



**Ashley Road Depot
Ashley Road
London N17 9AZ**

Desk Study and Ground
Investigation Report

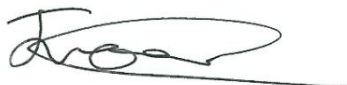
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This report is intended as a Ground Investigation Report (GIR) as defined in BS EN1997-2, unless specifically noted otherwise. The report is not a Geotechnical Design Report (GDR) as defined in EN1997-2 and recommendations made within this report are for guidance only.

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APPENDIX

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 desk study and ground investigation carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Haringey Council. The work has been carried out in two phases to date, with respect to the proposed redevelopment of the site through the demolition of the existing buildings and subsequent construction of a new residential development providing a total of 272 homes, comprising a number of apartment blocks of between four-storeys and 12-storeys in addition to two-storey houses, with associated areas of public realm, 174 square metres of flexible use Class E floorspace, private and communal soft landscaping and new roads and pavements. The purpose of the investigation has been to research the history of the site, to determine the ground conditions, to provide an indication of the presence of contamination and to provide information to assist with the design of suitable foundations.

DESK STUDY FINDINGS

The earliest map studied, dated 1864, shows the site to have comprised farmland. A gravel pit was located approximately 50 m to the east and had apparently been backfilled by the time of the 1895 map. The 1913 map shows a refuse destructor in the central southern portion of the site and also shows a small building in the far west of the site, likely to be the existing cottage, and shows that the railway line to the east had been expanded. Terraced housing had been constructed in the surrounding area along with associated road networks and Down Lane Recreation Ground had been established directly to the south of the site. The site had undergone significant changes by 1956 with several additional buildings present on site, mostly in the centre of the site but also along the northwestern and northern boundaries. A much smaller building in the west of the site was labelled as a refuse destructor, but this could be due to differences in mapping. A tank was present in the centre of the site, along with a conveyor and two ramps. It is likely that at some point between 1970 and 1974 the refuse destructor was removed from site. From 1988, the site is labelled as 'depot'. The map dated 1991 shows a large building to have been established in the south of the site.

GROUND CONDITIONS

Beneath a variable but generally moderate thickness of made ground, Enfield Silt was encountered over Kempton Park Gravel, underlain by London Clay. Below this, the Lambeth Group was encountered to the maximum depth investigated, of 30.00 m. The made ground extended to depths of between 0.50 m and 3.80 m, but generally to between 0.80 m and 1.50 m and comprised dark brown, orange-brown and yellowish brown slightly clayey gravelly sand with variable amounts of brick, concrete, gravel, plastic, metal, glass, suspected ash and clinker, ceramics, tile, suspected asbestos-containing materials and roots and rootlets. A hydrocarbon odour was noted in Borehole No 17A, and staining was noted in Borehole No 12. The Enfield Silt extended to depths of between 1.30 m and 3.00 m, below which Kempton Park Gravel was present to depths of between 4.50 m and 6.00 m. The London Clay initially comprised firm becoming stiff dark brown fissured clay to depths of between 14.00 m and 16.00 m over very stiff dark grey slightly silty slightly sandy fissured clay to depths of between 23.40 m and 26.00 m. The Lambeth Group comprised very stiff dark grey and multicoloured silty sandy gravelly clay and dense light grey silty gravelly sand, with rounded black pebbles and shells. Groundwater was encountered at depths of between 3.00 m and 4.00 m in the Kempton Park Gravel, and at 22.50 m and 24.50 m in the Lambeth Group. Groundwater has subsequently been monitored at depths of between 0.74 m and 2.85 m.

Contamination testing has indicated elevated concentrations of lead, arsenic, nickel, zinc, copper, sulphide, PAH and TPH above the generic risk-based screening value for a residential end use with plant uptake. Asbestos has also been identified.

RECOMMENDATIONS

Moderately sized pad or strip foundations bearing in the dense Kempton Park Gravel may be designed to apply a net allowable bearing pressure of 225 kN/m² at a minimum depth of 0.90 m. Alternatively, piled foundations could be adopted and a 450 mm pile extending to a depth of 20 m would provide a safe working load of approximately 550 kN. Given the high sensitivity of end users, it is likely that remediation will be required.

Following an appropriate programme of remediation, the proposed development of the site will not present a risk to end users or the wider environment. Remediation details should be set out in a Remediation Method Statement, and verification should be detailed in a verification report to be carried out towards the end of the construction phase. Site workers should be made aware of the potential presence of contamination.

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 Limited (GEA) has been commissioned by Haringey Council, to carry out a desk study and ground investigation at Ashley Road Depot, Ashley Road, Tottenham N17 9AZ. Civic Engineers are the structural engineers for the project.

1.1 Proposed Development

It is understood that it is proposed to demolish the existing buildings and subsequently construct a new residential development providing a total of 272 homes, comprising a number of apartment blocks of between four-storeys and 12-storeys in addition to two-storey houses, with associated areas of public realm, private and communal soft landscaping and new roads and pavements.

It is understood that a building in the northeastern corner of the site is proposed to have a 5.5 m deep basement.

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 provide an assessment of the risk of Unexploded Ordnance (UXO);
- ❏ to determine the ground conditions and hydrogeology and their engineering properties;
- ❏ to provide advice and information with respect to the design of suitable 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 desk study was carried out, followed by a ground investigation. The desk study comprised:

- ❏ a review of historical Ordnance Survey (OS) maps and environmental searches sourced from the Envirocheck database;

- ✎ a review of readily available geology maps;
- ✎ a walkover survey of the site carried out prior to fieldwork;
- ✎ commissioning of a tank search with the London Fire Brigade (ref: 31/013623, dated October 2021); and
- ✎ commissioning of a preliminary UXO risk assessment (ref: PA14366-00, dated October 2021).

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

- ✎ eight boreholes advanced to a depth of 30.00 m (-21.35 m OD) using a standard cable percussion rig;
- ✎ a total of 14 boreholes advanced to depths of between 0.50 m and 5.50 m (8.54 m OD and 4.20 m OD) using an opendrive sampler (Terrier) rig;
- ✎ seven trial pits manually excavated to a maximum depth of 1.20 m, in order to expose existing foundations;
- ✎ six slit trenches manually excavated to a maximum depth of 1.20 m (8.52 m OD), in order to expose tree roots;
- ✎ standard penetration tests (SPTs), carried out at regular intervals in the boreholes to provide quantitative data on the strength of the soils;
- ✎ the installation of seven combined gas and groundwater monitoring standpipes to depths of between 1.80 m and 5.00 m (6.73 m OD and 3.60 m OD) to monitor ground gas and groundwater and for the retrieval of groundwater samples for contamination testing;
- ✎ six return monitoring visits carried out at approximately three-weekly intervals after the fieldwork;
- ✎ six in situ California Bearing Ratio (CBR) tests, carried out at depths of 0.40 m (9.19 m OD) and 0.60 m (8.99 m OD) in areas of proposed new access roads;
- ✎ soakage tests carried out within Trial Pits IT1, IT2 and IT3;
- ✎ testing of selected soil and groundwater samples for contamination and geotechnical purposes;
- ✎ testing of groundwater samples for contamination purposes; 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 by a suitably qualified and competent professional in accordance with the methodology presented by the

Environment Agency in their Land contamination risk assessment (LCRM)¹ published 8 October 2020. This 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. Risk management is divided into three stages; Risk Assessment, Options Appraisal and Remediation, and each stage comprises three tiers. The Risk Assessment stage includes preliminary risk assessment (PRA), generic quantitative risk assessment (GQRA) and detailed quantitative risk assessment (DQRA) and this report includes the PRA and GQRA.

The exploratory methods adopted in this investigation have been selected on the basis of the constraints of the site including but not limited to access and space limitations, together with any budgetary or timing constraints. Where it has not been possible to reasonably use an EC7 compliant investigation technique a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

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 ground water samples tested. No liability can be accepted for conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from third parties are given in good faith on the assumption that the information is accurate; no independent validation of third-party information has been made by GEA.

2.0 THE SITE

2.1 Site Description

The site is located within London Borough of Haringey, approximately 540 m north of Tottenham Hale station and 1 km to the south of Northumberland Park station. The site fronts onto Ashley Road to the south and is bounded by Park View Road to the north and west, by sports pitches associated with the Harris Academy Tottenham to the east and by Down Lane Park to the south. The areas to the north and west are largely residential, whilst industrial estates are present to the east and northeast. It may additionally be located by National Grid Reference 534460, 190120 and is shown on the map extract overleaf.

The site is irregular in shape, with an area of 1.6270 hectares. It is occupied by a former municipal services depot, which provided storage, refuelling, cleaning and maintenance for bin lorries up until mid-November 2021. Various council offices were also located on site. The site is now largely vacant, and all buildings had been demolished by the time of the second phase of work in May 2022.

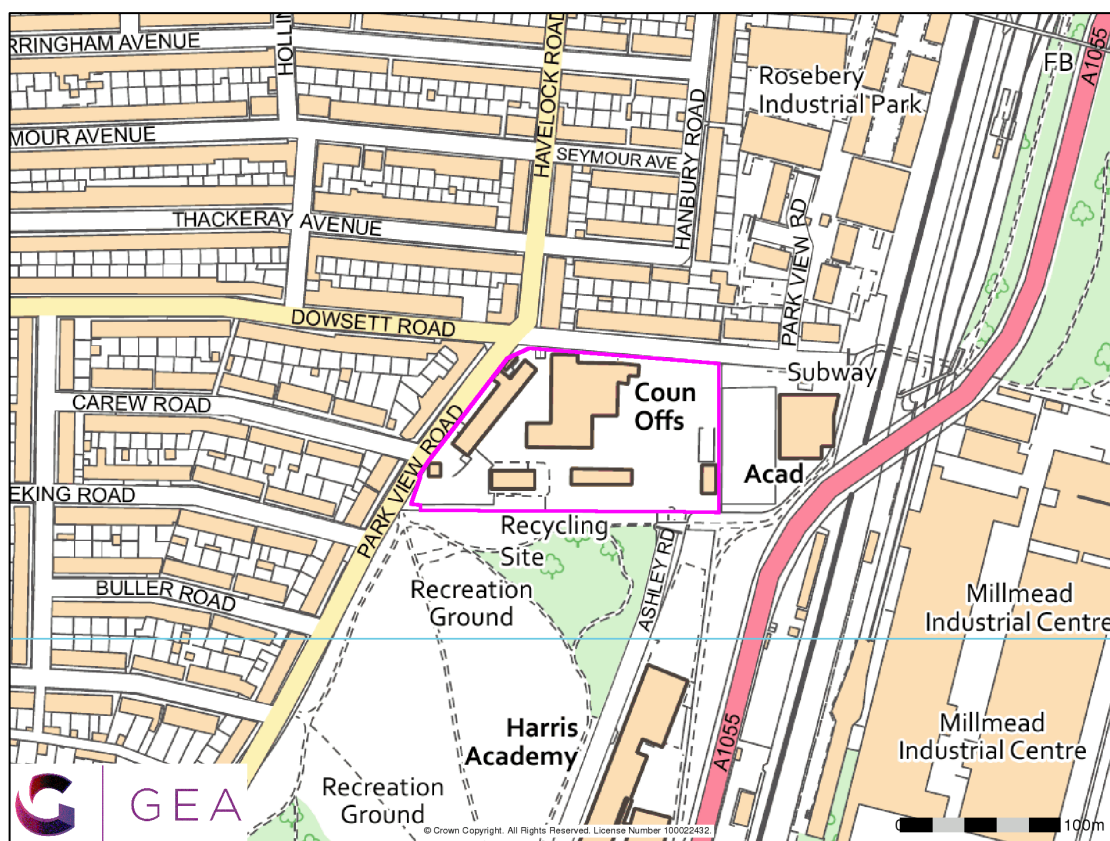
A fuel filling station is present on site, apparently providing diesel for the bin lorries and other council vehicles. The London Fire Brigade holds no records of any tanks located on the site. The site is almost entirely devoid of vegetation apart from eight mature London planes along the northern and western boundaries of the site, ranging in height from 14 m to 21 m, as well

¹ <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

as limited planters around the building in the south of the site. The site is sensibly level in keeping with the general topography of the area.

Asbestos warning stickers were present on buildings around the site as well as signs warning of oil tanks in some rooms, particularly in the northern areas of the site. It is understood a refuse destructor was located on the site for a number of years, and anecdotal evidence provided by a council worker on site suggested some of the waste was buried on site.

A vehicle washing facility is located in the far east of the site, which is used to clean the bin lorries and other council vehicles. The site originally extended an additional 70 m to the east, but this area was redeveloped in 2018 with the existing sports academy.



2.2 Site History

The history of the site and surrounding area has been researched by reference to archive historical maps and Ordnance Survey (OS) maps sourced from the Envirocheck database.

The earliest map studied, dated 1864, shows the site to comprise farmland associated with Hale Farm. Down Lane surrounded the northern and western extents of the site, and a small track was present running north to south bisecting the eastern portion of the site. A gravel pit was located approximately 50 m to the east with the Cambridge branch of the Great Eastern Railway a further 50 m to the east. The gravel pit had apparently been backfilled by the time of the 1895 map.

The site remained vacant until some time prior to the map dated 1913, which shows a refuse destructor located in the central southern portion of the site, labelled as being owned by 'Tottenham U.D. Council'. This map also shows that a small building was located in the far west of the site, likely to be the existing cottage, and that the railway line to the east had been

expanded. Terraced housing had been constructed in the surrounding area, along with associated road networks and Down Lane Recreation Ground had been established directly to the south of the site. Further terraced housing had been constructed in the surrounding area by the time of the next map, dated 1936, along with an athletic ground in the southern portion of the Down Lane Recreation Ground. A radio factory was present approximately 40 m to the northeast of the site. Few changes are noted on site, although what appears to be two train lines connecting to the nearby railway are present on the site, probably to aid bringing refuse into the site for the destructor.

The site had undergone significant changes by 1956 with several additional buildings present on site, mostly in the centre but also along the northwestern and northern boundaries. A much smaller building in the west of the site was labelled as the refuse destructor, but this could be due to differences in mapping. A tank was present in the centre of the site, along with a conveyor and two ramps. The aforementioned radio factory had changed uses to both a clothing factory and an atlas works. A zinc works was also present approximately 100 m to the northeast along with a cabinet factory and an engineering works was present across the railway, approximately 110 m to the east.

It is likely that at some point between 1970 and 1974 the refuse destructor was removed from site. From 1988 onwards, the site is labelled as 'depot'. The map dated 1991 shows a large building to have been established in the south of the site. Aerial imagery dated September 1999, source from Google Earth, appears to show a large pile of spreading salt stockpiled in the east of the site. Further imagery dated June 2018 shows the buildings to the east of the site had been removed and the site cleared. It appears as if the spreading salt stockpile had been removed, and in part replaced with the vehicle washing facility located on site today. By June 2019, four sports pitches had been established in this area along with a sports centre.

By the time of the additional phase of work in May 2022, all buildings on site had been demolished and several piles of debris were present on site.

2.3 Other Information

A search of public registers and databases has been made via the Envirocheck database and full results from the search are appended.

The search has revealed that there are no current landfill sites within 1 km of the site, however a historic landfill is recorded, located 192 m to the east. This operated from 1955 until 1962 and the specified waste is listed as inert and industrial waste. A single licensed waste management facility is located on site, but the license was surrendered in September 2017. Two other waste management facilities are located within 500 m of the site, but both have expired licenses.

Envirocheck holds records of three waste transfer sites located on site, all owned by London Borough of Haringey. The most recent licence is dated January 1995 and is still listed as 'operational as far as is known', although this may have been surrendered now that the site is vacant. One other waste transfer facility is located within 500 m of the site, located 380 m to the south, but its licence is suspended.

No other waste transfer, management, treatment or disposal sites are located within 500 m of the site.

The Envirocheck report suggests that no areas of infilled land are located within 200 m of the site, the closest is located 220 m to the southwest of the site and is associated with unknown

filled ground involving a pond or river etc. However, the historical maps indicate the presence of a gravel pit approximately 50 m to the east of site in the mid to late 19th Century.

Envirocheck holds records of a single pollution incident to controlled waters within 250 m of the site, located 236 m to the northeast listed as a category 3 – minor incident involving an unknown sewage pollutant occurring in April 1997.

A local authority pollution prevention and control is recorded on site, described as general waste incineration processes under 1 tonne an hour, dated December 1994. The authorisation for this has been revoked, however no details are provided as to when this happened.

Reference to records compiled by the Health Protection Agency (formerly the National Radiological Protection Board) 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.

A total of 17 active contemporary trade directory entries are recorded within 250 m of the site, including a waste disposal services on site, a domestic cleaning services 23 m to the west, five food product manufacturers located 148 m, 235 m and 247 m to the southeast and 169 m and 210 m to the east, a tungsten tool manufacturers and distributors 184 m to the northeast and a printers 199 m to the northeast.

Five inactive contemporary trade directory entries are recorded within 100 m of the site, including a tungsten tool manufactures and distributors formerly located on site, a domestic cleaning services located 23 m to the west, and two entries classified as ‘gearboxes’ located 98 m to the northeast.

No active fuel filling station is located within 1 km of the site. There are, however, records of three obsolete fuel filling stations located within 1 km of the site, the closest of which was located 471 m to the south. No dates of operation are provided.

The site is not located within any area of sensitive land use, however two areas of adopted green belt are located within 500 m of the site, located 171 m and 469 m to the east. A nitrate vulnerable zone is located 79 m to the east as well as a Ramsar site, Site of Special Scientific Interest and Special Protection, all relating to the Lee Valley and Walthamstow Reservoirs, located 471 m to the east.

A tank search was commissioned with the London Fire Brigade for the site, and the authority holds no record of petroleum storage tanks on the site. It is, therefore, likely that the fuel filling station comprises diesel tanks only.

2.4 Preliminary UXO Risk Assessment

A Preliminary UXO Risk Assessment has been completed by 1st Line Defence (report ref PA14366-00, dated October 2021), and the report is included in the appendix. The risk assessment has been carried out in accordance with the guidelines provided by CIRIA², which state that the likelihood of encountering and detonating UXO below a site should be assessed along with establishing the consequences that may arise. The first phase comprises a preliminary risk assessment, which should be undertaken at an early stage of the development planning. If such an assessment identifies a high level of risk, then a detailed risk assessment

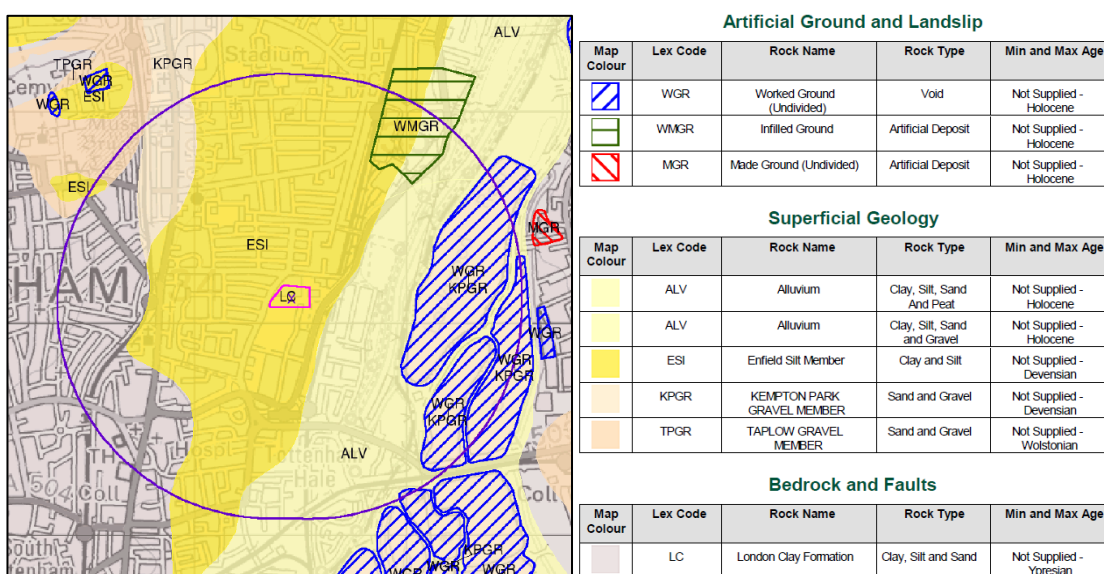
² CIRIA C681 (2009) Unexploded ordnance (UXO) A guide for the construction industry

should be carried out by a UXO specialist, which will identify an appropriate course of action with regard to risk mitigation.

The report indicates that, during World War II (WWII), the site was located in the Municipal Borough of Tottenham, which sustained an overall high density of bombing, with an average of 103.9 items of ordnance recorded per 1,000 acres. Despite this, no bombing incidents are recorded on or immediately surrounding the site on available London bomb census and local bomb plot mapping. The closest recorded strike is located north of the site boundary, opposite Park View Road and does not appear to have had a significant impact on the site. Additionally, no anecdotal or published information was located to suggest the site was bombed during WWII. No damage is recorded on site or in the surrounding area in MCC damage mapping. Furthermore, no evidence could be found to suggest the site was not subject to frequent access during the war. Due to the industrial usage and positioning in a built-up urban area of the site, it is believed to have been subject to post-raid checks. The report therefore concludes that the risk from UXO contamination is not considered to be significantly higher than the 'background risk' for this area. It has therefore been determined that, although it is not possible to completely discount the risk from UXO, it is not recommended that any further action is taken for this site.

2.5 Geology

The British Geological Survey (BGS) viewer of the area (Sheet 256 as reproduced by Envirocheck below) indicates the site to be underlain by the Enfield Silt Member, overlying the Kempton Park Gravel over the London Clay Formation.



A search of the BGS borehole database has identified a record of a 20 m deep borehole (TQ39SW675) that was drilled roughly 60 m to the northeast of the site in 2006. Made ground, described as soft dark grey sandy clay and silty sand with brick, concrete, ash and roots, was encountered to a depth of 1.2 m. Below this, soils interpreted as River Terrace Deposits were encountered to a depth of 3.60 m, comprising an initial layer of firm grey brown and orange brown sandy clay with rare gravel to a depth of 1.50 m, below which medium dense becoming dense, grey brown silty sandy gravel was encountered to a depth of 3.60 m. The gravel was described as fine to coarse grained, subangular to subrounded and of flint. This was underlain by soils interpreted as London Clay to the full depth investigated of 20.00 m and was described as firm becoming stiff extremely closely fissured dark grey to grey brown slightly silty clay.

The BGS holds records of another borehole (TQ39SW3), located approximately 115 m to the northwest of the site, extending to a depth of 76.5 m. No date is provided on the map. ‘Surface-earth and gravel’ was encountered to a depth of 4.6 m, which is likely to comprise the made ground and Kempton Park Gravel. Below this ‘Blue London Clay’ was encountered to a depth of 25.9 m, underlain by the Lambeth Group, formerly known as Woolwich and Reading Beds and the Thanet Beds. This is split up into four different soil types on the log, comprising ‘green sand’ to a depth of 26.5 m, ‘coloured clay’ to a depth of 28.4 m, ‘live sand’ to a depth of 29.0 m, and ‘dead sand’ to a depth of 64.8 m. Below this, the Upper Chalk is present to the full depth investigated of 76.5 m.

2.6 Hydrology and Hydrogeology

The Enfield Silt and London Clay are classified by the Environment Agency (EA) as Unproductive Strata, which refers to rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The Kempton Park Gravel and Lambeth Group are classified as Secondary ‘A’ Aquifers, which refers to permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The London Clay is not capable of supporting a groundwater table, although isolated pockets of perched groundwater do occur within fissures and silt and sand partings. Published data for the permeability of the London Clay indicates the horizontal permeability to generally range between 1×10^{-11} m/s and 1×10^{-9} m/s, with an even lower vertical permeability.

The site is not located within a Groundwater Source Protection Zone, but a Zone II (Outer Protection Zone) is located 11 m to the southeast of the site.

No water abstractions are located within 500 m of the site, the nearest is located 572 m to the south of the site. EA records indicate that the site is within an area with potential for groundwater flooding to occur below ground level.

The site is located within a Flood Zone 2 and is therefore considered to be at medium risk of flooding from rivers of sea. A flood risk assessment must therefore be carried out.

The site is largely covered by concrete and tarmac hardstanding and buildings. The proposals are likely to increase the amount of soft landscaping on the site, but this is not likely to significantly alter the ratio of infiltration of rainwater beneath the site and surface runoff. The majority of surface runoff currently drains into combined sewers beneath the site, and this will continue. There is not expected to be an adverse impact on the surrounding area. There should not, therefore, be any requirement for any mitigation measures.

2.7 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.

2.7.1 Source

The findings of the desk study and the site walkover indicate that the site has had a potentially contaminative history by virtue of it having been occupied by a fuel filling station, various

warehouses for servicing and repairing vehicles, vehicle washing facilities, a refuse destructor, a spreading salt stockpile, and storage for bin lorries.

Reference to the relevant DoE Industry Profile^{3,4} indicates the principal form of contamination likely to be found at a filling station is from leakage of underground tanks. Historically, contamination of the ground from spillage was common due to overfilling or faulty pipes or caps. Spillages may also occur due to operator error. Contaminants such as lead, polycyclic aromatic hydrocarbons (PAHs), tetraethyllead (TEL), methyl tertiary butyl ether (MTBE), naphthalenes and long-chain aliphatic compounds are likely to be found on former filling station sites. Leakages / spillages would also give rise to a vapour risk due to the breakdown of hydrocarbons.

It is believed that only diesel tanks are present on site, and commonly used diesel fuel additives include anti-oxidants, metal deactivators, detergents most commonly alkyl sulphonates, corrosion inhibitors, cetane improvers, low temperature flow improvers and combustion modifiers.

As the site also contained a repair and servicing garage, other possible contaminants include those from waste oil such as PAHs, along with heavy metals, ethylene glycol from anti-freeze, polymerised glycols and ethers from brake fluid and various chlorinated and non-chlorinated solvents, such as methanol, xylene, dichloromethane and trichloroethylene. Other widely used solvents include paraffin and propriety degreasing compounds.

Contaminants arising from the vehicle wash areas predominantly comprise detergent constituents, including linear alkyl sulphones, sodium carbonate, sodium silicate, sodium hydroxide, ethylene diamine tetraacetic acid and nitrilotriacetic acid.

Potential contaminants arising from the former refuse destructor will depend on the type of waste disposed of, but may include heavy metals, PAHs and asbestos. The length of time that the refuse destructor was located on site means that there is a significant potential of contamination to the site, which will be dependent on the type of waste and disposal method used. Furthermore, the length of time the site has been utilised as a road haulage depot means that there is a potential of not only hydrocarbon and metal contamination, but also from solvents due to the washing area.

A gravel pit was present approximately 50 m to the east of the site in the mid to late 19th century, such that it is possible for an increased thickness of fill materials to be present, which can typically include elevated concentrations of heavy metals and polycyclic aromatic hydrocarbons. Such contaminants are of relatively low solubility, with any potential soluble contaminants unlikely to remain below the site, given that the infilling took place over 100 years ago. Equally, given the age of the fill, it is very unlikely that any organic material that was able to degrade to produce hazardous soil gas, would have degraded by now, such that any fills beneath the site are not considered to form a source of soil gases.

Soil gas arising from landfill is unlikely to be present due to the nearest historic landfill being 192 m away and closed in 1962.

³ Department of the Environment Industry Profile (1996) *Road vehicle fuelling, service and repair – garages and filling stations*. HMSO

⁴ Department of the Environment Industry Profile (1996) *Road vehicle fuelling, service and repair – transport and haulage centres*. HMSO

2.7.2 Receptor

The proposed redevelopment of the site for residential purposes will result in the end users representing relatively high sensitivity receptors. Groundwater within the underlying Kempton Park Gravel, classified as a Secondary 'A' Aquifer, is considered to be a moderately sensitive receptor, as are adjacent sites. Buried services and new buried concrete 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 construction works.

2.7.3 Pathway

Within the site, end users will be isolated from direct contact with any contaminants present within the soil by the presence of buildings and hardstanding. However, any soft landscaping will present a potential exposure pathway. Site workers and building materials will be subject to direct contact with the soil. Given the presence of the underlying Secondary 'A' Aquifer, groundwater flows are a pathway by which contamination could transfer on and off site. The redevelopment of the site will not create any new pathways for contamination to reach shallow groundwater, nor will it create a pathway to adjacent sites.

2.6.4 Preliminary Risk Appraisal

On the basis of the above it is considered that there is a MODERATE risk of there being a significant contaminant linkage at this site, which would result in a requirement for major remediation work. Furthermore, as there is no evidence of filled ground within the vicinity of the site and no landfill sites, there is not considered to be a significant potential for hazardous soil gas to be present on or migrating towards the site.

3.0 EXPLORATORY WORK

In order to meet the objectives described in Section 1.2, eight boreholes were advanced to a depth of 30.00 m (-21.35 m OD) using a standard cable percussion rig. Additionally, 14 boreholes were advanced to depths of between 0.50 m and 5.50 m (8.54 m OD and 4.20 m OD) using an opendrive sampling rig to provide further coverage of the site.

A total of seven trial pits were manually excavated to provide foundation details of the existing buildings on site. During the initial phase of works, three slit trenches were hand excavated to a maximum depth of 0.90 m (8.82 m OD) to expose tree roots, although these were terminated at depths of between 0.40 m and 0.90 m (9.06 m OD and 8.82 m OD) due to the presence of suspected asbestos containing materials (ACM). An additional three slit trenches were excavated in May 2022 during the second phase of works with UKATA Category B trained operatives. Continuous asbestos air monitoring was also carried out during the works, to ensure airborne fibres remained below the control limit of 0.1 fibres/ml. These slit trenches were excavated to a maximum depth of 1.20 m (8.52 m OD) to expose tree roots. The three trenches were dampened with water and a suitable wetting agent throughout the works.

Standard Penetration Tests (SPTs) were carried out within the boreholes to provide an indication of the in-situ density of the soil.

Three mechanically excavated trial pits were excavated each to a depth of 1.00 m (8.65 m OD) using a mini excavator to undertake soakage testing broadly in accordance with BRE Digest 365. The soakage tests were conducted to provide information for soakaway design.

A selection of the samples recovered from the boreholes was submitted to a soil mechanics laboratory for a programme of geotechnical testing and an analytical laboratory for a

programme of contamination testing. The majority of the above work was carried out under the supervision of a geotechnical engineer from GEA.

Six in-situ California Bearing Ratio (CBR) tests were carried out on site, at depths of 0.40 m (9.19 m OD) and 0.60 m (8.99 m OD) in three different locations. Combined gas and groundwater monitoring standpipes were installed in Borehole Nos 1, 2, 5, 6, 12, 13 and 17A to depths of between 2.00 m and 5.00 m (6.93 m OD and 3.60 m OD) to determine the monitor of vapours arising from the breakdown of hydrocarbons and to allow for the recovery of groundwater samples for contamination testing. Six monitoring visits have now been carried out.

Headspace testing using a Photoionisation Detector (PID) was carried out within Borehole Nos 14, 14A, 14B, 14C, 17 and 17A due to the close proximity to the fuel filling station.

The borehole and trial pit records are appended, along with the results of the laboratory analyses, together with a site plan indicating the borehole locations. The Ordnance Datum (OD) levels on the records have been interpolated from a survey drawing of the site provided by the consulting engineers carried out by Site Engineering Surveys Ltd., (job ref 11533, drawing number SES-11533-001, dated June 2021).

3.1 Sampling Strategy

The borehole locations were agreed with the consulting engineer, Civic Engineers, prior to fieldwork and were positioned by a geotechnical engineer from GEA whilst avoiding known and suspected buried services. Disturbed and undisturbed samples were obtained from the boreholes and trial pits for subsequent laboratory examination and testing.

A total of 36 samples of the shallow soil have been tested for the presence of contamination. For this investigation the analytical suite for the soil included a range of metals, total petroleum hydrocarbons (TPH), speciation of polycyclic aromatic hydrocarbons (PAH), total cyanide and monohydric phenols and a range of typical industrial contaminants for the purposes of general coverage. 35 soil samples were also screened for the presence of asbestos, as well as four bulk samples.

Leachate testing was also carried out on four samples, and contamination testing has been carried out on four groundwater samples.

The contamination analyses were carried out at an MCERTs accredited laboratory with the majority of the testing suite accredited to MCERTS standards. A summary of the MCERTs accreditation and test methods are included with the attached results and further details are available upon request.

4.0 GROUND CONDITIONS

The investigation has encountered the expected ground conditions in that, beneath a variable but generally moderate and locally significant thickness of made ground, the Enfield Silt was encountered, below which the Kempton Park Gravel Member was present overlying the London Clay Formation, whereupon Lambeth Group was encountered and proved to the full depth investigated, of 30.00 m (-21.35 m OD).

4.1 Concrete

The concrete surfacing was, on average, 0.23 m thick, but in excess of 1.00 m in Borehole No 15. Borehole Nos 14, 14A, 14B, 14C, 15, 16 and 17 were terminated at shallow depths due to the thickness of the concrete or other obstructions. Borehole No 15 was drilled in the location of the former refuse destructor.

4.2 Made Ground

The made ground was found to extend to depths of between 0.50 m and 3.80 m (8.15 m OD and 5.76 m OD), but generally to between 0.80 m and 1.50 m (7.67 m OD and 7.80 m OD) and comprised dark brown, orange-brown and yellowish brown slightly clayey gravelly sand with variable amounts of brick, concrete, flint gravel, plastic, metal, glass, carbonaceous material including suspected ash and clinker, ceramics, tile, suspected asbestos containing materials and roots and rootlets. A hydrocarbon odour was noted in Borehole No 17A, and staining was noted in Borehole No 12.

A total of 36 samples were recovered for subsequent contamination testing given the potentially contaminative history of the site and the results are detailed in section 4.8.

4.3 Enfield Silt

The Enfield Silt was encountered in all locations apart from Borehole Nos 2, 5 and 11, to depths of between 1.30 m and 3.00 m (7.17 m OD and 5.86 m OD) and comprised soft orange brown silty slightly sandy gravelly clay.

The results of laboratory classification tests indicate that the Enfield Silt is of low volume change potential. A slight hydrocarbon odour was noted in the Enfield Silt in Borehole No 17A and a sample was submitted for contamination testing.

4.4 Kempton Park Gravel

The Kempton Park Gravel was present to depths of between 4.50 m and 6.00 m (4.60 m OD and 2.67 m OD) and comprised dense and very dense orange brown slightly clayey gravelly sand and sandy gravel. The base of the gravel was not proved in the open drive sampler boreholes apart from Borehole No 11 due to the density of the gravel.

No visual or olfactory evidence of contamination was observed within this stratum.

4.5 London Clay Formation

The London Clay initially comprised firm becoming stiff dark brown fissured clay to depths of between 14.00 m and 17.00 m (-4.44 m OD and -7.79 m OD) with rare fine selenite whereupon very stiff dark grey slightly silty slightly sandy fissured clay with rare fine mica and occasional

bioturbation was present to depths of between 23.10 m and 25.80 m (-14.45 m OD and -16.59 m OD).

No visual or olfactory evidence of contamination was observed within this stratum. The results of laboratory classification tests indicate that the London Clay is of generally high-volume change potential. The results of the undrained triaxial tests indicate the clay to be of high becoming very high strength in the majority of boreholes and high becoming extremely high strength in Borehole No 5.

4.6 Lambeth Group

The Lambeth Group comprised very stiff dark grey and multicoloured silty sandy gravelly clay with rounded black pebbles and shells and dense light grey silty gravelly sand, also with rounded black pebbles, shells, fragments of siltstone and occasional fine chalk gravel. No visual or olfactory evidence of contamination was observed within this stratum. The results of laboratory classification tests indicate that the clay of the Lambeth Group is of low to medium-volume change potential.

Gas expulsion was noted in Borehole No 2 once the Lambeth Group was reached at a depth of around 24.50 m (-14.94 m OD) and is likely to be a result of high levels of pressurised deoxygenated air venting from the borehole.

4.7 Groundwater

During the drilling of the boreholes, groundwater was encountered at depths of between 3.00 m and 4.00 m in the Kempton Park Gravel, and at depths of 22.50 m and 24.50 m (-13.83 m OD and -15.64 m OD) rising to depths of between 21.00 m and 23.50 m (-12.14 m OD and -14.84 m OD) in the Lambeth Group.

Combined gas and groundwater monitoring standpipes were installed in Borehole Nos 1, 2, 5, 6, 12, 13, and 17A to depths of between 1.80 m and 6.00 m (6.73 m OD and 2.60 m OD). The standpipes have been monitored on six occasions to date, and the results are shown in the table below. Due to the demolition works, various boreholes have been inaccessible at times, only those that could be accessed on the given date are included in the table.

Date	Borehole No	Standpipe depth m	Depth to water m [Level m OD]
01/02/2022	1	4.75	2.06 [6.80]
	2	5.98	2.85 [6.71]
	5	4.95	2.45 [6.76]
	13	1.74	1.20 [7.73]
	17A	2.27	2.60 [6.06]
03/03/2022	2	5.98	2.50 [7.06]
	5	4.58	1.91 [7.30]
	13	1.78	0.74 [8.19]

Date	Borehole No	Standpipe depth m	Depth to water m [Level m OD]
18/03/2022	17A	2.15	1.25 [7.41]
	5	4.65	2.32 [6.89]
	17A	2.23	1.64 [7.02]
06/05/2022	2	5.98	2.93 [5.93]
	5	4.58	2.48 [7.08]
	12	2.40	2.02 [7.19]
	13	1.75	0.97 [7.96]
	17A	2.00	1.72 [6.94]
31/05/2022	2	6.02	2.96 []
	5	4.63	2.50 []
	12	2.45	2.06 []
	13	1.73	0.91 []
	17A	2.15	1.70 []
22/06/2022	2	6.01	2.95 []
	5	4.62	2.45 []
	12	2.49	2.00 []
	13	1.70	0.85 []
	17A	2.20	1.55 []

4.8 Soil and Groundwater Contamination

The table below sets out the values measured within the 36 samples of made ground and natural soils analysed; all concentrations are in mg/kg unless otherwise stated.

Determinant	Minimum concentration (mg/kg)	Maximum concentration (mg/kg)	Generic risk-based screening value	Number below limit of detection	Number of samples above screening value
pH	7.4	11.4	-	-	-
Arsenic	10	170	37	0	18
Cadmium	< 0.2	15	26	22	0
Chromium	19	120	910	0	0
Lead	21	4600	200	0	32

Determinant	Minimum concentration (mg/kg)	Maximum concentration (mg/kg)	Generic risk-based screening value	Number below limit of detection	Number of samples above screening value
Mercury	< 0.3	7.1	40	13	0
Selenium	1	1.5	350	35	0
Copper	25	3500	2,400	0	2
Nickel	19	840	180	0	3
Zinc	74	4900	3,700	0	2
Total Cyanide	< 1.0	61	140	28	0
Total Phenols	< 1.0	< 1.0	184	32	0
Total PAH	< 0.80	76.0	62.1	13	2
Sulphide	< 1.0	1600	50	5	9
Naphthalene	< 0.05	< 0.05	2.30	36	0
Fluoranthene	< 0.05	14	280	14	0
Benzo(a)anthracene	< 0.05	7.7	7.2	16	1
Benzo(b)fluoranthene	< 0.05	5.6	2.6	15	5
Chrysene	< 0.05	4.9	15	16	0
Benzo(a)pyrene	< 0.05	5.7	4.35	17	2
Dibenz(a,h)anthracene	< 0.05	1.1	0.24	29	7
TPH	< 10	5400	500	7	3
Total Organic Carbon %	0.3	5.1	6	0	0
Note: Figures in bold are elevated when compared to the relevant risk based screening values.					

Groundwater samples were taken approximately one month after installation of the standpipes. Chemical analyses of the samples have indicated that elevated concentrations of nickel were present in Borehole Nos 13 and 17A and elevated concentrations of TPH were present in Borehole No 17A.

4.8.1 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. Contaminants of concern are those that have values in excess of generic human health risk-based guideline values, which are either the CLEA⁵ Soil Guideline Values where available, the Suitable 4 Use Values⁶ (S4UL) produced by LQM/CIEH calculated using the CLEA UK Version 1.07⁷ software, or the DEFRA Category 4 Screening values⁸, assuming a residential end use with plant uptake. The key generic assumptions for this end use are as follows:

- that groundwater will not be a critical risk receptor;

⁵ 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.

⁶ The LQM/CIEH S4ULs for Human Health Risk Assessment S4UL3065 November 2014

⁷ Contaminated Land Exposure Assessment (CL|EA) Software Version 1.071 Environment Agency 2015

⁸ CL:AIRE (2013) Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination Final Project Report SP1010 and DEFRA (2014) Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination Policy Companion Document SP1010

-  that the critical receptor for human health will be young female children aged less than 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 home grown produce, consumption of soil adhering to home grown produce, skin contact with soils and dust, and inhalation of indoor and outdoor dust and vapours; and
-  that the building type equates to a two-storey small terraced house.

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

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

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

A residential with plant uptake end use is deemed acceptable for the proposals as it is understood that private gardens are to be included which may contain home grown produce.

The results of the contamination testing indicate the presence of elevated concentrations of lead in 32 samples tested, arsenic in 18 samples tested, sulphide in nine samples tested, TPH in two samples tested, nickel in three samples tested, and copper and zinc in two samples tested, when compared to the generic risk-based screening values for a residential with plant uptake. Whilst overall levels of total PAH were only elevated above the screening values in two samples tested, speciation of the PAH results has indicated elevated concentrations of dibenz(a,h)anthracene in seven samples tested, benzo(b)fluoranthene in five samples tested, benzo(a)pyrene in two samples tested and benzo(a)anthracene in a single sample tested.

Additionally, elevated TPH contamination was identified in the Enfield Silt in Borehole No 17A at a depth of 2.40 m (6.26 m OD).

Leachate testing was carried out on four of the soil samples and indicate elevated concentrations of lead in all four samples tested and zinc in a single sample tested above the relevant groundwater screening values.

35 samples of shallow made ground were also screened for the presence of asbestos and was detected in three samples. Subsequent quantification testing revealed concentrations of 0.018 % and < 0.001 %. Additionally, four bulk samples of suspected asbestos containing materials were screened for the presence of asbestos and all were found to comprise chrysotile in the form of a hard / cement type material.

Asbestos air monitoring was carried out during the excavation, logging, and reinstatement of the three slit trenches excavated during the second phase of works. A total of 32 air tests were conducted and all tests recorded a result of < 0.01 fibres/ml. The full results are provided in the appendix.

The results of the chemical analyses within the groundwater indicate that elevated concentrations of nickel and TPH are present with respect to the screening values for groundwater.

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

4.9 Soil Gas

In order to provide an assessment of the requirement for gas protection measures, given the thickness of made ground encountered in some areas and the history of the site, standpipes have been installed into seven of the boreholes to depths of between 1.80 m and 5.00 m. A programme of gas monitoring comprising six monitoring visits has now been carried out. Borehole No 6 was not accessible during any visit and Borehole No 1 was only accessible during the first visit. Additionally, Borehole No 12 was not accessible until the fourth visit, but was accessible for the remainder of the programme, and only Borehole Nos 5 and 17A were accessible during the third visit due to demolition works.

The results from the first visit indicated that Borehole Nos 2 and 17A are at near normal oxygen levels of 17.6 % and 17.7 % respectively, Borehole No 13 has slightly reduced oxygen levels of 13.7 % and Borehole Nos 5 and 13 had significantly reduced oxygen levels of 7.7 % and 7.2 % respectively. Oxygen concentrations in all boreholes that could be accessed during the remaining visits had recovered to near normal. Reduced oxygen concentrations were recorded in Borehole No 12 during the fourth visit, but this was the first time this borehole was accessible, and the gas tap was noted to have been closed, which could have allowed for a build-up in concentrations. Negligible carbon dioxide concentrations were recorded in Borehole No 12 in subsequent visits.

Slight carbon dioxide levels were recorded in all boreholes of between 0.2 % in Borehole No 13 and 2.2 % in Borehole No 1 during the first visit. Carbon dioxide concentrations were all at 0.1 % during the second visit and between 0.1 % and 0.9 % during the remaining visits, apart from Borehole No 12 which is discussed above. No methane, carbon monoxide, or hydrogen sulphide was identified in any of the four visits.

All boreholes were also tested for volatile organic compounds (VOCs) using a Photoionisation Detector (PID) and recorded a maximum concentration of between 4.3 ppm in Borehole No 17A during the second visit, but concentrations of 0.0 ppm and 0.054 ppm were recorded in this borehole during the first and third visits respectively. A moderate to significant flow was recorded in Borehole Nos 1, 5 and 13 of 4.0 l/h, 19.9 l/hr and 20.2 l/hr respectively during the first visit, but no flow was recorded during the remaining five visits. Relative downhole pressure was measured at between 3 mb and 245 mb also during the first visit but was measured to be 0 mb during the remaining five visits. Breezy conditions were observed on the day of the first monitoring visit, which is likely to have affected the flow readings. This appears to have been

confirmed with the further five monitoring visits, and as such the average flow rate should be considered to be < 0.1 l/hr. It is recommended the monitoring programme be extended with an additional three visits to confirm this view. The full results of gas and groundwater monitoring are appended.

In determining the significance of soil gas concentrations both the gas concentrations and borehole flow rates are used to define a characteristic situation for a site based on the limiting borehole gas volume flow, renamed as the Gas Screening Value (GSV) for methane and carbon dioxide. In this case the following GSVs have been determined, in accordance with guidance provided by CIRIA⁹.

Gas	Max concentration % vol.	Avg flow rate l/hr	GSV
Methane	0.0	< 0.1	N/A
Carbon dioxide	6.1	< 0.1	0.0061

The gas screening value is calculated using the following formula:

$$\text{GSV} = \text{flow rate} \times (\text{concentration of gas}/100)$$

The gas screening value of less than 0.07 l/hr indicates Characteristic Situation 1 (CS1). For a carbon dioxide concentration of above 5 %, consideration should usually be given to increasing to a Characteristic Situation 2 (CS2), but the carbon dioxide concentration has not been replicated since, and this was recorded during the first monitoring visit for that standpipe, such that gas is likely to have been able to build up. The additional three recommended visits will confirm this view.

4.10 Existing Foundations

The findings of the trial pits are summarised in the table below. Sketches and photographs of the pits are included in the appendix.

Trial Pit No	Structure	Foundation detail	Bearing Stratum
1	Southeastern wall of building along northwestern extent of site	Brick wall over mass concrete pad Top 0.26 m Base 0.58 m Lateral projection 380 mm	MADE GROUND.
2	Southern wall of main workshop in north of site	Brick wall of concrete strip Top 0.30 m Base 0.58 m Lateral projection 0 mm	MADE GROUND.
3	Northern wall of office building extension	Brick wall over mass concrete pad Top 0.64 m Base 0.92 m Lateral projection 260 mm	Soft orange brown sandy SILT.
4	Concrete block associated with main workshop in north of site	Mass concrete pad Top 0.60 m Base not proved Lateral projection 400 mm	Not proved – trial pit terminated at a depth of 0.62 m due to presence of suspected asbestos containing material.

⁹ Wilson, S, Oliver, S, Mallett, H, Hutchings, H and Card, G (2006) *Assessing risks posed by hazardous ground gases to buildings* CIRIA Report C659

Trial Pit No	Structure	Foundation detail	Bearing Stratum
5	Northern wall of office building	Brick wall over mass concrete pad Top 0.44 m Base 0.74 m Lateral projection 230 mm	MADE GROUND.
6	Southwestern corner of office block in south of site	Brick wall over mass concrete pad Top 0.28 m Base 0.42 m Lateral projection 200 mm	MADE GROUND.
7	Southeastern corner of office block in southeast of site	Mass concrete pad Top 0.00 m Base 0.96 m Lateral projection 400 mm	Soft orange brown sandy slightly gravelly SILT.

Part 2: DESIGN BASIS REPORT

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

5.0 INTRODUCTION

It is understood that it is proposed to demolish the existing buildings and subsequently construct a new residential development providing a total of 272 homes, comprising a number of apartment blocks of between four storeys and 12 storeys in addition to two-storey houses, with associated areas of public realm, private and communal soft landscaping and new roads and pavements.

It is understood that one of the buildings in the northeastern corner of the site is proposed to include a 5.5 m deep basement.

6.0 GROUND MODEL

The findings of the desk study and the site walkover indicate that the site has had a potentially contaminative history by virtue of it having been occupied by a fuel filling station, various warehouses for servicing and repairing vehicles, vehicle washing facilities, a refuse destructor, a spreading salt stockpile, and storage for bin lorries. On the basis of the fieldwork, the ground conditions at this site can be characterised as follows:

- beneath a variable but generally moderate and locally significant thickness of made ground, Enfield Silt was encountered, below which the Kempton Park Gravel Member was encountered overlying the London Clay Formation, whereupon Lambeth Group was encountered and proved to the full depth investigated of 30.00 m (-21.35 m OD);
- a concrete surfacing is present across the site on average 0.23 m thick, but in excess of 1.00 m in some locations;
- made ground extends to depths of between 0.50 m and 3.80 m (8.15 m OD and 5.76 m OD), but generally to between 0.80 m and 1.50 m (7.67 m OD and 7.80 m OD) and comprises dark brown, orange-brown and yellowish brown slightly clayey gravelly sand with variable amounts of brick, concrete, flint gravel, plastic, metal, glass, carbonaceous material including suspected ash and clinker, ceramics, tile, suspected asbestos containing materials and roots and rootlets;
- the Enfield Silt comprises soft orange-brown silty slightly sandy gravelly clay and is present to depths of between 1.30 m and 3.00 m (7.17 m OD and 5.86 m OD);
- the Kempton Park Gravel comprises dense and very dense orange brown slightly clayey gravelly sand and sandy gravel, present to depths of between 4.50 m and 6.00 m (4.60 m OD and 2.67 m OD);
- the London Clay initially comprises a layer of firm becoming stiff dark brown fissured clay to depths of between 14.00 m and 17.00 m (-4.44 m OD and -7.79 m OD) with rare fine selenite, whereupon very stiff dark grey slightly silty slightly sandy fissured

clay with rare fine mica and occasional bioturbation is present to depths of between 23.40 m and 26.00 m (-14.45 m OD and -16.59 m OD);

- the Lambeth Group comprises very stiff dark grey and multicoloured silty sandy gravelly clay with rounded black pebbles and shells and dense light grey silty gravelly sand, also with rounded black pebbles, shells, siltstones and occasional fine chalk gravel, present to the full depth investigated of 30.00 m (-14.94 m OD);
- groundwater is present within the Kempton Park Gravel at depths of between 3.00 m and 4.00 m and was encountered at depths of between 22.50 m and 24.50 m (-13.83 m OD and -15.64 m OD) rising to depths of between 21.00 m and 23.50 m (-12.14 m OD and -14.84 m OD) in the Lambeth Group;
- subsequent groundwater monitoring has measured groundwater at depths of between 0.74 m and 2.85 m (8.19 m OD and 6.71 m OD);
- contamination testing has measured elevated concentrations of lead, arsenic, nickel, copper, zinc, sulphide, TPH, dibenz(a,h)anthracene, benzo(b)fluoranthene, benzo(a)anthracene and benzo(a)pyrene within the made ground and TPH within the Enfield Silt;
- testing of groundwater samples has indicated elevated concentrations of nickel and TPH and leachate testing has indicated elevated concentrations of lead and zinc above the relevant groundwater screening values;
- asbestos was detected in three samples of 29 tested and subsequent quantification testing indicated concentrations of 0.018 % and < 0.001 %; and
- gas monitoring carried out to date suggests the site falls under a Characteristic Situation 1, however it is recommended an additional three visits are carried out to confirm this view.

7.0 ADVICE AND RECOMMENDATIONS

In view of the thickness of made ground and the anticipated high loads, spread foundations may only be appropriate for the lower rise structures, whilst piled foundations will be required to support the larger new structures.

The excavation for the proposed basement structure in the northeast of the site will require temporary support to prevent any excessive ground movements. Whilst groundwater was not encountered during drilling, subsequent monitoring has recorded shallow groundwater at depths of between 2.50 m and 2.93 m (7.06 m OD and 5.93 m OD) in Borehole No 2, drilled close to the proposed basement, which is above the formation level of 5.50 m below ground level.

Basement formation level is expected to be towards the base of Kempton Park Gravel, which was present to a depth of 5.60 m (3.96 m OD) in Borehole No 2, below which the London Clay was encountered.

7.1 Basement Excavation

7.1.1 Basement Construction

It is understood that the proposed basement will extend to a depth of approximately 5.50 m below ground level, such that formation level is likely to be towards the base of the dense gravel of the Kempton Park Gravel. The groundwater monitoring has indicated groundwater to be present at depths of between 2.50 m and 2.96 m (7.06 m OD and 5.90 m OD) in Borehole No 2, located close to the proposed basement, which is above the proposed basement level. On this basis, groundwater inflows are likely to be encountered within the excavation and a requirement for groundwater protection should be assumed.

Shallow inflows of perched water may also be encountered from within the made ground particularly in the vicinity of existing structures. However, any such inflows are likely to be relatively minor in nature and should be adequately dealt with through sump pumping, although it would be prudent for the chosen contractor to have a contingency plan in place to deal with more significant or prolonged inflows as a precautionary measure. It would also be prudent, once access is available, to carry out a number of trial excavations to depths as close to the full basement depth as possible to provide an indication of the likely ground water conditions, following which groundwater control measures can be finalised.

There are a number of methods by which the sides of the basement excavation could be supported in the temporary and permanent conditions. The choice of wall will be governed, to a large extent, by whether it is to be incorporated into the permanent works and have a load bearing function. Consideration should also be given to the need to protect nearby structures from movements, the required overall stiffness of the support system and the potential need to control groundwater movement through the wall in the temporary condition.

Given the size of the development, the most appropriate method of constructing the basement and supporting the excavation will be through the use of a secant or contiguous bored piled wall. On the basis that groundwater will be encountered within the basement excavation, a secant piled wall may be the most suitable option and may remove a requirement for secondary groundwater control and also maximise the usable space within the basement structure. The use of sheet piles is not considered to be a viable option due to the noise and vibrations associated with their installation.

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

A ground movement analysis and building damage assessment may be required in due course.

7.1.2 Retaining Walls

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

Stratum	Bulk Density (kg/m ³)	Effective Cohesion (c' – kN/m ²)	Effective Friction Angle (Φ' – degrees)
Made Ground	1750	Zero	27
Kempton Park Gravel	1950	Zero	36
London Clay	2000	Zero	23

Provided a fully effective drainage system can be ensured in order to prevent the build-up of groundwater behind the retaining walls from surface water runoff and periodic seepages within the made ground, it should be possible to design the excavation on the basis that water will not collect behind the walls. If an effective drainage system cannot be ensured, then a water level of two-thirds of the basement depth should be assumed. The advice in BS8102:2009¹⁰ should be followed in this respect and with regard to the provision of suitable waterproofing and groundwater monitoring should be continued.

7.1.3 Basement Heave

The 5.50 m deep excavations to form the proposed basements will result in a net unloading of up to approximately 110 kN/m².

This unloading will result in elastic heave and long-term swelling of the underlying clay soils, although these movements will to a certain extent be counteracted by the applied loads from the proposed development. These movements could be mitigated through the use of tension piles, or the provision of compressible material below the slab, but further consideration should be given to these aspects once the loads are known.

7.2 Spread Foundations

Moderately sized pad or strip foundations bearing in the dense Kempton Park Gravel may be designed to apply a net allowable bearing pressure of 225 kN/m² at a minimum depth of 0.90 m, allowing for restricted new planting in accordance with National House Building Council (NHBC) guidelines for low volume change potential clay. This value incorporates an adequate factor of safety against bearing capacity failure and should ensure that settlement remains within normal tolerable limits.

Foundations should bypass the made ground and soft Enfield Silt which will make spread foundations uneconomic in some locations. Additional ground investigation would be required to check that spread foundations could be adopted.

7.3 Piled Foundations

For the ground conditions at this site, the moderate thickness of granular soils and the presence of groundwater, continuous flight auger (CFA) piles would be the most appropriate which would not require the provision of any casing.

The following table of ultimate coefficients may be used for the preliminary design of piles, although these values may change following the completion of geotechnical testing.

¹⁰ BS8102 (2009) *Code of practice for protection of below ground structures against water from the ground*

Stratum	Depths m	kN / m ²
Ultimate Skin Friction		
Made Ground / Enfield Silt	GL to 2.00	Ignore
Kempton Park Gravel	2.00 to 6.00	10
London Clay ($\alpha = 0.5$)	6.00 to 24.00	Increasing linearly from 34 to 95
Lambeth Group	24.00 to 30.00	90
Ultimate End Bearing		
London Clay	10.00 to 24.00	Increasing linearly from 850 to 1475
Lambeth Group	24.00 to 30.00	2000

In the absence of pile tests, guidance from the London District Surveyors Association (LDSA)¹¹ suggests that a factor of safety of 2.6 should be applied to the above coefficients in the computation of safe theoretical working loads within the London Clay.

On the basis of the above coefficients, the following pile capacities have been estimated.

Pile diameter mm	Depth Below Ground Level m	Safe Working Load kN
300	12	135
	15	225
	20	345
	25	510
	28	625
450	12	225
	15	360
	20	550
	25	810
	28	980
600	12	330
	15	510
	20	775
	25	1125
	28	1350
750	12	445
	15	680

¹¹ LDSA (2017) *Guidance notes for the design of straight shafted bored piles in London Clay*. LDSA

Pile diameter mm	Depth Below Ground Level m	Safe Working Load kN
	20	1025
	25	1490
	28	1740

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 and may change in light of the geotechnical testing. Specialist piling contractors should be consulted with regard to the design of a suitable piling scheme and their attention should be drawn to the potential for the presence of groundwater inflows within the Kempton Park Gravel and Lambeth Group, as well as the potential presence of sand lenses within the London Clay.

7.4 Shallow Excavations

On the basis of the borehole and trial pit findings, it is considered likely that it will be feasible to form relatively shallow excavations terminating within the made ground or Enfield Silt without the requirement for lateral support in the short term.

Significant inflows of groundwater into shallow excavations are not generally anticipated. Seepages may be encountered from perched water tables within the made ground, although such inflows should be suitably controlled by sump pumping.

If deeper excavations are considered or if excavations are to remain open for prolonged periods it is recommended that provision be made for battered side slopes or lateral support and the requirement for groundwater protection. 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.

7.5 Floor Slabs

The ground floor slab is likely to be formed within the made ground, such that a suspended slab is likely to be required.

Gas monitoring carried out to date has suggested the site falls under a CS1, but it is recommended an additional three visits are carried out to confirm this view.

Following the excavation of the basement, it is likely that the floor slab for the proposed basement will need to be suspended over a void to accommodate the anticipated heave unless the slab can be suitably reinforced to cope with these movements. This should be reviewed once the levels and loads are known.

7.6 Pavement Design

A total of six in situ CBR tests were carried in three locations at depths of 0.40 m and 0.60 m (9.19 m OD and 8.99 m OD). CBR values of between 5.1 % and 25.0 % were recorded at 0.40 m (9.19 m OD) and between 7.6 % and 36.0 % at 0.60 m (8.99 m OD), although the higher results are likely to be due to the presence of gravel at each depth, and as such a CBR value 5.0 % should be achievable. Where formation level for hardstanding and access roads is likely to be within the made ground, all pavements should be designed on the basis of a CBR value of less than 2 %.

Two soaked laboratory CBR tests were also carried out on samples retrieved from 1.00 m which gave CBR values of between 2.2 % and 2.4 %.

Formation level should be proof rolled any soft spots revealed should be removed and replaced with suitable granular fill or lean mix concrete.

7.7 Disposal of Surface Water

In order to provide an indication of the suitability of shallow drainage for the disposal of surface water, soakage tests were carried out in three trial pits. Three tests were carried out in Infiltration Test locations 2 and 3 and two tests were carried out in Infiltration Test location 1. The results of the soakage testing and ground conditions are summarised below.

Infiltration Test Location	Ground conditions	Test Number	Test Depth (m) [m OD]	Infiltration rate (m/s)	Infiltration rate (m/day)
1	MADE GROUND	1	1.00 [7.88]	4.27×10^{-6}	0.37
		2		1.35×10^{-6}	0.12
2	MADE GROUND	1	1.00 [8.60]	9.43×10^{-6}	0.81
		2		6.39×10^{-6}	0.55
		3		4.49×10^{-6}	0.39
3	MADE GROUND	1	1.00 [7.67]	6.29×10^{-6}	0.54
		2		4.68×10^{-6}	0.41
		3		4.71×10^{-6}	0.41

The tests yielded soakage rates of between 9.43×10^{-6} m/s to 1.35×10^{-6} m/s in the made ground; these assessments are based on the linear portion of the graphs, unless otherwise stated. Slightly lower infiltration rates were recorded in Infiltration Test Location 1 which had a much higher clay content than the other locations and as such only two tests were possible in the time.

The soakage results have indicated that the design soakage value of 4.49×10^{-6} m/s should be adopted and as such it is unlikely to be feasible to adopt soakaways in the made ground. The full results of the soakage testing are appended.

Given that the identified elevated concentrations of contaminants, discussed further in Section 7.8, are unlikely to be in a soluble form and should not pose a risk to groundwater, in addition to the recorded depth to groundwater, the use of permeable paving should provide an appropriate means for the disposal of surface water. The use of permeable paving should not pose a risk to shallow foundations or slope stability.

Guidance provided within CIRIA C753¹² and by NHBC¹³ should be referred to for the design of permeable paving.

7.8 Effect of Sulphates

Chemical analyses of the made ground have revealed reasonably high concentrations of soluble sulphate and near neutral pH in the made ground, 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

¹² The SUDS Manual CIRIA C753 (2015)

¹³ NHBC (2010) A simple guide to Sustainable Drainage Systems for housing.

samples show that an ACEC class of AC-4 would be appropriate which assumes a mobile water condition at the site.

Chemical analyses of the natural soils have revealed much lower concentrations of soluble sulphate and near neutral pH in the made ground, in accordance with Class DS-2 conditions of Table C2 of BRE Special Digest 1:SD Third Edition (2005). The measured pH values of the samples show that an ACEC class of AC-2 would be appropriate. These values assume a mobile water condition at the site. The guidelines contained in the digest should be followed in the design of foundation concrete.

7.9 Site Specific Risk Assessment

The findings of the desk study and the site walkover indicate that the site has had a potentially contaminative history by virtue of it having been occupied by a fuel filling station, various warehouses for servicing and repairing vehicles, vehicle washing facilities, a refuse destructor, a spreading salt stockpile, and storage for bin lorries. The contamination testing has identified elevated concentrations of lead, arsenic, nickel, copper, zinc, sulphide, TPH and PAH within the made ground and TPH within the Enfield Silt.

The source of the lead, arsenic, copper, zinc and nickel contamination is unknown but the made ground was noted as containing fragments of extraneous material and it is possible that fragments of such material could account for the elevated concentrations. The lead contamination was encountered across the site in 32 of the 36 samples tested, the highest concentrations were recorded in CBR Test Location 2, Trial Pit Nos 101, 101A and 103A, and Borehole Nos 5, 9 and 14, all of which are located in the former bin lorry storage area. The made ground in these areas was noted to contain ash and clinker.

The elevated concentrations of arsenic were identified in 18 samples across the site, the highest concentrations were encountered in Borehole Nos 2, 3 and 9, Trial Pit No 101A, CBR Test Location 2 and Infiltration Test Location 2 all located in the northeast of the site. The elevated concentrations of nickel and copper were identified in three and two samples tested respectively retrieved from Borehole No 2, Trial Pit No 101A and Infiltration Test Location 2, again located in the northeast of the site. The elevated concentrations of zinc were identified in two samples tested retrieved from Borehole No 3 and CBR test location 2, both of which are, again, located in the northeast of the site.

Leachate testing carried out on four soil samples that contained the highest metal concentrations were found to contain elevated concentrations of lead in all four samples tested and zinc in a single sample tested above the relevant groundwater screening values. As such, a risk to groundwater has been identified. Groundwater testing has also been carried out on four samples, two of which were found to contain elevated concentrations of nickel retrieved from Borehole Nos 13 and 17A located in the centre of the site and just to the south of the fuel filling station respectively. The sample from Borehole No 17A was also found to contain elevated concentrations of TPH, specifically bands C16-C21 and C21-C35.

The source of the PAH contamination is not known, but speciation of the results has indicated elevated concentrations of dibenz(a,h)anthracene in seven samples tested, benzo(b)fluoranthene in five samples tested, benzo(a)pyrene in two samples tested and benzo(a)anthracene in a single sample tested. The elevated concentrations were again recorded in samples taken from the northeast corner of the site. Based on the proportions of individual PAH compounds, the identified concentrations are indicative a pyrogenic origin comprising typical made ground with ash etc containing part burnt coal. The specific proportions of

individual PAHs are indicative of this material being degraded oil / bitumen. The PAH contamination identified is unlikely to be in a soluble form.

The TPH contamination was present within the made ground at depth of 0.50 m in Borehole No 14 and Trial Pit No 4, but no individual hydrocarbon chains were above the generic risk-based screening values for a residential without plant uptake end use. TPH contamination was also present within the Enfield Silt in Borehole No 17A, with significantly elevated concentrations of C21+ which is most likely to be attributable to spillages of diesel. Borehole No 14 was drilled to the north of the fuel filling station and Borehole No 17A to the south and therefore the contamination is likely attributable to localised spillages of diesel and leakage of the underground tanks or fuel interceptors. Elevated concentrations of TPH, specifically C21+, were also measured in the groundwater retrieved from Borehole No 17A. The fuel tanks and any grossly contaminated should be removed which will remove the source. Additional investigation should be carried out prior to the tank removal to determine whether contaminated soil removal is sufficient or if some form of remediation may be required.

Asbestos screening was undertaken in the laboratory under electron microscope on 35 shallow soil samples given the history of the site and was identified in two samples. Chrysotile has been identified in Trial Pit Nos 102 and 103A in the northeast of the site and in CBR Test Location 3 in the south of the site both at a depth of 0.40 m. Subsequent asbestos quantification has been carried out and recorded concentrations of 0.018 % in Trial Pit No 102 and < 0.001 % in both Trial Pit No 103A and CBR Test Location 3. Asbestos containing materials were also identified in Trial Pit Nos 101A and 102A. Four bulk samples of suspected asbestos containing materials were screened for the presence of asbestos and all were found to comprise chrysotile in the form of a hard / cement type material. It is likely that asbestos may be present elsewhere within the made ground in areas that have not been investigated.

A moderate to significant thickness of made ground is present beneath the site, and it would be prudent to keep the made ground separate from the natural soils and carry out additional asbestos screening of samples of made ground to be removed from the site to determine if any further asbestos from the building has entered the made ground.

The presence of elevated concentrations of sulphide should not pose a risk to end users.

As the site is underlain by the Enfield Silt, classified as Unproductive Stratum, the contamination would not normally pose a risk to groundwater, but the Enfield Silt was granular in some places and absent in others, and the made ground is directly underlain by the Kempton Park Gravel. The Gravel is classified as a Secondary 'A' Aquifer, and therefore groundwater should be considered a sensitive receptor. Given that the observed contamination is relatively immobile and unlikely to be in a soluble form and is considered to be non-volatile or of a low volatility, the contamination does not present a significant risk to groundwater through leaching, migration to adjacent sites or vapour risk.

7.9.1 End Users

In areas of soft landscaping, a pathway will exist by which end users can come into contact with any contamination in the shallow soils, via direct contact, accidental ingestion of soil and soil-derived dust and soil adhering to homegrown produce. The proposed development in the northeast of the site, where the highest concentrations of contamination were encountered, comprises the excavation of a basement which will remove the entirety of made ground in this area, along with the grossly contaminated soils.

The critical exposure pathways identified will be direct soil and dust ingestion, consumption of homegrown produce, consumption of soil adhering to homegrown produce, skin contact with soils

and dust, and inhalation of dust. The initial site strip is likely to result in the removal of much of the made ground, but if any remains below gardens or landscaped areas clean soil should be imported to provide a cover thickness of clean subsoil and topsoil in garden areas of 600 mm and 300 mm below communal grassed areas, in accordance with recommendations from BRE¹⁴ with a geotextile marker layer at the base over the made ground. Where this requirement results in the removal of the entire remaining thickness of made ground, the thickness of clean soil can be reduced accordingly, although it would be prudent to test the formation level as well as the imported soil.

It is recommended that a watching brief be maintained during ground works by the contractor and any suspected contamination, especially in areas not covered by the investigation, should be brought to the attention of a geoenvironmental engineer.

7.9.2 Site Workers

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 HSE¹⁵ and CIRIA¹⁶ and the requirements of the Local Authority Environmental Health Officer.

If suspicious soils are encountered during the construction works, then a suitably qualified engineer should inspect the soils and further testing should be carried out if required.

7.9.3 Buried Plastic Services

Consideration may need to be given to the protection of buried plastic water supply 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 likely that barrier pipe will be required.

7.9.4 Asbestos

The asbestos-containing material is only a risk to humans if the asbestos fibres become airborne. Given the positive identification of asbestos within three samples of the made ground, as well as four bulk samples, it can be assumed that some of the made ground contains a degree of asbestos. Quantification testing revealed that the concentration of asbestos found in Trial Pit No 102 was 0.018 % and in CBR Test Location 3 and Trial Pit No 103A was 0.018 % and < 0.001 % respectively. The bulk samples were found to comprise chrysotile in the form of a hard / cement type material.

As asbestos is insoluble and was found to be present as loose fibres, it is not considered to pose any meaningful risk to groundwater, the development or to neighbouring sites through migration in the ground. It is however potentially hazardous to human health as airborne fibres and could thus pose a risk through inhalation. In wet soil, the asbestos is highly unlikely to be released so the risk is minimal, but it is essential that the soil is not allowed to dry out and produce dust and this could be achieved by capping or damping down. If encountered, bonded asbestos cement boarding may be excavated safely, so long as the material is kept wet at all times, workers wear appropriate PPE (i.e. disposable overalls, gloves and FFP3 face masks) and the material is double bagged in clearly labelled heavy duty polythene bags.

However, the local authority and / or HSE should be consulted prior to commencement of any excavations. The local authority or Environment Agency will also be able to provide

¹⁴ BRE (2004) *Cover systems for land regeneration. Thickness of cover systems for contaminated land.* BRE pub 465

¹⁵ HSE (1992) HS(G)66 *Protection of workers and the general public during the development of contaminated land*
HMSO

¹⁶ CIRIA (1996) *A guide for safe working on contaminated sites* Report 132, Construction Industry Research and Information Association

information on the nearest suitable waste disposal facility licensed to accept asbestos. It is recommended that an asbestos expert is consulted, and that air monitoring is carried out during groundworks. Site workers should be made aware of the contamination and a programme of working should be identified to protect site workers¹⁷ handling any soil.

7.10 Waste Disposal

Under the European Waste Directive, waste is classified as being either Hazardous or Non-Hazardous and landfills receiving waste are classified as accepting hazardous or non-hazardous wastes or the non-hazardous sub-category of inert waste in accordance with the Waste Directive. Waste classification is a staged process, and this investigation represents the preliminary sampling exercise of that process. Once the extent and location of the waste that is to be removed has been defined, further sampling and testing may be necessary. The results from this ground investigation should be used to help define the sampling plan for such further testing, which could include WAC leaching tests where the totals analysis indicates the soil to be a hazardous waste or inert waste from a contaminated site. It should however be noted that the Environment Agency guidance WM3¹⁸ states that landfill WAC analysis, specifically leaching test results, must not be used for waste classification purposes.

Any spoil arising from excavations or landscaping works, which is not to be re-used in accordance with the CL:AIRE¹⁹ guidance, will need to be disposed of to a licensed tip. Waste going to landfill is subject to landfill tax at either the standard rate of £98.60 per tonne (about £185 per m³) or at the lower rate of £3.15 per tonne (roughly £6.10 per m³). However, the classifications for tax purposes and disposal purposes differ and currently all made ground and topsoil is taxable at the 'standard' rate and only naturally occurring soil and stones, which are accurately described as such in terms of the 2011 Order, would qualify for the 'lower rate' of landfill tax.

Based on the technical guidance provided by the EA it is considered likely that the soils encountered during this ground investigation, as represented by the chemical analyses carried out, would be generally classified as follows;

Soil Type	Waste Classification (Waste Code)	WAC Testing Required Prior to Landfill Disposal?	Current applicable rate of Landfill Tax
Made ground	Non-Hazardous (17 05 04)	No	£98.60 / tonne (Standard rate)
Made ground	Non-Hazardous (containing asbestos) (17 05 04)	No	£98.60 / tonne (Standard rate)
Made ground containing elevated copper, lead, and nickel	Hazardous (17 05 03)	Should not be required but confirm with receiving landfill	£98.60 / tonne (Standard rate)
Natural soil	Inert (17 05 04)	Should not be required but confirm with receiving landfill	£3.15 / tonne (Reduced rate for uncontaminated naturally occurring rocks and soils)

Any soils containing asbestos may be classified as HAZARDOUS waste if the concentration is over 0.1%. It would be prudent to screen made ground for asbestos before exporting off-site.

Under the requirements of the European Waste Directive all waste needs to be pre-treated prior to disposal. The pre-treatment process must be physical, thermal, chemical or biological, including sorting. It must change the characteristics of the waste in order to reduce its volume,

¹⁷ The Release of Dispersed Asbestos Fibres from Soils, Addison et. al., 1988 http://www.iom-world.org/pubs/IOM_TM8814.pdf
¹⁸ Environment Agency 2015. *Guidance on the classification and assessment of waste*. Technical Guidance WM3 First Edition
¹⁹ CL:AIRE March 2011. *The Definition of Waste: Development Industry Code of Practice* Version 2

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 paper²⁰ 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.

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 may be required.

The ground is a heterogeneous natural material and variations will inevitably arise between the locations at which it is investigated. This report provides an assessment of the ground conditions based on the discrete points at which the ground was sampled, 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.

Upon completion of the gas monitoring programme comprising six visits, the site likely falls under a Characteristic Situation 1. However, in light of recording a single high concentration of carbon dioxide and a relatively high flow rate, it is recommended an additional three visits are carried out to confirm this view. In any case, monitoring of the standpipes should be carried out over as long a period as possible to determine the extent of any seasonal variations.

It is recommended that further exploratory work should be undertaken once the buildings on site have been demolished in order to access areas of the site beneath the footprint of existing structures and to focus on the presence of contamination in proposed landscaped areas.

The leaching tests have indicated that some of the contaminants in the made ground have the potential to affect the groundwater and groundwater testing has identified the presence of elevated concentrations of nickel and TPH.

A specialist should be contacted with regard to the presence of asbestos fibres within the made ground and an asbestos survey should be undertaken within the buildings on site prior to their demolition.

²⁰ Environment Agency 23 Oct 2007 *Regulatory Position Statement Treating non-hazardous waste for landfill - Enforcing the new requirement*

This investigation has indicated the presence of contamination and recommendations have been made for the mitigation of this contamination in light of the current development proposals. This report should be viewed as the first stage in a process which culminates in the provision of a Verification Report confirming that the remediation has been carried out satisfactorily. The next stage in this process should be consultation with the Local Environmental Health Officer (EHO) and Environment Agency (EA) and the provision of Remediation Proposals that can be agreed with these parties as a basis for the remediation of the contamination.

If during ground works any visual or olfactory evidence of contamination is identified, it is recommended that further investigation be carried out and that the risk assessment is reviewed. These areas of doubt should be drawn to the attention of prospective contractors and further investigation will be required or sufficient contingency should be provided to cover the outstanding risk.

APPENDIX

Site Plan
Borehole Records
Trial Pit Records
Slit Trench Records
Geotechnical Test Results
SPT Cohesion Depth Plot
In-situ CBR Test Results
Soakage Testing Results
Contamination Test Results
Asbestos Air Monitoring Results
Gas Monitoring Results
Generic Risk Based Screening Values
Groundwater Screening Values
Envirocheck Report
Envirocheck Extracts
Historical Maps
London Fire Brigade Environmental Search
Preliminary UXO Risk Assessment

Site Ashley Road Depot, Ashley Road, Tottenham

Client Haringey Council

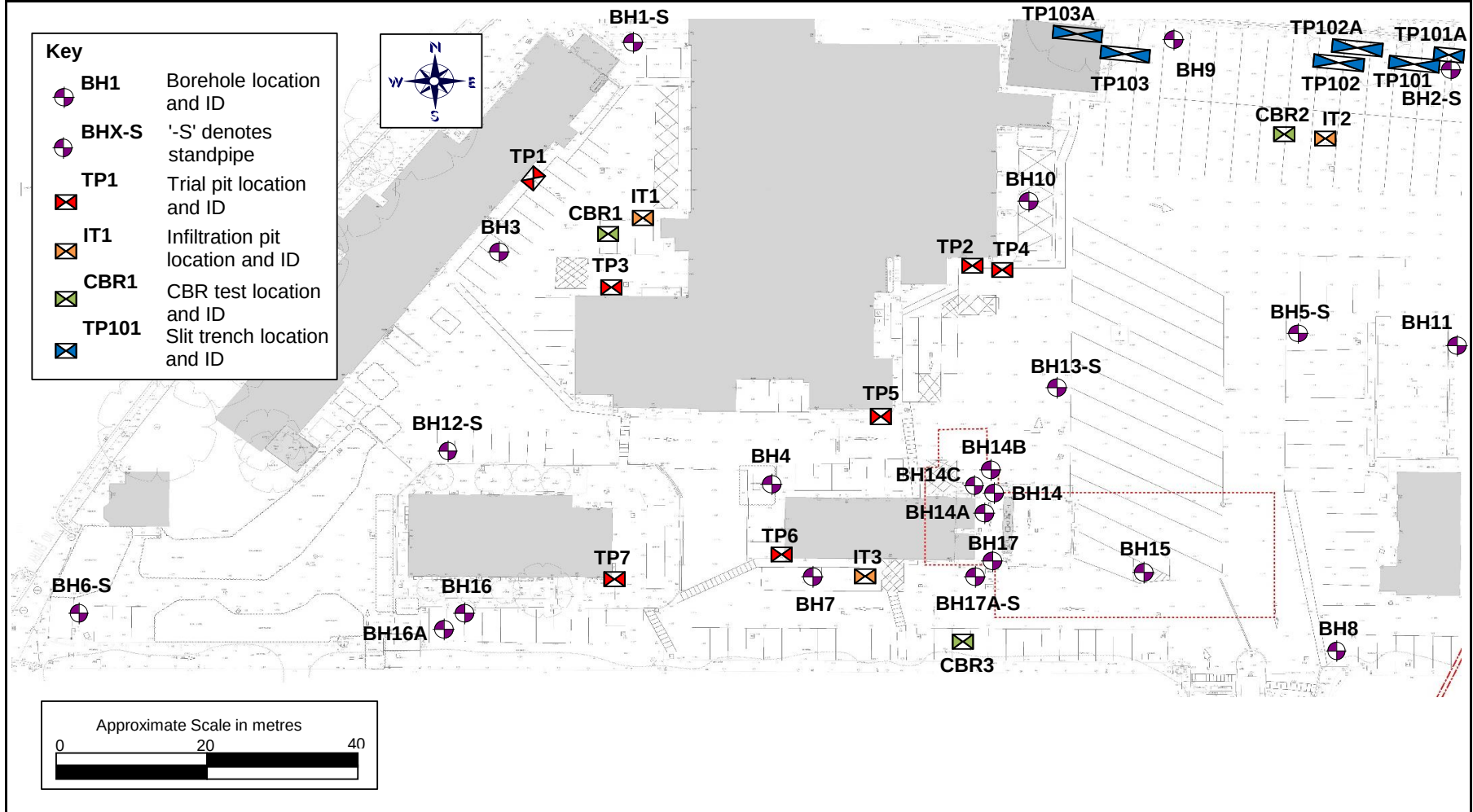
Engineer Civic Engineers

Job Number

J21294

Sheet

1 / 1





Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH1	
Job No J21294	Date 01-12-21 02-12-21	Ground Level (m OD) 8.86	Co-Ordinates () E 534,433.0 N 190,173.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.30	ES1	1,1/2,2,3,3 N60 = 9		8.63		0.23	CONCRETE	
0.50	B1			8.36		0.50	MADE GROUND (brick and concrete rubble).	
1.00	D2						Soft orange brown silty sandy CLAY with occasional flint gravel.	
1.20	D3							
1.75	D4					(2.50)		
2.00	U1001	20 blows						
2.75	D5						Medium dense orange brown slightly sandy GRAVEL. Gravel is fine to coarse grained, angular to subrounded and of flint. Sand is fine to coarse.	
3.00	B2	3,4/6,6,8,10 N60 = 28		5.86		3.00		
3.75	D6					(1.80)		
4.00	B3	6,6/8,9,9,11 N60 = 34						
4.75	D7			4.06		4.80	Medium strength becoming high strength, firm becoming stiff blueish grey slightly sandy fissured CLAY with occasional fine selenite.	
5.00	D8	2,2/3,4,5,5 N60 = 16						
6.00	D9							
6.50	U1002	30 blows						
7.50	D10							

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 4.00 m and 5.00 m. Groundwater strike at a depth of 24.50 m, rising to 21.00 m after 30 mins. Filling water drums for aiding drilling for 30 mins.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion rig			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH1	
Job No J21294	Date 01-12-21 02-12-21	Ground Level (m OD) 8.86	Co-Ordinates () E 534,433.0 N 190,173.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 2 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	D11	3,4/5,5,6,7 N60 = 21					Medium strength becoming high strength, firm becoming stiff blueish grey slightly sandy fissured CLAY with occasional fine selenite.(continued)	
9.00	D12							
9.50	U1003	33 blows				(10.20)		
10.50	D13							
11.00	D14	3,4/6,6,8,10 N60 = 28						
12.00	D15							
12.50	U1004	38 blows						
13.50	D16							
14.00	D17	2,5/6,8,8,11 N60 = 30						
15.00	D18			-6.14		15.00	Very high strength, stiff becoming very stiff dark grey fissured slightly sandy CLAY with occasional fine mica and rare bioturbation.	
15.50	U1005	42 blows						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 4.00 m and 5.00 m. Groundwater strike at a depth of 24.50 m, rising to 21.00 m after 30 mins. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH1
Job No J21294	Date 01-12-21 02-12-21	Ground Level (m OD) 8.86	Co-Ordinates () E 534,433.0 N 190,173.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
16.50	D19						Very high strength, stiff becoming very stiff dark grey fissured slightly sandy CLAY with occasional fine mica and rare bioturbation.(continued)	
17.00	D20	5,6/8,8,10,12 N60 = 35						
18.00	D21						18.00 ...light grey fine SAND.	
18.50	U1006	48 blows						
19.50	D22					(9.50)		
20.00	D23	5,7/9,10,12,14 N60 = 41						
21.00	D24		1					
21.50	U1007	53 blows						
22.50	D25							
23.00	D26	6,8/10,11,13,14 N60 = 44						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 4.00 m and 5.00 m. Groundwater strike at a depth of 24.50 m, rising to 21.00 m after 30 mins. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH1
Job No J21294	Date 01-12-21 02-12-21	Ground Level (m OD) 8.86	Co-Ordinates () E 534,433.0 N 190,173.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
24.00	D27		↓	-15.64		24.50	Very high strength, stiff becoming very stiff dark grey fissured slightly sandy CLAY with occasional fine mica and rare bioturbation.(continued)	
24.50	U1008	60 blows					Very stiff grey sandy gravelly CLAY with shells. Gravel coarse and rounded.	
25.50	D28							
26.00	D29	8,11/13,16,13,19 N60 = 56						
27.00	D30					(5.50)		
27.50	D31	25/50 N = 50/75 mm						
28.50	D32							
29.00	D33	10,14/16,19,17,23 N60 = 69						
30.00	D34	25/50 N = 50/75 mm		-21.14		30.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 4.00 m and 5.00 m. Groundwater strike at a depth of 24.50 m, rising to 21.00 m after 30 mins. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH2	
Job No J21294	Date 29-10-21 02-11-21	Ground Level (m OD) 9.56	Co-Ordinates () E 534,541.0 N 190,166.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.30	D1	0,1/0,1,1,1 N60 = 3		9.26		0.30	CONCRETE	
0.50	B1						MADE GROUND (dark brown very clayey gravelly sand with flint gravel, occasional brick, abundant concrete, rare road, plastic, glass and carbonaceous material).	
1.00	D2							
1.20	D3							
1.25	D4	25/50 N = 50/75 mm				(3.50)		
2.00	D5							
2.25	D6							
3.00	D7							
3.75	D8	3,5/7,10,12,12 N60 = 38		5.76		3.80	Dense orange brown sandy GRAVEL. Gravel is fine to coarse grained, angular to subrounded and of flint. Sand fine to coarse.	
4.00	B2					(1.80)		
4.75	D9							
5.00	B3							
6.00	D10	4,6/8,10,14,11 N60 = 39		3.96		5.60	High strength becoming very high strength, firm becoming stiff dark brown fissured CLAY with occasional fine selenite.	
6.50	U1001							
7.50	D11							

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 6.00 m, with a response zone from 4.00 m and 6.00 m. Groundwater strike at a depth of 24.50 m, rising to 23.00 m after 20 mins. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable Percussion Rig			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH2
Job No J21294	Date 29-10-21 02-11-21	Ground Level (m OD) 9.56	Co-Ordinates () E 534,541.0 N 190,166.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	D12	3,3/4,4,5,7 N60 = 18					High strength becoming very high strength, firm becoming stiff dark brown fissured CLAY with occasional fine selenite.(continued)	
9.00	D13							
9.50	U1002	34 blows				(8.40)		
10.50	D14							
11.00	D15	3,4/4,6,8,8 N60 = 24						
12.00	D16						Very high strength, stiff becoming very stiff dark grey fissured CLAY with occasional fine mica and bioturbation towards the base.	
12.50	U1003	38 blows						
13.50	D17							
14.00	D18	4,6/8,8,10,10 N60 = 33		-4.44		14.00		
15.00	D19							
15.50	U1004	42 blows						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 6.00 m, with a response zone from 4.00 m and 6.00 m. Groundwater strike at a depth of 24.50 m, rising to 23.00 m after 20 mins. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable Percussion Rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH2
Job No J21294	Date 29-10-21 02-11-21	Ground Level (m OD) 9.56	Co-Ordinates () E 534,541.0 N 190,166.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
16.50	D20						Very high strength, stiff becoming very stiff dark grey fissured CLAY with occasional fine mica and bioturbation towards the base.(continued)	
17.00	D21	5,7/10,10,11,13 N60 = 40						
18.00	D22							
18.50	U1005	47 blows				(9.50)		
19.50	D23							
20.00	D24	7,9/11,14,13,16 N60 = 50						
21.00	D25							
21.50	D26	6,9/12,15,17,16 N60 = 55						
22.50	D27						22.50 ...light greenish grey fine SAND.	
23.00	D28	8,12/15,17,21,23 N60 = 70						
			1 ▽	-13.94		23.50	Stiff greenish grey gravelly CLAY with shells. Gravel coarse and rounded.	

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 6.00 m, with a response zone from 4.00 m and 6.00 m. Groundwater strike at a depth of 24.50 m, rising to 23.00 m after 20 mins. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable Percussion Rig	Logged By JW
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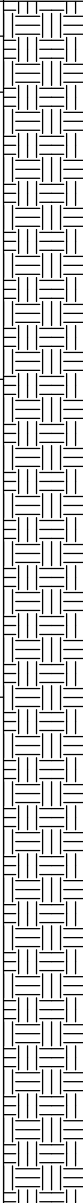
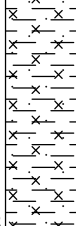
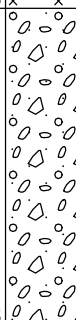
Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH2
Job No J21294	Date 29-10-21 02-11-21	Ground Level (m OD) 9.56	Co-Ordinates () E 534,541.0 N 190,166.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 4 of 4

SAMPLES & TESTS			Water	STRATA			Instrument / Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		DESCRIPTION
24.00	D29	6,8/11,13,15,18 N60 = 52		-14.94		(1.00) 24.50	Stiff greenish grey gravelly CLAY with shells. Gravel coarse and rounded.(continued)	
24.50	D30					(1.50)	Dense light grey clayey SAND with occasional claystones.	
25.50	D31	5,9/11,14,15,18 N60 = 53		-16.44		26.00	Dense light grey silty gravelly SAND	
26.00	D32							
27.00	D33	25/50 N = 50/75 mm				(4.00)		
27.50	D34							
28.50	D35	25/50 N = 50/75 mm						
29.55	D36			-20.44		30.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 6.00 m, with a response zone from 4.00 m and 6.00 m. Groundwater strike at a depth of 24.50 m, rising to 23.00 m after 20 mins. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable Percussion Rig			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH3	
Job No J21294	Date 03-12-21 06-12-21	Ground Level (m OD) 8.88	Co-Ordinates () E 534,415.0 N 190,141.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 4	

SAMPLES & TESTS			Water	STRATA			Instrument / Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		DESCRIPTION
0.30 0.50	ES1 B1	1,1/1,2,1,2 N60 = 6 25 blows 6,7/9,10,10,12 N60 = 38 4,6/7,9,8,7 N60 = 28 3,4/6,6,5,6 N60 = 21 30 blows	 	8.65		0.23	CONCRETE	
				8.28		0.60	MADE GROUND (brick and concrete rubble).	
1.00 1.20	D2 D3				(1.90)	Soft orange brown silty sandy CLAY with occasional flint gravel with black staining and hydrocarbon odour.		
1.75	D4							
2.00	U1001							
6.38	2.50							
2.75 3.00	D5 B2				(2.10)	Medium dense orange brown sandy GRAVEL. Gravel is fine to coarse grained, angular to subrounded and of flint. Sand is fine to coarse.		
3.75	D6							
4.00	B3							
4.28	4.60							
4.75 5.00	D7 D8			Medium strength, firm becoming stiff blueish grey slightly sandy fissured CLAY.				
6.00	D9							
6.50	U1002							
7.50	D10							

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strikes at depths of 3.50 m rising to 2.80 m after 20 mins and 24.00 m, rising to 22.00 m after 30 mins. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH3
Job No J21294	Date 03-12-21 06-12-21	Ground Level (m OD) 8.88	Co-Ordinates () E 534,415.0 N 190,141.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	D11	3,5/6,7,8,8 N60 = 27					Medium strength, firm becoming stiff blueish grey slightly sandy fissured CLAY.(continued)	
9.00	D12					(9.40)		
9.50	U1003	32 blows						
10.50	D13							
11.00	D14	4,6/6,8,8,11 N60 = 30						
12.00	D15							
12.50	U1004	35 blows						
13.50	D16							
14.00	D17	4,6/8,8,10,12 N60 = 35		-5.12		14.00	High strength, stiff becoming very stiff dark grey fissured CLAY with rare fine mica.	
15.00	D18							
15.50	U1005	40 blows						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strikes at depths of 3.50 m rising to 2.80 m after 20 mins and 24.00 m, rising to 22.00 m after 30 mins. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH3
Job No J21294	Date 03-12-21 06-12-21	Ground Level (m OD) 8.88	Co-Ordinates () E 534,415.0 N 190,141.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 3 of 4

SAMPLES & TESTS			Water	STRATA			Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	
16.50	D19					High strength, stiff becoming very stiff dark grey fissured CLAY with rare fine mica.(continued)	
17.00	D20	3,6/8,10,11,14 N60 = 39				17.00 ...light grey fine SAND.	
18.00	D21						
18.50	U1006	48 blows			(10.00)		
19.50	D22						
20.00	D23	5,8/9,11,13,15 N60 = 44					
21.00	D24						
21.50	U1007	52 blows					
22.50	D25						
23.00	D26	6,8/10,13,15,17 N60 = 50		-15.12		24.00	

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strikes at depths of 3.50 m rising to 2.80 m after 20 mins and 24.00 m, rising to 22.00 m after 30 mins. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH3
Job No J21294	Date 03-12-21 06-12-21	Ground Level (m OD) 8.88	Co-Ordinates () E 534,415.0 N 190,141.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
24.00	D27						Very stiff grey clayey gravelly SAND. Gravel fine to coarse, rounded and of flint.	
24.50	D28	9,11/13,15,18,21 N60 = 61						
25.50	D29							
26.00	D30	6,8/11,14,16,14 N60 = 50						
27.00	D31					(6.00)		
27.50	D32	9,12/15,18,20,19 N60 = 66						
28.50	D33							
29.00	D34	25/50 N = 50/75 mm						
30.00	D35	25/50 N = 50/75 mm						
				-21.12		30.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strikes at depths of 3.50 m rising to 2.80 m after 20 mins and 24.00 m, rising to 22.00 m after 30 mins. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH4	
Job No J21294	Date 02-12-21 05-12-21	Ground Level (m OD) 8.65	Co-Ordinates () E 534,455.0 N 109,108.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 4	

SAMPLES & TESTS			Water	STRATA			Instrument / Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		DESCRIPTION
0.50	ES1			8.42		0.23	CONCRETE with reinforcement	
				8.15		0.50	MADE GROUND (dark brown brick and concrete rubble with carbonaceous material).	
1.00	D2	1,0/1,0,1,0 N60 = 2			(1.20)	Soft grey brown silty very sandy CLAY with occasional flint gravel.		
1.20	D3							
								
1.75	D4	1,1/1,1,2,2 N60 = 5		6.95		1.70	Loose brown clayey very sandy GRAVEL. Gravel fine to coarse grained, subangular to subrounded and of flint.	
2.00	B1							
2.75	D5	5,7/8,10,10,12 N60 = 30			(3.40)			
3.00	B2							
								
3.75	D6	4,7/8,10,9,7 N60 = 26						
4.00	B3							
								
4.75	D7	2,2/3,3,4,4 N60 = 11			3.55	5.10	Medium strength becoming very high strength, firm becoming very stiff blueish grey slightly sandy fissured CLAY with rare fine mica.	
5.00	B4							
6.00	D8	2,3/4,5,6,7 N60 = 17						
6.50	D9							
								
7.50	D10							

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strike at a depth of 22.90 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable Percussion Rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH4	
Job No J21294	Date 02-12-21 05-12-21	Ground Level (m OD) 8.65	Co-Ordinates () E 534,455.0 N 109,108.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 2 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	U1001	20 blows					Medium strength becoming very high strength, firm becoming very stiff blueish grey slightly sandy fissured CLAY with rare fine mica.(continued)	
9.00	D11							
9.50	D12	3,3/4,5,6,8 N60 = 17						
10.50	D13							
11.00	U1002	25 blows						
12.00	D14							
12.50	D15	4,5/7,7,8,8 N60 = 23						
13.50	D16							
14.00	U1003	25 blows				(18.00)		
15.00	D17							
15.50	D18	5,7/7,8,8,12 N60 = 26						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strike at a depth of 22.90 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable Percussion Rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH4
Job No J21294	Date 02-12-21 05-12-21	Ground Level (m OD) 8.65	Co-Ordinates () E 534,455.0 N 109,108.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
16.50	D19						Medium strength becoming very high strength, firm becoming very stiff blueish grey slightly sandy fissured CLAY with rare fine mica.(continued)	
17.00	U1004	40 blows						
18.00	D20	6,8/9,8,9,14 N60 = 30						
18.50	D21							
19.50	D22							
20.00	U1005	50 blows					20.00 - 23.10 ...increasing fine grey sand bands with depth.	
21.00	D23							
21.50	D24	6,8/10,10,11,15 N60 = 35						
22.50	D25							
23.00	D26	25/50 N = 50/75 mm		-14.45		23.10	22.90 ...dark grey cemented siltstone. Dense grey clayey gravelly SAND with shells becoming reddish grey silty CLAY with depth. Gravel fine to coarse, rounded and of flint.	

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strike at a depth of 22.90 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable Percussion Rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH4
Job No J21294	Date 02-12-21 05-12-21	Ground Level (m OD) 8.65	Co-Ordinates () E 534,455.0 N 109,108.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
24.00	D27						Dense grey clayey gravelly SAND with shells becoming reddish grey silty CLAY with depth. Gravel fine to coarse, rounded and of flint.(continued)	
24.50	D28	8,12/14,18,20,23 N60 = 56						
25.50	D29							
26.00	D30	25/50 N = 50/75 mm						
27.00	D31							
27.50	D32	7,15/17,16,17,18 N60 = 51						
28.50	D33							
29.00	D34							
30.00	D35	25/50 N = 50/75 mm						
				-21.35		30.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strike at a depth of 22.90 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable Percussion Rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH5	
Job No J21294	Date 02-11-21 03-11-21	Ground Level (m OD) 9.21	Co-Ordinates () E 534,523.0 N 190,130.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.30	D1	1,1/1,2,2,1 N60 = 6		8.81		(0.40) 0.40	CONCRETE	
0.50	B1						MADE GROUND (dark brown very sandy gravelly clay with occasional brick and concrete fragments, flint gravel, plastic, carbonaceous material and a slight hydrocarbon odour).	
1.00	D2					(1.30)		
1.20	D3	5,9/10,12,11,12 N60 = 41		7.51		1.70	Dense orange brown gravelly SAND. Gravel is fine to coarse grained, subangular to rounded and of flint. Sand is fine to coarse.	
1.75	D4							
2.00	B2							
2.75	D5	7,10/11,12,12,13 N60 = 44				(3.80)		
3.00	B3							
3.25	D6							
4.00	B4	4,6/9,9,8,9 N60 = 32						
4.75	D7							
5.00	B5			3.71		5.50	Medium strength becoming high strength, firm becoming stiff dark brown fissured CLAY with occasional fine selenite.	
6.00	D8	28 blows						
6.50	U1001							
7.50	D9							

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 2.00 m and 5.00 m. Groundwater seepage at a depth of 15.00 m. Groundwater strike at a depth of 26.10 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion rig			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH5
Job No J21294	Date 02-11-21 03-11-21	Ground Level (m OD) 9.21	Co-Ordinates () E 534,523.0 N 190,130.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 2 of 4

SAMPLES & TESTS			STRATA					Instrument / Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	D10	3,4/5,5,7,8 N60 = 23					Medium strength becoming high strength, firm becoming stiff dark brown fissured CLAY with occasional fine selenite.(continued)	
9.00	D11							
9.50	U1002	30 blows						
10.50	D12							
11.00	D13	3,5/6,6,8,8 N60 = 26				(11.50)		
12.00	D14							
12.50	U1003	32 blows						
13.50	D15							
14.00	D16	4,7/7,8,10,11 N60 = 33						
15.00	D17						15.00 ...light grey band of fine sand at a depth of 15.00 m.	
15.50	U1004	35 blows						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 2.00 m and 5.00 m. Groundwater seepage at a depth of 15.00 m. Goundwater strike at a depth of 26.10 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH5
Job No J21294	Date 02-11-21 03-11-21	Ground Level (m OD) 9.21	Co-Ordinates () E 534,523.0 N 190,130.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
16.50	D18						Medium strength becoming high strength, firm becoming stiff dark brown fissured CLAY with occasional fine selenite.(continued)	
17.00	D19	2,4/6,8,10,12 N60 = 33		-7.79		17.00	High strength becoming extremely high strength, stiff becoming very stiff dark grey fissured silty CLAY with rare fine mica.	
18.00	D20						18.00 ...light greenish grey band of fine sand at a depth of 18.00 m.	
18.50	U1005	30 blows						
19.50	D21						19.50 - 23.50 ...sandy CLAY from a depth of 19.50 m to a depth of 23.50 m.	
20.00	D22	4,6/9,7,12,14 N60 = 39						
21.00	D23							
21.50	U1006	40 blows				(8.80)	21.50 ...light greenish grey band of fine sand at a depth of 21.50 m.	
22.50	D24							
23.00	D25	5,8/9,13,14,17 N60 = 49						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 2.00 m and 5.00 m. Groundwater seepage at a depth of 15.00 m. Goundwater strike at a depth of 26.10 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion rig			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH5
Job No J21294	Date 02-11-21 03-11-21	Ground Level (m OD) 9.21	Co-Ordinates () E 534,523.0 N 190,130.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
24.00	D26						High strength becoming extremely high strength, stiff becoming very stiff dark grey fissured silty CLAY with rare fine mica.(continued)	
24.50	U1007	65 blows						
25.50	D27			-16.59		25.80		
26.00	D28	8,10,12,15,17,18 N60 = 57		-16.89		26.10	Very stiff greenish grey gravelly CLAY with shells. Gravel coarse and rounded.	
27.00	D29						Dense light grey clayey SAND with occasional claystones.	
27.50	D30	6,9/13,14,18,20 N60 = 60				(3.90)		
28.50	D31							
29.55	D32	25/50 N = 50/75 mm		-20.79		30.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 30 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 2.00 m and 5.00 m. Groundwater seepage at a depth of 15.00 m. Goundwater strike at a depth of 26.10 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion rig			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH6
Job No J21294	Date 04-11-21 08-11-21	Ground Level (m OD) 8.60	Co-Ordinates () E 534,371.0 N 190,093.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 4

SAMPLES & TESTS			Water	STRATA			Instrument / Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		DESCRIPTION
0.30	D1	1,1/2,2,2,2 N60 = 7		8.10		(0.50) 0.50	CONCRETE	
0.50	B1			7.80		0.80	MADE GROUND (light yellowish brown clayey gravelly sand with brick and concrete fragments).	
1.00	D2			20 blows		(1.70)	Soft light yellowish brown very sandy very gravelly CLAY. Gravel fine to medium grained, rarely coarse, subangular to rounded and of flint. Sand is fine to coarse grained.	
1.20	D3							
1.75	D4							
2.00	U1001							
2.75	D5	3,4/6,6,8,10 N60 = 28			(1.50)	Dense orange brown gravelly SAND. Gravel is fine to coarse grained, subangular to subrounded and of flint. Sand fine to coarse grained.		
3.00	D3							
3.75	D6							
4.00	D7	2,2/3,3,3,4 N60 = 12		4.60	4.00	Initially soft, then firm becoming stiff, medium to high strength, dark brown fissured CLAY with occasional fine selenite.		
4.75	D8	25 blows						
5.00	U1002							
6.00	D9							
6.50	D10	2,3/3,4,6,7 N60 = 18						
7.50	D11							

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 90 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 1.00 m and 5.00 m. Groundwater strikes at depths of 3.00 m and 23.00 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH6	
Job No J21294	Date 04-11-21 08-11-21	Ground Level (m OD) 8.60	Co-Ordinates () E 534,371.0 N 190,093.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 2 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	U1003	30 blows					Initially soft, then firm becoming stiff, medium to high strength, dark brown fissured CLAY with occasional fine selenite.(continued) 8.00 ...light grey band of fine sand at a depth of 8.00 m.	
9.00	D12						9.00 ...greenish grey band of fine sand at a depth of 9.00 m.	
9.50	D13	2,4/4,6,8,8 N60 = 24				(11.00)		
10.50	D14							
11.00	U1004	35 blows						
12.00	D15							
12.50	D16	3,4/6,5,8,11 N60 = 28						
13.50	D17							
14.00	U1005	37 blows						
15.00	D18			-6.40		15.00	High strength to very high strength, stiff becoming very stiff dark grey fissured silty CLAY with rare fine mica and possible bioturbation.	
15.50	D19	2,4/5,6,7,9 N60 = 25						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 90 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 1.00 m and 5.00 m. Groundwater strikes at depths of 3.00 m and 23.00 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH6
Job No J21294	Date 04-11-21 08-11-21	Ground Level (m OD) 8.60	Co-Ordinates () E 534,371.0 N 190,093.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
16.50	D20						High strength to very high strength, stiff becoming very stiff dark grey fissured silty CLAY with rare fine mica and possible bioturbation.(continued)	
17.00	U1006	38 blows						
18.00	D21							
18.50	D22	4,6/8,8,10,11 N60 = 34				(8.00)		
19.50	D23							
20.00	U1007	43 blows						
21.00	D24						21.00 ...greenish grey band of fine sand at a depth of 21.00 m.	
21.50	D25	5,7/8,10,13,15 N60 = 42						
22.50	D26						22.50 ...soft silty CLAY at a depth of 22.50 m.	
23.00	U1008	60 blows		-14.40		23.00	Stiff light greenish grey sandy CLAY.	

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 90 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 1.00 m and 5.00 m. Groundwater strikes at depths of 3.00 m and 23.00 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH6
Job No J21294	Date 04-11-21 08-11-21	Ground Level (m OD) 8.60	Co-Ordinates () E 534,371.0 N 190,093.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
24.00	D27						Stiff light greenish grey sandy CLAY.(continued)	
24.50	D28	4,7/9,11,15,18 N60 = 49				(3.00)		
25.50	D29							
26.00	D30	6,8/10,12,16,19 N60 = 52		-17.40		26.00	Very stiff multicoloured silty very sandy CLAY. Sand fine to medium grained. Becoming sandier with depth.	
27.00	D31					(2.00)		
27.50	D32	5,8/11,13,17,20 N60 = 56						
28.50	D33			-19.40		28.00	Firm very sandy multicoloured CLAY with occasional fine chalk gravel.	
29.50	D34					(2.00)		
30.00	D35	25/50 N = 50/75 mm		-21.40		30.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 90 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 1.00 m and 5.00 m. Groundwater strikes at depths of 3.00 m and 23.00 m. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH7	
Job No J21294	Date 07-12-21 09-12-21	Ground Level (m OD) 8.67	Co-Ordinates () E 534,529.0 N 190,094.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.30	ES1	3,4/7,10,12,15 N60 = 40		8.44		0.23	CONCRETE	
0.50	B1			8.17		0.50	MADE GROUND (brick and concrete rubble).	
1.00	D2					(1.00)	Soft orange brown silty sandy CLAY with occasional flint gravel.	
1.20	D3	5,7/9,11,13,16 N60 = 45		7.17		1.50	Medium dense orange brown sandy GRAVEL. Gravel fine to medium grained, subangular to rounded and of flint. Sand fine to coarse grained.	
1.75	D4					(4.50)		
2.00	B2							
2.75	D5	5,6/8,10,11,13 N60 = 39						
3.00	B3							
3.75	D6							
4.00	B4	3,5/7,9,11,12 N60 = 36						
4.75	D7							
5.00	B5							
6.00	D8	28 blows		2.67		6.00	High strength, firm becoming stiff blueish grey slightly sandy fissured CLAY with rare fine selenite.	
6.50	U1001							
7.50	D9							

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 60 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Groundwater strike at a depth of 22.50 m. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH7	
Job No J21294	Date 07-12-21 09-12-21	Ground Level (m OD) 8.67	Co-Ordinates () E 534,529.0 N 190,094.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 2 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	D10	3,4/5,7,8,7 N60 = 25					High strength, firm becoming stiff blueish grey slightly sandy fissured CLAY with rare fine selenite.(continued)	
9.00	D11							
9.50	U1002	30 blows						
10.50	D12					(9.50)		
11.00	D13	4,5/7,8,11,11 N60 = 34						
12.00	D14							
12.50	U1003	34 blows						
13.50	D15							
14.00	D16	5,6/8,8,10,12 N60 = 35						
15.00	D17							
15.50	U1004	40 blows		-6.83		15.50	High strength becoming very high strength, stiff becoming very stiff grey fissured CLAY with rare fine mica and occasional bioturbation.	

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 60 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Groundwater strike at a depth of 22.50 m. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH7	
Job No J21294	Date 07-12-21 09-12-21	Ground Level (m OD) 8.67	Co-Ordinates () E 534,529.0 N 190,094.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 3 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
16.50	D18						High strength becoming very high strength, stiff becoming very stiff grey fissured CLAY with rare fine mica and occasional bioturbation.(continued)	
17.00	D19	5,6/8,10,12,13 N60 = 39						
18.00	D20							
18.50	U1005	45 blows						
19.50	D21					(8.50)		
20.00	D22	5,7/9,11,12,14 N60 = 42						
21.00	D23							
21.50	U1006	50 blows						
22.50	D24							
23.00	D25	6,9/11,14,14,16 N60 = 50						
				-15.33		24.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 60 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strike at a depth of 22.50 m. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH7
Job No J21294	Date 07-12-21 09-12-21	Ground Level (m OD) 8.67	Co-Ordinates () E 534,529.0 N 190,094.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
24.00	D26						Very stiff grey sandy gravelly CLAY. Gravel fine to medium grained and rounded.	
24.50	U1007	70 blows						
25.50	D27					(3.00)		
26.00	D28	7,10/12,10,14,17 N60 = 49					Very stiff grey sandy gravelly CLAY with shells.	
27.00	D29			-18.33		27.00		
27.50	D30	9,11/13,15,17,19 N60 = 59						
28.50	D31					(3.00)		
29.00	D32	25/50 N = 50/75 mm						
30.00	D33	25/50 N = 50/75 mm		-21.33		30.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Breaking out concrete for 60 mins. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. Goundwater strike at a depth of 22.50 m. Filling water drums for aiding drilling for 30 mins.

All dimensions in metres Scale 1:50	Method/ Plant Used Cable percussion rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH8	
Job No J21294	Date 27-10-21 29-10-21	Ground Level (m OD) 8.66	Co-Ordinates () E 534,529.0 N 190,083.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 4	

SAMPLES & TESTS			Water	STRATA			Instrument / Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		DESCRIPTION
0.30	D1	1,3/4,6,7,11 N60 = 26	 	8.26		(0.40) 0.40	CONCRETE	
0.50	B1			8.06		0.60	MADE GROUND (dark brown very clayey very gravelly sand with abundant concrete, frequent brick fragments and occasional plastic and glass).	
				7.86		0.80	CONCRETE	
1.00	D2	4,7/12,16,18,21 N60 = 61		7.46		(0.40) 1.20	MADE GROUND (dark brown sandy gravelly silt with brick and concrete fragments and flint gravel).	
1.20	D3			6.86		(0.60)	Soft orange brown sandy slightly gravelly CLAY. Gravel subangular to subrounded, fine to medium grained, rarely coarse and of flint. Sand fine to coarse grained.	
1.75	D4				Dense orange brown very gravelly SAND. Gravel is fine to medium grained, rarely coarse, angular to subrounded and of flint. Sand is fine to coarse.			
2.00	D5	6,10/12,15,13,10 N60 = 46					(3.70)	
2.75	D6							
3.00	D7							
3.75	D8	4,8/9,11,13,15 N60 = 44			(3.70)			
4.00	D9							
4.25	D10							
5.00	D11	3,5/7,10,12,14 N60 = 39		3.16		5.50	Soft brown silty sandy CLAY.	
6.00	D12	32 blows		2.66		(0.50) 6.00	Medium strength becoming high strength, firm becoming stiff dark brown fissured CLAY with rare fine selenite.	
6.50	U1001							
7.50	D13							

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Site induction and walkover for 1 hour before drilling. Breaking out concrete for 1 hour. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 1.00 m and 5.00 m. Groundwater strike at depths of 4.00 m rising to 3.20 m after 20 mins and 25.00 m, rising to 23.50 m after 30 mins. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH8	
Job No J21294	Date 27-10-21 29-10-21	Ground Level (m OD) 8.66	Co-Ordinates () E 534,529.0 N 190,083.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 2 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
8.00	D14	3,3/4,5,7,8 N60 = 22					Medium strength becoming high strength, firm becoming stiff dark brown fissured CLAY with rare fine selenite.(continued)	
9.00	D15					(6.00)		
9.50	U1002	30 blows						
10.50	D16							
11.00	D17	3,4/4,6,8,9 N60 = 25						
12.00	D18			-3.34		12.00	High strength becoming very high strength, stiff becoming very stiff dark grey fissured silty CLAY with rare fine mica and possible bioturbation.	
12.50	U1003	35 blows						
13.50	D19							
14.00	D20	4,6/6,8,10,9 N60 = 30						
15.00	D21							
15.50	U1004	45 blows						

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Site induction and walkover for 1 hour before drilling. Breaking out concrete for 1 hour. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 1.00 m and 5.00 m. Groundwater strike at depths of 4.00 m rising to 3.20 m after 20 mins and 25.00 m, rising to 23.50 m after 30 mins. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH8
Job No J21294	Date 27-10-21 29-10-21	Ground Level (m OD) 8.66	Co-Ordinates () E 534,529.0 N 190,083.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
16.50	D22						High strength becoming very high strength, stiff becoming very stiff dark grey fissured silty CLAY with rare fine mica and possible bioturbation.(continued)	
17.00	D23	3,5/6,8,10,12 N60 = 33						
18.00	D24					(11.50)		
18.50	U1005	45 blows						
19.50	D25							
20.00	D26	4,6/8,10,12,13 N60 = 39						
21.00	D27							
21.50	U1006	50 blows						
22.50	D28							
23.00	D29	3,7/9,11,14,6 N60 = 37						
				-14.84		23.50	Very stiff greenish grey sandy CLAY with shells.	
				-15.34		(0.50) 24.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Site induction and walkover for 1 hour before drilling. Breaking out concrete for 1 hour. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 1.00 m and 5.00 m. Groundwater strike at depths of 4.00 m rising to 3.20 m after 20 mins and 25.00 m, rising to 23.50 m after 30 mins. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion			Logged By JW



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH8	
Job No J21294	Date 27-10-21 29-10-21	Ground Level (m OD) 8.66	Co-Ordinates () E 534,529.0 N 190,083.0		
Client Haringey Council		Engineer Civic Engineers		Sheet 4 of 4	

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
24.00	D30						Very dense dark grey sandy GRAVEL. Gravel generally coarse and rounded, occasionally cemented.	
24.50	D31	25/50 N = 50/75 mm				(2.00)		
25.50	D32							
26.00	D33	25/50 N = 50/75 mm		-17.34		26.00	Dense dark grey clayey SAND with bands of light grey clay and occasional black gravel.	
27.00	D34							
27.50	D35	7,10/14,16,19,22 N60 = 65				(4.00)		
28.50	D36							
29.55	D37	25/50 N = 50/75 mm		-21.34		30.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Site induction and walkover for 1 hour before drilling. Breaking out concrete for 1 hour. Services inspection pit excavated to a depth of 1.20 m for 1 hour. Erecting Heras fencing for 30 mins. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 5.00 m, with a response zone from 1.00 m and 5.00 m. Groundwater strike at depths of 4.00 m rising to 3.20 m after 20 mins and 25.00 m, rising to 23.50 m after 30 mins. Filling water drums for aiding drilling for 30 mins. Bagging up spoil, reinstating borehole and tidying up for 2 hours.
All dimensions in metres Scale 1:50			Method/ Plant Used Cable percussion			Logged By JW



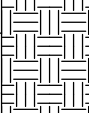
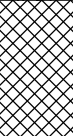
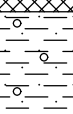
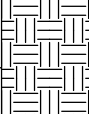
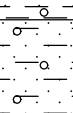
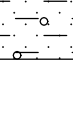
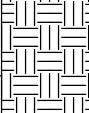
Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH9
Job No J21294	Date 02-12-21	Ground Level (m OD) 9.70	Co-Ordinates () E 534,507.0 N 190,172.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.90	ES1	1,1/1,1,1,1 N60 = 5		9.45		0.25	CONCRETE	
						(1.05)	MADE GROUND (dark brown slightly clayey gravelly sand with flint gravel, brick and concrete fragments, ceramic and rare metal, glass and carbonaceous material).	
1.40	D1			8.40		1.30	Orange brown very sandy slightly gravelly CLAY with occasional rootlets. Gravel fine to medium grained, angular to subrounded and of flint. Sand fine to coarse.	
1.90	D2	2,3/4,3,4,2 N60 = 16				(1.30)		
2.50	D3			7.10		2.60	Dense orange brown gravelly SAND. Gravel is fine to medium grained, rarely coarse, subangular to rounded and of flint. Sand fine to coarse grained.	
3.50	D4	2,7/9,8,8,6 N60 = 38				(2.40)		
4.50	D5	3,5/6,6,7,7 N60 = 32						
		3,4/6,10,9,10 N60 = 43		4.70		5.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Groundwater was not encountered.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH10
Job No J21294	Date 07-12-21	Ground Level (m OD) 9.58	Co-Ordinates () E 534,487.0 N 190,151.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.60	ES1	10,7/3,4,3,3 N60 = 15		9.35		0.23	CONCRETE	
						(0.97)	MADE GROUND (orange grey slightly clayey gravelly sand with brick, concrete and tarmac fragments, plastic, glass and tile).	
1.50 1.60	ES2 D1	4,4/4,12,13,14 N60 = 49		8.38		1.20	Soft orange brown slightly sandy gravelly reworked CLAY with occasional black staining. Gravel is fine to coarse grained, angular to rounded and of flint.	
				7.58		2.00	Dense orange brown slightly clayey gravelly SAND. Gravel fine to medium grained, rarely coarse, subangular to subrounded and of flint. Sand fine to coarse grained.	
2.30	D2	12,16/16,16,15,16 N60 = 72		6.58		3.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Position cored prior to drilling. Borehole terminated at a depth of 3.00 m due to dense gravel. Groundwater present at base of borehole upon completion.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH11
Job No J21294	Date 02-12-21	Ground Level (m OD) 9.40	Co-Ordinates () E 534,545.0 N 190,127.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.60	ES1	1,2/1,2,1,1 N60 = 6		9.28		0.12 (0.98)	CONCRETE MADE GROUND (dark brown slightly clayey gravelly sand with abundant concrete fragments, occasional brick fragments, glass, plastic and metal).	
1.40 1.50	ES2 D1	1,1/2,2,1,1 N60 = 7		8.30		1.10 (2.10)	MADE GROUND (dark brown sandy slightly gravelly silt with occasional brick and concrete fragments, glass, wood and carbonaceous material).	
2.50	D2	1,2/6,9,9,12 N60 = 44		6.20		3.20	Dense orange brown sandy GRAVEL. Gravel is fine to coarse grained, subangular to rounded and of flint. Sand fine to coarse grained. 3.80 - 4.00 ...gravelly SAND.	
3.70	D3	6,7/9,9,10,7 N60 = 43				(2.00)		
4.20	D4	3,3/5,6,6,6 N60 = 28		4.20		5.20	Firm orange grey slightly sandy CLAY.	
5.40	D5			3.90		5.50		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Groundwater encountered at a depth of 4.00 m during drilling and measured at a depth of 3.20 m upon completion. Borehole collapsed to a depth of 3.20 m upon completion.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH12
Job No J21294	Date 07-12-21	Ground Level (m OD) 8.70	Co-Ordinates () E 534,410.0 N 190,112.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

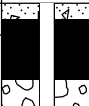
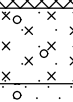
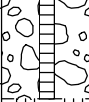
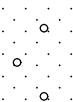
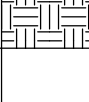
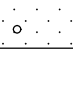
SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.50	ES1	3,2/3,3,1,2 N60 = 10		8.47		0.23	CONCRETE	
						(0.67)	MADE GROUND (dark brown sandy slightly gravelly clay with brick fragments, metal, carbonaceous material and occasional black staining).	
1.10	D1	4,8/10,10,7,8 N60 = 40		7.80		0.90	Soft orange brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium grained, angular to subangular and of flint.	
1.60	D2					(1.10)	1.10 - 1.30 ...clayey GRAVEL.	
2.50	D3	4,6/8,10,9,10 N60 = 42		6.70		2.00	Dense orange brown slightly clayey gravelly SAND. Gravel fine to medium grained, rarely coarse, subangular to rounded and of flint. Sand fine to coarse grained.	
3.50	D4			5.20		3.50		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Position cored prior to drilling. Borehole terminated at a depth of 4.00 m due to partial collapse. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 2.30 m, with a response zone from 0.50 m and 2.30 m. Groundwater encountered at a depth of 1.80 m during drilling and was dry upon completion.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH13
Job No J21294	Date 07-12-21	Ground Level (m OD) 8.93	Co-Ordinates () E 534,493.0 N 190,123.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.50	ES1	2,1/1,4,6,5 N60 = 18		8.72		0.21	CONCRETE	
						(1.19)	MADE GROUND (dark brownish grey very clayey slightly gravelly sand with brick and concrete fragments and carbonaceous material).	
1.60	D1	11,12/11,12,10,10 N60 = 49		7.53		1.40	Soft greyish brown sandy gravelly SILT. Gravel fine to medium grained, rarely coarse, angular to subrounded and of flint. Sand fine to coarse grained.	
				7.03		1.90	Dense orange brown gravelly SAND. Gravel fine to medium grained, rarely coarse, subangular to rounded and of flint. Sand fine to coarse grained.	
2.60	D2	6,7/7,10,9,11 N60 = 42				(1.10)		
				5.93		3.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Position cored prior to drilling. Borehole terminated at a depth of 3.0 m due to borehole collapse. Groundwater present at a depth of 0.90 m during drilling. Borehole redrilled to a depth of 2.0 m to install standpipe. 50 mm gas and groundwater monitoring standpipe installed to a depth of 2.00 m with a response zone between 1.00 m and 2.00 m.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH14
Job No J21294	Date 02-12-21	Ground Level (m OD) 8.77	Co-Ordinates () E 534,482.0 N 190,106.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

[illegible]

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Depth	Casing Dia. mm	Water Depth	
						Borehole terminated at a depth of 0.30 m due to hard and thick concrete.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH14A
Job No J21294	Date 02-12-21	Ground Level (m OD) 8.77	Co-Ordinates () E 534,481.0 N 190,105.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

[illegible]

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Depth	Casing Dia. mm	Water Depth	
						Borehole terminated at a depth of 0.50 m due to hard and thick concrete.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Report ID: CABLE PERCUSSION | | Project: J21294 - ASHLEY ROAD.GPJ | | Library: GEA LIBRARY.GLB | | Date: 21 February 2022



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH14B
Job No J21294	Date 02-12-21	Ground Level (m OD) 8.77	Co-Ordinates () E 534,482.0 N 190,110.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

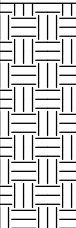
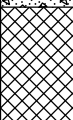
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Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Depth	Casing Dia. mm	Water Depth	
						Borehole terminated at a depth of 0.50 m due to hard and thick concrete.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Report ID: CABLE PERCUSSION | | Project: J21294 - ASHLEY ROAD.GPJ | | Library: GEA LIBRARY.GLB | | Date: 21 February 2022



SAMPLES & TESTS			Water	STRATA			Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	
0.90	ES1	PID = 0.4 ppm 5,4/3,2,1,1 N60 = 8 PID = 0.2 ppm					
			8.54		0.23	CONCRETE	
					(0.77)	MADE GROUND (dark brown gravelly sand with whole brick, brick and concrete fragments and carbonaceous material).	
			7.77		1.00	0.90 - 1.00 ...black staining at depths of between 1.00 m and 1.10 m.	
			7.27		(0.50)	NO RECOVERY	
					1.50		

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH15
Job No J21294	Date 02-12-21	Ground Level (m OD) 8.68	Co-Ordinates () E 534,504.0 N 190,095.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

[illegible]

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Depth	Casing Dia. mm	Water Depth	
						Borehole terminated at a depth of 0.50 m due to hard and thick concrete.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Report ID: CABLE PERCUSSION | | Project: J21294 - ASHLEY ROAD.GPJ | | Library: GEA LIBRARY.GLB | | Date: 21 February 2022



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH16
Job No J21294	Date 07-12-21	Ground Level (m OD) 8.77	Co-Ordinates () E 534,410.0 N 190,090.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

[illegible]

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Depth	Casing Dia. mm	Water Depth	
						Position cored prior to drilling. Borehole terminated at a depth of 0.30 m due to brick obstruction.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Report ID: CABLE PERCUSSION | | Project: J21294 - ASHLEY ROAD.GPJ | | Library: GEA LIBRARY.GLB | | Date: 21 February 2022

Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH16A
Job No J21294	Date 07-12-21	Ground Level (m OD) 8.77	Co-Ordinates () E 534,409.0 N 190,086.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.70 0.90	ES1 D1	1,1/4,4,7,5 N60 = 23		8.54		0.23	CONCRETE	
				7.97		(0.57) 0.80	MADE GROUND (light brown gravelly sand with concrete fragments, rare brick, abundant flint gravel and roots and rootlets). 0.50 ...20 mm diameter root present at a depth of 0.50 m.	
1.80	D2	1,1/1,2,3,6 N60 = 14				(1.60)	Soft becoming firm orange brown mottled light grey sandy slightly gravelly CLAY with occasional decayed rootlets. Gravel is generally fine grained, angular to subangular and of flint. Sand fine to coarse grained.	
2.30	D3			6.37		2.40	Dense orange brown slightly clayey gravelly SAND. Gravel fine to medium grained, rarely coarse, subangular to rounded and of flint. Sand fine to coarse grained.	
3.00	D4	4,3/8,7,7,8 N60 = 34				(1.60)		
				4.77		4.00		

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Position cored prior to drilling. Borehole terminated at a depth of 3.00 m due to partial collapse. Groundwater encountered at a depth of 1.75 m upon completion.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH17
Job No J21294	Date 02-12-21	Ground Level (m OD) 8.61	Co-Ordinates () E 534,479.0 N 190,095.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

[illegible]

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Depth	Casing Dia. mm	Water Depth	
						Borehole terminated at a depth of 0.30 m due to hard and thick concrete.



Project Ashley Road Depot, Ashley Road, London				BOREHOLE No BH17A
Job No J21294	Date 07-12-21	Ground Level (m OD) 8.66	Co-Ordinates () E 534,478.0 N 190,094.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.50	ES1	2,3/6,8,10,10 N60 = 39		8.43		0.23	CONCRETE	
				8.26		0.40	MADE GROUND (light brown gravelly sand with brick, concrete and tarmac fragments, plastic, glass and tile).	
						(0.50)	MADE GROUND (orange brown sandy slightly gravelly clay with occasional brick and concrete fragments and a slight hydrocarbon odour).	
				7.76		0.90		
1.20	D1	7,13/13,12,12,12 N60 = 56 PID = 0 ppm PID = 8.6 ppm PID = 48.6 ppm PID = 14.4 ppm					Dense orange brown slightly clayey gravelly SAND. Gravel is fine to coarse grained, subangular to rounded and of flint.	
1.60	D2						1.40 ...hydrocarbon staining.	
							1.80 - 2.00 ...sandy GRAVEL.	
							2.00 - 2.60 ...hydrocarbon staining.	
2.40	ES2	7,5/6,5,7,8 N60 = 30 PID = 0.9 ppm PID = 0 ppm PID = 0 ppm PID = 0 ppm						
2.50	D3					(3.60)		
3.10	D4	6,6/7,12,11,12 N60 = 48						
				4.16		4.50	3.80 - 4.20 ...sandy GRAVEL.	

Boring Progress and Water Observations						GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	
						Position cored prior to drilling. Borehole terminated at a depth of 4.00 m due to partial collapse. 50 mm diameter gas and groundwater monitoring standpipe installed to a depth of 2.50 m, with a response zone from 0.50 m and 2.50 m. Groundwater encountered at a depth of 3.00 m during drilling and at the base upon completion.

All dimensions in metres Scale 1:50	Method/ Plant Used Opendrive sampling rig	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				TRIAL PIT No TP101
Job No J21294	Date 30-11-21	Ground Level (m OD) 9.56	Co-Ordinates () E 534,540.0 N 190,168.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS				Water	STRATA			
Depth	No	Type	Results		DESCRIPTION	Reduced Level	Depth (Thickness)	Legend
0.40	1	ES			CONCRETE	9.33	(0.23) 0.23	
					MADE GROUND (dark brown gravelly sand with metal, plastic, carbonaceous material, suspected ACM, glass, concrete, rare brick and occasional rootlets).	9.06	(0.27) 0.50	

GENERAL REMARKS

All sides of the pit remained stable throughout the investigation.
Trial pit measures 3.10 m long by 0.56 m wide.
Groundwater was not encountered.
Trial pit terminated at a depth of 0.50 m due to the presence of suspected asbestos containing materials.

All dimensions in metres Scale 1:25	Method/ Plant Used Hand excavated trial pit	Logged By JW
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Project Ashley Road Depot, Ashley Road, London				TRIAL PIT No TP102
Job No J21294	Date 30-11-21	Ground Level (m OD) 9.70	Co-Ordinates () E 534,526.0 N 190,170.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS				Water	STRATA			
Depth	No	Type	Results		DESCRIPTION	Reduced Level	Depth (Thickness)	Legend
0.40	1	ES			CONCRETE	9.45	(0.25) 0.25	
					MADE GROUND (dark brown very gravelly sand with whole brick, abundant brick fragments, glass, metal, carbonaceous material, suspected ACM, concrete and occasional rootlets).	9.20	(0.25) 0.50	

GENERAL REMARKS

All sides of the pit remained stable throughout the investigation.
Trial pit measures 4.50 m long by 0.48 m wide.
Groundwater was not encountered.
Trial pit terminated at a depth of 0.50 m due to the presence of suspected asbestos containing materials.

All dimensions in metres Scale 1:25	Method/ Plant Used Hand excavated trial pit	Logged By JW
--	--	-----------------

Project Ashley Road Depot, Ashley Road, London				TRIAL PIT No TP103
Job No J21294	Date 30-11-21	Ground Level (m OD) 9.72	Co-Ordinates () E 534,502.0 N 190,171.0	
Client Haringey Council		Engineer Civic Engineers		Sheet 1 of 1

SAMPLES & TESTS				Water	STRATA			
Depth	No	Type	Results		DESCRIPTION	Reduced Level	Depth (Thickness)	Legend
0.30	1	ES			CONCRETE	9.47	(0.25) 0.25	
					MADE GROUND (dark brown gravelly sand with occasional brick and concrete fragments, ceramic, carbonaceous material, suspected ACM, glass, metal and occasional rootlets).	8.82	(0.65) 0.90	

GENERAL REMARKS

All sides of the pit remained stable throughout the investigation.
Trial pit measures 3.00 m long by 0.56 m wide.
Groundwater was not encountered.
Trial pit terminated at a depth of 0.90 m due to the presence of suspected asbestos containing materials.

All dimensions in metres Scale 1:25	Method/ Plant Used Hand excavated trial pit	Logged By JW
--	--	-----------------



GEA

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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

1

Site Ashley Road Depot, Tottenham

Job Number
J21294

Client London Borough of Haringey

Sheet
1/15

Engineer

Dates

Excavation Method

Manual

Dimensions

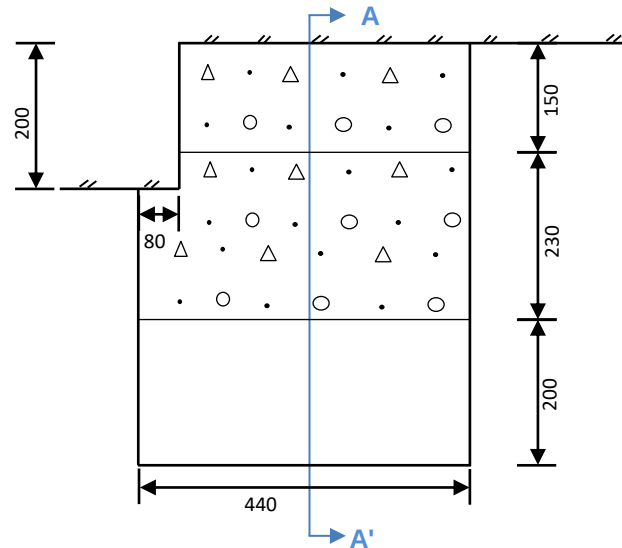
440 x 580 x 660

Ground Level (mOD)

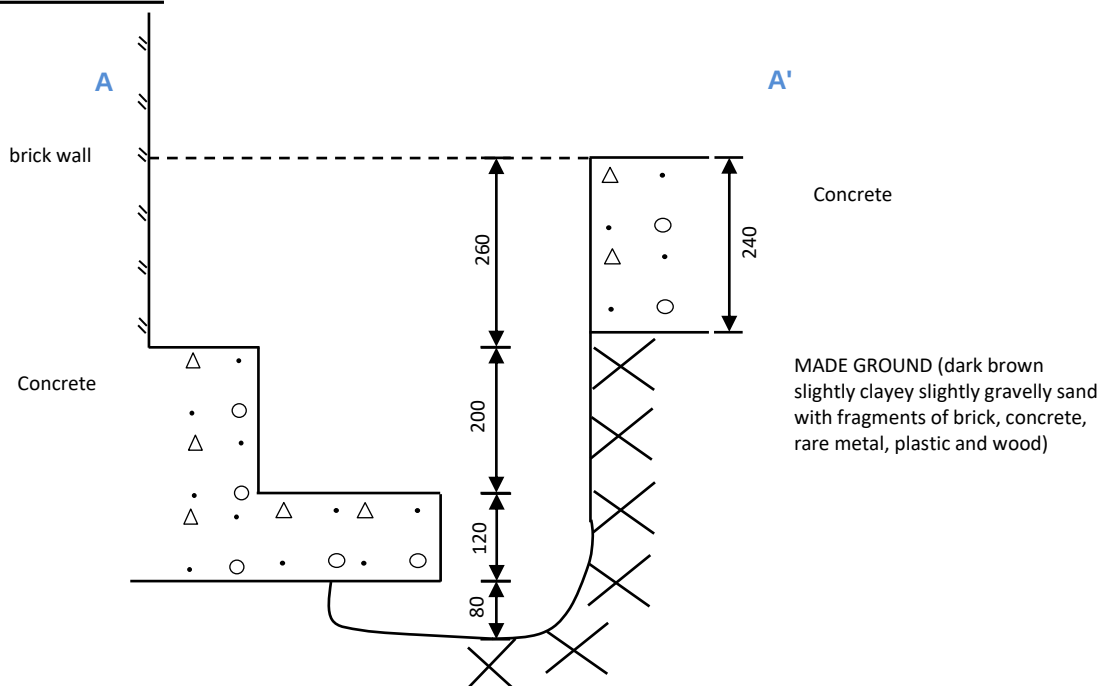
Location

Southeastern wall of building along northwestern extent of site

Plan: -



Section A - A': -



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

1

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number
J21294

Sheet
2/15

Dates

Excavation Method

Manual

Dimensions

440 x 580 x 660

Ground Level (mOD)

Location

Southeastern wall of building along northwestern extent of site



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

2

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number

J21294

Sheet

3/15

Dates

Excavation Method

Manual

Dimensions

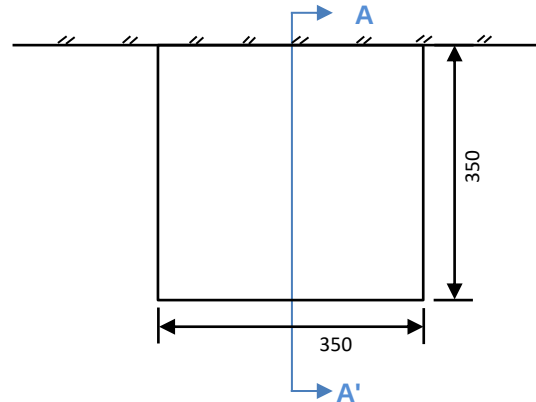
350 x 350 x 620

Ground Level (mOD)

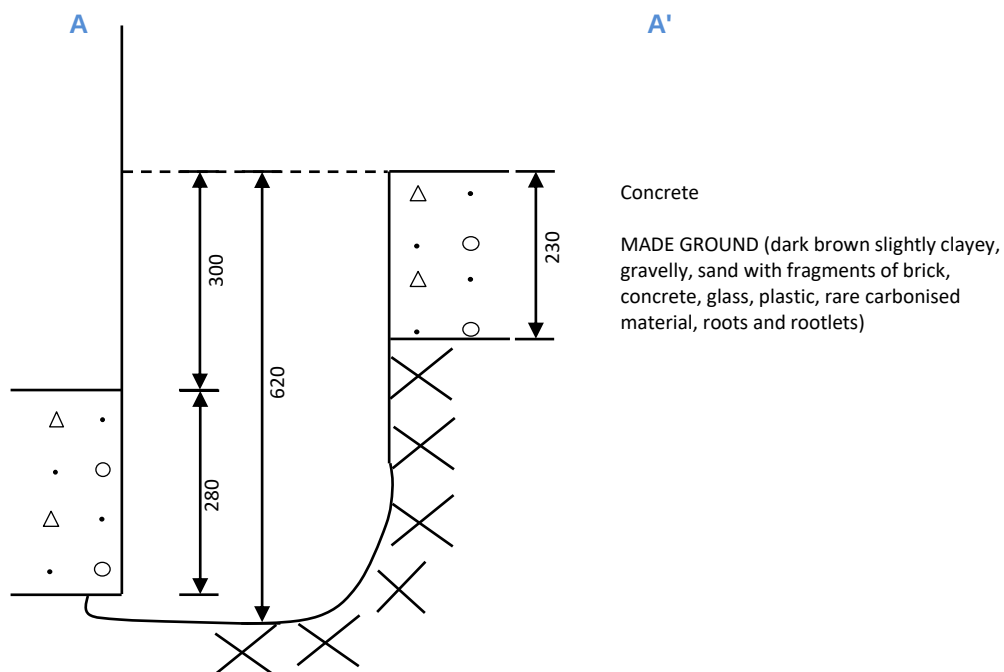
Location

Southern wall of main workshop in north of site

Plan: -



Section A - A': -



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

2

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number

J21294

Sheet

4/15

Dates

Excavation Method

Manual

Dimensions

350 x 350 x 620

Ground Level (mOD)

Location

Southern wall of main workshop in north of site



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

3

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number

J21294

Sheet

5/15

Dates

Excavation Method

Manual

Dimensions

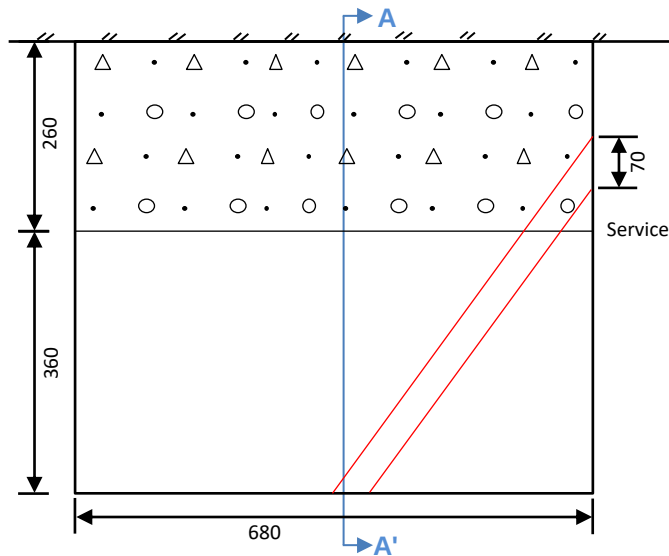
680 x 620 x 1010

Ground Level (mOD)

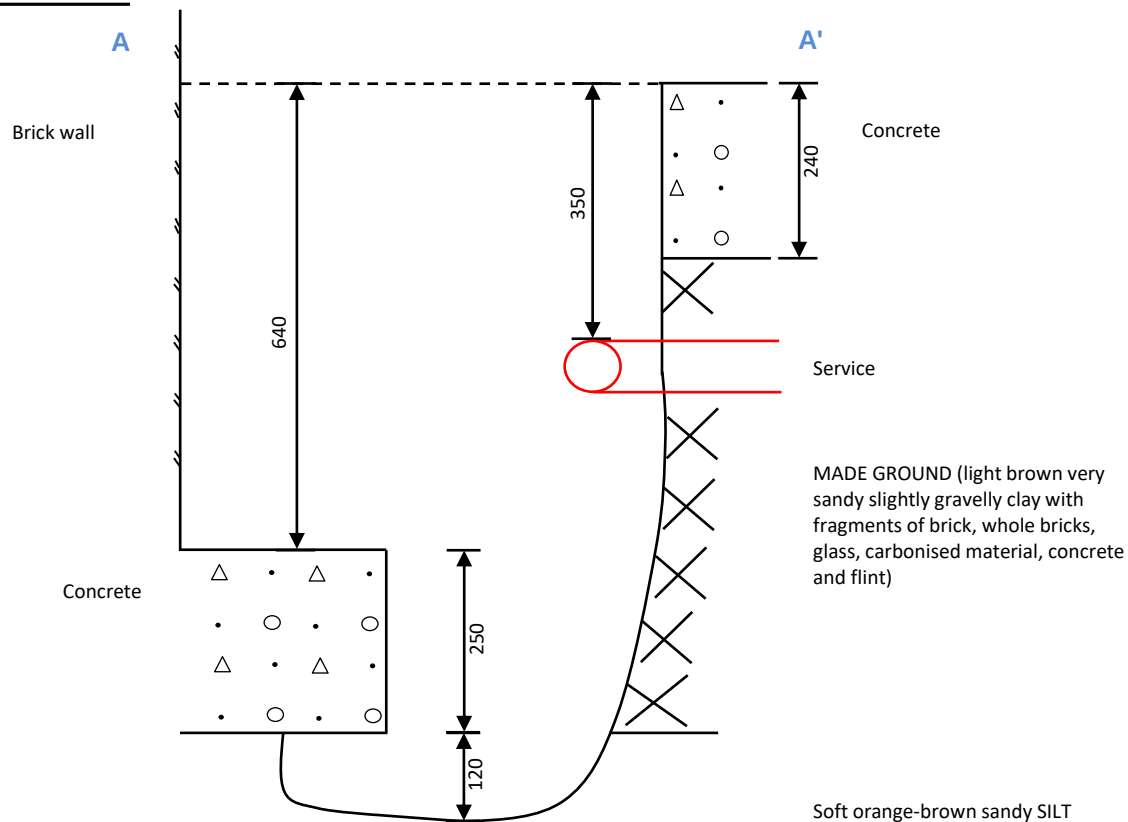
Location

Northern wall of office building extension

Plan: -



Section A - A': -



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

3

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number

J21294

Sheet

6/15

Dates

Excavation Method

Manual

Dimensions

680 x 620 x 1010

Ground Level (mOD)

Location

Northern wall of office building extension



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

4

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number

J21294

Sheet

7/15

Dates

Excavation Method

Manual

Dimensions

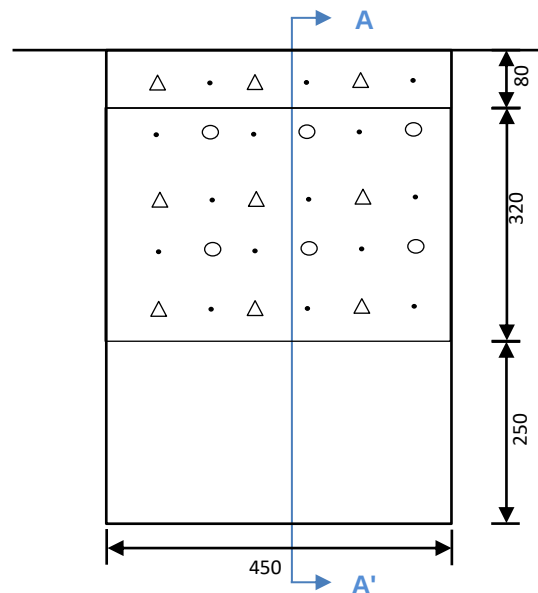
450 x 650 x 620

Ground Level (mOD)

Location

Concrete block associated with main workshop in north of site

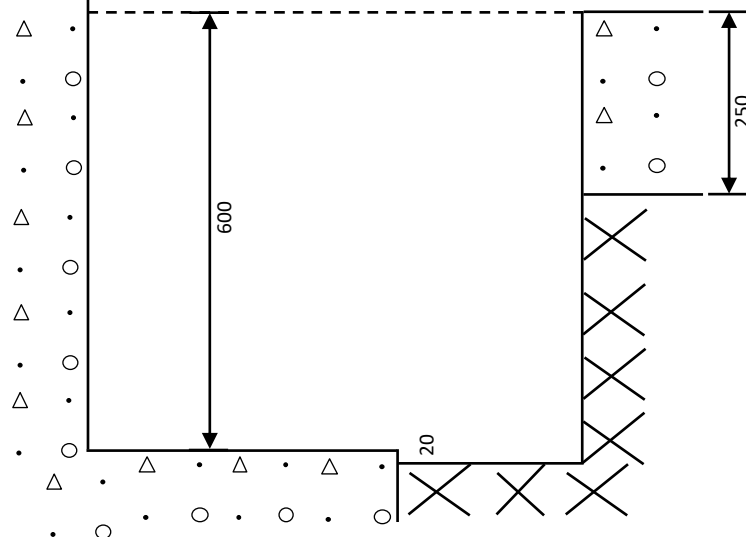
Plan: -



Section A - A': -

A

A'



Concrete

MADE GROUND (dark brown gravelly, sand with fragments of brick, concrete, wood, glass, carbonised material and possible asbestos containing material)

Pit Terminated at 0.62 m due to suspected asbestos containing material

Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW

		www.gea-ltd.co.uk		Trial Pit No
		Herts 01727 824666 Notts 01509 674888		4
Site Ashley Road Depot, Tottenham				Job Number J21294
Client London Borough of Haringey				Sheet 8/15
Engineer				Dates
Excavation Method Manual	Dimensions 450 x 650 x 620	Ground Level (mOD)	Location	
				
Remarks:				Scale: Approx 1:10
Trial pit backfilled upon completion				Logged by: JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

5

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number

J21294

Sheet

9/15

Dates

Excavation Method

Manual

Dimensions

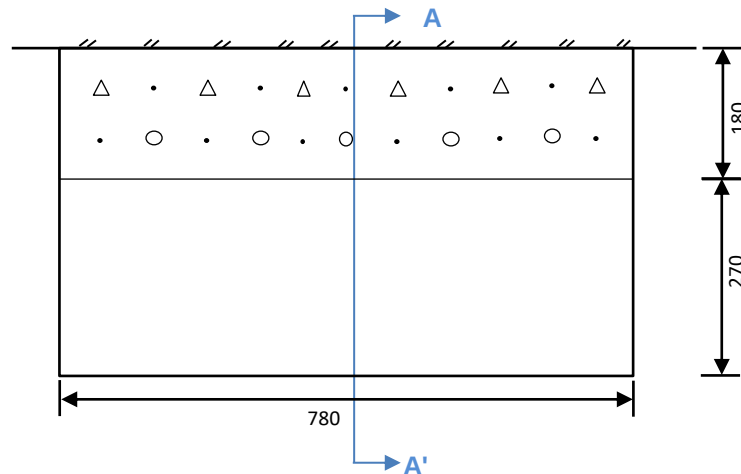
750 x 450 x 910

Ground Level (mOD)

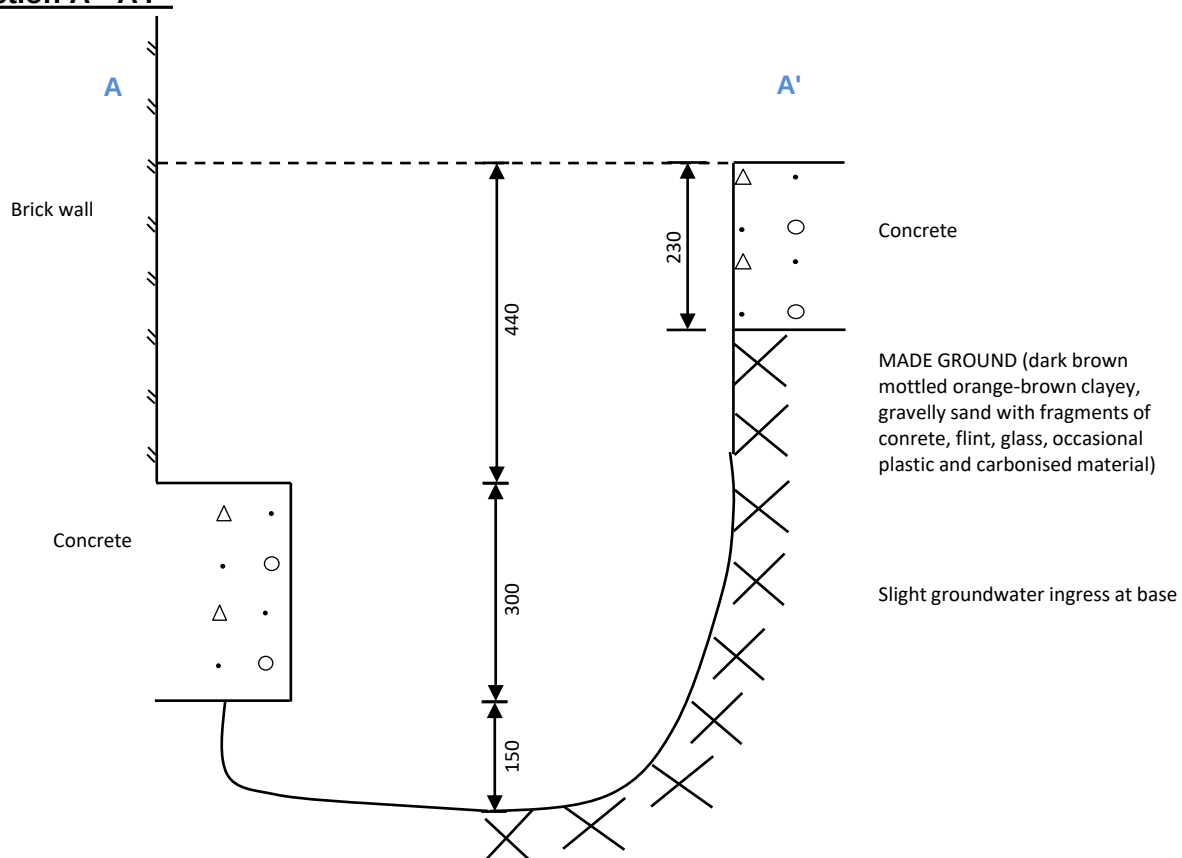
Location

Northern wall of office building

Plan: -



Section A - A': -



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

5

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number

J21294

Sheet

10/15

Dates

Excavation Method

Manual

Dimensions

750 x 450 x 910

Ground Level (mOD)

Location

Northern wall of office building



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

6

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number

J21294

Sheet

11/15

Dates

Excavation Method

Manual

Dimensions

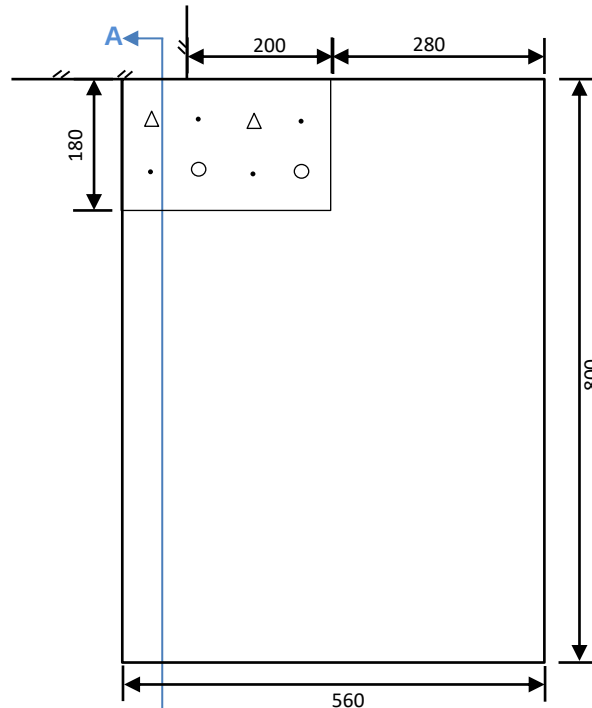
560 x 800 x 660

Ground Level (mOD)

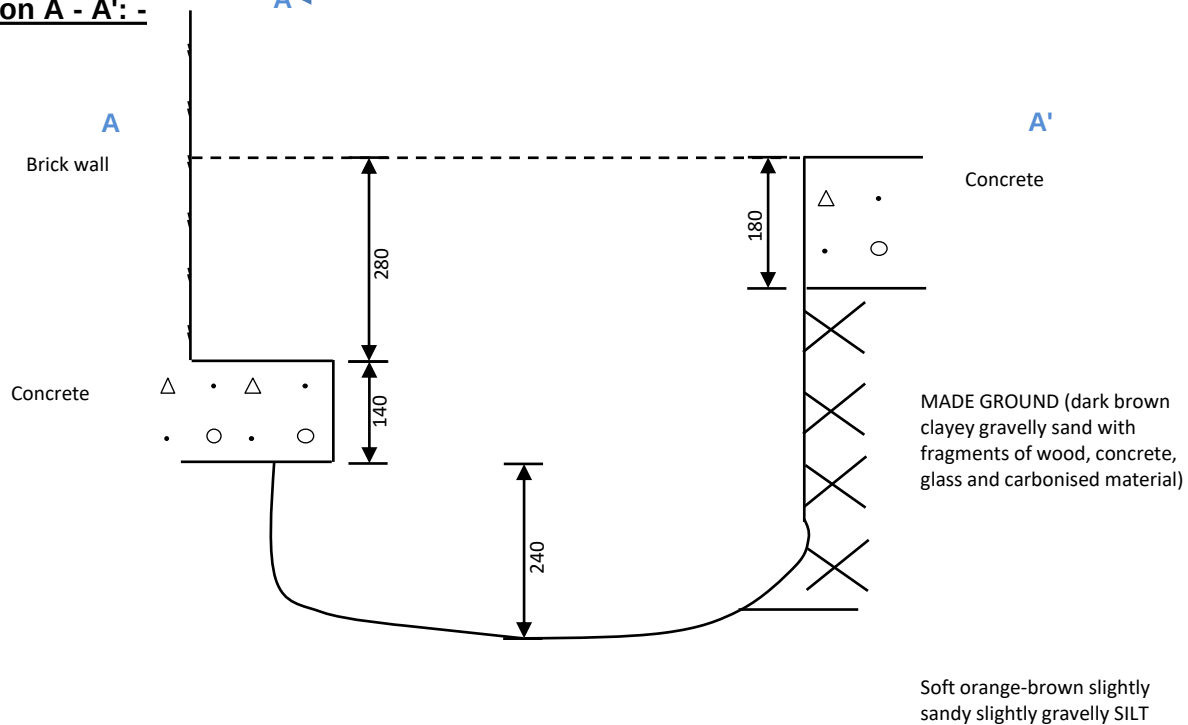
Location

Southwestern corner of office block in south of site

Plan: -



Section A - A': -



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW

		www.gea-ltd.co.uk		Trial Pit No
		Herts 01727 824666 Notts 01509 674888		6
Site Ashley Road Depot, Tottenham				Job Number J21294
Client London Borough of Haringey				Sheet 12/15
Engineer				Dates
Excavation Method Manual	Dimensions 560 x 800 x 660	Ground Level (mOD)	Location Southwestern corner of office block in south of site	
				
Remarks:				Scale: Approx 1:10
Trial pit backfilled upon completion				Logged by: JW

7

Site	Ashley Road Depot, Tottenham
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Job Number	J21294
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Client	London Borough of Haringey
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Sheet 13/15

Dates



GEA

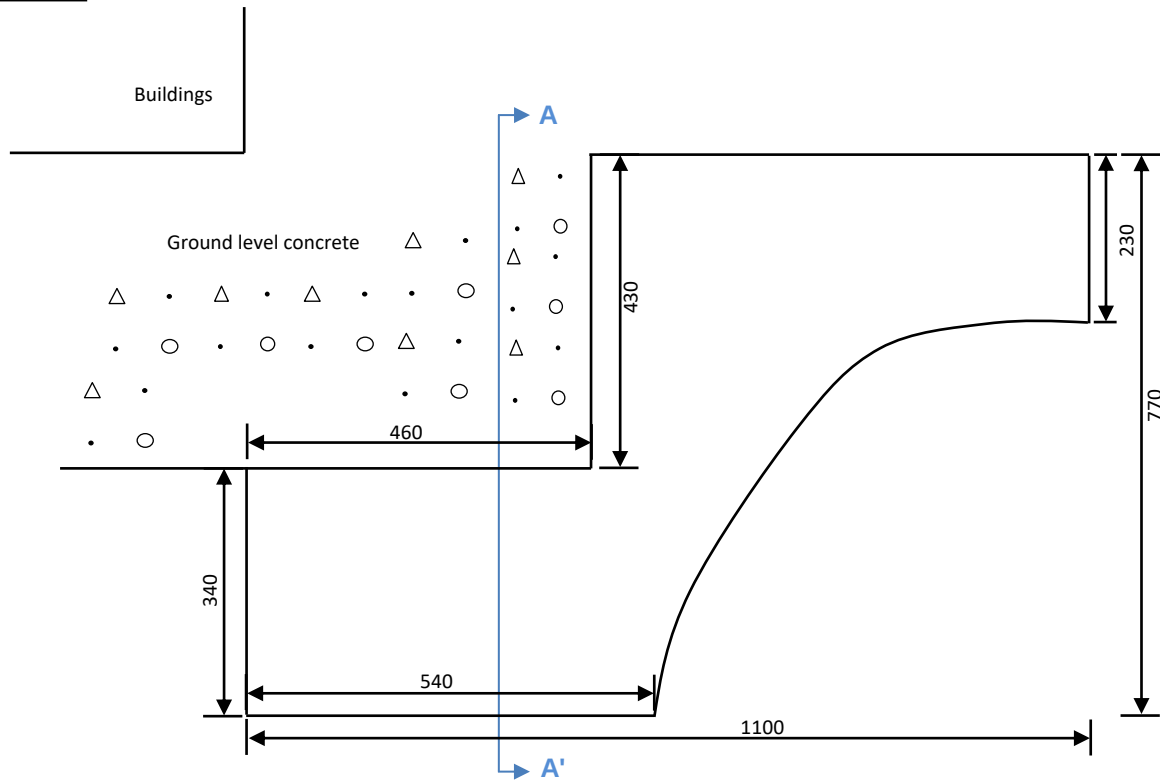
Dimensions
1100 x 770 x 1040

Ground Level (mOD)

Location	
----------	--

Southeastern corner of office block in southeast of site

Plan: -



Remarks:

Scale:

Approx 1:10

Logged by:

JW

Trial pit backfilled upon completion



Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number
J21294

Sheet
14/15

Dates

Excavation Method

Manual

Dimensions

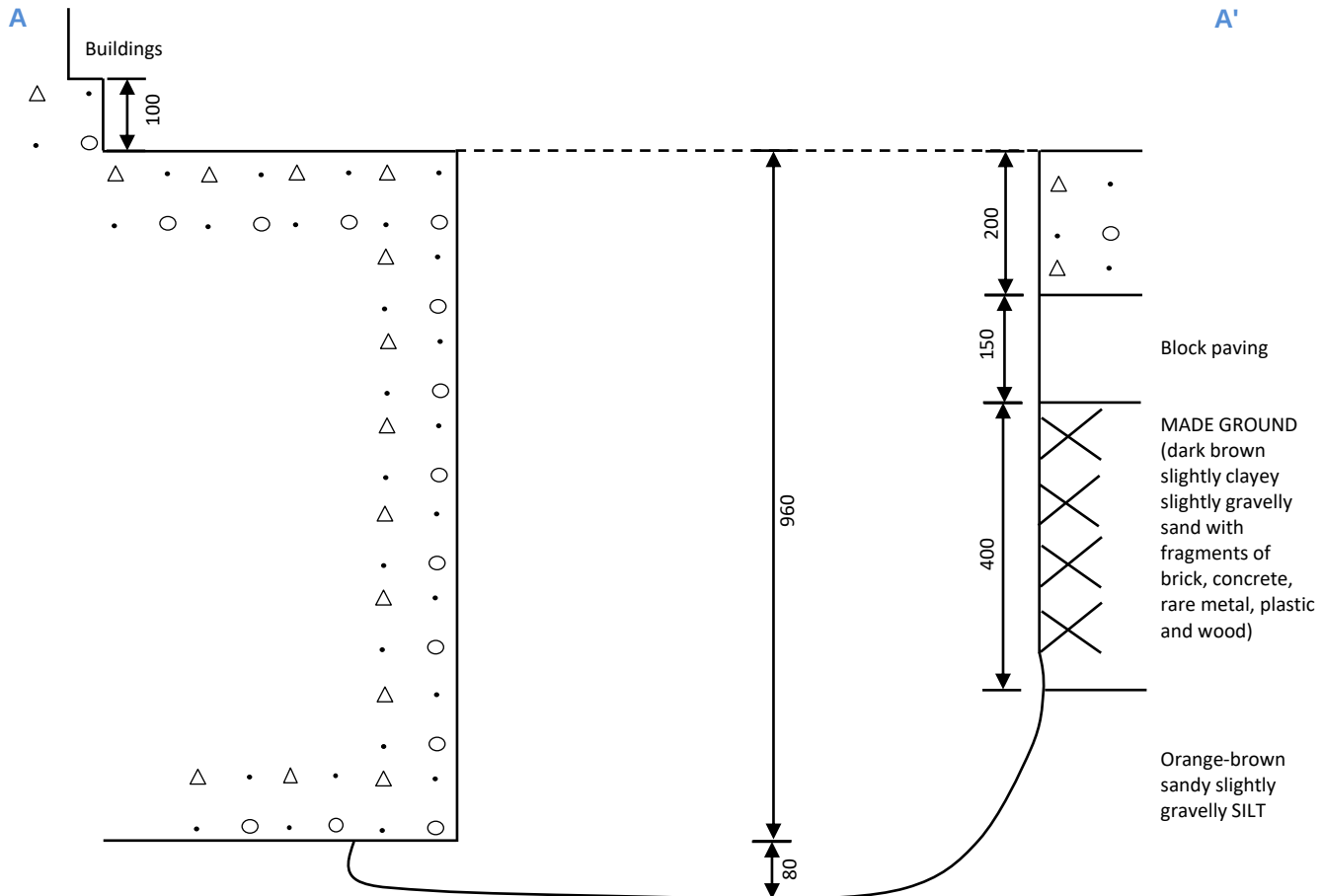
1100 x 770 x 1040

Ground Level (mOD)

Location

Southeastern corner of office block in southeast of site

Section A - A': -



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Trial Pit No

7

Site Ashley Road Depot, Tottenham

Client London Borough of Haringey

Engineer

Job Number
J21294

Sheet
15/15

Dates

Excavation Method

Manual

Dimensions

1100 x 770 x 1040

Ground Level (mOD)

Location

Southeastern corner of office block in southeast of site



Remarks:

Trial pit backfilled upon completion

Scale:

Approx 1:10

Logged by:

JW



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Herts | 01727 824666 Notts | 01509 674888

Site
Ashley Road Depot, London

Client
London Borough of Haringey

Engineer
Madlins

Trial Pit No
101A

Excavation Method
Manual

Dimensions

Ground Level (mOD)

Dates
03/05/2022 - 09/05/2022

Location
Far NE corner of site

Scale
1:20

Logged by
JW

Sheet
1/1

Job Number
J21294



Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.



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Herts | 01727 824666 Notts | 01509 674888

Site
Ashley Road Depot, London

Client
London Borough of Haringey

Engineer
Madlins

Trial Pit No
101A

Excavation Method
Manual

Dimensions

Ground Level (mOD)

Dates
03/05/2022 - 09/05/2022

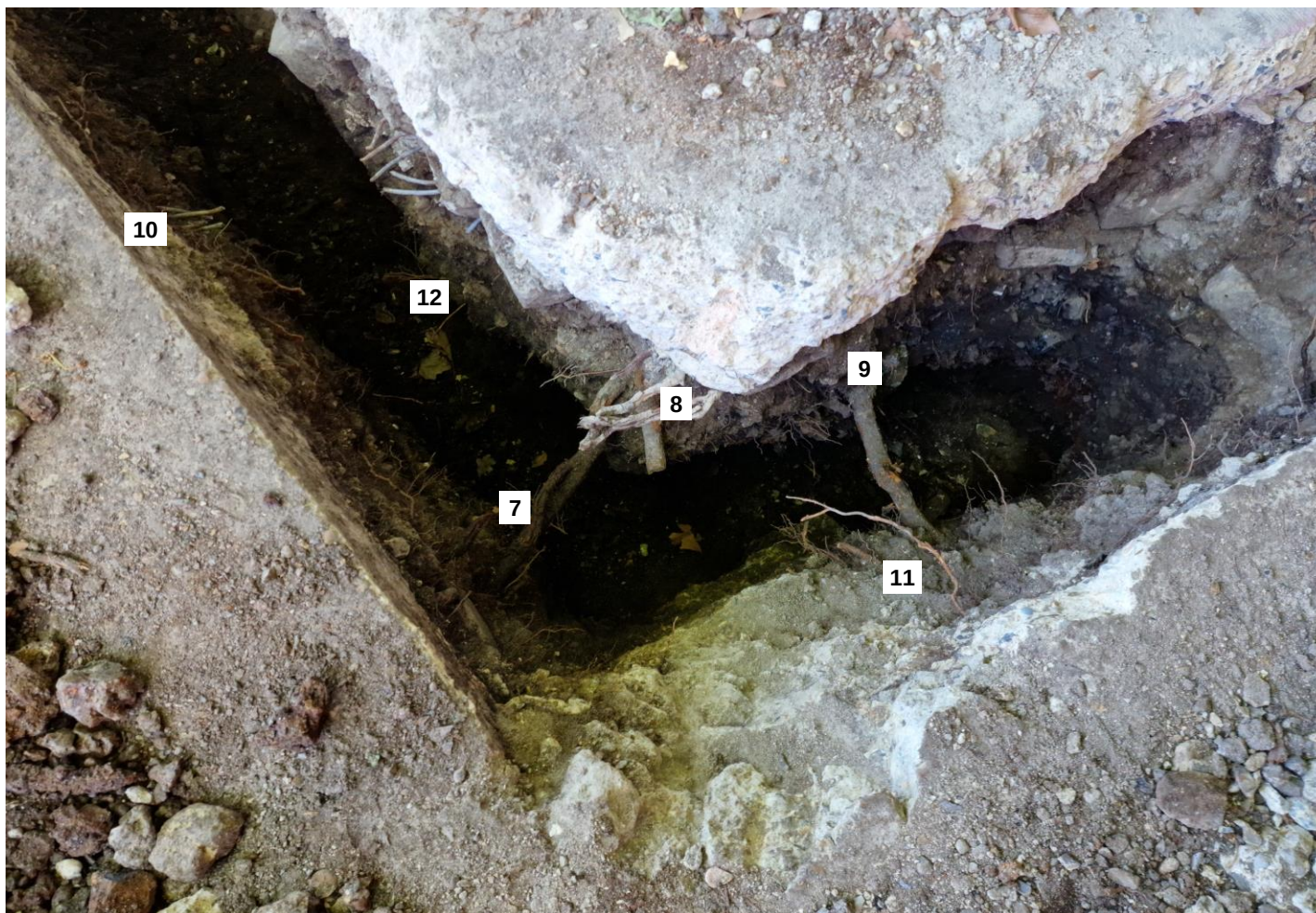
Location
Far NE corner of site

Scale
1:20

Logged by
JW

Sheet
1/1

Job Number
J21294



Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.



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Herts | 01727 824666 Notts | 01509 674888

Site
Ashley Road Depot, London

Client
London Borough of Haringey

Engineer
Madlins

Trial Pit No
101A

Excavation Method
Manual

Dimensions

Ground Level (mOD)

Dates
03/05/2022 - 09/05/2022

Location
Far NE corner of site

Scale
1:20

Logged by
JW

Sheet
1/1

Job Number
J21294

Root ID	Depth (mm)	Diameter (mm)	Additional Notes
1	730	48	Partially rotten, 86mm at widest point, and 48mm at thinnest
2	860	96	-
3a	670	68	Root thins quickly from a to b, becoming deeper as it does so
3b	890	32	
4	670	108	-
5	790	54	-
6	570	35	Root rotten and broken
7	440	30	-
8	230	20	Three 10 mm to 20 mm diameter roots directly under concrete
9	530	38	-
10	420	4	-
11	260	3	-
12	850	7	-

Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.



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Herts | 01727 824666 Notts | 01509 674888

Site
Ashley Road Depot, London

Client
London Borough of Haringey

Engineer
Madlins

Trial Pit No
101A

Excavation Method
Manual

Dimensions

Ground Level (mOD)

Dates
03/05/2022 - 09/05/2022

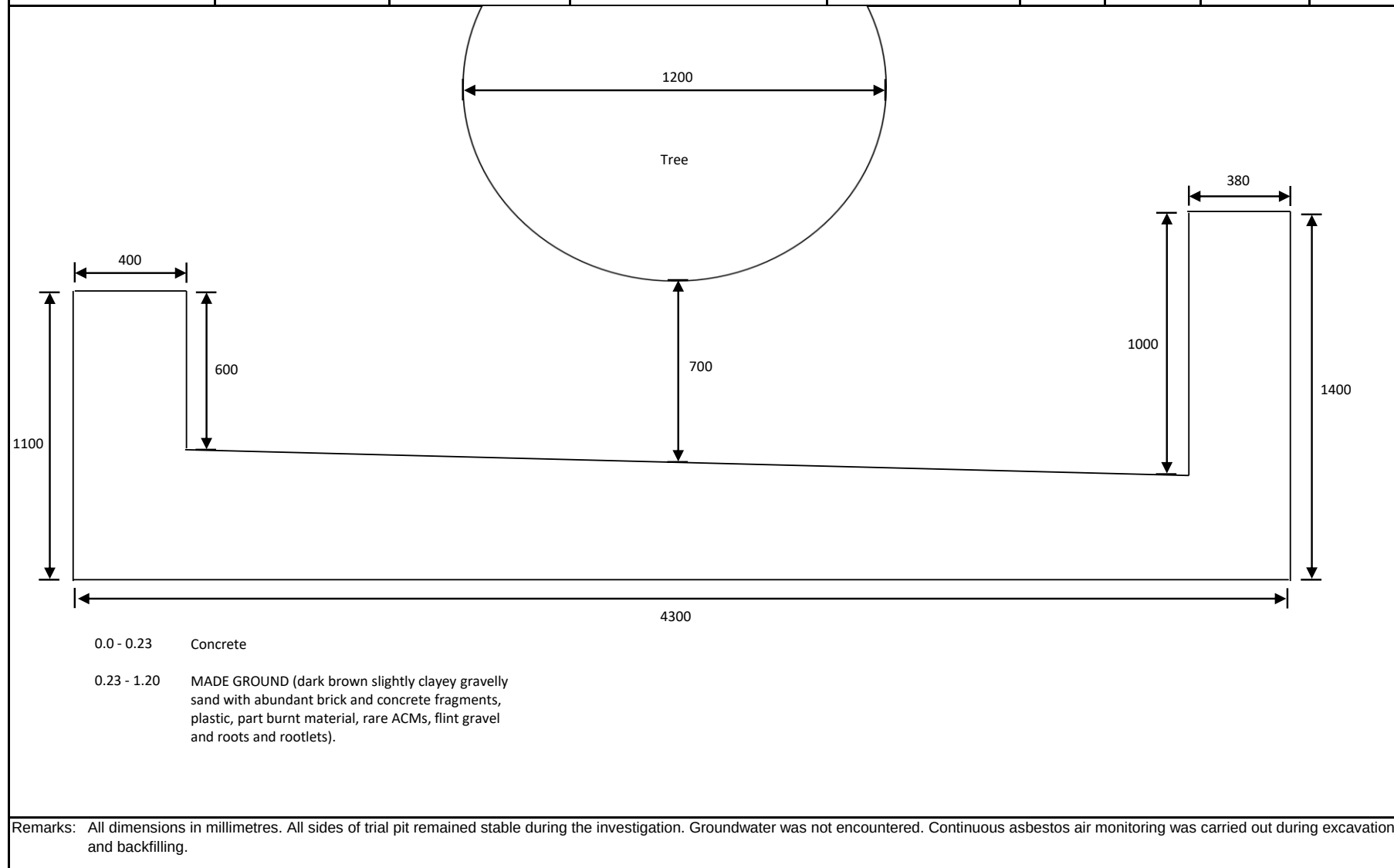
Location
Far NE corner of site

Scale
1:20

Logged by
JW

Sheet
1/1

Job Number
J21294

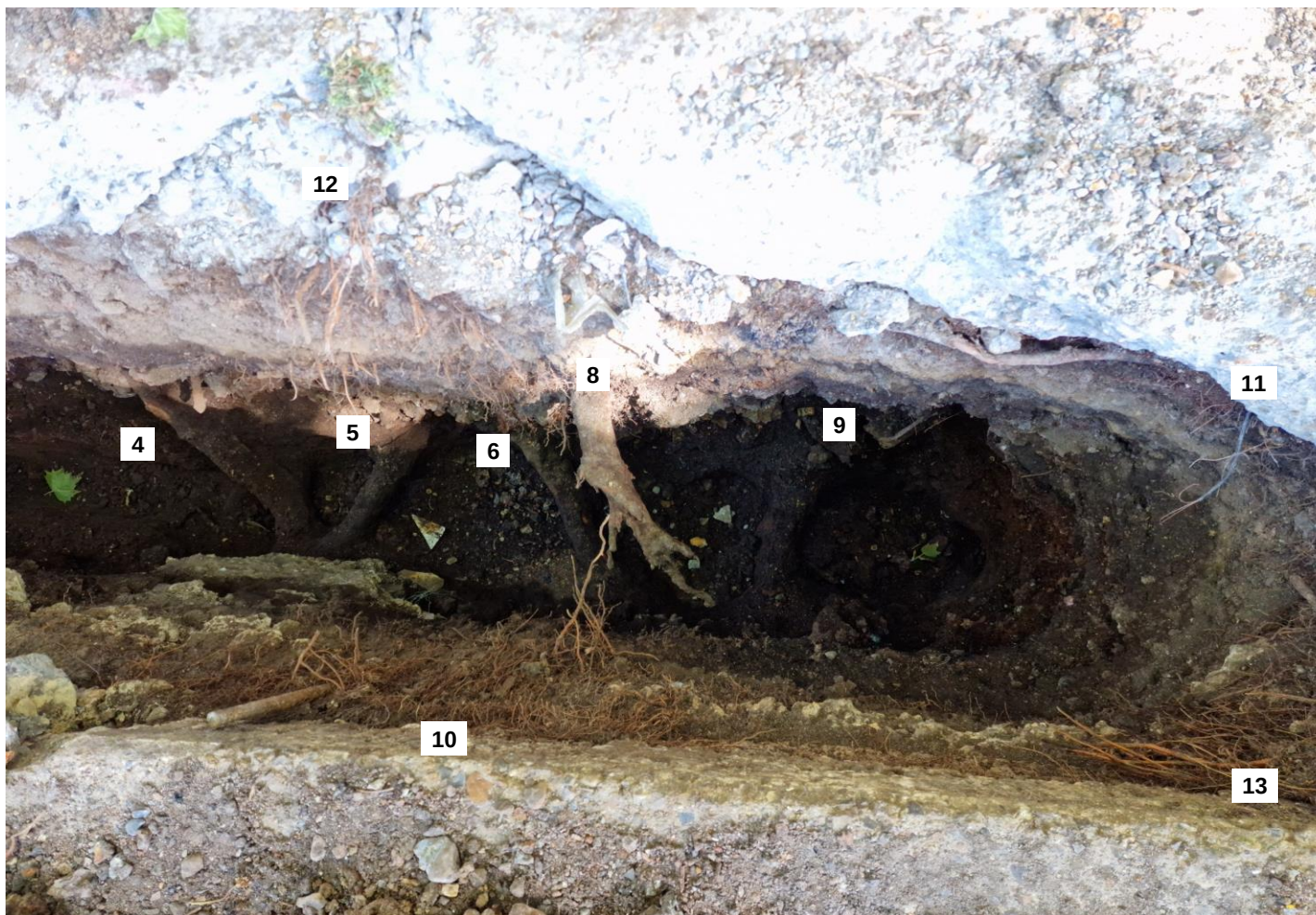


 www.gea-ltd.co.uk Herts 01727 824666 Notts 01509 674888			Site Ashley Road Depot, London	Client London Borough of Haringey		Engineer Madlins		Trial Pit No 102A
Excavation Method Manual	Dimensions	Ground Level (mOD)	Dates 03/05/2022 - 09/05/2022	Location Far NE corner of site	Scale 1:20	Logged by JW	Sheet 1/1	Job Number J21294



Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.

 GEA www.gea-ltd.co.uk Herts 01727 824666 Notts 01509 674888			Site Ashley Road Depot, London	Client London Borough of Haringey	Engineer Madlins		Trial Pit No 102A	
Excavation Method Manual	Dimensions	Ground Level (mOD)	Dates 03/05/2022 - 09/05/2022	Location Far NE corner of site	Scale 1:20	Logged by JW	Sheet 1/1	Job Number J21294



Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.

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Herts | 01727 824666 Notts | 01509 674888

Site

Ashley Road Depot, London

Client

London Borough of Haringey

Engineer

Madlins

Trial Pit No

102A

Excavation Method

Manual

Dimensions**Ground Level (mOD)****Dates**

03/05/2022 - 09/05/2022

Location

Far NE corner of site

Scale

1:20

Logged by

JW

Sheet

1/1

JobNumber
J21294

Root ID	Depth (mm)	Diameter (mm)	Additional Notes
1	1060	56	-
2	1080	42	-
3	560	115	-
4	840	72	Extends deeper in south of pit to 1130 mm deep
5	1030	61	-
6	980	68	-
7	250	< 1 - 3	Area of fine rootlets below concrete max 3 mm diameter
8	540	55	Forks off and breaks, appears rotten
9	970	84	Three 10 mm to 20 mm diameter roots directly under concrete
10	230	< 1 - 3	Area of fine rootlets below concrete max 3 mm diameter
11	250	2	Area of fine rootlets below concrete max 2 mm diameter
12	230	3	Area of fine rootlets below concrete each around 3 mm diameter
13	230	< 1 - 3	Area of fine rootlets below concrete max 3 mm diameter

Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.



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Herts | 01727 824666 Notts | 01509 674888

Site
Ashley Road Depot, London

Client
London Borough of Haringey

Engineer
Madlins

Trial Pit No
TP102A

Excavation Method
Manual

Dimensions

Ground Level (mOD)

Dates
03/05/2022 - 09/05/2022

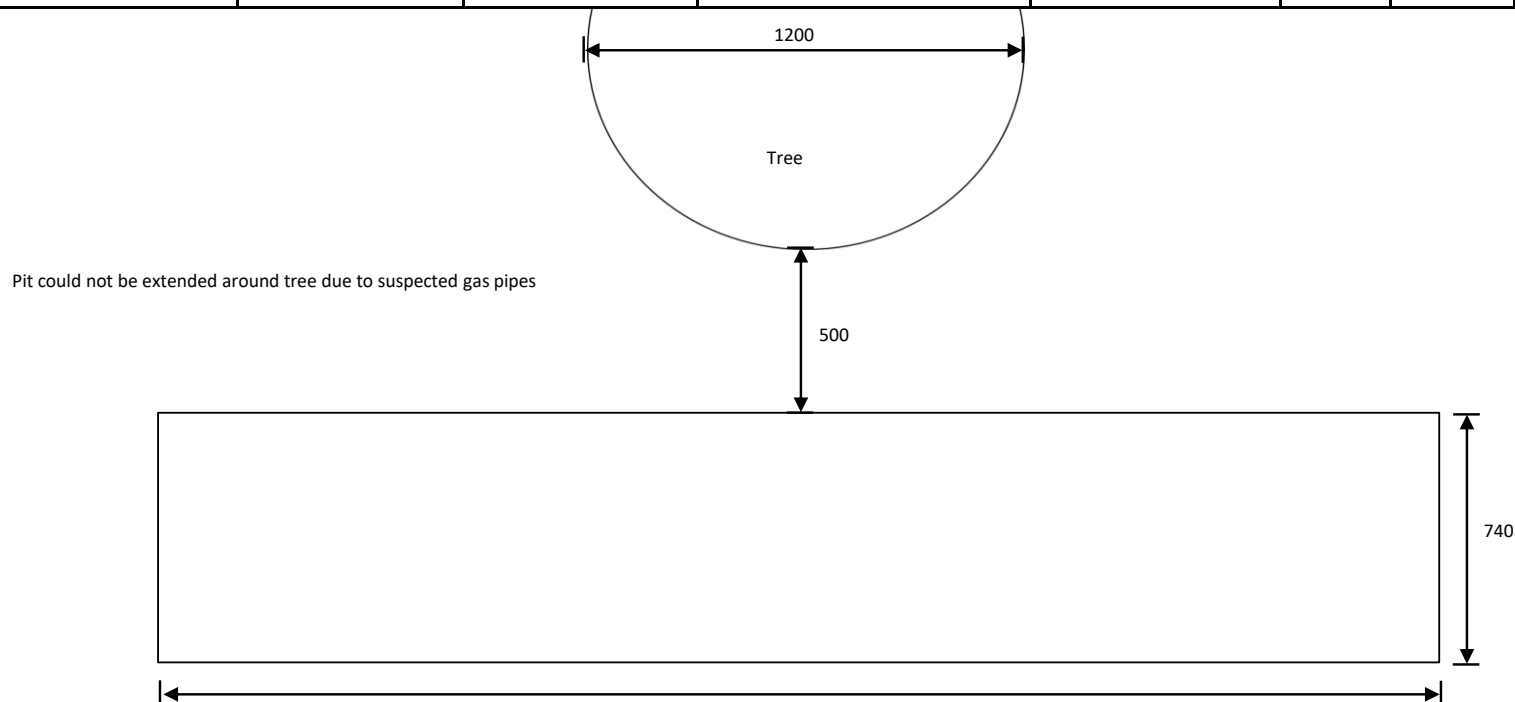
Location
Far NE corner of site

Scale
1:20

Logged by
JW

Sheet
1/1

Job Number
J21294

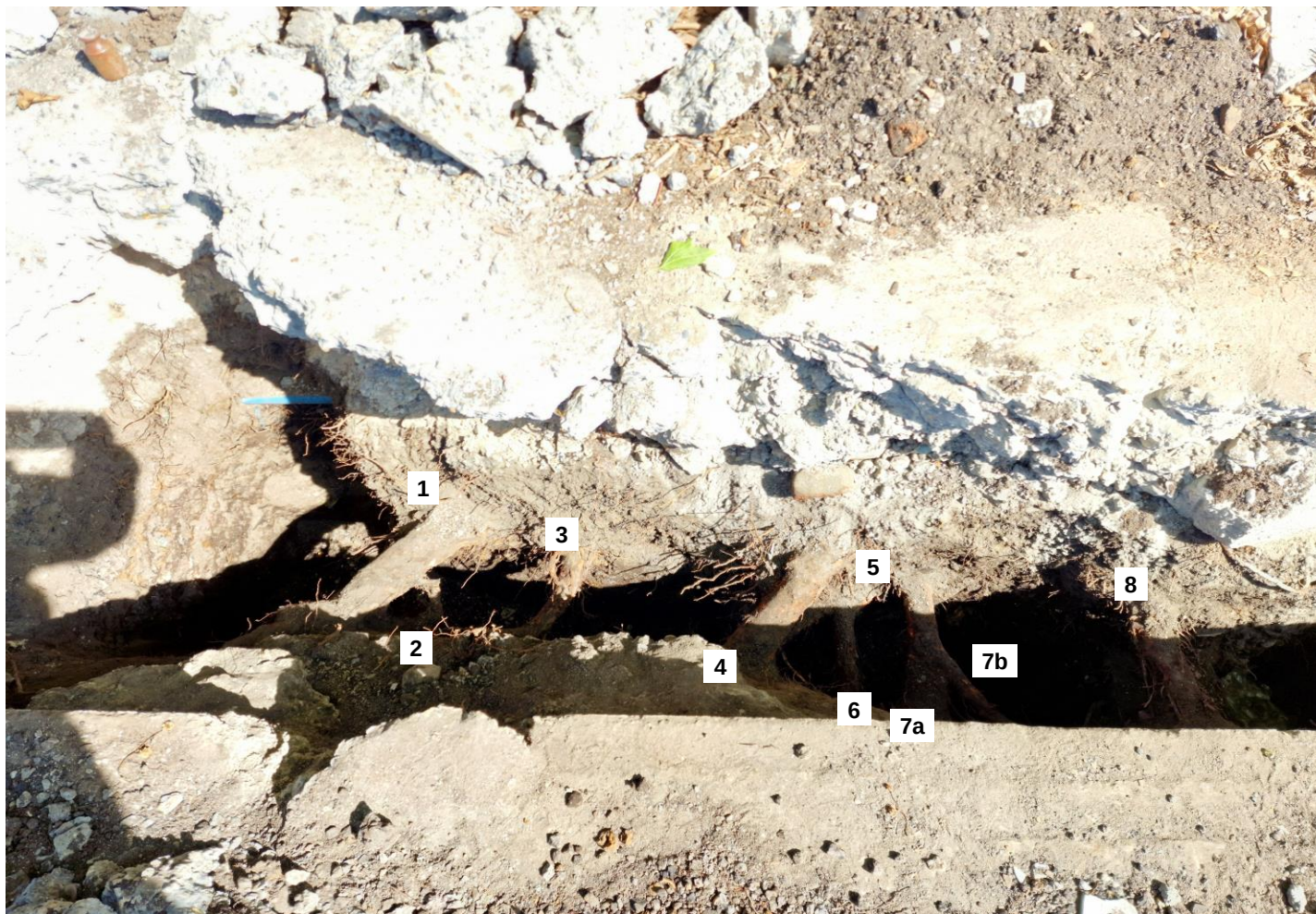


0.0 - 0.23 Concrete

0.23 - 1.20 MADE GROUND (dark brown slightly clayey very gravelly sand with abundant brick and concrete fragments, tile, metal, plastic, glass, rubber, rare ACMs, flint gravel and roots and rootlets).

Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.

 GEA www.gea-ltd.co.uk Herts 01727 824666 Notts 01509 674888			Site Ashley Road Depot, London	Client London Borough of Haringey	Engineer Madlins		Trial Pit No TP103A	
Excavation Method Manual	Dimensions	Ground Level (mOD)	Dates 03/05/2022 - 09/05/2022	Location Far NE corner of site	Scale 1:20	Logged by JW	Sheet 1/1	Job Number J21294



Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.



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Herts | 01727 824666 Notts | 01509 674888

Site
Ashley Road Depot, London

Client
London Borough of Haringey

Engineer
Madlins

Trial Pit No
TP103A

Excavation Method
Manual

Dimensions

Ground Level (mOD)

Dates
03/05/2022 - 09/05/2022

Location
Far NE corner of site

Scale
1:20

Logged by
JW

Sheet
1/1

Job Number
J21294



Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.



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Herts | 01727 824666 Notts | 01509 674888

Site
Ashley Road Depot, London**Client**
London Borough of Haringey**Engineer**
Madlins**Trial Pit No**
103A**Excavation Method**
Manual**Dimensions****Ground Level (mOD)****Dates**
03/05/2022 - 09/05/2022**Location**
Far NE corner of site**Scale**
1:20**Logged by**
JW**Sheet**
1/1**Job Number**
J21294

Root ID	Depth (mm)	Diameter (mm)	Additional Notes
1	580	85	-
2	650	15	Curves beneath root 1
3	550	40	Has a fork at southern edge with root going up under concrete
4	430	76	-
5	660	26	Largely beneath root 4
6	660	43	-
7a	550	48	Root forks into 7a and 7b
7b	580	18	
8	410	62	Contains lots of fine roots (up to 3 mm diameter) forking off main
9	620	160	Thick clump of at least 4 separate roots
10	570	67	-
11	400	38	-
12	550	120	Area contains many thick roots - too difficult to excavate around
13	380	18	-
14	360	3 - 8	Several fine roots 3 - 8 mm diamter below concrete to around 360

Remarks: All dimensions in millimetres. All sides of trial pit remained stable during the investigation. Groundwater was not encountered. Continuous asbestos air monitoring was carried out during excavation and backfilling.



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Herts | 01727 824666 Notts | 01509 674888

Site
Ashley Road Depot, London

Client
London Borough of Haringey

Engineer
Madlins

Trial Pit No
TP102A

Excavation Method
Manual

Dimensions

Ground Level (mOD)

Dates
03/05/2022 - 09/05/2022

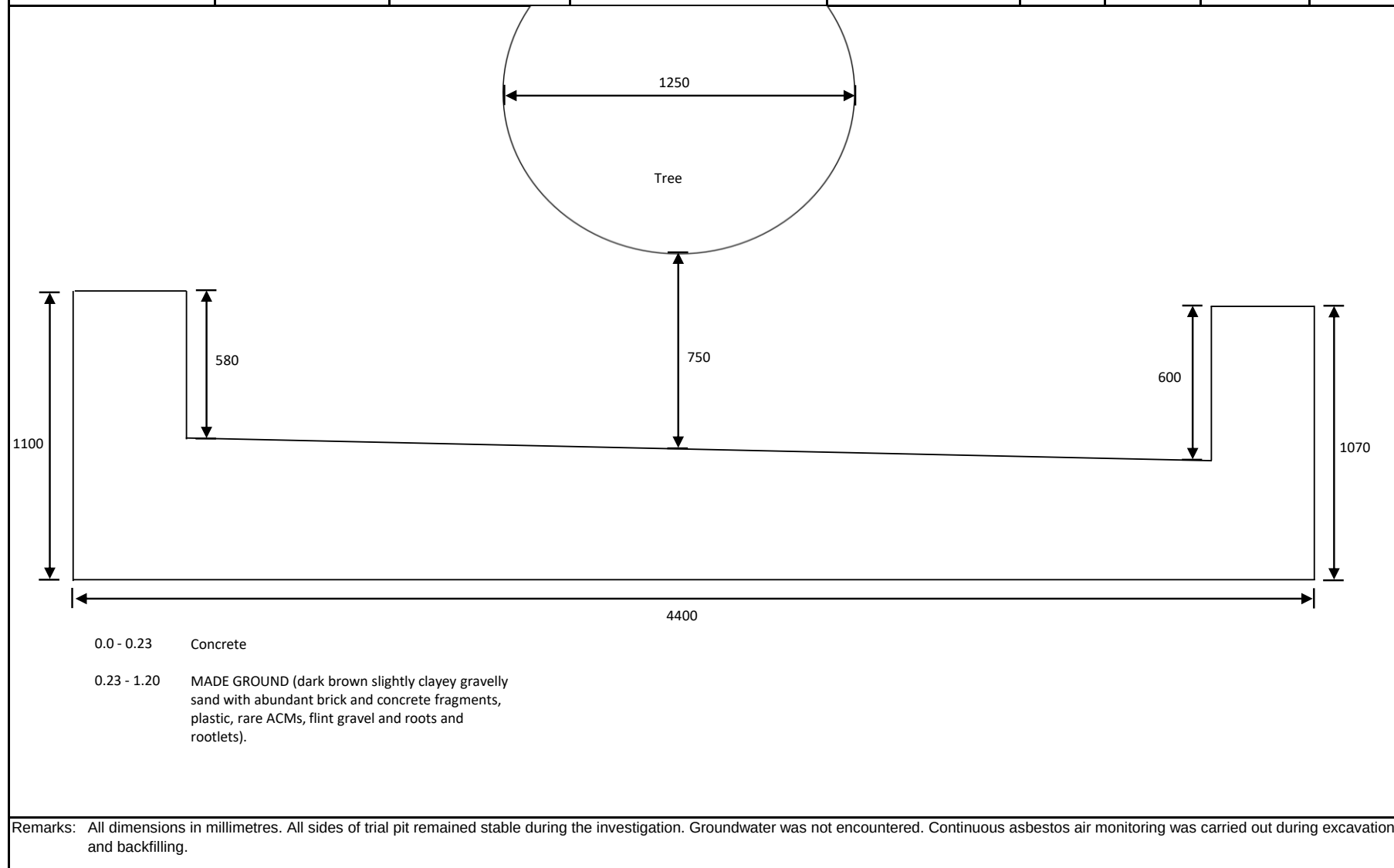
Location
Far NE corner of site

Scale
1:20

Logged by
JW

Sheet
1/1

Job Number
J21294



SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH2	4.00	2	B	Dark greyish brown sandy flint GRAVEL with one cobble.															Particle Size Distribution
BH2	6.50		U	Very stiff fissured brown CLAY.	26.9					2.02	1.59	Undisturbed	130	224	112				
BH2	7.50	11	D	Dark brown slightly silty CLAY.	28.6	72	26	46	100										
BH2	8.00	12	D													8.0	0.27		
BH2	9.50	2	U	Very stiff fissured dark brown silty CLAY.	29.4					1.99	1.54	Undisturbed	190	238	119				
BH2	12.50	3	U	Very stiff fissured dark brown silty CLAY.	29.7					1.97	1.52	Undisturbed	250	268	134				
BH2	14.00	18	D	Dark brown slightly silty CLAY.	26.5	70	26	44	100										
BH2	15.50	4	U	Very stiff fissured dark brown silty CLAY.	21.6					2.01	1.65	Undisturbed	310	368	184				
BH2	18.50	5	U	Very stiff fissured dark brown silty CLAY.	28.8					2.00	1.55	Undisturbed	370	287	144				
BH2	24.00	29	D	Light greyish brown covered in dark brown slightly sandy slightly silty CLAY.	18.6	37	18	19	100										

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 17/12/2021	Project Number:	GEO / 34361 ASHLEY ROAD DEPOT J21294	
	Project Name:		

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH2	24.50	30	D	Grey slightly silty fine to medium SAND.	21.7											7.9	0.39		
BH5	2.00	2	B	Greyish brown very sandy flint GRAVEL.															Particle Size Distribution
BH5	6.50	1	U	Stiff fissured dark brown silty CLAY.	27.2					2.00	1.57	Undisturbed	130	204	102				
BH5	7.50	9	D	Brown slightly silty CLAY.	28.3	67	29	38	100										
BH5	9.50	2	U	Very stiff fissured dark brown silty CLAY.	29.3					1.97	1.52	Undisturbed	190	243	122				
BH5	10.50	12	D													8.0	0.73		
BH5	12.50	3	U	Very stiff fissured dark brown silty CLAY.	30.9					1.97	1.50	Undisturbed	250	199	99				
BH5	15.50	4	U	Very stiff fissured dark brown silty CLAY.	24.7					1.98	1.58	Undisturbed	310	298	149				
BH5	16.50	18	D	Dark brown slightly silty CLAY with rare gypsum.	28.0														
BH5	18.50	5	U	Very stiff fissured dark grey silty CLAY.	29.4					1.95	1.51	Undisturbed	370	382	191				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 17/12/2021	Project Number: GEO / 34361 Project Name: ASHLEY ROAD DEPOT J21294	
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SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH5	21.50	6	U	Very stiff fissured dark brown silty CLAY with rare gypsum.	24.2					2.04	1.64	Undisturbed	430	553	276				
BH5	24.50		U	Very stiff fissured dark grey silty CLAY.	22.8					1.99	1.62	Undisturbed	490	750	375				
BH5	25.50	27	D													7.8	1.1		
BH5	26.00	28	D	Brown slightly silty slightly sandy slightly gravelly CLAY.	35.7	60	22	38	99										
BH6	2.00	1	U	Medium dense orange brown clayey gravelly SAND	14.3					2.23	1.95	Undisturbed	40	127	63				
BH6	3.75	6	D	Brown very sandy GRAVEL.															Particle Size Distribution
BH6	4.75	8	D													8.0	0.22		
BH6	5.00	2	U	Stiff fissured dark brown silty CLAY	34.3					1.95	1.45	Undisturbed	100	158	79				
BH6	6.00	9	D	Brown slightly silty CLAY.	31.2	68	27	41	100										
BH6	8.00	3	U	Stiff fissured dark brown silty CLAY.	30.5					1.91	1.47	Undisturbed	160	231	115				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 17/12/2021	Project Number: Project Name: GEO / 34361 ASHLEY ROAD DEPOT J21294	
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SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH6	11.00	4	U	Very stiff fissured dark brown silty CLAY.	27.8					1.98	1.55	Undisturbed	220	294	147				
BH6	14.00	5	U	Very stiff fissured dark brown silty CLAY.	24.3					1.99	1.60	Undisturbed	280	256	128				
BH6	15.50	19	D	Brown slightly silty CLAY.	24.2														
BH6	17.00	6	U	Very stiff fissured dark grey silty CLAY.	29.8					1.98	1.52	Undisturbed	340	258	129				
BH6	20.00	7	U	Very stiff fissured dark grey silty CLAY.	25.7					1.99	1.59	Undisturbed	400	203	102				
BH6	23.00	8	U	Very stiff fissured grey mottled red silty CLAY.	22.6					2.04	1.66	Undisturbed	460	332	166				
BH6	24.50	28	D													9.4	0.015		
BH6	26.00	30	D	Multi-coloured slightly sandy slightly silty CLAY.	18.5	61	20	41	100										
BH6	29.00	34	D	Light brown covered in brown slightly sandy CLAY.	14.2														
BH8	6.00	12	D	Brown slightly sandy gravelly CLAY.	22.8	61	23	38	86										

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 17/12/2021	Project Number:	GEO / 34361 ASHLEY ROAD DEPOT J21294	
	Project Name:		

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH8	6.50	1	U	Stiff fissured dark brown silty CLAY.	30.4					1.96	1.50	Undisturbed	130	140	70				
BH8	8.00	14	D													8.3	0.25		
BH8	9.50	2	U	Stiff fissured dark brown silty CLAY.	30.1					1.95	1.50	Undisturbed	190	196	98				
BH8	12.50	3	U	Stiff fissured dark brown silty CLAY.	28.7					2.04	1.59	Undisturbed	250	360	180				
BH8	13.50	19	D	Brown slightly silty slightly sandy CLAY.	21.3														
BH8	15.50	4	U	Very stiff fissured dark grey silty CLAY	28.5					1.98	1.54	Undisturbed	310	303	152				
BH8	18.50	5	U	Very stiff fissured dark grey silty CLAY.	23.5					2.04	1.65	Undisturbed	370	506	253				
BH8	21.50	6	U	Very stiff fissured dark grey silty CLAY.	26.1					1.96	1.56	Undisturbed	430	512	256				
BH8	24.50	31	D	Brown slightly silty slightly gravelly CLAY.	37.0	51	22	29	77										
BH8	25.50	32	D													8.0	0.013		

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 17/12/2021	Project Number:	GEO / 34361 ASHLEY ROAD DEPOT J21294	
	Project Name:		

PARTICLE SIZE DISTRIBUTION

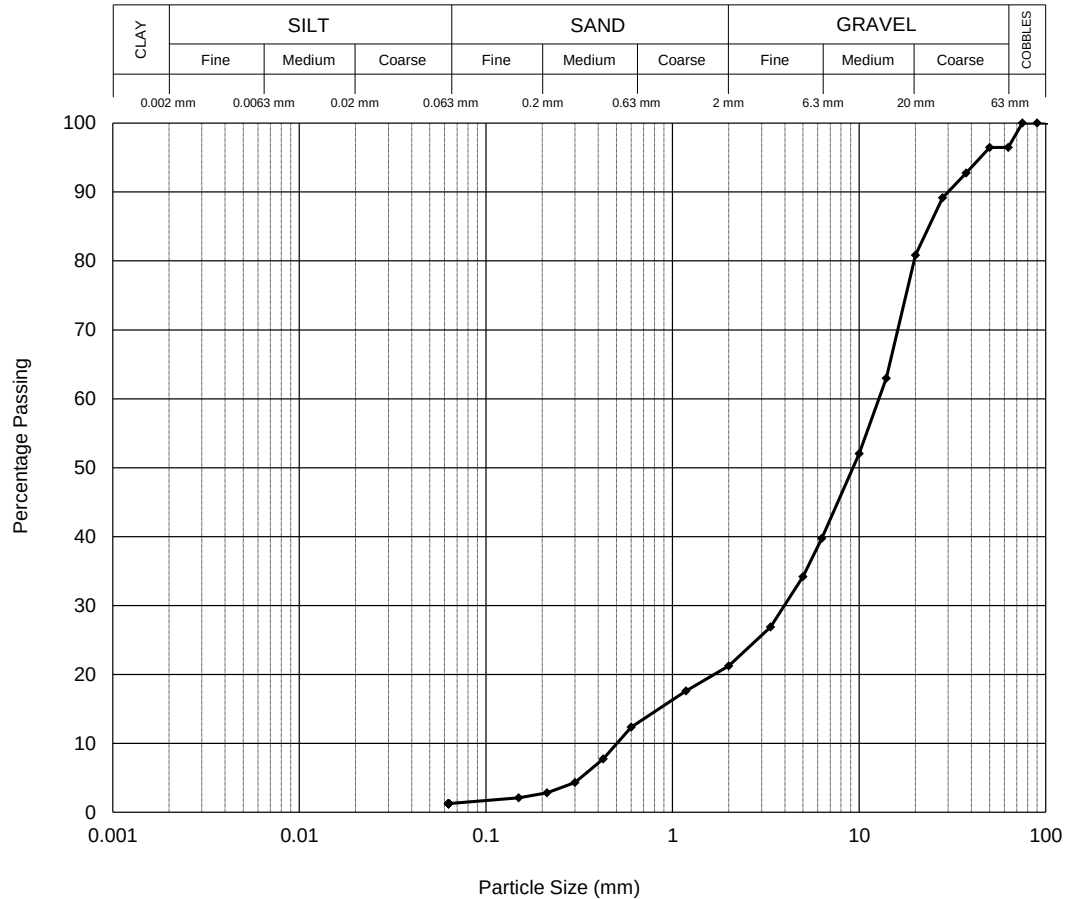
Location BH2
 Sample Ref 2
 Depth (m) 4.00
 Sample Type B

Description

Dark greyish brown sandy flint GRAVEL with one cobble.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	96
50.0 mm	96
37.5 mm	93
28.0 mm	89
20.0 mm	81
14.0 mm	63
10.0 mm	52
6.30 mm	40
5.00 mm	34
3.35 mm	27
2.00 mm	21
1.18 mm	18
600 µm	12
425 µm	8
300 µm	4
212 µm	3
150 µm	2
63 µm	1



Particle Proportions	
Cobbles	3.5
Gravel	75.2
Sand	20.0
Silt & Clay	1.3

Tested by AW
 Checked and Approved by

S Burke

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

**ASHLEY ROAD DEPOT
 J21294**



PARTICLE SIZE DISTRIBUTION

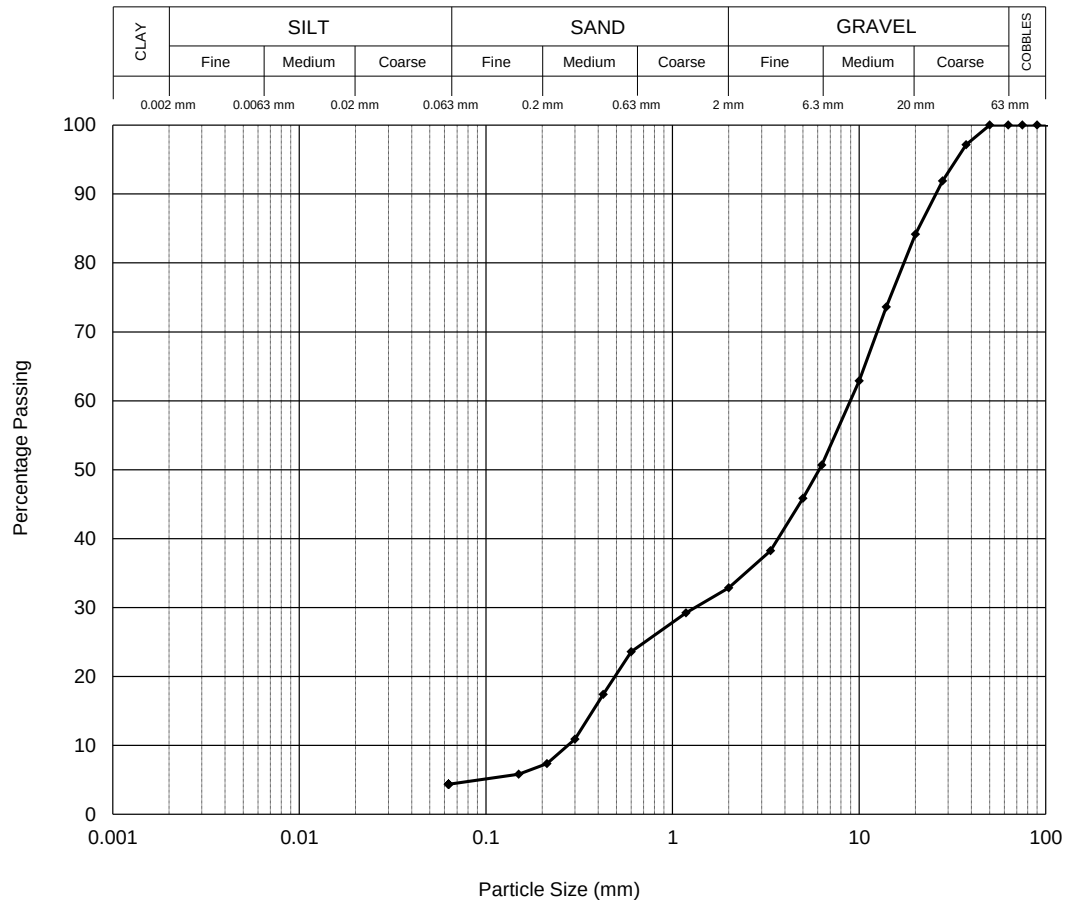
Location BH5
 Sample Ref 2
 Depth (m) 2.00
 Sample Type B

Description

Greyish brown very sandy flint GRAVEL.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	97
28.0 mm	92
20.0 mm	84
14.0 mm	74
10.0 mm	63
6.30 mm	51
5.00 mm	46
3.35 mm	38
2.00 mm	33
1.18 mm	29
600 µm	24
425 µm	17
300 µm	11
212 µm	7
150 µm	6
63 µm	4



Particle Proportions	
Cobbles	0.0
Gravel	67.2
Sand	28.5
Silt & Clay	4.3

Tested by AW
 Checked and Approved by

S Burke

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 17/12/2021

Project Number:

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Project Name:

ASHLEY ROAD DEPOT
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PARTICLE SIZE DISTRIBUTION

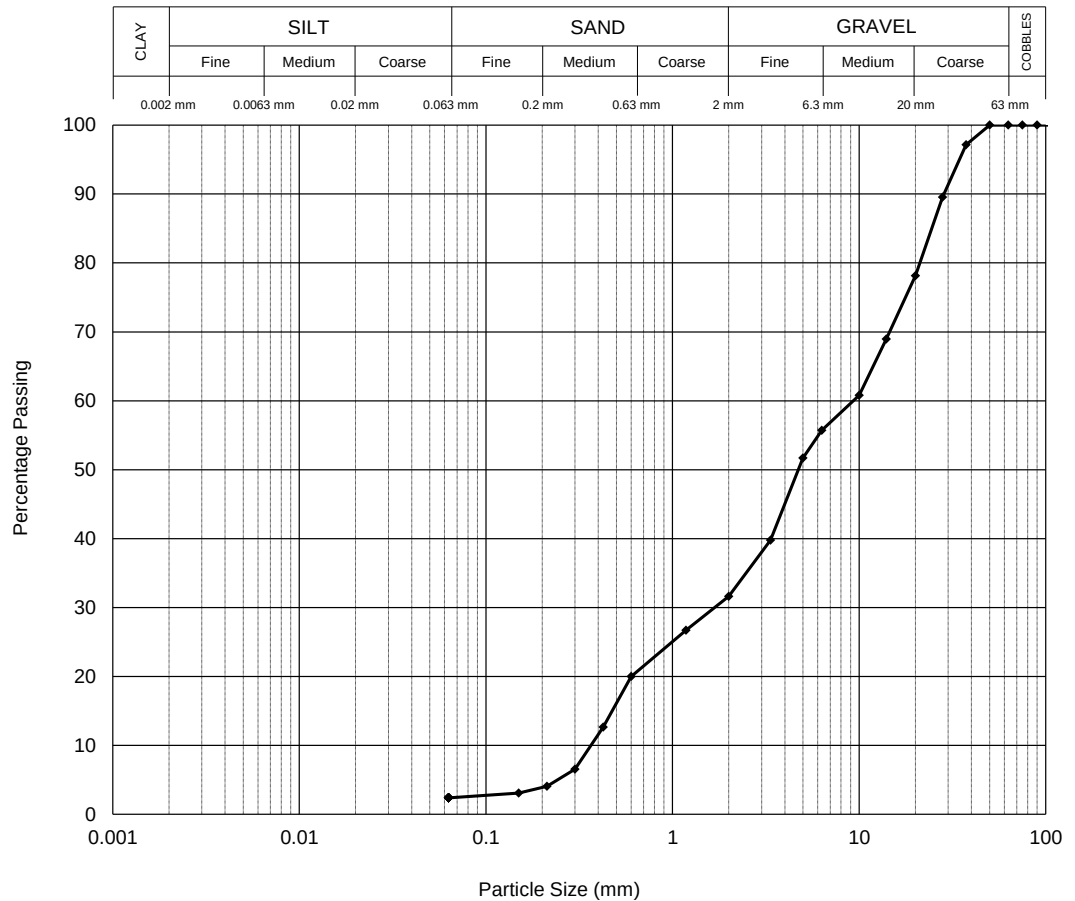
Location BH6
 Sample Ref 6
 Depth (m) 3.75
 Sample Type D

Description

Brown very sandy GRAVEL.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	97
28.0 mm	90
20.0 mm	78
14.0 mm	69
10.0 mm	61
6.30 mm	56
5.00 mm	52
3.35 mm	40
2.00 mm	32
1.18 mm	27
600 µm	20
425 µm	13
300 µm	7
212 µm	4
150 µm	3
63 µm	2



Particle Proportions	
Cobbles	0.0
Gravel	68.4
Sand	29.2
Silt & Clay	2.4

Tested by AW
 Checked and Approved by

S Burke

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH2
Depth (m) 6.50
Sample Type U

Description:

Very stiff fissured brown CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.2
Diameter (mm)	100.9
Moisture content (%)	26.9
Bulk density (Mg/m ³)	2.02
Dry density (Mg/m ³)	1.59
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.2
Membrane correction (kPa)	0.4
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	130
Strain at failure (%)	5.4
Maximum deviator stress (kPa)	224
Shear Stress Cu (kPa)	112

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

110

Tested by SB
Checked and Approved by

S Burke - Senior Technician
17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

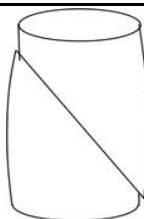
Location BH2
 Sample Ref 2
 Depth (m) 9.50
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	201.8
Diameter (mm)	102.3
Moisture content (%)	29.4
Bulk density (Mg/m ³)	1.99
Dry density (Mg/m ³)	1.54
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	201.8
Membrane correction (kPa)	0.3
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	190
Strain at failure (%)	3.2
Maximum deviator stress (kPa)	238
Shear Stress Cu (kPa)	119

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

50

Tested by SB
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S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH2
 Sample Ref 3
 Depth (m) 12.50
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.5
Diameter (mm)	101.9
Moisture content (%)	29.7
Bulk density (Mg/m ³)	1.97
Dry density (Mg/m ³)	1.52
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.4
Membrane correction (kPa)	0.3
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	250
Strain at failure (%)	4.2
Maximum deviator stress (kPa)	268
Shear Stress Cu (kPa)	134

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

48

Tested by SB
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S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

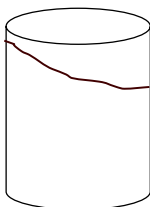
Location BH2
 Sample Ref 4
 Depth (m) 15.50
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	201.9
Diameter (mm)	101.6
Moisture content (%)	21.6
Bulk density (Mg/m ³)	2.01
Dry density (Mg/m ³)	1.65
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	201.8
Membrane correction (kPa)	0.6
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	310
Strain at failure (%)	8.4
Maximum deviator stress (kPa)	368
Shear Stress Cu (kPa)	184

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

28

Tested by SB

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S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

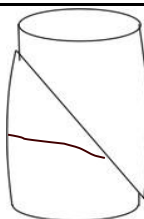
Location BH2
 Sample Ref 5
 Depth (m) 18.50
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.7
Diameter (mm)	102.5
Moisture content (%)	28.8
Bulk density (Mg/m ³)	2.00
Dry density (Mg/m ³)	1.55
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.7
Membrane correction (kPa)	0.5
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	370
Strain at failure (%)	6.4
Maximum deviator stress (kPa)	287
Shear Stress Cu (kPa)	144

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

15

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

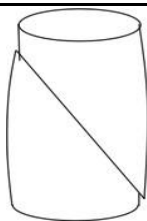
Location BH5
 Sample Ref 1
 Depth (m) 6.50
 Sample Type U

Description:

Stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.0
Diameter (mm)	102.8
Moisture content (%)	27.2
Bulk density (Mg/m ³)	2.00
Dry density (Mg/m ³)	1.57
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	201.9
Membrane correction (kPa)	0.4
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	130
Strain at failure (%)	5.9
Maximum deviator stress (kPa)	204
Shear Stress Cu (kPa)	102

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

25

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S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
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UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

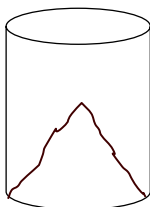
Location BH5
 Sample Ref 2
 Depth (m) 9.50
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.4
Diameter (mm)	102.8
Moisture content (%)	29.3
Bulk density (Mg/m ³)	1.97
Dry density (Mg/m ³)	1.52
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.4
Membrane correction (kPa)	0.5
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	190
Strain at failure (%)	6.9
Maximum deviator stress (kPa)	243
Shear Stress Cu (kPa)	122

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

89

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S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH5
 Sample Ref 3
 Depth (m) 12.50
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.2
Diameter (mm)	101.8
Moisture content (%)	30.9
Bulk density (Mg/m ³)	1.97
Dry density (Mg/m ³)	1.50
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.1
Membrane correction (kPa)	0.5
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	250
Strain at failure (%)	7.4
Maximum deviator stress (kPa)	199
Shear Stress Cu (kPa)	99

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

30

Tested by SB

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S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH5
 Sample Ref 4
 Depth (m) 15.50
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.7
Diameter (mm)	102.4
Moisture content (%)	24.7
Bulk density (Mg/m ³)	1.98
Dry density (Mg/m ³)	1.58
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.6
Membrane correction (kPa)	0.6
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	310
Strain at failure (%)	8.4
Maximum deviator stress (kPa)	298
Shear Stress Cu (kPa)	149

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

28

Tested by SB

Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH5
 Sample Ref 5
 Depth (m) 18.50
 Sample Type U

Description:

Very stiff fissured dark grey silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.5
Diameter (mm)	103.6
Moisture content (%)	29.4
Bulk density (Mg/m ³)	1.95
Dry density (Mg/m ³)	1.51
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.4
Membrane correction (kPa)	0.5
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	370
Strain at failure (%)	6.9
Maximum deviator stress (kPa)	382
Shear Stress Cu (kPa)	191

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

34

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

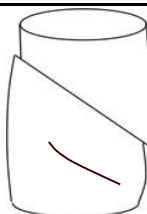
Location BH5
 Sample Ref 6
 Depth (m) 21.50
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY with rare gypsum.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.1
Diameter (mm)	102.5
Moisture content (%)	24.2
Bulk density (Mg/m ³)	2.04
Dry density (Mg/m ³)	1.64
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	201.9
Membrane correction (kPa)	0.7
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	430
Strain at failure (%)	11.4
Maximum deviator stress (kPa)	553
Shear Stress Cu (kPa)	276

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

28

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

**ASHLEY ROAD DEPOT
 J21294**



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH5
Depth (m) 24.50
Sample Type U

Description:

Very stiff fissured dark grey silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	203.2
Diameter (mm)	103.2
Moisture content (%)	22.8
Bulk density (Mg/m ³)	1.99
Dry density (Mg/m ³)	1.62
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	203.1
Membrane correction (kPa)	0.7
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	490
Strain at failure (%)	11.8
Maximum deviator stress (kPa)	750
Shear Stress Cu (kPa)	375

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

50

Tested by SB
Checked and Approved by

S Burke - Senior Technician
17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

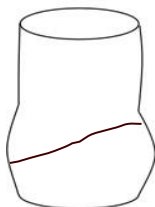
Location BH6
 Sample Ref 1
 Depth (m) 2.00
 Sample Type U

Description:

Medium dense orange brown clayey gravelly SAND

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	204.2
Diameter (mm)	100.6
Moisture content (%)	14.3
Bulk density (Mg/m ³)	2.23
Dry density (Mg/m ³)	1.95
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	204.2
Membrane correction (kPa)	0.8
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	40
Strain at failure (%)	12.2
Maximum deviator stress (kPa)	127
Shear Stress Cu (kPa)	63

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

30

Tested by SB

Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH6
 Sample Ref 2
 Depth (m) 5.00
 Sample Type U

Description:

Stiff fissured dark brown silty CLAY

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.5
Diameter (mm)	102.1
Moisture content (%)	34.3
Bulk density (Mg/m ³)	1.95
Dry density (Mg/m ³)	1.45
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.5
Membrane correction (kPa)	0.4
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	100
Strain at failure (%)	5.4
Maximum deviator stress (kPa)	158
Shear Stress Cu (kPa)	79

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

36

Tested by SB

Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

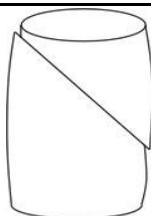
Location BH6
 Sample Ref 3
 Depth (m) 8.00
 Sample Type U

Description:

Stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.7
Diameter (mm)	101.7
Moisture content (%)	30.5
Bulk density (Mg/m ³)	1.91
Dry density (Mg/m ³)	1.47
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.7
Membrane correction (kPa)	0.4
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	160
Strain at failure (%)	4.9
Maximum deviator stress (kPa)	231
Shear Stress Cu (kPa)	115

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

18

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

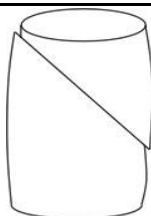
Location BH6
 Sample Ref 4
 Depth (m) 11.00
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	203.7
Diameter (mm)	102.4
Moisture content (%)	27.8
Bulk density (Mg/m ³)	1.98
Dry density (Mg/m ³)	1.55
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	203.6
Membrane correction (kPa)	0.6
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	220
Strain at failure (%)	8.8
Maximum deviator stress (kPa)	294
Shear Stress Cu (kPa)	147

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

20

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

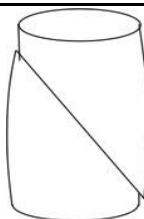
Location BH6
 Sample Ref 5
 Depth (m) 14.00
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.1
Diameter (mm)	103.2
Moisture content (%)	24.3
Bulk density (Mg/m ³)	1.99
Dry density (Mg/m ³)	1.60
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.1
Membrane correction (kPa)	0.2
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	280
Strain at failure (%)	2.5
Maximum deviator stress (kPa)	256
Shear Stress Cu (kPa)	128

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

18

Tested by SB

Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

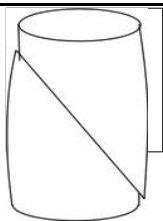
Location BH6
 Sample Ref 6
 Depth (m) 17.00
 Sample Type U

Description:

Very stiff fissured dark grey silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.2
Diameter (mm)	102.3
Moisture content (%)	29.8
Bulk density (Mg/m ³)	1.98
Dry density (Mg/m ³)	1.52
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.0
Membrane correction (kPa)	0.4
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	340
Strain at failure (%)	4.9
Maximum deviator stress (kPa)	258
Shear Stress Cu (kPa)	129

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

34

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH6
 Sample Ref 7
 Depth (m) 20.00
 Sample Type U

Description:

Very stiff fissured dark grey silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	203.2
Diameter (mm)	103.4
Moisture content (%)	25.7
Bulk density (Mg/m ³)	1.99
Dry density (Mg/m ³)	1.59
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	203.0
Membrane correction (kPa)	0.3
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	400
Strain at failure (%)	3.2
Maximum deviator stress (kPa)	203
Shear Stress Cu (kPa)	102

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

55

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH6
 Sample Ref 8
 Depth (m) 23.00
 Sample Type U

Description:

Very stiff fissured grey mottled red silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	203.7
Diameter (mm)	102.5
Moisture content (%)	22.6
Bulk density (Mg/m ³)	2.04
Dry density (Mg/m ³)	1.66
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	203.6
Membrane correction (kPa)	0.7
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	460
Strain at failure (%)	9.8
Maximum deviator stress (kPa)	332
Shear Stress Cu (kPa)	166

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

42

Tested by SB
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S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

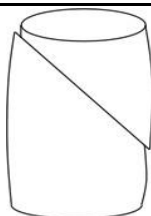
Location BH8
 Sample Ref 1
 Depth (m) 6.50
 Sample Type U

Description:

Stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.5
Diameter (mm)	102.4
Moisture content (%)	30.4
Bulk density (Mg/m ³)	1.96
Dry density (Mg/m ³)	1.50
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.5
Membrane correction (kPa)	0.5
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	130
Strain at failure (%)	7.4
Maximum deviator stress (kPa)	140
Shear Stress Cu (kPa)	70

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

16

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

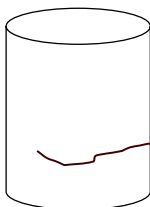
Location BH8
 Sample Ref 2
 Depth (m) 9.50
 Sample Type U

Description:

Stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.7
Diameter (mm)	101.7
Moisture content (%)	30.1
Bulk density (Mg/m ³)	1.95
Dry density (Mg/m ³)	1.50
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.6
Membrane correction (kPa)	0.4
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	190
Strain at failure (%)	5.9
Maximum deviator stress (kPa)	196
Shear Stress Cu (kPa)	98

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

26

Tested by SB

Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH8
 Sample Ref 3
 Depth (m) 12.50
 Sample Type U

Description:

Stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.9
Diameter	(mm)	102.6
Moisture content	(%)	28.7
Bulk density	(Mg/m ³)	2.04
Dry density	(Mg/m ³)	1.59
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	201.8
Membrane correction	(kPa)	0.8
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	250
Strain at failure	(%)	12.9
Maximum deviator stress	(kPa)	360
Shear Stress Cu	(kPa)	180

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

34

Tested by SB

Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

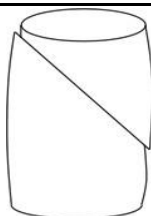
Location BH8
 Sample Ref 4
 Depth (m) 15.50
 Sample Type U

Description:

Very stiff fissured dark grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.3
Diameter	(mm)	103.2
Moisture content	(%)	28.5
Bulk density	(Mg/m ³)	1.98
Dry density	(Mg/m ³)	1.54
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	202.1
Membrane correction	(kPa)	0.2
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	310
Strain at failure	(%)	2.5
Maximum deviator stress	(kPa)	303
Shear Stress Cu	(kPa)	152

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

16

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

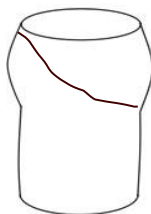
Location BH8
 Sample Ref 5
 Depth (m) 18.50
 Sample Type U

Description:

Very stiff fissured dark grey silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.1
Diameter (mm)	102.5
Moisture content (%)	23.5
Bulk density (Mg/m ³)	2.04
Dry density (Mg/m ³)	1.65
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.0
Membrane correction (kPa)	0.9
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	370
Strain at failure (%)	15.3
Maximum deviator stress (kPa)	506
Shear Stress Cu (kPa)	253

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

40

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294

GEOLABS

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

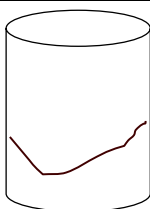
Location BH8
 Sample Ref 6
 Depth (m) 21.50
 Sample Type U

Description:

Very stiff fissured dark grey silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.2
Diameter (mm)	103.3
Moisture content (%)	26.1
Bulk density (Mg/m ³)	1.96
Dry density (Mg/m ³)	1.56
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.2
Membrane correction (kPa)	0.5
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	430
Strain at failure (%)	7.4
Maximum deviator stress (kPa)	512
Shear Stress Cu (kPa)	256

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

16

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 17/12/2021

Project Number:

GEO / 34361

Project Name:

ASHLEY ROAD DEPOT
J21294



SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH1	1.75	4	D	Orangish brown and greyish brown sandy silty CLAY. Sand is fine.	23.4	42	19	23	100										
BH1	6.50-6.95	2	U	Stiff brown CLAY.	31.9					2.00	1.51	Undisturbed	130	97	49				
BH1	9.50-9.95	3	U	Stiff fissured dark brownish grey CLAY.	32.3					1.98	1.50	Undisturbed	190	138	69				
BH1	12.50-12.95	4	U	Very stiff dark grey silty CLAY.	32.3					1.95	1.48	Undisturbed	250	160	80				
BH1	15.50-15.95	5	U	Very stiff dark brownish grey silty CLAY.	23.9					2.01	1.62	Undisturbed	310	350	175				
BH1	18.50-18.95	6	U	Very stiff brown silty CLAY	27.8					2.03	1.59	Undisturbed	370	387	193				
BH1	21.50-21.95	7	U	Very stiff grey silty CLAY.	27.8					1.97	1.54	Undisturbed	430	247	124				
BH1	24.00	27	D	Dark grey silty CLAY.	24.5														
BH1	25.50	28	D													8.0	0.59		
BH1	27.50	31	D	Dark grey slightly gravelly sandy silty CLAY.															Particle Size Distribution

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 02/02/2022	Project Number: GEO / 34598 Project Name: ASHLEY ROAD DEPOT J21294	
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SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH3	2.00-2.45	1	U	Soft to firm brown mottled grey gravelly CLAY.	18.5					2.09	1.76	Undisturbed	40	86	43				
BH3	6.50-6.95	2	U	Very stiff fissured dark brown silty CLAY.	29.4					1.98	1.53	Undisturbed	130	166	83				
BH3	9.50-9.95	3	U	Very stiff fissured dark brown silty CLAY.	31.2					1.94	1.48	Undisturbed	190	133	66				
BH3	12.50-12.95	4	U	Very stiff fissured dark brown silty CLAY.	31.2					1.96	1.49	Undisturbed	250	127	64				
BH3	15.50-15.95	5	U	Very stiff dark brown sandy silty CLAY.	28.9					1.96	1.52	Undisturbed	310	356	178				
BH3	18.50-18.95	6	U	Very stiff fissured dark grey silty CLAY.	24.8					1.96	1.57	Undisturbed	370	207	104				
BH3	21.00	24	D													8.2	0.81		
BH3	21.50-21.95	7	U	Very stiff fissured dark grey silty CLAY.	24.5					1.96	1.58	Undisturbed	430	295	148				
BH3	23.00	26	D	Dark grey sandy silty CLAY. Sand is fine.	21.6	51	23	28	100										
BH3	27.50	32	D	Dark grey slightly gravelly sandy silty CLAY. Gravel is fine to medium.															Particle Size Distribution

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 02/02/2022	Project Number:	GEO / 34598 ASHLEY ROAD DEPOT J21294	
	Project Name:		

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH4	3.00	2	B	Brown silty sandy GRAVEL.															Particle Size Distribution
BH4	6.00	8	D	Dark grey silty CLAY.	33.0														
BH4	8.00-8.45	1	U	Very stiff brownish grey CLAY.	29.7					2.00	1.54	Undisturbed	160	145	73				
BH4	9.00	11	D	Dark grey slightly silty CLAY.	29.0														
BH4	11.00-11.45	2	U	Very stiff fissured dark brown silty CLAY.	24.1					2.01	1.62	Undisturbed	220	257	129				
BH4	14.00-14.45	3	U	Very stiff fissured dark grey silty CLAY.	25.6					2.01	1.60	Undisturbed	280	451	225				
BH4	17.00-17.45	4	U	Very stiff fissured dark grey silty CLAY.	21.2					2.05	1.69	Undisturbed	340	424	212				
BH4	20.00-20.45	5	U	Very stiff fissured dark grey silty CLAY.	26.2					1.93	1.53	Undisturbed	400	269	134				
BH4	22.45		D	Dark grey sandy silty CLAY. Sand is fine.	22.9														
BH7	6.50-6.95	1	U	Very stiff fissured dark grey silty CLAY.	28.4					1.93	1.50	Undisturbed	130	167	84				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 02/02/2022	Project Number: GEO / 34598 Project Name: ASHLEY ROAD DEPOT J21294	
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SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH7	9.50-9.95	2	U	Very stiff fissured brown CLAY with rare medium gravel.	31.4					1.93	1.47	Undisturbed	190	159	79				
BH7	10.50	12	D	Dark grey sandy silty CLAY. Sand is fine.	27.9														
BH7	12.50-12.95	3	U	Very stiff dark grey silty CLAY.	30.4					1.95	1.49	Undisturbed	250	157	78				
BH7	14.00	16	D													8.5	0.30		
BH7	15.50-15.95	4	U	Very stiff grey silty CLAY.	22.8					2.02	1.64	Undisturbed	30	369	185				
BH7	18.50-18.95	5	U	Very stiff dark grey silty CLAY.	21.9					1.98	1.62	Undisturbed	370	386	193				
BH7	24.50	27	D	Dark grey sandy silty CLAY. Sand is fine.	37.7														
BH7	26.00	29	D	Dark grey sandy silty CLAY. Sand is fine to medium.	34.7	30	15	15	90										
BH7	29.00	33	D	Dark grey slightly gravelly sandy silty CLAY.															Particle Size Distribution
BH9	1.90	2	D	Orangish brown mottled greyish brown gravelly sandy silty CLAY. Sand is fine. Gravel is fine to medium.	15.5	47	22	25	60										

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 02/02/2022	Project Number:	GEO / 34598 ASHLEY ROAD DEPOT J21294	
	Project Name:		

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
BH9	3.50	4	D	Yellowish brown silty very sandy GRAVEL.															Particle Size Distribution
BH10	2.30	2	D	Oranges brown and grey, pocket black gravelly sandy silty CLAY. Sand is fine. Gravel is fine to medium.	15.8	42	22	20	50										
BH11	2.50	2	D	Dark grey and black slightly gravelly sandy silty CLAY. Sand is fine. Gravel is fine to medium.	32.6														
BH11	5.40	5	D	Dark grey silty CLAY.	27.0														
BH12	1.60	2	D	Greyish brown mottled grey gravelly sandy silty CLAY. Sand and gravel are fine to medium..	19.5	37	17	20	75										
BH16A	1.80	2	D	Orangish brown mottled grey and brown gravelly sandy silty CLAY with rare rootlets. Sand is fine. Gravel is fine to medium.	16.8														
IT1	0.90		B	Multicoloured slightly sandy slightly gravelly CLAY. Gravel is fine to medium.															California Bearing Ratio
IT3	0.90		B	Brown mottled orangish brown slightly sandy slightly gravelly CLAY.															California Bearing Ratio

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by  S Burke - Senior Technician 02/02/2022	Project Number: GEO / 34598 Project Name: ASHLEY ROAD DEPOT J21294	
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PARTICLE SIZE DISTRIBUTION

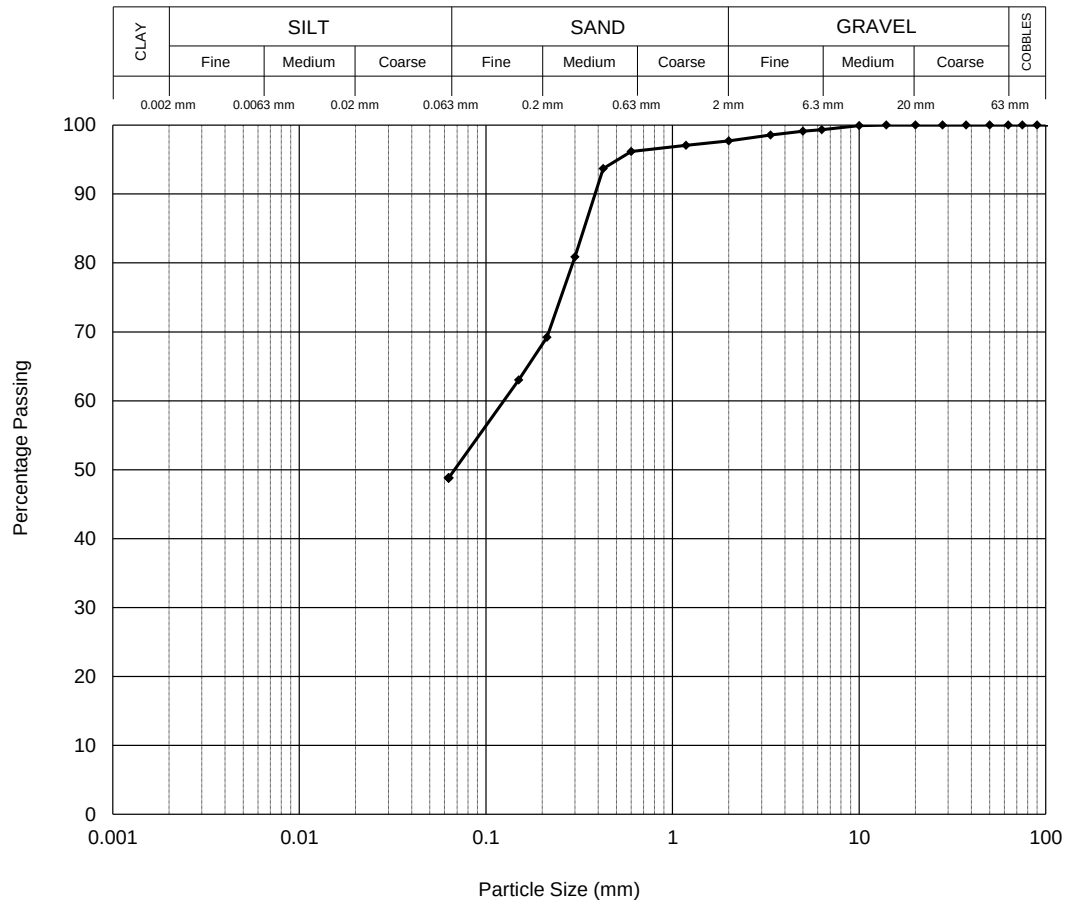
Location BH1
 Sample Ref 31
 Depth (m) 27.50
 Sample Type D

Description

Dark grey slightly gravelly sandy silty CLAY.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	96
425 µm	94
300 µm	81
212 µm	69
150 µm	63
63 µm	49



Particle Proportions	
Cobbles	0.0
Gravel	2.3
Sand	49.0
Silt & Clay	48.7

Tested by EM
 Checked and Approved by

S Burke

S Burke - Senior Technician
 02/02/2022

Project Number:

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ASHLEY ROAD DEPOT
J21294



PARTICLE SIZE DISTRIBUTION

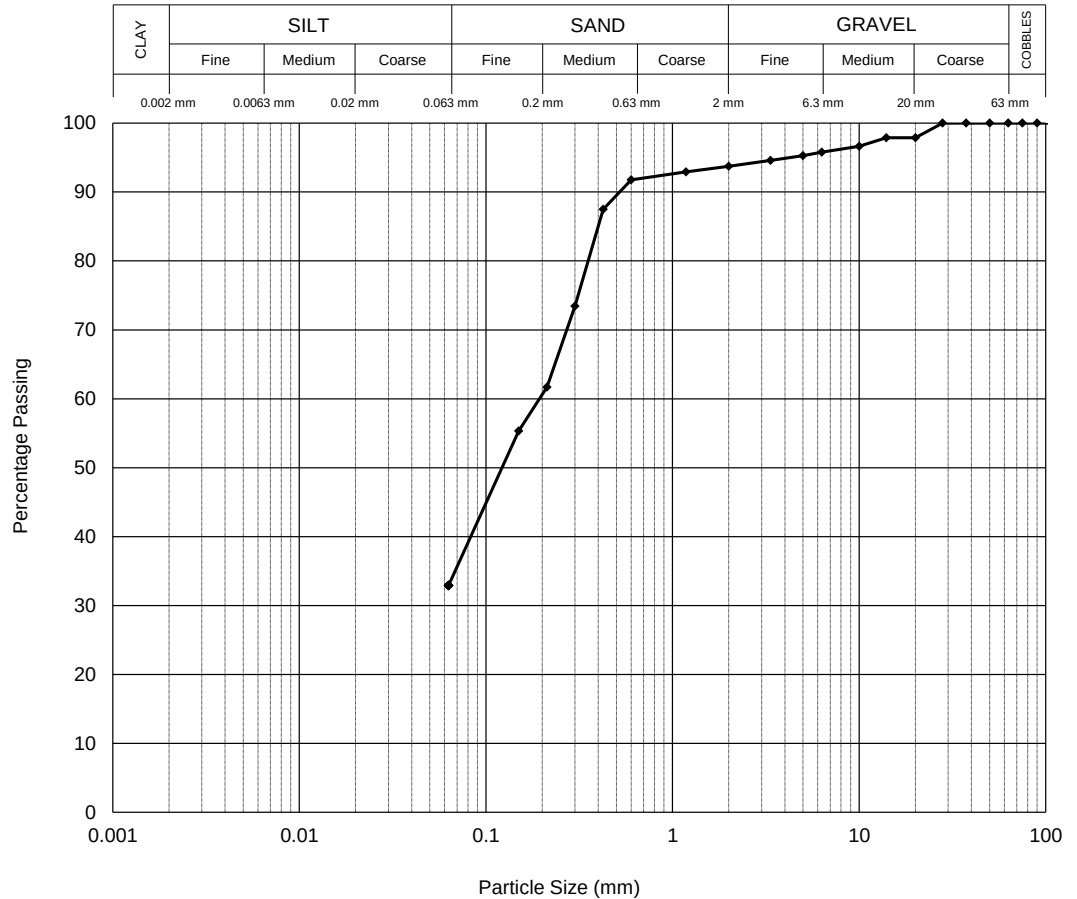
Location BH3
 Sample Ref 32
 Depth (m) 27.50
 Sample Type D

Description

Dark grey slightly gravelly sandy silty CLAY. Gravel is fine to medium.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	98
14.0 mm	98
10.0 mm	97
6.30 mm	96
5.00 mm	95
3.35 mm	95
2.00 mm	94
1.18 mm	93
600 µm	92
425 µm	87
300 µm	73
212 µm	62
150 µm	55
63 µm	33



Particle Proportions	
Cobbles	0.0
Gravel	6.3
Sand	60.8
Silt & Clay	32.9

Tested by EM
 Checked and Approved by

S Burke

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 02/02/2022

Project Number:

GEO / 34598

Project Name:

**ASHLEY ROAD DEPOT
 J21294**



PARTICLE SIZE DISTRIBUTION

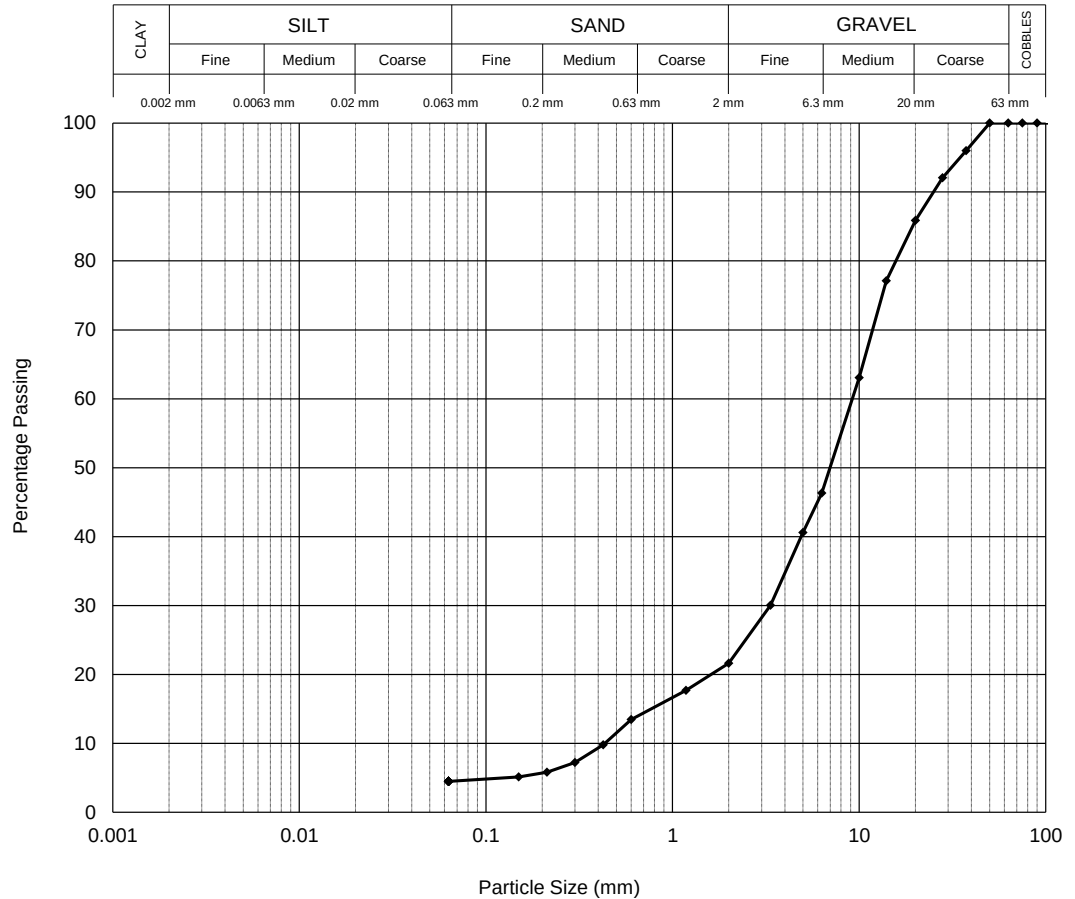
Location BH4
 Sample Ref 2
 Depth (m) 3.00
 Sample Type B

Description

Brown silty sandy GRAVEL.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	96
28.0 mm	92
20.0 mm	86
14.0 mm	77
10.0 mm	63
6.30 mm	46
5.00 mm	41
3.35 mm	30
2.00 mm	22
1.18 mm	18
600 µm	13
425 µm	10
300 µm	7
212 µm	6
150 µm	5
63 µm	4



Particle Proportions	
Cobbles	0.0
Gravel	78.4
Sand	17.1
Silt & Clay	4.5

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S Burke

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Project Number:

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PARTICLE SIZE DISTRIBUTION

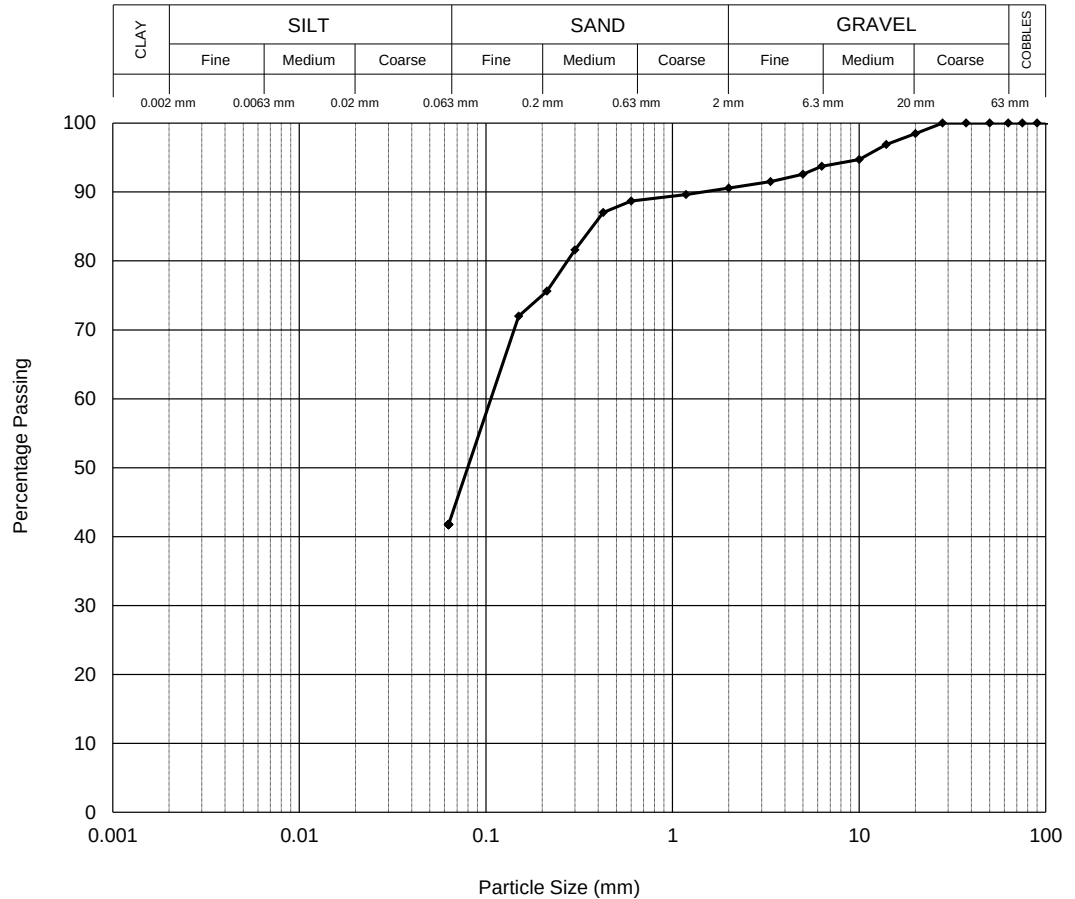
Location BH7
 Sample Ref 33
 Depth (m) 29.00
 Sample Type D

Description

Dark grey slightly gravelly sandy silty CLAY.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	98
14.0 mm	97
10.0 mm	95
6.30 mm	94
5.00 mm	93
3.35 mm	91
2.00 mm	91
1.18 mm	90
600 µm	89
425 µm	87
300 µm	82
212 µm	76
150 µm	72
63 µm	42



Particle Proportions	
Cobbles	0.0
Gravel	9.4
Sand	48.8
Silt & Clay	41.8

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S Burke

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Project Number:

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PARTICLE SIZE DISTRIBUTION

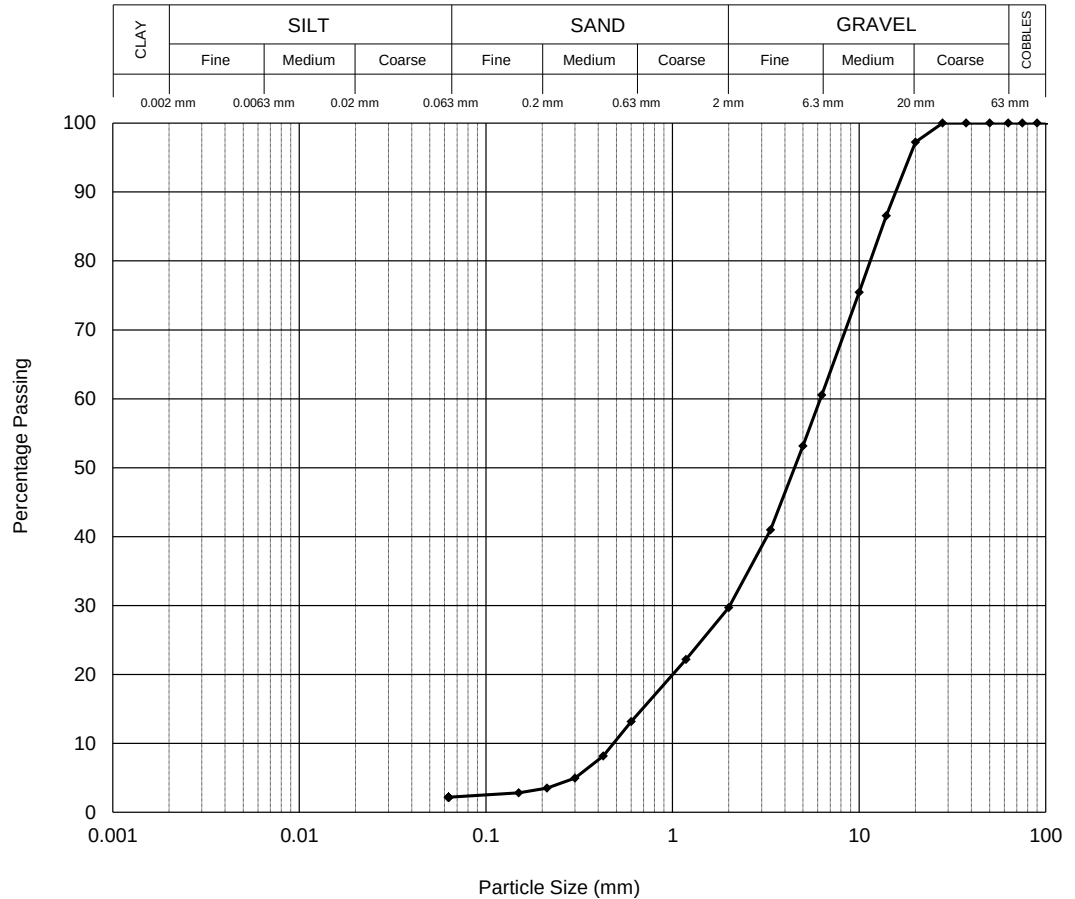
Location BH9
 Sample Ref 4
 Depth (m) 3.50
 Sample Type D

Description

Yellowish brown silty very sandy GRAVEL.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	97
14.0 mm	87
10.0 mm	75
6.30 mm	61
5.00 mm	53
3.35 mm	41
2.00 mm	30
1.18 mm	22
600 µm	13
425 µm	8
300 µm	5
212 µm	3
150 µm	3
63 µm	2



Particle Proportions	
Cobbles	0.0
Gravel	70.3
Sand	27.5
Silt & Clay	2.2

Tested by EM
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S Burke

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Project Number:

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Project Name:

ASHLEY ROAD DEPOT
J21294



BS1377 : Part 4 : Clause 7 : 1990
CALIFORNIA BEARING RATIO

Location: IT1
 Depth (m): 0.90
 Sample Type: B

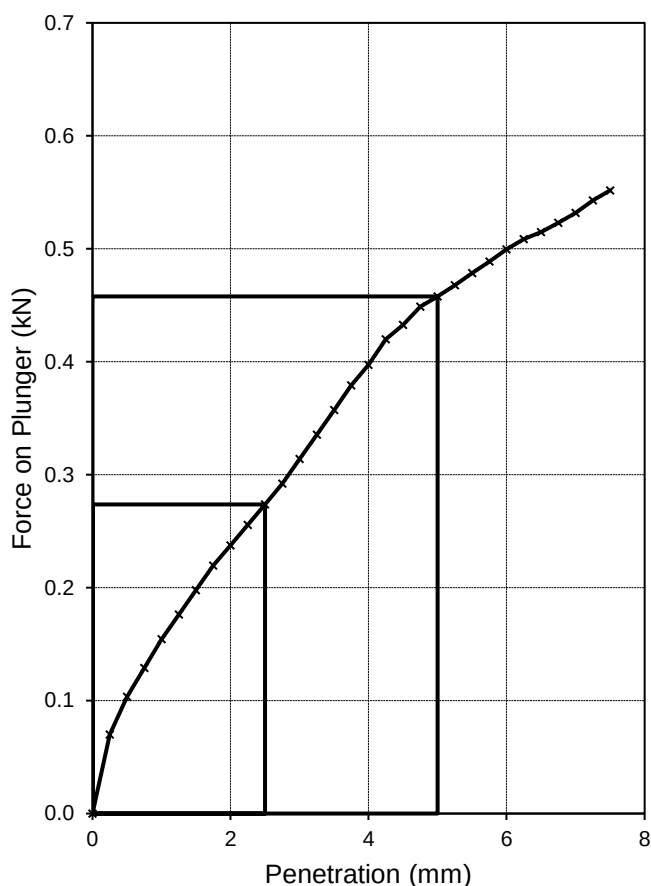
Description:
 Multicoloured slightly sandy slightly gravelly CLAY. Gravel is fine to medium.

PREPARATION DETAILS

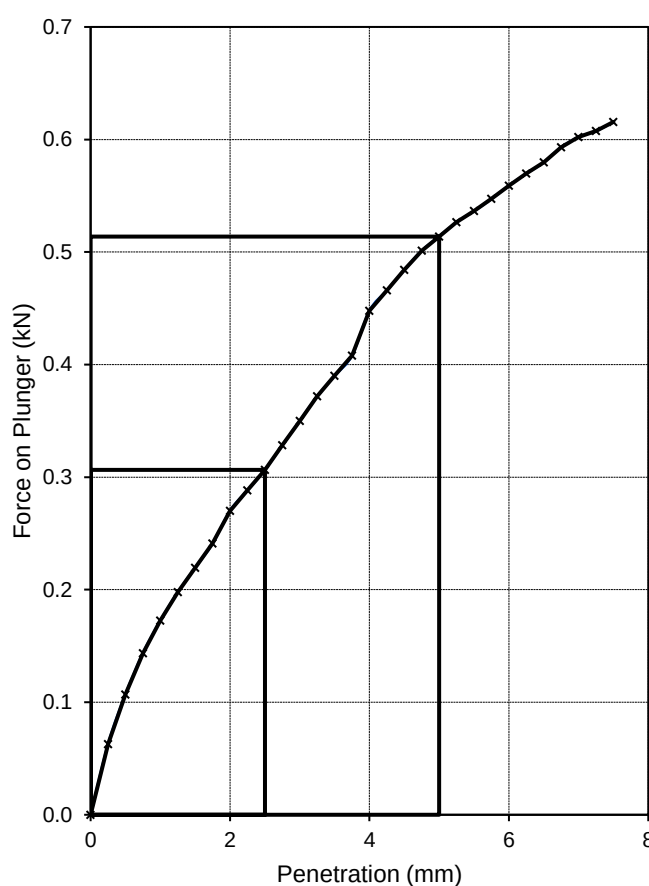
The specimen was soaked for 4 days, after which swelling equilibrium had been reached with 0.0 % vertical swell.
 The specimen was prepared at its existing moisture content of 26%
 The specimen was prepared by dynamic compaction using a 2.5 kg rammer
 Soaked specimen bulk density 1.96 Mg/m³ (1.96 Mg/m³ before soaking)
 Soaked specimen dry density 1.55 Mg/m³ (1.55 Mg/m³ before soaking)
 0.0 % of the sample was retained on a 20mm sieve

Test Details	Top	Base
Surcharge	10.0 kg	10.0 kg
Seating load	10 N	10 N
Water content	26 %	26 %
CBR Value	2.3 %	2.6 %

Top of Specimen



Base of Specimen



Checked and Approved by:

S Burke

S Burke - Senior Technician
 02/02/2022

Project Number:

GEO / 34598

Project Name:

**ASHLEY ROAD DEPOT
 J21294**

GEOLABS



CALIFORNIA BEARING RATIO

Location: IT3
 Depth (m): 0.90
 Sample Type: B

Description:

Brown mottled orange brown slightly sandy slightly gravelly CLAY.

PREPARATION DETAILS

The specimen was soaked for 4 days, after which swelling equilibrium had been reached with 0.0 % vertical swell.
 The specimen was prepared at its existing moisture content of 22%
 The specimen was prepared by dynamic compaction using a 2.5 kg rammer
 Soaked specimen bulk density 2.00 Mg/m³ (1.99 Mg/m³ before soaking)
 Soaked specimen dry density 1.63 Mg/m³ (1.63 Mg/m³ before soaking)
 0.5 % of the sample was retained on a 20mm sieve

Test Details

Surcharge
 Seating load
 Water content

Top

10.0 kg
 10 N
 22 %

Base

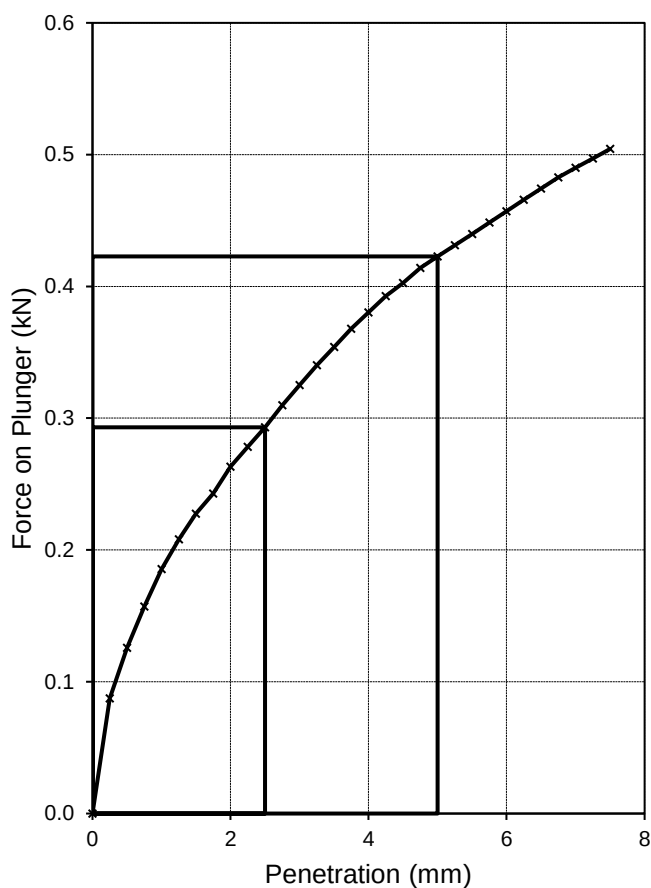
10.0 kg
 10 N
 23 %

CBR Value

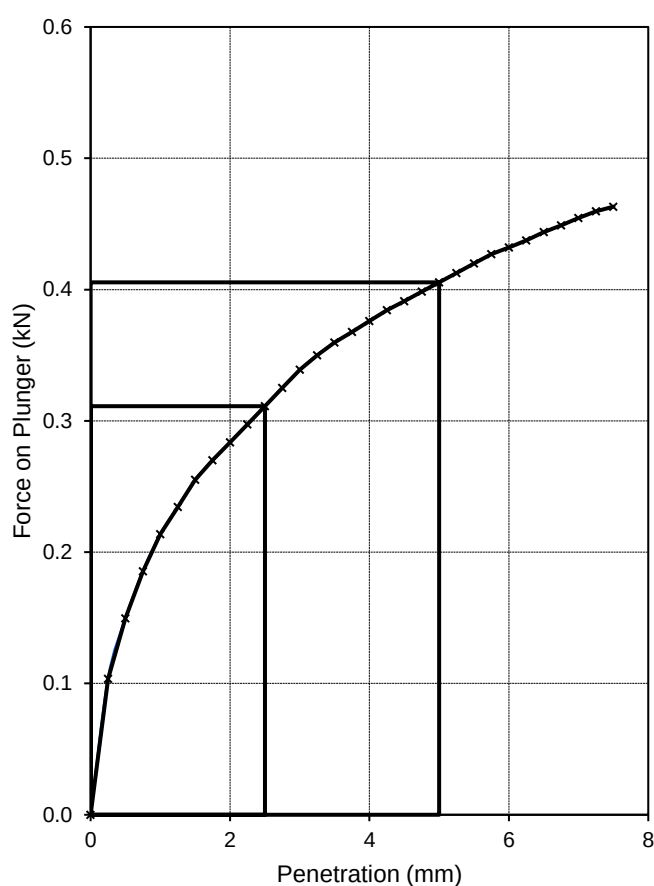
2.2 %

2.4 %

Top of Specimen



Base of Specimen



Checked and Approved by:

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Project Number:

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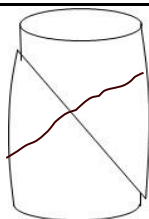
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location BH1
 Sample Ref 2
 Depth (m) 6.50-6.95
 Sample Type U

Description:
 Stiff brown CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	200.6
Diameter (mm)	102.3
Moisture content (%)	31.9
Bulk density (Mg/m ³)	2.00
Dry density (Mg/m ³)	1.51
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	200.6
Membrane correction (kPa)	0.6
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	130
Strain at failure (%)	8.0
Maximum deviator stress (kPa)	97
Shear Stress Cu (kPa)	49

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	30

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 02/02/2022

Project Number:

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Project Name:

ASHLEY ROAD DEPOT
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UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

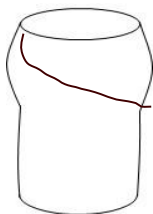
Location BH1
 Sample Ref 3
 Depth (m) 9.50-9.95
 Sample Type U

Description:

Stiff fissured dark brownish grey CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	200.5
Diameter (mm)	101.9
Moisture content (%)	32.3
Bulk density (Mg/m ³)	1.98
Dry density (Mg/m ³)	1.50
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	200.5
Membrane correction (kPa)	0.8
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	190
Strain at failure (%)	12.5
Maximum deviator stress (kPa)	138
Shear Stress Cu (kPa)	69

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

50

Tested by SB

Checked and Approved by

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Project Number:

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Project Name:

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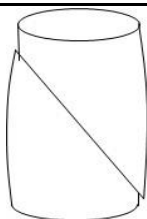
Location BH1
 Sample Ref 4
 Depth (m) 12.50-12.95
 Sample Type U

Description:

Very stiff dark grey silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	200.5
Diameter (mm)	102.4
Moisture content (%)	32.3
Bulk density (Mg/m ³)	1.95
Dry density (Mg/m ³)	1.48
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	200.4
Membrane correction (kPa)	0.4
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	250
Strain at failure (%)	5.5
Maximum deviator stress (kPa)	160
Shear Stress Cu (kPa)	80

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

95

Tested by SB
 Checked and Approved by

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 02/02/2022

Project Number:

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Project Name:

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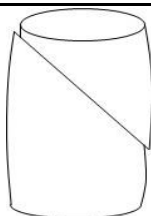
Location BH1
 Sample Ref 5
 Depth (m) 15.50-15.95
 Sample Type U

Description:

Very stiff dark brownish grey silty CLAY.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.1
Diameter	(mm)	102.5
Moisture content	(%)	23.9
Bulk density	(Mg/m ³)	2.01
Dry density	(Mg/m ³)	1.62
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	200.9
Membrane correction	(kPa)	0.7
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	310
Strain at failure	(%)	10.4
Maximum deviator stress	(kPa)	350
Shear Stress Cu	(kPa)	175

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

40

Tested by SB
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S Burke - Senior Technician
 02/02/2022

Project Number:

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Project Name:

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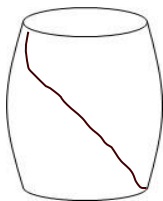
Location BH1
 Sample Ref 6
 Depth (m) 18.50-18.95
 Sample Type U

Description:

Very stiff brown silty CLAY

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	201.2
Diameter (mm)	103.2
Moisture content (%)	27.8
Bulk density (Mg/m ³)	2.03
Dry density (Mg/m ³)	1.59
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	201.0
Membrane correction (kPa)	0.8
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	370
Strain at failure (%)	13.9
Maximum deviator stress (kPa)	387
Shear Stress Cu (kPa)	193

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

50

Tested by SB

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Project Number:

GEO / 34598

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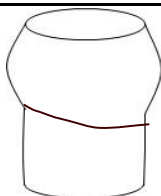
Location BH1
 Sample Ref 7
 Depth (m) 21.50-21.95
 Sample Type U

Description:

Very stiff grey silty CLAY.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	200.4
Diameter	(mm)	102.4
Moisture content	(%)	27.8
Bulk density	(Mg/m ³)	1.97
Dry density	(Mg/m ³)	1.54
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	200.2
Membrane correction	(kPa)	1.1
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	430
Strain at failure	(%)	20.0
Maximum deviator stress	(kPa)	247
Shear Stress Cu	(kPa)	124

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

60

Tested by SB

Checked and Approved by

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 02/02/2022

Project Number:

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Project Name:

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UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

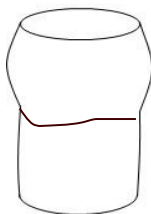
Location BH3
 Sample Ref 1
 Depth (m) 2.00-2.45
 Sample Type U

Description:

Soft to firm brown mottled grey gravelly CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	200.5
Diameter (mm)	101.6
Moisture content (%)	18.5
Bulk density (Mg/m ³)	2.09
Dry density (Mg/m ³)	1.76
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	200.5
Membrane correction (kPa)	0.8
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	40
Strain at failure (%)	13.0
Maximum deviator stress (kPa)	86
Shear Stress Cu (kPa)	43

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

230

Tested by SB

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 02/02/2022

Project Number:

GEO / 34598

Project Name:

ASHLEY ROAD DEPOT
J21294

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UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

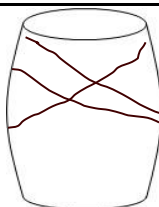
Location BH3
 Sample Ref 2
 Depth (m) 6.50-6.95
 Sample Type U

Description:

Very stiff fissured dark brown silty CLAY.

Specimen Details

Specimen conditions	Undisturbed
Length (mm)	202.8
Diameter (mm)	101.9
Moisture content (%)	29.4
Bulk density (Mg/m ³)	1.98
Dry density (Mg/m ³)	1.53
Test Details	
Latex membrane thickness (mm)	0.3
Specimen height prior to shearing (mm)	202.8
Membrane correction (kPa)	0.6
Mean rate of shear (%/min)	2.0
Cell pressure (kPa)	130
Strain at failure (%)	9.4
Maximum deviator stress (kPa)	166
Shear Stress Cu (kPa)	83

Mode of failure

Orientation of the sample

Vertical

Distance from top of tube mm

60

Tested by SB
 Checked and Approved by

S Burke - Senior Technician
 02/02/2022

Project Number:

GEO / 34598

Project Name:

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