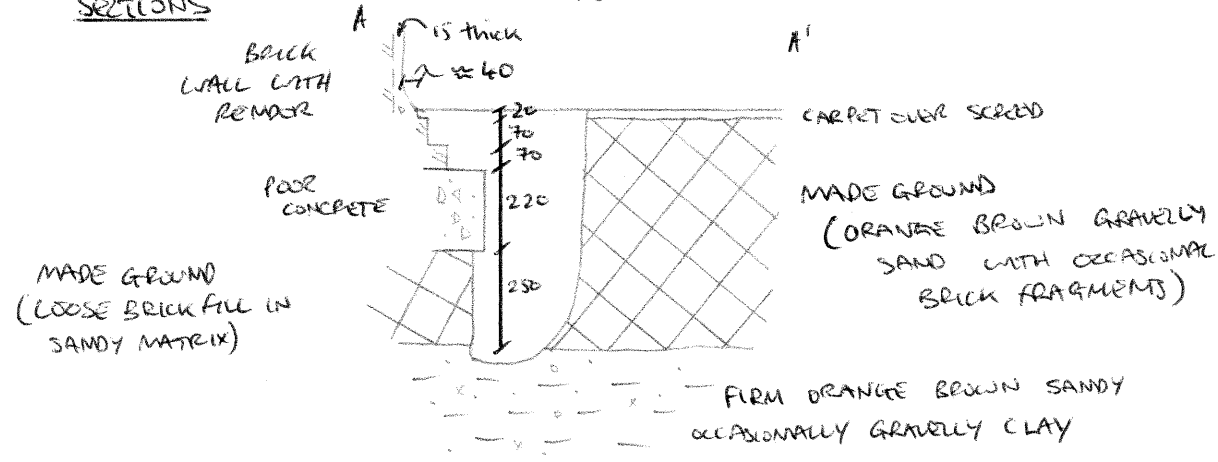
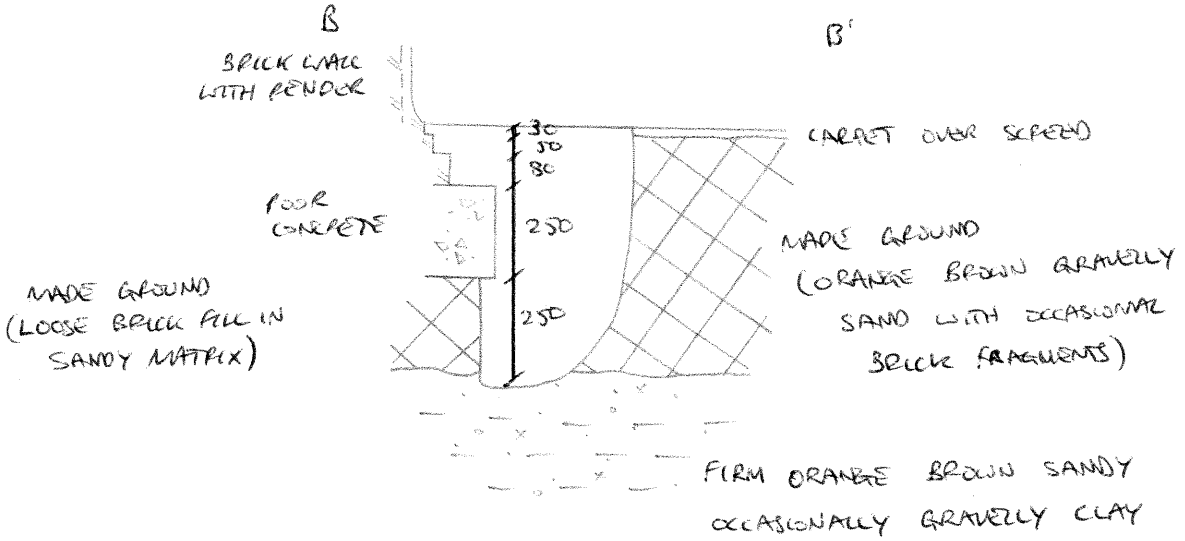


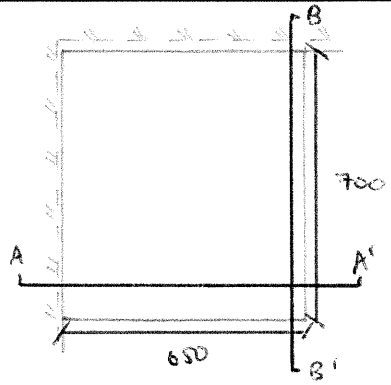




| Remarks: | Scale: |
|---|---|
| All dimensions in millimetres | 1:20 |
| Sides of trial pit remained stable during excavation | Logged by: |
| Groundwater not encountered | ME |

| Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>Herts AL4 0PG | **Site**<br>30a Highgate Road, London, NW5 1NS | **Trial Pit Number**<br>4 |
|---|---|---|---|

| **Excavation Method**<br>Manual | **Dimensions (mm)** | **Ground Level (mOD)** | **Client**<br>Mr Colin Serlin | **Job Number**<br>J12041 |
|---|---|---|---|---|
| | **Location** | **Dates**<br>12-13/3/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>1 / 1 |

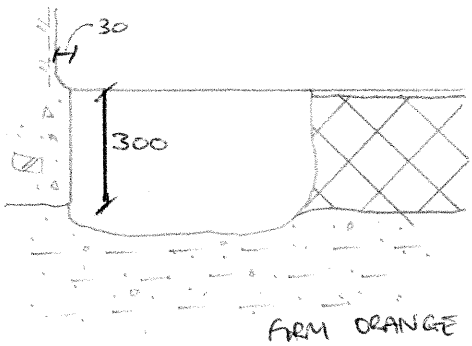
PLAN





SECTIONS

A



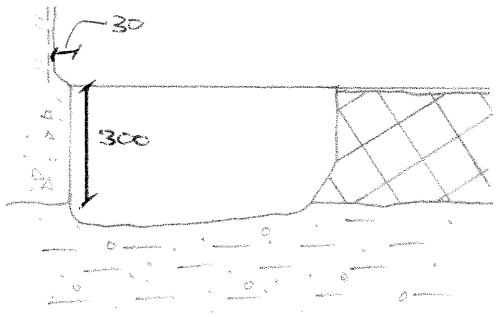

A'

BRICK CONCRETE

SCREED
MADE GROUND (BROWN GRAVELLY SAND WITH BRICK AND CONCRETE)

FIRM ORANGE BROWN SANDY GRAVELLY CLAY

B




B'

BRICK CONCRETE

SCREED
MADE GROUND
(BROWN GRAVELLY SAND WITH BRICK AND CONCRETE)

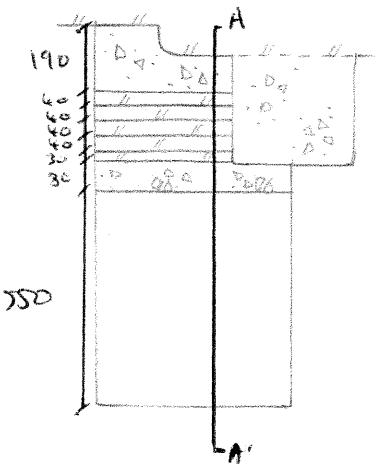
FIRM ORANGE BROWN SANDY GRAVELLY CLAY

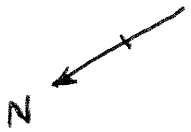
| Remarks: | Scale: |
|---|---|
| All dimensions in millimetres | 1:20 |
| Sides of trial pit remained stable during excavation | Logged by: |
| Groundwater not encountered | ME |

| GEA Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>Herts AL4 0PG | Site<br>30a Highgate Road, London, NW5 1NS | Trial Pit Number<br>5 |
|---|---|---|---|

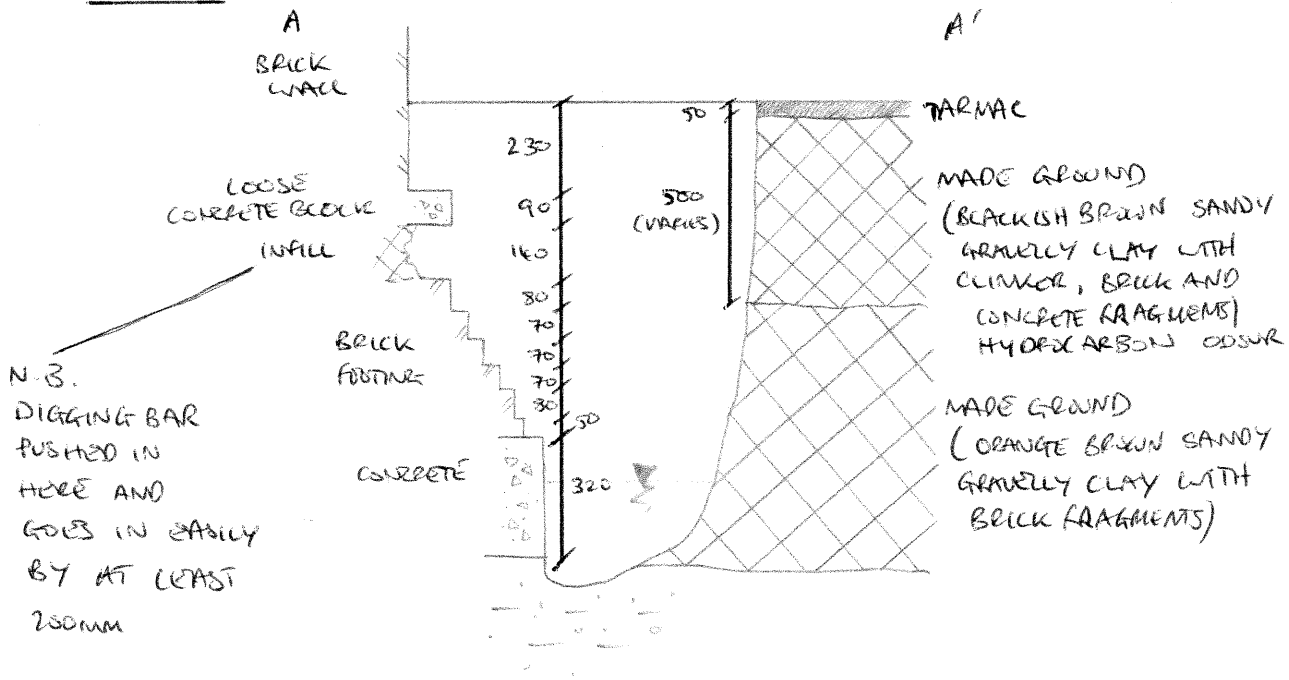
| Excavation Method<br>Manual | Dimensions (mm) | Ground Level (mOD) | Client<br>Mr Colin Serlin | Job Number<br>J12041 |
|---|---|---|---|---|
| | Location | Dates<br>12-13/3/2012 | Engineer<br>Elliott Wood Partnership | Sheet<br>1 / 1 |

PLAN




SECTION

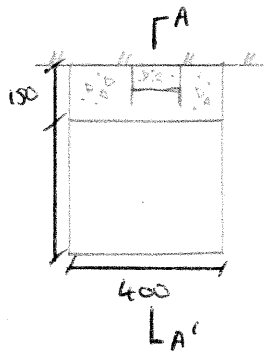



WATER ENTERING PIT FROM MADE GROUND RESTING AT ABOUT 1.0M - PUMP USED TO CONFIRM FOUNDATION BASE. OILY SHEEN NOTED ON WATER

| Remarks:<br>All dimensions in millimetres<br>Sides of trial pit unstable during excavation | Scale:<br>1:20 |
|---|---|
| | Logged by:<br>ME |

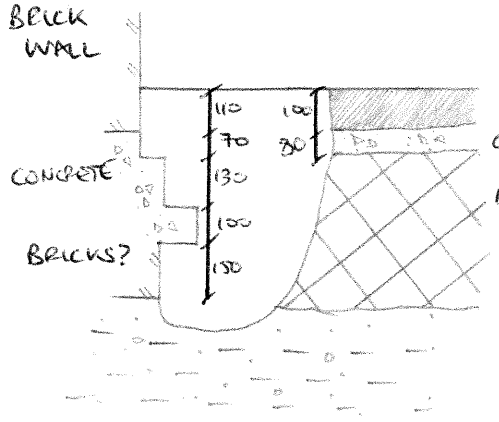
| GEA Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>Herts AL4 0PG | **Site**<br>30a Highgate Road, London, NW5 1NS | **Trial Pit Number**<br>6 |
|---|---|---|---|
| **Excavation Method**<br>Manual | **Dimensions (mm)** | **Ground Level (mOD)** | **Client**<br>Mr Colin Serlin | **Job Number**<br>J12041 |
| | **Location** | **Dates**<br>12-13/3/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>1 / 1 |

PLAN





SECTION

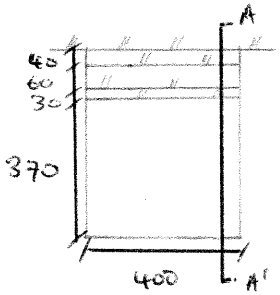



NB
'I' BEAM TYPE ARRAGMENT, BUT OF CONCRETE NOT STEEL.

| Remarks: | Scale: |
|---|---|
| All dimensions in millimetres | 1:20 |
| Sides of trial pit remained stable during excavation | Logged by: |
| Groundwater not encountered | ME |

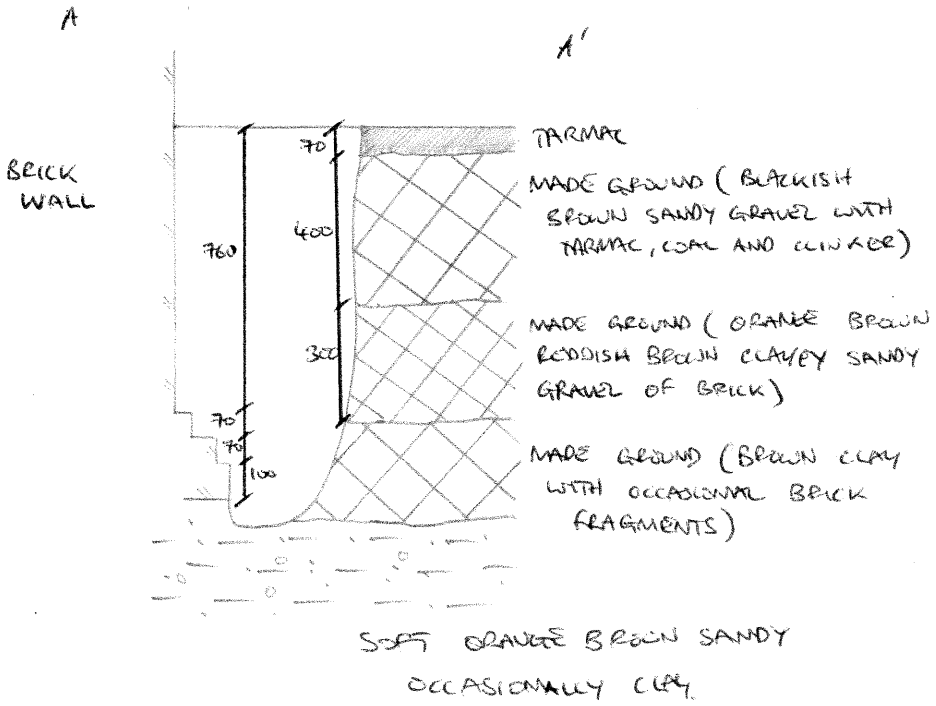
| GEA Geotechnical & Environmental Associates | Tyttenhanger House<br>Coursers Road<br>St Albans<br>Herts AL4 0PG | **Site**<br>30a Highgate Road, London, NW5 1NS | **Trial Pit Number**<br>7 |
|---|---|---|---|
| **Excavation Method**<br>Manual | **Dimensions (mm)** | **Ground Level (mOD)** | **Client**<br>Mr Colin Serlin | **Job Number**<br>J12041 |
| | **Location** | **Dates**<br>12-13/3/2012 | **Engineer**<br>Elliott Wood Partnership | **Sheet**<br>1 / 1 |

PLAN





SECTION




| Remarks: | Scale: |
|---|---|
| All dimensions in millimetres | 1:20 |
| Sides of trial pit remained stable during excavation | Logged by: |
| Groundwater not encountered | ME |

Geotechnical & Environmental Associates

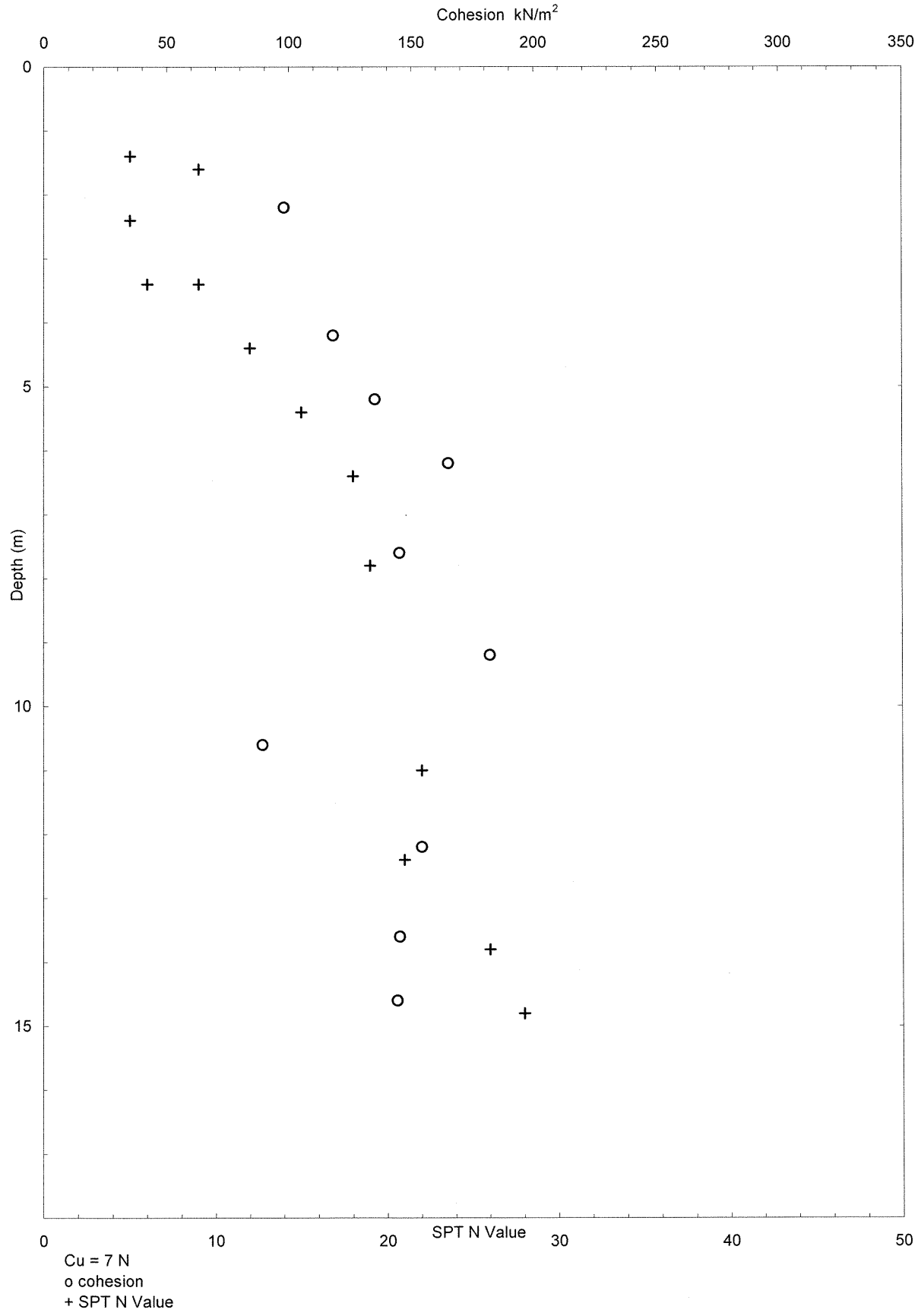
Tyttenhanger House
Coursers Road
St Albans
Herts AL4 0PG

# SPT & Cohesion / Depth Graph

| | |
|---|---|
| **Site** | 30a Highgate Road, London, NW5 1NS |
| **Client** | Mr Colin Serlin |
| **Engineer** | Elliott Wood Partnership |

**Job Number** J12041

**Sheet** 1 / 1



| | | |
|---|---|---|
| **PROJECT NAME** | **30a HIGHGATE ROAD, LONDON** | |
| | **Project Number: J12041** | |
| **PROJECT NO:** | **GEO / 18042** | |

| | |
|---|---|
| Date | 03/04/2012 |
| Approved | *Simon Burke* |
| Page | 1 of 2 |

| Sample details | | | | | Classification Tests | | | | | Density Tests | | Undrained Triaxial Compression Tests | | | Chemical Tests | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Borehole No. | Depth (m) | No. | Type | Description | MC (%) | LL (%) | PL (%) | PI (%) | <425 mic (%) | Bulk (Mg/m³) | Dry (Mg/m³) | Cell Pressure (kPa) | Deviator Stress (kPa) | Shear Stress (kPa) | pH | 2:1 W/S SO4 (g/l) | Magnesium Water Soluble (mg/kg) | Other tests and comments |
| BH1 | 2.00 - 2.45 | 1 | U | Firm to stiff brown with grey veins CLAY | 33 | 73 | 27 | 46 | 100 | 1.97 | 1.48 | 40 | 196 | 98 | 8.5 | 0.75 | | California Bearing Ratio Test |
| BH1 | 4.00 - 4.45 | 2 | U | Stiff brown with grey veins CLAY | 29 | | | | | 1.95 | 1.51 | 80 | 235 | 118 | | | | |
| BH1 | 6.00 - 6.45 | 3 | U | Stiff brown CLAY | 29 | 72 | 28 | 44 | 100 | 1.99 | 1.54 | 120 | 331 | 165 | | | | |
| BH1 | 9.00 - 9.45 | 4 | U | Stiff brown CLAY | 32 | | | | | 1.95 | 1.48 | 180 | 364 | 182 | | | | |
| BH1 | 12.00 - 12.45 | 5 | U | Very stiff dark brown CLAY | 29 | | | | | 1.98 | 1.53 | 240 | 309 | 154 | | | | |
| BH1 | 14.50 - 14.95 | 6 | U | Very stiff dark brown CLAY | 28 | | | | | 1.97 | 1.54 | 290 | 288 | 144 | | | | |
| BH2 | 4.10 | 1 | S | Stiff brown silty CLAY with rare grey staining and selenite crystals | 28 | 69 | 26 | 43 | 100 | | | | | | 7.9 | 4.8 | 460 | |
| BH2 | 5.00 - 5.45 | 1 | U | Stiff brown with grey veins CLAY with rare pockets of selenite crystals | 30 | | | | | 1.97 | 1.51 | 100 | 270 | 135 | | | | |
| BH2 | 7.50 - 7.95 | 2 | U | Stiff brown CLAY | 30 | | | | | 1.99 | 1.53 | 150 | 290 | 145 | | | | |
| BH2 | 10.50 - 10.95 | 3 | U | Stiff brown CLAY | 31 | | | | | 1.95 | 1.48 | 210 | 177 | 89 | | | | |
| BH2 | 13.50 - 13.95 | 4 | U | Very stiff dark brown CLAY | 27 | | | | | 2.01 | 1.58 | 270 | 291 | 145 | | | | |
| BH2 | 14.50 | 5 | S | Stiff dark grey-brown silty CLAY | 27 | 78 | 28 | 50 | 100 | | | | | | | | | |

# SUMMARY OF GEOTECHNICAL TESTING

GEOLABS®





Client: Geotechnical & Environmental Associates Limited, Tyttenhanger House, Courses Road, St Albans, Hertfordshire AL4 0PG

| | | | |
|---|---|---|---|
| **PROJECT NAME** | **30a HIGHGATE ROAD, LONDON** | Date | 03/04/2012 |
| | **Project Number: J12041** | Approved | *Simon Burke* |
| **PROJECT NO:** | **GEO / 18042** | Page | 2 of 2 |

| Sample details | | | | | Classification Tests | | | | | Density Tests | | Undrained Triaxial Compression Tests | | | Chemical Tests | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Borehole No. | Depth (m) | No. | Type | Description | MC (%) | LL (%) | PL (%) | PI (%) | <425 mic (%) | Bulk (Mg/m³) | Dry (Mg/m³) | Cell Pressure (kPa) | Deviator Stress (kPa) | Shear Stress (kPa) | pH | 2:1 W/S SO4 (g/l) | Ground Water SO4 (g/l) | Other tests and comments |
| TP7 | 1.00 | - | B | Firm brown, grey and orange sandy gravelly CLAY | 29 | 60 | 27 | 33 | 81 | | | | | | | | | |
| TP2 | 0.80 | - | D | Stiff brown and orange sandy CLAY with rare fine gravel | 26 | 56 | 23 | 33 | 99 | | | | | | 8.1 | 0.48 | | |
| BH2 | 1.20 | - | B | MADE GROUND: (Soft brown silty clay inter mixed with black sand sized ash, coarse concrete and fine to medium brick) | | | | | | | | | | | | | | California Bearing Ratio Test |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
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# SUMMARY OF GEOTECHNICAL TESTING

GEOLABS®

BS1377 : Part 7 : Clause 8 : 1990

# Quick Undrained Triaxial Compression Test

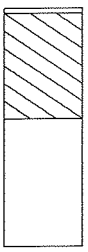
| | |
|---|---|
| Borehole Number: | BH1 |
| Sample Number: | 1 |
| Depth (m): | 2.00 - 2.45 |

Description:
Firm to stiff brown with grey veins CLAY

## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 202.8 |
| Diameter (mm): | 101.9 |
| Moisture Content (%): | 33 |
| Bulk Density (Mg/m³): | 1.97 |
| Dry Density (Mg/m³): | 1.48 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.8 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 40 |
| Strain at failure (%): | 12.8 |
| Maximum Deviator Stress (kPa): | 196 |
| Shear Stress Cu (kPa): | 98 |

Orientation and position of sample



Mode of failure:

Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: GEO / 18042

Project Name: 30a HIGHGATE ROAD, LONDON

Project Number: J12041

UKAS TESTING 1982

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BS1377 : Part 7 : Clause 8 : 1990

# Quick Undrained Triaxial Compression Test

| | |
|---|---|
| Borehole Number: | BH1 |
| Sample Number: | 2 |
| Depth (m): | 4.00 - 4.45 |

Description:
Stiff brown with grey veins CLAY

## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 202.1 |
| Diameter (mm): | 103.4 |
| Moisture Content (%): | 29 |
| Bulk Density (Mg/m³): | 1.95 |
| Dry Density (Mg/m³): | 1.51 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.7 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 80 |
| Strain at failure (%): | 10.4 |
| Maximum Deviator Stress (kPa): | 235 |
| Shear Stress Cu (kPa): | 118 |

Orientation and position of sample

Mode of failure:

Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: GEO / 18042

Project Name: 30a HIGHGATE ROAD, LONDON

Project Number: J12041

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# Quick Undrained Triaxial Compression Test

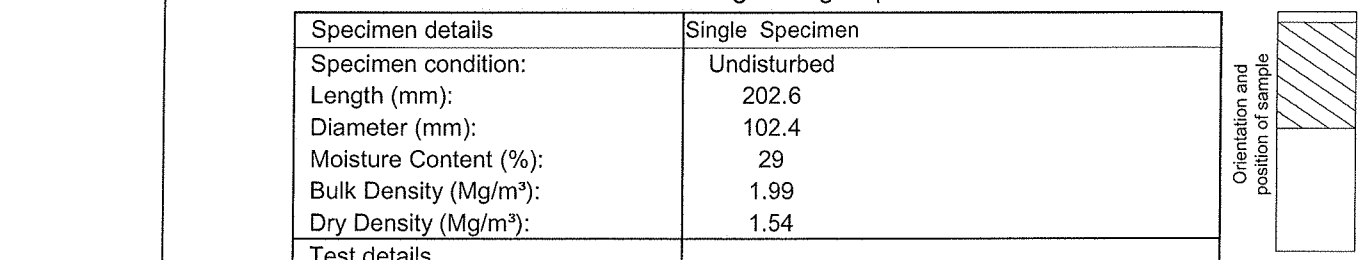
| | |
|---|---|
| Borehole Number: | BH1 |
| Sample Number: | 3 |
| Depth (m): | 6.00 - 6.45 |

Description:
Stiff brown CLAY

## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 202.6 |
| Diameter (mm): | 102.4 |
| Moisture Content (%): | 29 |
| Bulk Density (Mg/m³): | 1.99 |
| Dry Density (Mg/m³): | 1.54 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.5 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 120 |
| Strain at failure (%): | 6.9 |
| Maximum Deviator Stress (kPa): | 331 |
| Shear Stress Cu (kPa): | 165 |

Orientation and position of sample



Mode of failure:

| | | |
|---|---|---|
| Checked and Approved<br>Initials: SB<br>Date: 03/04/2012 | Project Number: GEO / 18042<br>Project Name: 30a HIGHGATE ROAD, LONDON<br>Project Number: J12041 | GEOLABS® |

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# Quick Undrained Triaxial Compression Test

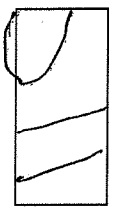
| | |
|---|---|
| Borehole Number: | BH1 |
| Sample Number: | 4 |
| Depth (m): | 9.00 - 9.45 |

Description:
Stiff brown CLAY

## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 204.9 |
| Diameter (mm): | 103.0 |
| Moisture Content (%): | 32 |
| Bulk Density (Mg/m³): | 1.95 |
| Dry Density (Mg/m³): | 1.48 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.3 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 180 |
| Strain at failure (%): | 4.1 |
| Maximum Deviator Stress (kPa): | 364 |
| Shear Stress Cu (kPa): | 182 |

Orientation and position of sample



Mode of failure:

| | | |
|---|---|---|
| Checked and Approved<br>Initials: SB<br>Date: 03/04/2012 | Project Number: GEO / 18042<br>Project Name: 30a HIGHGATE ROAD, LONDON<br>Project Number: J12041 | UKAS TESTING 1982<br>GEOLABS® |

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# Quick Undrained Triaxial Compression Test

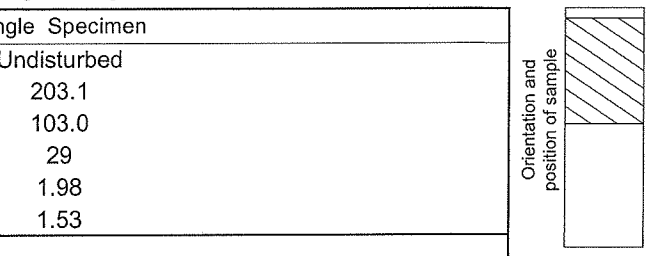
| | |
|---|---|
| Borehole Number: | BH1 |
| Sample Number: | 5 |
| Depth (m): | 12.00 - 12.45 |

Description:
Very stiff dark brown CLAY

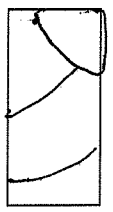
## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 203.1 |
| Diameter (mm): | 103.0 |
| Moisture Content (%): | 29 |
| Bulk Density (Mg/m³): | 1.98 |
| Dry Density (Mg/m³): | 1.53 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.5 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 240 |
| Strain at failure (%): | 6.9 |
| Maximum Deviator Stress (kPa): | 309 |
| Shear Stress Cu (kPa): | 154 |

Orientation and position of sample



Mode of failure:



Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: GEO / 18042

Project Name: 30a HIGHGATE ROAD, LONDON

Project Number: J12041

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# Quick Undrained Triaxial Compression Test

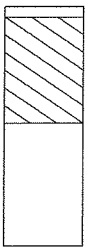
| | |
|---|---|
| Borehole Number: | BH1 |
| Sample Number: | 6 |
| Depth (m): | 14.50 - 14.95 |

Description:
Very stiff dark brown CLAY

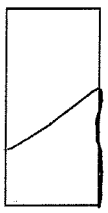
## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 203.5 |
| Diameter (mm): | 103.3 |
| Moisture Content (%): | 28 |
| Bulk Density (Mg/m³): | 1.97 |
| Dry Density (Mg/m³): | 1.54 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.3 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 290 |
| Strain at failure (%): | 3.7 |
| Maximum Deviator Stress (kPa): | 288 |
| Shear Stress Cu (kPa): | 144 |

Orientation and position of sample



Mode of failure:



Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: GEO / 18042

Project Name: 30a HIGHGATE ROAD, LONDON

Project Number: J12041

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# Quick Undrained Triaxial Compression Test

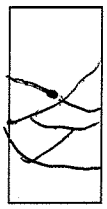
| | |
|---|---|
| Borehole Number: | BH2 |
| Sample Number: | 1 |
| Depth (m): | 5.00 - 5.45 |

Description:
Stiff brown with grey veins CLAY with rare pockets of selenite crystals

## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 204.0 |
| Diameter (mm): | 103.1 |
| Moisture Content (%): | 30 |
| Bulk Density (Mg/m³): | 1.97 |
| Dry Density (Mg/m³): | 1.51 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.5 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 100 |
| Strain at failure (%): | 7.4 |
| Maximum Deviator Stress (kPa): | 270 |
| Shear Stress Cu (kPa): | 135 |

Orientation and position of sample



Mode of failure:

Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: GEO / 18042

Project Name: 30a HIGHGATE ROAD, LONDON

Project Number: J12041

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# Quick Undrained Triaxial Compression Test

| | |
|---|---|
| Borehole Number: | BH2 |
| Sample Number: | 2 |
| Depth (m): | 7.50 - 7.95 |

Description:
Stiff brown CLAY

## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 202.1 |
| Diameter (mm): | 101.6 |
| Moisture Content (%): | 30 |
| Bulk Density (Mg/m³): | 1.99 |
| Dry Density (Mg/m³): | 1.53 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.4 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 150 |
| Strain at failure (%): | 5.9 |
| Maximum Deviator Stress (kPa): | 290 |
| Shear Stress Cu (kPa): | 145 |

Orientation and position of sample



Mode of failure:

Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number:

**GEO / 18042**

Project Name:

**30a HIGHGATE ROAD, LONDON**

**Project Number: J12041**

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# Quick Undrained Triaxial Compression Test

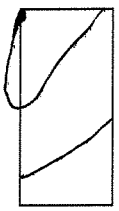
| | |
|---|---|
| Borehole Number: | BH2 |
| Sample Number: | 3 |
| Depth (m): | 10.50 - 10.95 |

Description:
Stiff brown CLAY

## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 202.4 |
| Diameter (mm): | 102.7 |
| Moisture Content (%): | 31 |
| Bulk Density (Mg/m³): | 1.95 |
| Dry Density (Mg/m³): | 1.48 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.3 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 210 |
| Strain at failure (%): | 3.2 |
| Maximum Deviator Stress (kPa): | 177 |
| Shear Stress Cu (kPa): | 89 |

Orientation and position of sample



Mode of failure:

Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: GEO / 18042

Project Name: 30a HIGHGATE ROAD, LONDON

Project Number: J12041

UKAS TESTING 1982

GEOLABS ®

BS1377 : Part 7 : Clause 8 : 1990

# Quick Undrained Triaxial Compression Test

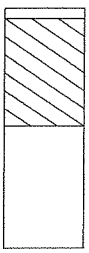
| | |
|---|---|
| Borehole Number: | BH2 |
| Sample Number: | 4 |
| Depth (m): | 13.50 - 13.95 |

Description:
Very stiff dark brown CLAY

## Single Stage Specimen

| Specimen details | Single Specimen |
|---|---|
| Specimen condition: | Undisturbed |
| Length (mm): | 202.7 |
| Diameter (mm): | 102.5 |
| Moisture Content (%): | 27 |
| Bulk Density (Mg/m³): | 2.01 |
| Dry Density (Mg/m³): | 1.58 |
| **Test details** | |
| Latex membrane thickness (mm): | 0.3 |
| Membrane correction (kPa): | 0.3 |
| Axial displacement rate (%/min): | 2.0 |
| Cell pressure (kPa): | 270 |
| Strain at failure (%): | 3.7 |
| Maximum Deviator Stress (kPa): | 291 |
| Shear Stress Cu (kPa): | 145 |

Orientation and position of sample



Mode of failure:

Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: GEO / 18042

Project Name: 30a HIGHGATE ROAD, LONDON

Project Number: J12041

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BS1377 : Part 4 : Clause 7 : 1990

# Determination of California Bearing Ratio

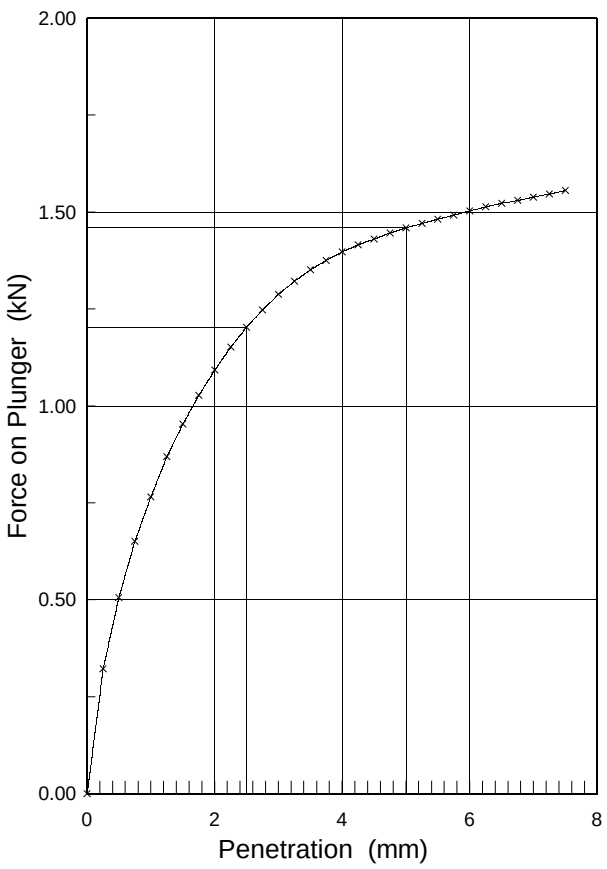
| | | | |
|---|---|---|---|
| Borehole Number: | 1 | Description: | Firm brown silty CLAY |
| Sample Number: | 1 | | |
| Depth (m): | 2.0 - 2.45 | | |

Preparation Details

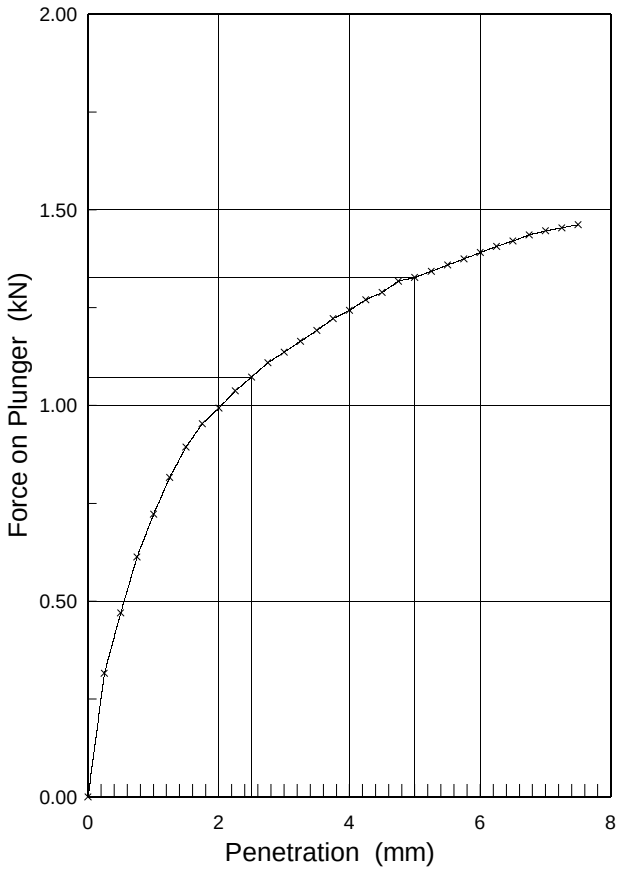
The specimen was tested in an unsoaked condition
The specimen was tested at its existing moisture content
The specimen was prepared by dynamic compaction using a 2.5 kg rammer
Prepared bulk density 1.90 Mg/m³
Prepared dry density 1.45 Mg/m³

| Test Details | Top | Base | |
|---|---|---|---|
| Surcharge | 8.0 kg | 8.0 kg | |
| Seating load | 10 N | 50 N | |
| Moisture content | 30 % | 31 % | |
| CBR Value | 9.1 % | 8.1 % | Mean 8.6 % |

Top of Specimen




Base of Specimen




Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: **GEO / 18042**

Project Name: **30a HIGHGATE ROAD, LONDON**

**Project Number: J12041**

UKAS TESTING 1982

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BS1377 : Part 4 : Clause 7 : 1990

# Determination of California Bearing Ratio

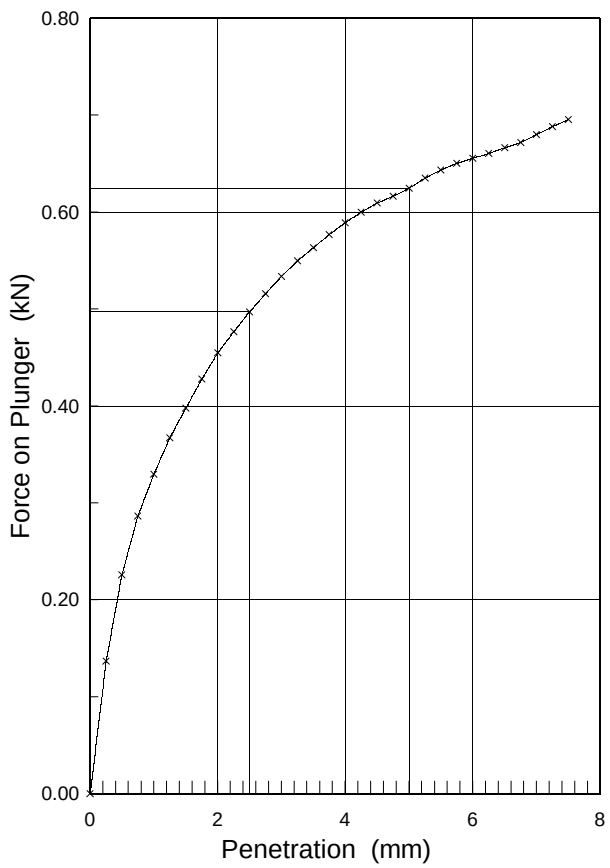
| | |
|---|---|
| Borehole Number: 2<br>Sample Number: -<br>Depth (m): 1.20 | Description: MADE GROUND: (Soft brown silty clay inter mixed with black sand sized ash, coarse concrete and fine to medium brick) |

Preparation Details

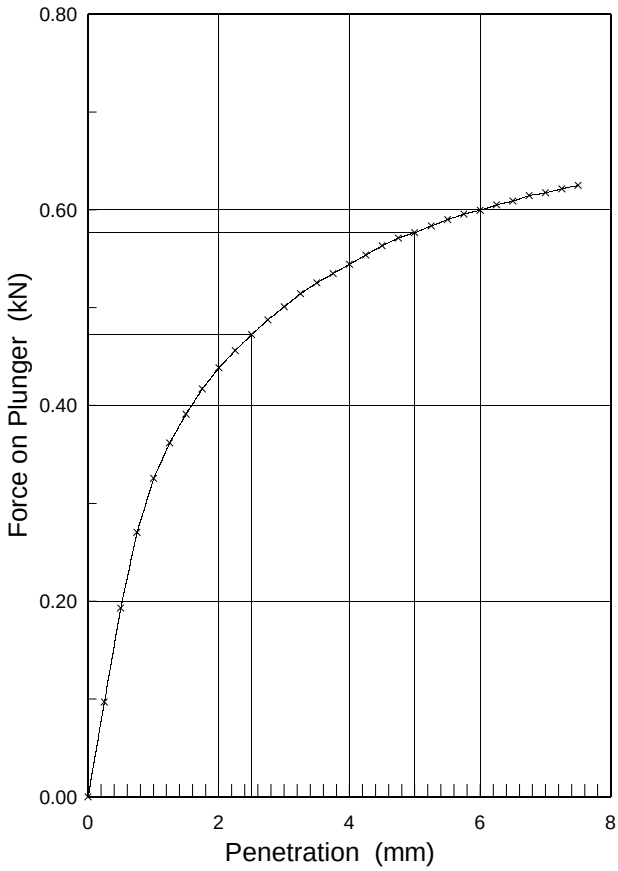
The specimen was tested in an unsoaked condition
The specimen was tested at its existing moisture content
The specimen was prepared by dynamic compaction using a 2.5 kg rammer
Prepared bulk density 1.88 Mg/m³
Prepared dry density 1.42 Mg/m³
3.9 % of the sample was retained on a 20mm sieve

| Test Details | Top | Base | |
|---|---|---|---|
| Surcharge | 8.0 kg | 8.0 kg | |
| Seating load | 10 N | 10 N | |
| Moisture content | 32 % | 33 % | |
| CBR Value | 3.8 % | 3.6 % | Mean 3.7 % |

Top of Specimen




Base of Specimen




Checked and Approved

Initials: SB

Date: 03/04/2012

Project Number: **GEO / 18042**

Project Name: **30a HIGHGATE ROAD, LONDON**

**Project Number: J12041**

UKAS TESTING 1982

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GEA
Tyttenhanger House
Coursers Road
St Albans Herts
AL4 0PG

FAO Matthew Elcock

# LABORATORY TEST REPORT

**Results of analysis of 8 samples**
**received 19 March 2012**

**30a Highgate Road, London - J12041**

Chemtest
The right chemistry to deliver results

**Report Date**
**27 March 2012**

| Login Batch No | | | | | 202745 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chemtest LIMS ID | | | | | AH11989 | AH11990 | AH11991 | AH11992 | AH11993 | AH11994 | AH11996 | AH11997 |
| Sample ID | | | | | BH1 | BH2 | BH2 | TP1 | TP4 | TP5 | TP7 | TP2 |
| Sample No | | | | | D2 | D1 | D2 | | | | | |
| Sampling Date | | | | | 08/03/2012 | 08/03/2012 | 08/03/2012 | 13/03/2012 | 30/12/1899 | 30/12/1899 | 30/12/1899 | 30/12/1899 |
| Depth | | | | | 1m | 0.6m | 2.8m | 0.4m | 0.3m | 0.4m | 0.5m | 0.3m |
| *Matrix* | | | | | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* |
| SOP↓ | Determinand↓ | CAS No↓ | Units↓ | * | | | | | | | | |
| 2300 | Cyanide (total) | 57125 | mg kg-¹ | M | <0.50 | <0.50 | <0.50 | 0.60 | <0.50 | <0.50 | <0.50 | <0.50 |
| 2325 | Sulfide (Easily Liberatable) | 18496258 | mg kg-¹ | M | 38 | 95 | 150 | 370 | 18 | 140 | 5.6 | 16 |
| 2625 | Total Organic Carbon | | % | M | 3.3 | 5.7 | 0.75 | 4.1 | 2.3 | 0.99 | 4.6 | 3.3 |
| 2220 | Chloride (extractable) | 16887006 | g l-¹ | M | 0.12 | 0.087 | 0.012 | 0.097 | 0.26 | 0.020 | <0.010 | 0.021 |
| 2430 | Sulfate (total) as SO4 | | mg kg-¹ | M | 9400 | 3900 | 800 | 8200 | 4700 | 600 | 400 | 6400 |
| 2450 | Arsenic | 7440382 | mg kg-¹ | M | 17 | 18 | 9.8 | 12 | 38 | 25 | 18 | 19 |
| | Cadmium | 7440439 | mg kg-¹ | M | 0.33 | 0.14 | 0.18 | 0.50 | 0.27 | <0.10 | <0.10 | <0.10 |
| | Chromium | 7440473 | mg kg-¹ | M | 28 | 21 | 44 | 28 | 38 | 51 | 39 | 37 |
| | Copper | 7440508 | mg kg-¹ | M | 110 | 71 | 26 | 160 | 130 | 79 | 66 | 130 |
| | Mercury | 7439976 | mg kg-¹ | M | 0.48 | 0.75 | <0.10 | 0.49 | 1.6 | 1.3 | 1.1 | 0.74 |
| | Nickel | 7440020 | mg kg-¹ | M | 25 | 27 | 39 | 58 | 51 | 33 | 27 | 28 |
| | Lead | 7439921 | mg kg-¹ | M | 100 | 160 | 56 | 470 | 680 | 410 | 340 | 380 |
| | Selenium | 7782492 | mg kg-¹ | M | 0.48 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| | Zinc | 7440666 | mg kg-¹ | M | 240 | 150 | 73 | 700 | 360 | 180 | 150 | 200 |
| 2670 | TPH >C5-C6 | | mg kg-¹ | U | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | TPH >C6-C7 | | mg kg-¹ | U | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | TPH >C7-C8 | | mg kg-¹ | M | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | TPH >C8-C10 | | mg kg-¹ | M | 4.5 | 0.78 | < 0.1 | 0.76 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | TPH >C10-C12 | | mg kg-¹ | M | 13 | 2.6 | < 0.1 | 4.8 | 0.45 | < 0.1 | < 0.1 | < 0.1 |
| | TPH >C12-C16 | | mg kg-¹ | M | 110 | 45 | 0.40 | 120 | 2.4 | 0.51 | < 0.1 | 4.2 |
| | TPH >C16-C21 | | mg kg-¹ | M | 260 | 360 | 3.9 | 1600 | 11 | 12 | 1.9 | 420 |
| | TPH >C21-C35 | | mg kg-¹ | M | 360 | 690 | 0.94 | 3800 | 20 | 17 | 5.2 | 2000 |
| | Total Petroleum Hydrocarbons | | mg kg-¹ | U | 750 | 1100 | < 10 | 5500 | 34 | 29 | < 10 | 2500 |
| 2700 | Naphthalene | 91203 | mg kg-¹ | M | 1.9 | 2.1 | 1.8 | 1.1 | 0.56 | 2.8 | 1.7 | 0.8 |
| | Acenaphthylene | 208968 | mg kg-¹ | M | 3.3 | 1.1 | 0.71 | 3.1 | 0.21 | 0.2 | 0.2 | 0.21 |
| | Acenaphthene | 83329 | mg kg-¹ | M | 7.5 | 8.2 | 1.1 | 7.6 | 0.28 | 0.99 | 0.36 | 0.16 |
| | Fluorene | 86737 | mg kg-¹ | M | 6.1 | 5.3 | 0.6 | 8.4 | 0.11 | 0.7 | 0.27 | < 0.1 |

All tests undertaken between 20/03/2012 and 23/03/2012

* Accreditation status

***This report should be interpreted in conjunction with the notes on the accompanying cover page.***

GEA
Tyttenhanger House
Coursers Road
St Albans Herts
AL4 0PG

FAO Matthew Elcock

# LABORATORY TEST REPORT

**Results of analysis of 8 samples**
**received 19 March 2012**

**30a Highgate Road, London - J12041**

Chemtest
The right chemistry to deliver results

**Report Date**
**27 March 2012**

| | | | | | 202745 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | AH11989 | AH11990 | AH11991 | AH11992 | AH11993 | AH11994 | AH11996 | AH11997 |
| | | | | | BH1 | BH2 | BH2 | TP1 | TP4 | TP5 | TP7 | TP2 |
| | | | | | D2 | D1 | D2 | | | | | |
| | | | | | 08/03/2012 | 08/03/2012 | 08/03/2012 | 13/03/2012 | 30/12/1899 | 30/12/1899 | 30/12/1899 | 30/12/1899 |
| | | | | | 1m | 0.6m | 2.8m | 0.4m | 0.3m | 0.4m | 0.5m | 0.3m |
| | | | | | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* |
| 2700 | Phenanthrene | 85018 | mg kg-¹ | M | 53 | 70 | 2.5 | 93 | 1.2 | 6.9 | 2.6 | 0.86 |
| | Anthracene | 120127 | mg kg-¹ | M | 19 | 17 | 0.82 | 33 | 0.64 | 1.5 | 1.1 | 0.32 |
| | Fluoranthene | 206440 | mg kg-¹ | M | 80 | 81 | 2.1 | 140 | 2.3 | 7.2 | 4.8 | 1.2 |
| | Pyrene | 129000 | mg kg-¹ | M | 60 | 61 | 1.6 | 100 | 1.8 | 6 | 3.1 | 0.71 |
| | Benzo[a]anthracene | 56553 | mg kg-¹ | M | 34 | 32 | 0.99 | 70 | 1.8 | 3.4 | 2 | 1.1 |
| | Chrysene | 218019 | mg kg-¹ | M | 36 | 35 | 1 | 74 | 1.5 | 3.8 | 2.3 | 0.88 |
| | Benzo[b]fluoranthene | 205992 | mg kg-¹ | M | 34 | 32 | 0.93 | 42 | 1.5 | 3.5 | 2.1 | 0.25 |
| | Benzo[k]fluoranthene | 207089 | mg kg-¹ | M | 20 | 19 | 0.93 | 36 | 0.97 | 2.3 | 1 | 0.23 |
| | Benzo[a]pyrene | 50328 | mg kg-¹ | M | 28 | 26 | 0.89 | 54 | 1.3 | 3.7 | 1.5 | < 0.1 |
| | Dibenzo[a,h]anthracene | 53703 | mg kg-¹ | M | 5.9 | 7.2 | 1.6 | 10 | < 0.1 | 0.55 | 0.24 | < 0.1 |
| | Indeno[1,2,3-cd]pyrene | 193395 | mg kg-¹ | M | 21 | 20 | 1.3 | 34 | 0.65 | 2.4 | 1 | < 0.1 |
| | Benzo[g,h,i]perylene | 191242 | mg kg-¹ | M | 17 | 18 | 1.1 | 34 | 0.94 | 2.9 | 1.1 | < 0.1 |
| | Total (of 16) PAHs | | mg kg-¹ | M | 430 | 430 | 20 | 740 | 16 | 49 | 25 | 6.7 |
| 2920 | Phenols (total) | | mg kg-¹ | N | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 |
| 2010 | pH | | | M | 11.1 | 10.7 | 8.7 | 9.8 | 8.9 | 8.3 | 8.3 | 8.1 |
| 2030 | Moisture | | % | n/a | 12.9 | 10.4 | 25.3 | 7.83 | 11.5 | 21.9 | 19.4 | 8.69 |
| | Stones content (>50mm) | | % | n/a | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 2040 | Soil colour | | | n/a | brown | brown | brown | brown | brown | brown | brown | brown |
| | Soil texture | | | n/a | sand | sand | clay | sand | sand | clay | sand | sand |
| | Other material | | | n/a | stones | stones | stones | stones | stones | none | stones | stones |

All tests undertaken between 20/03/2012 and 23/03/2012

* Accreditation status

***This report should be interpreted in conjunction with the notes on the accompanying cover page.***

GEA
Tyttenhanger House
Coursers Road
St Albans Herts
AL4 0PG

FAO Matthew Elcock

# LABORATORY TEST REPORT

**Results of analysis of 5 samples received 3 April 2012**

**30a Highgate Road, London - J12041**

**Report Date 11 April 2012**

| Login Batch No | | | | | 203763 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Chemtest LIMS ID | | | | | AH18351 | AH18352 | AH18353 | AH18354 | AH18355 |
| Sample ID | | | | | BH1 | BH2 | TP1 | TP4 | TP2 |
| Sample No | | | | | D2 | D1 | | | |
| Sampling Date | | | | | 8/3/2012 | 8/3/2012 | 13/3/2012 | Not Provided | Not Provided |
| Depth | | | | | 1m | 0.6m | 0.4m | 0.3m | 0.3m |
| *Matrix* | | | | | *SOIL* | *SOIL* | *SOIL* | *SOIL* | *SOIL* |
| SOP↓ | Determinand↓ | CAS No↓ | Units↓ | * | | | | | |
| 2120 | Sulfate (2:1 water soluble) as SO4 | 14808798 | g l-1 | M | 1.2 | 1.3 | 0.93 | 1.1 | 1.7 |
| 2675 | TPH aliphatic >C5-C6 | | mg kg-1 | N | < 0.1 | < 0.1 | < 0.1 | | < 0.1 |
| | TPH aliphatic >C6-C8 | | mg kg-1 | N | < 0.1 | < 0.1 | < 0.1 | | < 0.1 |
| | TPH aliphatic >C8-C10 | | mg kg-1 | N | 0.65 | < 0.1 | < 0.1 | | < 0.1 |
| | TPH aliphatic >C10-C12 | | mg kg-1 | M | 7.8 | < 1 | < 1 | | < 1 |
| | TPH aliphatic >C12-C16 | | mg kg-1 | M | 89 | < 1 | 47 | | 11 |
| | TPH aliphatic >C16-C21 | | mg kg-1 | M | 170 | < 1 | 630 | | 420 |
| | TPH aliphatic >C21-C35 | | mg kg-1 | M | 92 | < 1 | 1000 | | 1100 |
| | TPH aliphatic >C35-C44 | | mg kg-1 | N | 1.2 | < 1 | 2.4 | | < 1 |
| | TPH aromatic >C5-C7 | | mg kg-1 | N | < 0.1 | < 0.1 | < 0.1 | | < 0.1 |
| | TPH aromatic >C7-C8 | | mg kg-1 | N | < 0.1 | < 0.1 | < 0.1 | | < 0.1 |
| | TPH aromatic >C8-C10 | | mg kg-1 | N | < 0.1 | < 0.1 | < 0.1 | | < 0.1 |
| | TPH aromatic >C10-C12 | | mg kg-1 | M | 3.7 | < 1 | 3.1 | | 1.5 |
| | TPH aromatic >C12-C16 | | mg kg-1 | M | 66 | 38 | 53 | | 6.0 |
| | TPH aromatic >C16-C21 | | mg kg-1 | M | 640 | 310 | 1100 | | 98 |
| | TPH aromatic >C21-C35 | | mg kg-1 | M | 800 | 440 | 2000 | | 390 |
| | TPH aromatic >C35-C44 | | mg kg-1 | N | 33 | 24 | 43 | | 5.0 |
| | Total Petroleum Hydrocarbons | | mg kg-1 | N | 1900 | 810 | 4900 | | 2100 |

All tests undertaken between 05/04/2012 and 10/04/2012

* Accreditation status

***This report should be interpreted in conjunction with the notes on the accompanying cover page.***

GEA Geotechnical & Environmental Associates

Tyttenhanger House
Coursers Road
St Albans
AL4 0PG

# Generic Risk-Based Soil Guideline Values

**Site** 30a Highgate Road, London, NW5 1NS

**Client** Mr Colin Serlin

**Engineer** Elliott Wood Partnership

**Job Number** J12041

**Sheet** 1 / 1

**Proposed End Use** Residential with plant uptake

**Soil pH** 8

**Soil Organic Matter content %** 6.0

| Contaminant | Guideline Value mg/kg | Data Source |
|---|---|---|
| ***Metals*** | | |
| Arsenic | 32 | SGV |
| Cadmium | 10 | SGV |
| Chromium (III) | 3000 | LQM/CIEH |
| Chromium (VI) | 4.3 | LQM/CIEH |
| Copper | 2,330 | LQM/CIEH |
| Lead | 450 | withdrawn SGV |
| Elemental Mercury | 1 | SGV |
| Inorganic Mercury | 170 | SGV |
| Nickel | 130 | LQM/CIEH |
| Selenium | 350 | SGV |
| Zinc | 3,750 | LQM/CIEH |
| ***Hydrocarbons*** | | |
| Benzene | 0.33 | SGV |
| Toluene | 610 | SGV |
| Ethyl Benzene | 350 | SGV |
| Xylene | 230 | SGV |
| Aliphatic C5-C6 | 110 | LQM/CIEH |
| Aliphatic C6-C8 | 370 | LQM/CIEH |
| Aliphatic C8-C10 | 110 | LQM/CIEH |
| Aliphatic C10-C12 | 540 | LQM/CIEH |
| Aliphatic C12-C16 | 3000 | LQM/CIEH |
| Aliphatic C16-C35 | 76,000 | LQM/CIEH |
| Aromatic C6-C7 | See Benzene | LQM/CIEH |
| Aromatic C7-C8 | See Toluene | LQM/CIEH |
| Aromatic C8-C10 | 151 | LQM/CIEH |
| Aromatic C10-C12 | 346 | LQM/CIEH |
| Aromatic C12-C16 | 593 | LQM/CIEH |
| Aromatic C16-C21 | 770 | LQM/CIEH |
| Aromatic C21-C35 | 1230 | LQM/CIEH |
| PRO ($C_5$ –$C_{10}$) | 1351 | Calc |
| DRO ($C_{12}$ –$C_{28}$) | 80,363 | Calc |
| Lube Oil ($C_{28}$ –$C_{44}$) | 77,230 | Calc |
| **TPH** | **500** | Trigger for speciated testing |

| Contaminant | Guideline Value mg/kg | Data Source |
|---|---|---|
| ***Anions*** | | |
| Soluble Sulphate | 0.5 g/l | Structures |
| Sulphide | 50 | Structures |
| Chloride | 400 | Structures |
| ***Others*** | | |
| Organic Carbon (%) | 6 | Methanogenic potential |
| Total Cyanide | 140 | WRAS |
| Total Mono Phenols | 420 | SGV |
| ***PAH*** | | |
| Naphthalene | 8.70 | LQM/CIEH |
| Acenaphthylene | 850 | LQM/CIEH |
| Acenaphthene | 1,000 | LQM/CIEH |
| Fluorene | 780 | LQM/CIEH |
| Phenanthrene | 380 | LQM/CIEH |
| Anthracene | 9,200 | LQM/CIEH |
| Fluoranthene | 670 | LQM/CIEH |
| Pyrene | 1,600 | LQM/CIEH |
| Benzo(a) Anthracene | 5.9 | LQM/CIEH |
| Chrysene | 9 | LQM/CIEH |
| Benzo(b) Fluoranthene | 7.0 | LQM/CIEH |
| Benzo(k) Fluoranthene | 10.0 | LQM/CIEH |
| Benzo(a) pyrene | 1.00 | LQM/CIEH |
| Indeno(1 2 3 cd) Pyrene | 4.2 | LQM/CIEH |
| Dibenzo(a h) Anthracene | 0.90 | LQM/CIEH |
| Benzo (g h i) Perylene | 47 | LQM/CIEH |
| **Total PAH** | **6.7** | B(a)P / 0.15 |
| ***Chlorinated Solvents*** | | |
| 1,1,1 trichloroethane (TCA) | 28 | LQM/CIEH |
| tetrachloroethane (PCA) | 4.8 | LQM/CIEH |
| tetrachloroethene (PCE) | 4.8 | LQM/CIEH |
| trichloroethene (TCE) | 0.49 | LQM/CIEH |
| 1,2-dichloroethane (DCA) | 0.014 | LQM/CIEH |
| vinyl chloride (Chloroethene) | 0.00099 | LQM/CIEH |
| tetrachloromethane (Carbon tetrac | 0.089 | LQM/CIEH |
| trichloromethane (Chloroform) | 2.7 | LQM/CIEH |

*Notes*

Concentrations measured below the above values may be considered to represent 'uncontaminated conditions' which do not pose a risk to human health. Concentrations measured in excess of these valuesindicate a potential risk, and thus require further, site specific risk assessment.

SGV - Soil Guideline Value, derived from the CLEA model and published by Environment Agency 2009

withdrawn SGV - Former SGV, derived from the CLEA 2000 model and published by DEFRA pending confirmation of new approach to modeling lead

LQM/CIEH - Generic Assessment Criteria for Human Health Risk Assessment 2nd edition (2009)derived using CLEA 1.04 model 2009

Calc - sum of nearest available carbon range specified including BTEX for PRO fraction

B(a)P / 0.15 - GEA experince indicates that Benzo(a) pyrene (one of the most common and most carcenogenic of the PAHs) rarely exceeds 15% of the total PAH concentration, hence this Total PAH threshold is regarded as being conservative

# Envirocheck® Report:

# Datasheet

## Order Details:

**Order Number:**
37877679_1_1

**Customer Reference:**
J12041

**National Grid Reference:**
528930, 185450

**Slice:**
A

**Site Area (Ha):**
0.11

**Search Buffer (m):**
1000

## Site Details:

30a Highgate Road
LONDON
NW5 1NS

## Client Details:

Mr S Branch
GEA Ltd
Tyttenhanger House
Coursers Road
St Albans
Herts
AL4 0PG

# Contents



**Introduction**

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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**Radon Potential dataset Copyright Notice**



**Report Version v47.0**

| Data Type | Page Number | On Site | 0 to 250m | 251 to 500m | 501 to 1000m (*up to 2000m) |
|---|---|---|---|---|---|
| **Agency & Hydrological** | | | | | |
| Contaminated Land Register Entries and Notices | pg 1 | | 6 | | |
| Discharge Consents | | | | | |
| Enforcement and Prohibition Notices | | | | | |
| Integrated Pollution Controls | | | | | |
| Integrated Pollution Prevention And Control | | | | | |
| Local Authority Integrated Pollution Prevention And Control | | | | | |
| Local Authority Pollution Prevention and Controls | pg 1 | | 5 | 8 | 11 |
| Local Authority Pollution Prevention and Control Enforcements | pg 5 | | | | 1 |
| Nearest Surface Water Feature | pg 5 | | | Yes | |
| Pollution Incidents to Controlled Waters | | | | | |
| Prosecutions Relating to Authorised Processes | | | | | |
| Prosecutions Relating to Controlled Waters | | | | | |
| Registered Radioactive Substances | | | | | |
| River Quality | | | | | |
| River Quality Biology Sampling Points | | | | | |
| River Quality Chemistry Sampling Points | | | | | |
| Substantiated Pollution Incident Register | | | | | |
| Water Abstractions | pg 5 | | | | 3 (*6) |
| Water Industry Act Referrals | | | | | |
| Groundwater Vulnerability | pg 7 | Yes | n/a | n/a | n/a |
| Bedrock Aquifer Designations | pg 7 | Yes | n/a | n/a | n/a |
| Superficial Aquifer Designations | | | n/a | n/a | n/a |
| Source Protection Zones | | | | | |
| Extreme Flooding from Rivers or Sea without Defences | | | | n/a | n/a |
| Flooding from Rivers or Sea without Defences | | | | n/a | n/a |
| Areas Benefiting from Flood Defences | | | | n/a | n/a |
| Flood Water Storage Areas | | | | n/a | n/a |
| Flood Defences | | | | n/a | n/a |
| **Waste** | | | | | |
| BGS Recorded Landfill Sites | | | | | |
| Historical Landfill Sites | | | | | |
| Integrated Pollution Control Registered Waste Sites | | | | | |
| Licensed Waste Management Facilities (Landfill Boundaries) | | | | | |
| Licensed Waste Management Facilities (Locations) | pg 8 | | | 1 | |
| Local Authority Recorded Landfill Sites | | | | | |
| Registered Landfill Sites | | | | | |
| Registered Waste Transfer Sites | pg 8 | | | | 1 |
| Registered Waste Treatment or Disposal Sites | pg 8 | | | 1 | |

GEA Geotechnical & Environmental Associates

# Summary

| Data Type | Page Number | On Site | 0 to 250m | 251 to 500m | 501 to 1000m (*up to 2000m) |
|---|---|---|---|---|---|
| **Hazardous Substances** | | | | | |
| Control of Major Accident Hazards Sites (COMAH) | | | | | |
| Explosive Sites | | | | | |
| Notification of Installations Handling Hazardous Substances (NIHHS) | | | | | |
| Planning Hazardous Substance Consents | | | | | |
| Planning Hazardous Substance Enforcements | | | | | |
| **Geological** | | | | | |
| BGS Recorded Mineral Sites | | | | | |
| BGS 1:625,000 Solid Geology | pg 9 | Yes | n/a | n/a | n/a |
| Brine Compensation Area | | | n/a | n/a | n/a |
| Coal Mining Affected Areas | | | n/a | n/a | n/a |
| Mining Instability | | | n/a | n/a | n/a |
| Man-Made Mining Cavities | | | | | |
| Natural Cavities | | | | | |
| Non Coal Mining Areas of Great Britain | | | | n/a | n/a |
| Potential for Collapsible Ground Stability Hazards | pg 9 | Yes | | n/a | n/a |
| Potential for Compressible Ground Stability Hazards | | | | n/a | n/a |
| Potential for Ground Dissolution Stability Hazards | | | | n/a | n/a |
| Potential for Landslide Ground Stability Hazards | pg 9 | Yes | Yes | n/a | n/a |
| Potential for Running Sand Ground Stability Hazards | pg 9 | | Yes | n/a | n/a |
| Potential for Shrinking or Swelling Clay Ground Stability Hazards | pg 9 | Yes | | n/a | n/a |
| Radon Potential - Radon Affected Areas | | | n/a | n/a | n/a |
| Radon Potential - Radon Protection Measures | | | n/a | n/a | n/a |
| **Industrial Land Use** | | | | | |
| Contemporary Trade Directory Entries | pg 10 | 1 | 24 | n/a | n/a |
| Fuel Station Entries | pg 12 | | | 1 | 3 |

| Data Type | Page Number | On Site | 0 to 250m | 251 to 500m | 501 to 1000m (*up to 2000m) |
|---|---|---|---|---|---|
| **Sensitive Land Use** | | | | | |
| Areas of Adopted Green Belt | | | | | |
| Areas of Unadopted Green Belt | | | | | |
| Areas of Outstanding Natural Beauty | | | | | |
| Environmentally Sensitive Areas | | | | | |
| Forest Parks | | | | | |
| Local Nature Reserves | | | | | |
| Marine Nature Reserves | | | | | |
| National Nature Reserves | | | | | |
| National Parks | | | | | |
| Nitrate Sensitive Areas | | | | | |
| Nitrate Vulnerable Zones | | | | | |
| Ramsar Sites | | | | | |
| Sites of Special Scientific Interest | | | | | |
| Special Areas of Conservation | | | | | |
| Special Protection Areas | | | | | |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 1 | **Contaminated Land Register Entries and Notices**<br>Location: Even Numbers 2-10 Ascham Street, Odd Numbers 15-31 Falkland Road And Even Numbers 34-48 Leverton Street, London, Nw5<br>Notice Type: Environmental Protection Act (1990) Section 78A(2) And 78(B) Determination That Land Is Contaminated<br>Reference: Not Supplied<br>Dated: 12th September 2005<br>Positional Accuracy: Positioned by the supplier<br>Boundary Quality: Good | A13SE (SE) | 164 | 1 | 529085 185362 |
| 2 | **Contaminated Land Register Entries and Notices**<br>Location: 29 Falkland Road, London, Nw5 2pu<br>Notice Type: Environmental Protection Act (1990) Section 78A(2) And 78(B) Determination That Land Is Contaminated<br>Reference: Not Supplied<br>Dated: 31st July 2005<br>Positional Accuracy: Positioned by the supplier<br>Boundary Quality: Good | A13SE (SE) | 207 | 1 | 529131 185360 |
| 3 | **Contaminated Land Register Entries and Notices**<br>Location: 31 Falkland Road, London, Nw5 2pu<br>Notice Type: Environmental Protection Act (1990) Section 78A(2) And 78(B) Determination That Land Is Contaminated<br>Reference: Not Supplied<br>Dated: 31st July 2005<br>Positional Accuracy: Positioned by the supplier<br>Boundary Quality: Good | A13SE (SE) | 212 | 1 | 529136 185359 |
| 4 | **Contaminated Land Register Entries and Notices**<br>Location: Even Numbers 14-20 Ascham Street, Odd Numbers 15-33 Lady Margaret Road, And Odd Numbers 37-41 Falkland Road, London, Nw5<br>Notice Type: Environmental Protection Act (1990) Section 78A(2) And 78(B) Determination That Land Is Contaminated<br>Reference: Not Supplied<br>Dated: 12th September 2005<br>Positional Accuracy: Positioned by the supplier<br>Boundary Quality: Good | A13SE (E) | 214 | 1 | 529151 185389 |
| 5 | **Contaminated Land Register Entries and Notices**<br>Location: 33 Falkland Road, London, Nw5 2pu<br>Notice Type: Environmental Protection Act (1990) Section 78A(2) And 78(B) Determination That Land Is Contaminated<br>Reference: Not Supplied<br>Dated: 12th September 2005<br>Positional Accuracy: Positioned by the supplier<br>Boundary Quality: Good | A13SE (SE) | 218 | 1 | 529142 185358 |
| 6 | **Contaminated Land Register Entries and Notices**<br>Location: 35 Falkland Road, London, Nw5 2pu<br>Notice Type: Update on Remediation Statement - Remediation Work Completed<br>Reference: Not Supplied<br>Dated: 31st July 2005<br>Positional Accuracy: Positioned by the supplier<br>Boundary Quality: Good | A13SE (SE) | 224 | 1 | 529149 185357 |
| 7 | **Local Authority Pollution Prevention and Controls**<br>Name: M & A Coachworks<br>Location: 36/52 Fortress Road, LONDON, NW5 1AD<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: NOT GIVEN<br>Dated: 15th May 1997<br>Process Type: Local Authority Air Pollution Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Authorisation revokedRevoked**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (E) | 88 | 1 | 529036 185443 |
| 8 | **Local Authority Pollution Prevention and Controls**<br>Name: Perk Clean<br>Location: 20 Fortress Road, London, Nw5 2hb<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC21<br>Dated: 12th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A13SE (SE) | 93 | 1 | 529004 185375 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 8 | **Local Authority Pollution Prevention and Controls**<br>Name: M & A Coachworks<br>Location: Fortess Grove, London, Nw5 2HE<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC3<br>Dated: 15th May 1997<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Permitted**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (E) | 93 | 1 | 529031 185415 |
| 9 | **Local Authority Pollution Prevention and Controls**<br>Name: Zappeo Dry Cleaners<br>Location: 310 Kentish Town Road, London, Nw5 2th<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC2<br>Dated: 12th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A13SE (SE) | 193 | 1 | 529009 185256 |
| 10 | **Local Authority Pollution Prevention and Controls**<br>Name: Post Office Vehicle Services<br>Location: Unit A Kentish Town Business Park, Regis Road, LONDON, NW5 3RR<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC2<br>Dated: 27th February 1996<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Permitted**<br>Positional Accuracy: Automatically positioned to the address | A13SW (S) | 249 | 1 | 528820 185192 |
| 11 | **Local Authority Pollution Prevention and Controls**<br>Name: The Kleen Machine<br>Location: 347 Kentish Town Road, London, Nw5 2tj<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC44<br>Dated: 26th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A13SE (S) | 270 | 1 | 528988 185167 |
| 12 | **Local Authority Pollution Prevention and Controls**<br>Name: J Murphy & Sons Ltd<br>Location: 81 Highgate Road, London, Nw5 1ts<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC10<br>Dated: 1st March 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A13NW (NW) | 312 | 1 | 528642 185605 |
| 13 | **Local Authority Pollution Prevention and Controls**<br>Name: Royal Mail Property Holdings Ltd<br>Location: 1 Regis Road, LONDON, NW5 3EW<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: Not Given<br>Dated: Not Supplied<br>Process Type: Local Authority Air Pollution Control<br>Description: PG6/10 Coating manufacturing<br>**Status: Authorisation revokedRevoked**<br>Positional Accuracy: Manually positioned to the road within the address or location | A8NW (S) | 343 | 1 | 528875 185083 |
| 14 | **Local Authority Pollution Prevention and Controls**<br>Name: M & A Coachworks<br>Location: 135 Highgate Road, CAMDEN, NW5 1LE<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC5<br>Dated: 6th September 1993<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Permitted**<br>Positional Accuracy: Manually positioned to the address or location | A13NW (NW) | 397 | 1 | 528600 185695 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 15 | **Local Authority Pollution Prevention and Controls**<br>Name: Sun Dry Cleaners<br>Location: 167 Fortress Road, London, Nw5 2hr<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC46<br>Dated: 28th December 2006<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A18SE (NE) | 433 | 1 | 529132 185860 |
| 16 | **Local Authority Pollution Prevention and Controls**<br>Name: Asf Garage Ltd<br>Location: 138 Highgate Road, London, NW5 1PB<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC22<br>Dated: 1st April 1999<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG1/14 Petrol filling station<br>**Status: Permitted**<br>Positional Accuracy: Automatically positioned to the address | A18SW (NW) | 448 | 1 | 528633 185810 |
| 17 | **Local Authority Pollution Prevention and Controls**<br>Name: Hexagon Of Highgate Ltd<br>Location: 1 Browns Lane, Regis Road, LONDON, NW5 3EX<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC4<br>Dated: 30th April 1993<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Permitted**<br>Positional Accuracy: Automatically positioned to the address | A8NW (SW) | 451 | 1 | 528626 185072 |
| 18 | **Local Authority Pollution Prevention and Controls**<br>Name: Perfect Dry Cleaners<br>Location: 151 Highgate Road, London, Nw5 1lj<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC31<br>Dated: 24th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A12NE (NW) | 463 | 1 | 528588 185787 |
| 19 | **Local Authority Pollution Prevention and Controls**<br>Name: The Choice Dry Cleaners<br>Location: 62 Chetwynd Road, London, Nw5 1dj<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC40<br>Dated: 24th December 2006<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A18SW (N) | 530 | 1 | 528810 185992 |
| 20 | **Local Authority Pollution Prevention and Controls**<br>Name: Eventech Ltd<br>Location: 3 - 6 Spring Place, LONDON, NW5 3BA<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC2<br>Dated: 30th April 1993<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Permitted**<br>Positional Accuracy: Manually positioned to the address or location | A7NE (SW) | 538 | 1 | 528569 185005 |
| 21 | **Local Authority Pollution Prevention and Controls**<br>Name: L G Coachworks<br>Location: 61-65 Wilkin Street Mews, Wilkin Street, London, NW5 3NN<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: NOT GIVEN<br>Dated: 9th December 1997<br>Process Type: Local Authority Air Pollution Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Authorised**<br>Positional Accuracy: Manually positioned to the road within the address or location | A7NE (SW) | 697 | 1 | 528586 184806 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 21 | **Local Authority Pollution Prevention and Controls**<br>Name: D P Enamellers<br>Location: Imperial Works, Perren Street, London, NW5 3ED<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: Not Given<br>Dated: 27th July 1997<br>Process Type: Local Authority Air Pollution Control<br>Description: PG6/23 Coating of metal and plastic<br>**Status: Authorisation revokedRevoked**<br>Positional Accuracy: Manually positioned to the address or location | A8NW (SW) | 706 | 1 | 528610 184784 |
| 22 | **Local Authority Pollution Prevention and Controls**<br>Name: Whittington Service Station (Esso)<br>Location: 213-217 Junction Road, LONDON, N19 5QA<br>Authority: London Borough of Islington, Environmental Health Department<br>Permit Reference: Epa-Auth-020<br>Dated: 18th December 1998<br>Process Type: Local Authority Air Pollution Control<br>Description: PG1/14 Petrol filling station<br>**Status: Authorised**<br>Positional Accuracy: Manually positioned to the address or location | A18SE (NE) | 698 | 2 | 529214 186115 |
| 23 | **Local Authority Pollution Prevention and Controls**<br>Name: Prince Of Wales Dry Cleaners<br>Location: 17 Prince Of Wales Road, London, Nw5 3lh<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC12<br>Dated: 12th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A8SW (S) | 740 | 1 | 528777 184696 |
| 24 | **Local Authority Pollution Prevention and Controls**<br>Name: J T Coachworks<br>Location: 52A Prince Wales Road, LONDON, NW5 3LR<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: Not Given<br>Dated: 30th April 1993<br>Process Type: Local Authority Air Pollution Control<br>Description: PG6/34 Respraying of road vehicles<br>**Status: Authorisation revokedRevoked**<br>Positional Accuracy: Automatically positioned to the address | A8SW (SW) | 790 | 1 | 528594 184700 |
| 25 | **Local Authority Pollution Prevention and Controls**<br>Name: Moderna Dry Cleaners<br>Location: 70 Queens Crescent, London, Nw5 4ee<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC16<br>Dated: 12th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A7NW (SW) | 807 | 1 | 528216 185005 |
| 26 | **Local Authority Pollution Prevention and Controls**<br>Name: Universal Dry Cleaners<br>Location: 9-11 Brecknock Road, London, N7 0bl<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC30<br>Dated: 29th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A9NE (SE) | 925 | 1 | 529761 185015 |
| 27 | **Local Authority Pollution Prevention and Controls**<br>Name: Fairways Camden<br>Location: 135-143 Camden Road, LONDON, NW1 9HA<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: Not Given<br>Dated: 11th December 1998<br>Process Type: Local Authority Air Pollution Control<br>Description: PG1/14 Petrol filling station<br>**Status: Site Closed**<br>Positional Accuracy: Manually positioned to the address or location | A9SW (SE) | 981 | 1 | 529516 184646 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 28 | **Local Authority Pollution Prevention and Controls**<br>Name: Visage<br>Location: 171 Malden Road, London, Nw5 4ht<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC50<br>Dated: 1st February 2008<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Manually positioned to the address or location | A12SW (W) | 985 | 1 | 527961 185143 |
| 29 | **Local Authority Pollution Prevention and Control Enforcements**<br>Location: 3 - 6 Spring Place, London, Nw5 3ba<br>Type: Air Pollution Control Enforcement Notice<br>Reference: Not Given<br>Date Issued: 16th November 2001<br>Enforcement Date: Not Supplied<br>Details: Failure To Maintain Proper Paperwork For Organic Compounds<br>Positional Accuracy: Manually positioned to the address or location | A7NE (SW) | 538 | 1 | 528569 185005 |
| | **Nearest Surface Water Feature** | A18SW (N) | 364 | - | 528831 185826 |
| 30 | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: 28/39/39/0091<br>Permit Version: 100<br>Location: Two Bores At Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Commercial/Industrial/Public Services: Drinking; Cooking; Sanitary; Washing; (Small Garden)<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): 605<br>Yearly Rate (m3): 76509<br>Details: Kentish Town Sports Centre, Prince Of Wales Road, London<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 13th June 1966<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 100m | A8SW (S) | 732 | 3 | 528800 184700 |
| 30 | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: 28/39/39/0091<br>Permit Version: 100<br>Location: Two Bores At Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Industrial; Commercial And Public Services: Laundry Use<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: St. Pancras Public Baths, Prince Of Wales Road, London Nw1<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 13th June 1966<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A8SW (S) | 732 | 3 | 528800 184700 |
| 30 | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: 28/39/39/0091<br>Permit Version: 100<br>Location: Two Bores At Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Other Industrial/Commercial/Public Services: Process Water<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: St. Pancras Public Baths, Prince Of Wales Road, London Nw1<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 13th June 1966<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A8SW (S) | 732 | 3 | 528800 184700 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **Water Abstractions**<br>Operator: British Waterways Board<br>Licence Number: 28/39/39/0164<br>Permit Version: 101<br>Location: Southampton Bridge, London, Nw8 - Regents Canal<br>Authority: Environment Agency, Thames Region<br>Abstraction: Amenity: Spray Irrigation - Direct<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Surface<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: Pipeline Alongside The Regents Canal, London<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 17th December 2007<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A2SE (S) | 1462 | 3 | 528500 184020 |
| | **Water Abstractions**<br>Operator: British Waterways Board<br>Licence Number: 28/39/39/0164<br>Permit Version: 100<br>Location: Southampton Bridge, London, Nw8 - Regents Canal<br>Authority: Environment Agency, Thames Region<br>Abstraction: Amenity: Spray Irrigation - Direct<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Surface<br>Daily Rate (m3): 3840<br>Yearly Rate (m3): 1<br>Details: Pipeline Alongside The Regents Canal, London<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 25th April 1983<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A2SE (S) | 1462 | 3 | 528500 184020 |
| | **Water Abstractions**<br>Operator: British Waterways Board<br>Licence Number: 28/39/39/0173<br>Permit Version: 100<br>Location: Oval Road, Camden - Grand Union Regents Canal<br>Authority: Environment Agency, Thames Region<br>Abstraction: Other Industrial/Commercial/Public Services: Non-Evaporative Cooling<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Surface<br>Daily Rate (m3): 20<br>Yearly Rate (m3): 7000<br>Details: Land At Oval Road, Camden, London<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 8th December 1994<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A2SE (S) | 1465 | 3 | 528490 184020 |
| | **Water Abstractions**<br>Operator: British Waterways<br>Licence Number: 28/39/39/0164B<br>Permit Version: Not Supplied<br>Location: Southampton Bridge, LONDON, Nw8<br>Authority: Environment Agency, Thames Region<br>Abstraction: Industrial Cooling (Cegb)<br>Abstraction Type: Not Supplied<br>Source: River<br>Daily Rate (m3): 3840<br>Yearly Rate (m3): 1<br>Details: Annual Abstraction Total Aggregated To Another Licence For Quantity Purposes.<br>Authorised Start: Not Supplied<br>Authorised End: Not Supplied<br>Permit Start Date: Not Supplied<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 100m | A2SE (S) | 1481 | 3 | 528500 184000 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **Water Abstractions**<br>Operator: Hanson Quarry Products Europe Ltd<br>Licence Number: Th/039/0039/027<br>Permit Version: 1<br>Location: Kings Cross Concrete Plant-Borehole<br>Authority: Environment Agency, Thames Region<br>Abstraction: Mineral Products: General use relating to Secondary Category (High Loss)<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: Kings Cross Concrete Plant, Off York Way, London.<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 21st April 2010<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A4SE (SE) | 1709 | 3 | 529920 184040 |
| | **Water Abstractions**<br>Operator: Hanson Quarry Products Europe Ltd<br>Licence Number: 28/39/39/0222<br>Permit Version: 1<br>Location: Kings Cross Concrete Plant-Borehole<br>Authority: Environment Agency, Thames Region<br>Abstraction: Mineral Products: General use relating to Secondary Category (High Loss)<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: Kings Cross Concrete Plant, Off York Way, London.<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 31st August 2006<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A4SE (SE) | 1709 | 3 | 529920 184040 |
| | **Groundwater Vulnerability**<br>Soil Classification: Not classified<br>Map Sheet: Sheet 39 West London<br>Scale: 1:100,000 | A13SW (S) | 0 | 3 | 528927 185449 |
| | **Drift Deposits**<br>None | | | | |
| | **Bedrock Aquifer Designations**<br>Aquifer Desination: Unproductive Strata | A13SW (S) | 0 | 4 | 528927 185449 |
| | **Superficial Aquifer Designations**<br>No Data Available | | | | |
| | **Extreme Flooding from Rivers or Sea without Defences**<br>None | | | | |
| | **Flooding from Rivers or Sea without Defences**<br>None | | | | |
| | **Areas Benefiting from Flood Defences**<br>None | | | | |
| | **Flood Water Storage Areas**<br>None | | | | |
| | **Flood Defences**<br>None | | | | |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 31 | **Licensed Waste Management Facilities (Locations)**<br>Licence Number: 80349<br>Location: Recycling Centre, Regis Road, Kentish Town, London, NW5 3EP<br>Operator Name: Camden London Borough Council<br>Operator Location: Not Supplied<br>Authority: Environment Agency - South East Region, North East Thames Area<br>Site Category: Household Waste Amenity Sites<br>**Licence Status: Modified**<br>Issued: 10th December 1996<br>Last Modified: 25th January 2002<br>Expires: Not Supplied<br>Suspended: Not Supplied<br>Revoked: Not Supplied<br>Surrendered: Not Supplied<br>IPPC Reference: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A13SW (SW) | 331 | 3 | 528740 185138 |
| | **Local Authority Landfill Coverage**<br>Name: London Borough of Camden - Has no landfill data to supply | | 0 | 6 | 528927 185449 |
| | **Local Authority Landfill Coverage**<br>Name: London Borough of Islington - Has no landfill data to supply | | 374 | 2 | 529247 185694 |
| 32 | **Registered Waste Transfer Sites**<br>Licence Holder: Wharf & Jetty Services Ltd<br>Licence Reference: DL098<br>Site Location: BR Goods Depot, Gordon House Road, CAMDEN, London, NW5<br>Operator Location: As Site Address<br>Authority: Environment Agency - Thames Region, North East Area<br>Site Category: Transfer<br>Max Input Rate: Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year)<br>Waste Source Restrictions: No known restriction on source of waste<br>Licence Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled<br>Dated: 1st May 1982<br>Preceded By Licence: Not Given<br>Superseded By Licence: Not Given<br>Positional Accuracy: Manually positioned to the road within the address or location<br>Boundary Quality: Not Supplied<br>Authorised Waste: Commercial Waste; Construction And Demolition Wastes<br>Prohibited Waste: Biodegradable/Putrescible Waste; Clinical Wastes; Notifiable Wastes; Special Wastes | A12NE (W) | 597 | 3 | 528350 185650 |
| 33 | **Registered Waste Treatment or Disposal Sites**<br>Licence Holder: Camden L.B.C<br>Licence Reference: T/NE/0475090 (CAM070)<br>Site Location: Regis Road Recycling Centre, CAMDEN, London, NW5 3EP<br>Operator Location: Environment Department, Town Hall Extension, Argyle Street, London, Greater London, Wc1h 8eq<br>Authority: Environment Agency - Thames Region, North East Area<br>Site Category: Recycling / Reclamation<br>Max Input Rate: Very Small (Less than 10,000 tonnes per year)<br>Waste Source Restrictions: No known restriction on source of waste<br>Licence Status: Operational as far as is knownOperational<br>Dated: 10th December 1996<br>Preceded By Licence: Not Given<br>Superseded By Licence: Not Given<br>Positional Accuracy: Manually positioned to the road within the address or location<br>Boundary Quality: Not Supplied<br>Authorised Waste: Elec/Onic Compts/Fix/Fit/App/Photocopi; Empty Used Containers; Lead/Acid Batteries; Lighting Lamps/Tubes/Fluorescents; Lwra Cat Bii Gen. Scrap Metal Waste; Lwra Cat. A = Inert Wastes; Lwra Cat. Bi Gen.Non-Putresc; Lwra Cat. C 'Putresc'; Mineral Oils<br>Prohibited Waste: Waste N.O.S. | A13SW (SW) | 352 | 3 | 528700 185140 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **BGS 1:625,000 Solid Geology**<br>Description: London Clay | A13SW (S) | 0 | 4 | 528927 185449 |
| | **Coal Mining Affected Areas**<br>In an area which may not be affected by coal mining | | | | |
| | **Non Coal Mining Areas of Great Britain**<br>No Hazard | | | | |
| | **Potential for Collapsible Ground Stability Hazards**<br>Hazard Potential: Very Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (S) | 0 | 4 | 528927 185449 |
| | **Potential for Compressible Ground Stability Hazards**<br>Hazard Potential: No Hazard<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (S) | 0 | 4 | 528927 185449 |
| | **Potential for Ground Dissolution Stability Hazards**<br>No Hazard | | | | |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Very Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (S) | 0 | 4 | 528927 185449 |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 105 | 4 | 528857 185332 |
| | **Potential for Running Sand Ground Stability Hazards**<br>Hazard Potential: No Hazard<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (S) | 0 | 4 | 528927 185449 |
| | **Potential for Running Sand Ground Stability Hazards**<br>Hazard Potential: Very Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 111 | 4 | 528799 185391 |
| | **Potential for Shrinking or Swelling Clay Ground Stability Hazards**<br>Hazard Potential: Moderate<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (S) | 0 | 4 | 528927 185449 |
| | **Radon Potential - Radon Affected Areas**<br>Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (S) | 0 | 4 | 528927 185449 |
| | **Radon Potential - Radon Protection Measures**<br>Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (S) | 0 | 4 | 528927 185449 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 34 | **Contemporary Trade Directory Entries**<br>Name: A S Hepburn<br>Location: 30a, Highgate Road, London, NW5 1QB<br>Classification: Fasteners & Fixing Devices<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NE (E) | 0 | - | 528938 185451 |
| 35 | **Contemporary Trade Directory Entries**<br>Name: Alexander Green Ltd<br>Location: 19, Greenwood Place, London, NW5 1LB<br>Classification: Children & Babywear - Manufacturers & Wholesalers<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the address or location | A13SW (SW) | 60 | - | 528848 185403 |
| 36 | **Contemporary Trade Directory Entries**<br>Name: Perk Clean<br>Location: 20 Fortess Rd, London, NW5 2HB<br>Classification: Dry Cleaners<br>**Status: Active**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (SE) | 95 | - | 529006 185374 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: Millenium Designs Ltd<br>Location: 39-51, Highgate Road, London, NW5 1RS<br>Classification: Clothing & Fabrics - Manufacturers<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NW (W) | 97 | - | 528813 185463 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: Regalfield Ltd<br>Location: 39-51, Highgate Road, London, NW5 1RS<br>Classification: Clothing & Fabrics - Manufacturers<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NW (W) | 97 | - | 528813 185463 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: The Constance Wood Group<br>Location: 39-51, Highgate Road, London, NW5 1RS<br>Classification: Clothing & Fabrics - Manufacturers<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NW (W) | 97 | - | 528813 185463 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: Alan Pharmaceuticals<br>Location: 33, Greenwood Place, London, NW5 1LB<br>Classification: Pharmaceutical Manufacturers & Distributors<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SW (W) | 114 | - | 528791 185444 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: Billi Co<br>Location: Unit 5A, 33, Greenwood Place, London, NW5 1LB<br>Classification: Candle Manufacturers & Suppliers<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the address or location | A13SW (W) | 114 | - | 528791 185444 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: Angelic Candles Ltd<br>Location: Unit 5A, 33, Greenwood Place, London, NW5 1LB<br>Classification: Candle Manufacturers & Suppliers<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the address or location | A13SW (W) | 114 | - | 528791 185444 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: Amano Ltd<br>Location: Studio 3B, 33, Greenwood Place, London, NW5 1LB<br>Classification: Knitwear Manufacturers & Wholesalers<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the address or location | A13SW (W) | 114 | - | 528791 185444 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: Muir & Osborne<br>Location: Studio 3B, 33, Greenwood Place, London, NW5 1LB<br>Classification: Knitwear Manufacturers & Wholesalers<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the address or location | A13SW (W) | 114 | - | 528791 185444 |
| 37 | **Contemporary Trade Directory Entries**<br>Name: World Classics<br>Location: Deane House, 27, Greenwood Place, London, NW5 1LB<br>Classification: T-Shirts<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the address or location | A13SW (W) | 125 | - | 528780 185409 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 38 | **Contemporary Trade Directory Entries**<br>Name: S & A Electricals<br>Location: 1, Fortess Road, London, NW5 1AA<br>Classification: Electrical goods - servicing & repairs<br>**Status: Active**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (S) | 105 | - | 528964 185332 |
| 39 | **Contemporary Trade Directory Entries**<br>Name: Lakis<br>Location: 61, Fortess Road, London, NW5 1AD<br>Classification: Sausage Manufacturers<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13NE (NE) | 113 | - | 529007 185564 |
| 40 | **Contemporary Trade Directory Entries**<br>Name: Tse Europe Ltd<br>Location: 79, Fortess Road, London, NW5 1AG<br>Classification: Knitwear Manufacturers & Wholesalers<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NE (NE) | 163 | - | 529008 185620 |
| 41 | **Contemporary Trade Directory Entries**<br>Name: Car Care<br>Location: 50, Leverton Street, London, NW5 2PG<br>Classification: Garage Services<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13SE (E) | 166 | - | 529108 185411 |
| 42 | **Contemporary Trade Directory Entries**<br>Name: Universe Pizza<br>Location: 320, Kentish Town Road, London, NW5 2TH<br>Classification: Catering Equipment<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13SE (S) | 168 | - | 528997 185278 |
| 42 | **Contemporary Trade Directory Entries**<br>Name: Zappeo Dry Cleaning<br>Location: 310, Kentish Town Road, London, NW5 2TH<br>Classification: Dry Cleaners<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 192 | - | 529008 185257 |
| 43 | **Contemporary Trade Directory Entries**<br>Name: Fabulously French<br>Location: A, 15, Falkland Road, London, NW5 2PU<br>Classification: Confectionery Manufacturers<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 176 | - | 529086 185343 |
| 44 | **Contemporary Trade Directory Entries**<br>Name: Merit Cleaning Co<br>Location: 15, Lady Somerset Road, London, NW5 1UR<br>Classification: Commercial Cleaning Services<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NE (N) | 188 | - | 528971 185661 |
| 45 | **Contemporary Trade Directory Entries**<br>Name: Caesar Fashions Ltd<br>Location: 53-79 Highgate Rd, London, NW5 1TL<br>Classification: Clothing & Fabrics - Manufacturers<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the address or location | A13NW (W) | 207 | - | 528720 185525 |
| 45 | **Contemporary Trade Directory Entries**<br>Name: Freight-Linc Logistics<br>Location: Studio 320,Highgate Studios,53-79 Highgate Rd, London, NW5 1TL<br>Classification: Freight Forwarders<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the address or location | A13NW (W) | 207 | - | 528720 185525 |
| 45 | **Contemporary Trade Directory Entries**<br>Name: Caesar Fashions Ltd<br>Location: Highgate Studios Unit 801,53-79 Highgate Rd, London, NW5 1TL<br>Classification: Clothing & Fabrics - Manufacturers<br>**Status: Active**<br>Positional Accuracy: Manually positioned to the address or location | A13NW (W) | 207 | - | 528721 185526 |
| 45 | **Contemporary Trade Directory Entries**<br>Name: Airwaves Trading Ltd<br>Location: Highgate Studios,443 Highgate Rd, London, NW5 1TL<br>Classification: Telecommunications Equipment & Systems<br>**Status: Active**<br>Positional Accuracy: Manually positioned to the address or location | A13NW (W) | 208 | - | 528720 185526 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 46 | **Contemporary Trade Directory Entries**<br>Name: R B Cleanings<br>Location: Lupton St, London, NW5 2HY<br>Classification: Carpet, Curtain & Upholstery Cleaners<br>**Status: Active**<br>Positional Accuracy: Manually positioned to the road within the address or location | A13NE (NE) | 238 | - | 529140 185612 |
| 47 | **Fuel Station Entries**<br>Name: Parliament Hill Service Station<br>Location: 138-140, Highgate Road, London, NW5 1PB<br>Brand: Unbranded<br>Premises Type: Petrol Station<br>**Status: Open**<br>Positional Accuracy: Manually positioned to the address or location | A18SW (NW) | 448 | - | 528633 185810 |
| 48 | **Fuel Station Entries**<br>Name: Whittington Service Station<br>Location: 207 Junction Road, Tufnell Park, LONDON, N19 5QA<br>Brand: Obsolete<br>Premises Type: Not Applicable<br>**Status: Obsolete**<br>Positional Accuracy: Manually positioned to the address or location | A18SE (NE) | 691 | - | 529220 186104 |
| 49 | **Fuel Station Entries**<br>Name: Court Service Station<br>Location: 160a Malden Road, Kentish Town, LONDON, NW5 4BT<br>Brand: Obsolete<br>Premises Type: Not Applicable<br>**Status: Obsolete**<br>Positional Accuracy: Located by supplier to within 100m | A12SW (W) | 900 | - | 528033 185200 |
| 50 | **Fuel Station Entries**<br>Name: Fairways Garage<br>Location: 139-143 Camden Road, Sandal Road, Camden Town, LONDON, NW1 9HA<br>Brand: Total<br>Premises Type: Not Applicable<br>**Status: Obsolete**<br>Positional Accuracy: Manually positioned to the address or location | A9SW (SE) | 980 | - | 529530 184658 |

# Useful Contacts

| Contact | Name and Address | Contact Details |
|---|---|---|
| 1 | **London Borough of Camden - Pollution Projects Team**<br>Seventh Floor, Town Hall Extension, Argyle Street, London, WC1H 8EQ | Telephone: 020 7278 4444<br>Fax: 020 7860 5713<br>Website: www.camden.gov.uk |
| 2 | **London Borough of Islington - Environmental Health Department**<br>159 Upper Street, Islington, London, N1 1RE | Telephone: 020 7527 2000<br>Fax: 020 7477 3057<br>Website: www.islington.gov.uk |
| 3 | **Environment Agency - National Customer Contact Centre (NCCC)**<br>PO Box 544, Templeborough, Rotherham, S60 1BY | Telephone: 08708 506 506<br>Email: enquiries@environment-agency.gov.uk |
| 4 | **British Geological Survey - Enquiry Service**<br>British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG | Telephone: 0115 936 3143<br>Fax: 0115 936 3276<br>Email: enquiries@bgs.ac.uk<br>Website: www.bgs.ac.uk |
| 5 | **Natural England**<br>Northminster House, Northminster Road, Peterborough, Cambridgeshire, PE1 1UA | Telephone: 0845 600 3078<br>Fax: 01733 455103<br>Email: enquiries@naturalengland.org.uk<br>Website: www.naturalengland.org.uk |
| 6 | **London Borough of Camden**<br>Town Hall, Judd Street, London, WC1H 9JE | Telephone: 020 7974 4444<br>Fax: 020 7974 6866<br>Email: info@camden.gov.uk<br>Website: www.camden.gov.uk |
| - | **Health Protection Agency - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards**<br>Chilton, Didcot, Oxfordshire, OX11 0RQ | Telephone: 01235 822622<br>Fax: 01235 833891<br>Email: radon@hpa.org.uk<br>Website: www.hpa.org.uk |
| - | **Landmark Information Group Limited**<br>The Smith Centre, Henley On Thames, Oxfordshire, RG9 6AB | Telephone: 0844 844 9952<br>Fax: 0844 844 9951<br>Email: customerservices@landmarkinfo.co.uk<br>Website: www.landmarkinfo.co.uk |

Please note that the Environment Agency / SEPA have a charging policy in place for enquiries.