Chemical Interpretive Report

Site	Parisfal Garages, London, NW6 1UG, (Behind 521 Finchley Road)
Client	Gary Sugarman
Date	August 2020
Our Ref	CHEM/11384

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Gary Sugarman

10th August 2020

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Parsifal Road Garages, London, NW6 1UG
(behind 521 Finchley Road, NW3 7BT)

1.0 Introduction

We are pleased to provide this revised Chemical Interpretative Report for the above project with regards to the recent works undertaken by Chelmer Global Ltd (CGL), to the written instructions of Client for the project, Gary Sugarman.

This Intrusive site investigation has been commissioned to provide information on the sub-soil conditions, together with laboratory testing of the underlying soils, groundwater and monitoring of the ground gas regime. Based on the findings of the site investigation, an assessment has been undertaken to evaluate the site conditions in the context of it being potentially contaminated and presenting an environmental risk in the context of current UK policy. Where appropriate, recommendations are made in light of the findings and evaluation.

A combined Basement Impact Assessment, Ground Investigation Report, Ground Movement Assessment and Damage Category Assessment has also been undertaken for this project, the results of which have been reported under cover of a separate report, ref BIA 11384, dated August 2020.

2.0 Site Setting

The site is currently occupied by three rows of garages, two of which are adjoined back-to-back. The site is bordered to the north-west by No.1g and to the south-east by the recently constructed No.1e and the shared forecourt with No.1f. Between the garages and Parsifal House there is a small garden which includes lawns, flower beds and paved paths. The garden to the south-west of the driveway (No. 1 Parsifal Road) included the felled/fallen trunk of a substantial Copper Beech tree.

The garages are built of brick with shallow-pitched, felt roofs and up-and-over metal doors. An access driveway which is shared with No's 1e & 1f is surfaced with asphalt. With the exception of a path surfaced with paving slabs and a gravelled edge strip along the north-west boundary, the whole of the remainder of the site for the proposed houses (within the area of the existing garages) is surfaced with concrete.

The first available historic Ordnance Survey (OS) map with coverage of this area, dated 1870 (1:2,500 scale, as presented in Appendix C) shows that the area remained undeveloped farmland, with the rear driveway to West End Farm/House crossing the south-west end of the site. Finchley Road and Fortune Green Lane were present to the north-east and south-west respectively. By 1896 Parsifal Road was present, Finchley Road had been widened and formalised, and a large detached house had been built on the site, linked to similar houses on both sides. No's 1, 3 & 5 Parsifal Road had also been built by 1896.

By publication of the 1915 map, the surrounding area was almost fully developed. The most notable change on the 1953 1:1,250 scale OS map was the demolition of five large houses on the opposite side of Finchley Road, leaving a large vacant plot. The London County Council Bomb Damage Map for this area (London Topographical Society, 2005) records "*Blast damage, minor in nature*" for the south-eastern of these houses, but no other damage attributable to bombing during WW2 in the vicinity of the site. Also, on the 1953 map, No.1 Parsifal Road was labelled 'Vicarage', No.1a had been built in the former rear garden of No.519 Finchley Road, and No.519 had been replaced by No's 519 & 519a.

By 1973, Parsifal House (14 flats) and the existing garages had been built on the site of current interest. In the rear garden of the adjoining No.523 a large extension had been added (labelled "*Moadon Habonim Jewish Youth Centre*") and a separate building had appeared alongside the driveway to the site. The existing No's 1a-1d Parsifal Road first appeared on the 1981 OS map, in the former rear garden to No.525 Finchley Road, while No's 1e & 1f first appeared (where No.1a had been) on the 1991 map, though they were probably built much earlier, as planning approval was granted in February 1978 (and those parts of the 1979 and 1981 maps were not available in Groundsure's map pack).

No further changes were evident from the appended historic maps; the current 1:1,250 scale OS map (Figure 1) shows the new footprints for No's 1e & 1f, and the re-development of No.523's site with Kings Court (11 flats) and the newer No.1g.

The Hampstead bomb map shows that the nearest recorded high explosive bomb fell at the junction of Heath Drive with Finchley Road (probably in the garden of No.38 Heath Drive). That was the western of a line of three bombs; these bomb lines often have five or six recorded explosions, so if there were two or three unexploded bombs extending west from this string then one could have fallen in the garden of No.521. Accordingly, it is recommended that an unexploded ordnance (UXO) screening report should be obtained from a suitably experience specialist before excavations are undertaken.

The site is located on a broadly south-facing slope which leads up to Hampstead Heath. A former branch of the River Westbourne, one of the 'lost' rivers of London, passes to the east of the site, close to Heath Drive and Cannon Hill. The contours indicate a maximum overall slope angle between the 80m and 75m contour lines in the vicinity of the site of approximately 2.3°, increasing between the 75m and 70m contours to 3.3°.

The topographical survey by Spatial Dimensions (Drg No.18301_01) shows that the site has a very gentle fall towards the south across the site. Within the footprint of the proposed houses the existing ground is almost level, falling from 75.02m to 74.79m AOD. From the rear wall of Parsifal House to the southernmost point of the site, the range is 75.83m to 74.71m AOD which, over a distance of 50.6m, represents a slope angle of 1.3˚.

Due to the age of the existing properties on site asbestos is likely to have been used in their original construction and so may be present in soils as a result of the construction process.

3.0 Proposed Development

This report has been prepared in support of a planning application to be submitted to the London Borough of Camden (LBC) for demolition of the existing garages to the rear of Parsifal House, No.521 Finchley Road and construction of a pair of two-storey houses with basements. Vehicular access to the site is via a driveway off Parsifal Road which passes along the north-east side of No.1 Parsifal Road.

The basements beneath the proposed pair of houses for which planning permission will be sought, as shown in the scheme drawings by Granit (architect), will comprise:

- Adjoined single-storey basements beneath the entire footprint of both houses. Each basement includes a Kitchen/Diner, Utility, Bedroom, WC and stairs up to the ground floor.
- Full depth front lightwells with grilles over.
- Rear lightwells with tiered flower beds and steps up to private rear gardens

Both houses will also have landscaped amenity gardens at the front of the house, at ground floor level, with cycle stores and refuse/recycling bin stores. Green roofs have been specified above both the ground floor rear projection and first floor.

4.0 Fieldwork

The ground investigation sitework was undertaken on the 21st May 2020 and comprised the drilling of two (c.f.a) continuous flight auger boreholes and six hand-dug trial pits. Boreholes BH1 and BH2 were both drilled to a depth of 8.0m below ground level (bgl). Borehole BH1 was located towards the front of the site, with borehole BH2 drilled to the rear. The trial pits we excavated across in order to obtain existing foundation detail, collect additional samples for laboratory testing and to further understand the superficial geology across the site. The final locations of the boreholes and trial pits are indicated on the appended *Sketch Site Location Plan*.

The only visual or olfactory evidence of contamination was observed during the excavation of TP6, where a pungent hydrocarbon odour was noted, both within the Made Ground and top of the underlying superficial natural Clay.

Standpipes were installed to the base of both boreholes.

The borehole and trial pit record sheets are appended to this report.

Following the initial site works, two return monitoring visits were undertaken on the 3rd and 10th June 2020, in order to measure both the groundwater levels and ground gas concentrations within the site using the installations fitted within boreholes BH1 and BH2.

The concentrations (%v/v) of methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), hydrogen sulphide (H_2S) and carbon monoxide (CO) were recorded within the boreholes, along with the barometric pressure and gas flow (l/min) measurements.

Volatile Organic Compounds (VOC) were also recorded using a PhotoIonisation Detector (PID).

Full details of the readings are included on the appended Groundwater/Ground Gas Monitoring Record Sheet.

No groundwater entries were recorded in any of the exploratory holes during drilling/excavation. Furthermore, during the return monitoring visits the standpipe installed at the location of borehole BH1 was found to be 'dry'. However, the water level recorded at the location of borehole BH2 was found to be as high as 6.00m bgl during the second visit on the 10th June.

No visual or olfactory evidence of contamination was noted within the water encountered, either during the initial site works or during the subsequent monitoring visits.

5.0 Ground Conditions

Mapping by the British Geological Survey (BGS) indicates that the site is underlain by the London Clay Formation.

In urban parts of London, the London Clay is typically overlain by Made Ground. A thin superficial layer of natural, locally-derived re-worked soils called Head deposits may also be present (because these are not mapped by the British Geological Survey where they are expected to be less than 1.0m thick). In the areas which have been excavated, some or all of these deposits may have been removed.

The London Clay is well documented as being a firm to very stiff over-consolidated clay which is typically of high or very high plasticity and high-volume change potential. As a result, it undergoes considerable volume changes in response to variations in its natural moisture content (the clay shrinks on drying and swells on subsequent rehydration). These changes can occur seasonally, in response to normal climatic variations, to depths of up to 1.50m and too much greater depths in the presence of the trees whose roots abstract moisture from the clay. The clay will also swell when unloaded by excavations such as those required for the construction of basements.

Full details of the ground conditions encountered are presented on the trial pit and borehole records appended to this report and can be summarised as follows;

Depth to top of stratum (m bgl)	Depth to base of stratum (m bgl)	Stratum
0.00	0.10	TOPSOIL
0.00	0.10/0.25	CONCRETE
0.00	0.05	PAVING
0.05/0.25	0.70/1.60+	MADE GROUND
0.70/1.00	8.00 +	Weathered London Clay

It should be noted that the Made Ground depths recorded above are those encountered within the boreholes and trial pits undertaken during the current work. Owing to the variable nature and unknown provenance of Made Ground it is possible that deeper or more extensive areas of Made Ground may exist at this site which have not been revealed by the current work.

Roots were recorded to a maximum depth of 3.40m bgl in BH1, which was 7.0m from a large Plane pavement tree. No roots were recorded in BH2, despite that being near the fallen Copper Beech.

No groundwater entries were recorded in any of the exploratory holes during drilling/ digging.

Standpipes were installed to the base of both boreholes, comprising 1.0m of plain pipe at top, then 7.0m of slotted pipe. Water level readings were recorded on two occasions; the results during this short monitoring period are presented in the Table below.

Water levels from Groundwater Monitoring		
Date	Depth to Water (m bgl / m AOD)	
	BH1	BH2
03-06-2020	Dry	6.62 / 69.47
10-06-2020	Dry	6.00 / 68.85

Both the gas and groundwater monitoring readings undertaken and are presented in the 'Landborne Gas Assessment' appended.

6.0 Chemical Testing

6 N^{o}. representative samples of the underlying soils encountered across the site were selected and tested for a suite of key chemical species used to identify and assess the nature of the soil in the context of it being contaminated and potentially presenting a risk to end users of the site, building fabric and the wider environment.

The testing suite applied included selected critical heavy metals, US EPA 16 priority Polycyclic Aromatic Hydrocarbons (PAH), speciated Total Petroleum Hydrocarbons in accordance with TPH CWG recommended carbon bandings for both aliphatic and aromatic compounds, BTEX (benzene, toluene, ethylbenzene, xylene), MTBE (Methyl tertiary-butyl ether) and asbestos screening.

In addition to the above, a total of seven near surface samples were collected from across the site and screened for asbestos content.

A single near surface samples was also tested for **P**oly **C**hlorinated **B**iphenyl's (PCBs).

In addition to the above, in order to assist with the classification of soils in the context of their possible off-site disposal, 1 N^{o}. sample was collected from borehole TP6 at a depth of 0.50m bgl and tested for Waste Acceptance Criteria (WAC) in accordance with BS EN 12457 Part 3.

Full details of the results are given on the appended results sheets.

7.0 Background & Terms of Reference

In the UK, contaminated land is assessed and managed through a number of integrated policies and guidance. Contaminated land is defined in legislation enacted under Part IIA of the Environmental Protection Act 1990 and guidance issued by DEFRA under CLR11 and sister documentation published in 2012 advises on how the legislative framework dealing with contaminated land should be implemented.

Distinct from the strict and onerous legal definition and classification of land as being contaminated but a corollary to the legislation and associated statutory guidance, the National Planning Policy Framework (NPPF) makes provision or assessing and managing contaminated land in the context of redevelopment which is subject to planning control. Earlier published guidance (PPS23) identified contamination as being a material consideration within any planning application and current policy under NPPF states that land which "is affected by contamination or land stability issues" must be correctly assessed such that planning decisions should ensure that "the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation".

The assessment process requires that "adequate site investigation information, prepared by a competent person, is presented." The guidance provided in NPPF also states that "all investigations of land potentially affected by contamination should be carried out in accordance with established procedures, such as BS10175 (2001) + A1:2013."

The NPPF and statutory provisions for dealing with contaminated land are clear in ensuring that where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the "developer and/or landowner."

Fundamental to the assessment of contaminated land is the development of a Conceptual Site Model (CSM). This is an evaluation of the site conditions and its particular characteristics with respect to so called Source-Pathway-Receptor relationships, or plausible pollutant linkages. The CSM can then be used to assess and define risk and in turn it provides a basis for determining the condition of the land in the context of the proposed development and what, if any, action needs to be taken to allow the proposed development to proceed safely and without detrimental impact to the site itself or the wider environment.

A plausible pollutant linkage is defined by three elements;

Source	A hazard which exists within the site or its environs which has the potential to cause harm (e.g. contaminated soil, ground gas, unstable ground, etc.)
Receptor	Something associated with the site (e.g. end-user, building, off-site feature, etc.) which can be harmed.
Pathway	A plausible linkage between the Source and Receptor such that harm can be realised (e.g. end-user coming into direct contact with contaminated soil, mobile contamination adversely impacting groundwater, etc.).

By definition a pollutant linkage can only exist where the three elements, source-pathway-receptor, are present and co-exist. If one of the elements that make up the pollutant linkage are not present, then it follows that there can be no related risk. The breaking of pollutant linkages is a fundamental principal in the management of contaminated land risk and where the risk is identified and deemed to be unacceptable the appropriate action taken will be "breaking" the pollutant linkage in some way.

Risk in the context of contaminated land is considered in terms of its significance and this is qualitatively assessed on the basis of magnitude of harm that may occur and likelihood of that harm occurring. The risk assessment follows the general principles as set out within BS10175: 2011+A2:2017 and CIRIA C552.

The CSM is used to provide both a context and framework for undertaking any intrusive site investigation which may be deemed necessary to characterise the site with respect to contamination. Where a pollutant linkage is identified further investigation may be needed to confirm or quantify specific conditions, validate the existence of the pollutant linkage and thereby confirm and quantify the degree of risk. This is an important element of the assessment process and under the principles of risk assessment constitutes "hazard identification" and "hazard assessment".

8.0 Conceptual Site Model & Plausible Pollutant Linkages

Hazards

Made Ground was identified during the current investigation across the site, to a maximum depth in excess of 1.60m bgl. Made Ground should always be viewed as being a potential source of contamination which may have adverse impacts to a number of different receptors.

A Phase I Geo-Environmental Desk Top Study has not been undertaken and therefore, no off-site sources and limited on-site have been considered.

Ground gas (carbon dioxide, methane, and possibly other related gases and vapours) are ubiquitous within the subsoil environment. Low concentration of either, or both, carbon dioxide and methane may not be problematic. However, elevated concentrations of ground gas and/or conditions where ground gas is being actively generated (e.g. filled ground, landfill, organic rich natural soils, etc.) may present a significant hazard to the site development or the wider environment, particularly so where these gases may enter and accumulate in buildings and as such impact building occupants. Ground gas may be present from sources either within the site itself or maybe being generated from an off-site source and migrating on to the site.

Groundwater present within a site may itself be contaminated or may liberate and be a source of (and pathway for) mobile contamination. Contaminated groundwater can impact on various receptors but most notably controlled waters either on the site or offsite.

Receptors

From the intended end site use the following potential receptors have been identified.

- *Construction workers on the site during development.*
- *Neighbouring sites and site users.*
- *Controlled Waters both within the site and off-site.*
- *Future users of the proposed development, including young children.*
- *Building fabric for the proposed development.*
- *Vegetation.*

Pathways

Contamination within the soil could reach receptors by direct contact with the soils where there is a potential for contamination to be ingested by some means (direct ingestion, inhalation, dermal contact). This is most acute during site development although contact, albeit limited, is also possible for current site users and future site users.

Mobile contamination, present either within the groundwater or otherwise liberated by contact with groundwater (leachable contaminants), may exist.

Ground gas may migrate through on/offsite preferential pathways most likely in the superficial Made Ground, but may also be sourced from any underlying natural deposits.

Elements of the building fabric for the proposed development may be in direct contact with contamination which may have adverse impacts. Plastic potable water supply pipelines may be susceptible to certain organic contamination if present.

9.0 Soil Contamination Evaluation

In accordance with current good practice (DEFRA guidance and CLR11) a Tier 1 assessment has been undertaken to determine the significance of the contamination present within the site in the context of the CSM. In this regard the contamination present within the soils sampled and determined from the program of chemical testing has been compared to Suitable for Use Levels (S4ULs) provided by Land Quality Management/Chartered Institution of Environmental Health (LQM/CIEH) Generic Assessment Criteria (GAC) dated 2015 and based on CLEA v1.06 In their absence, DEFRA/CL:AIRE C4SLs (Category 4 Screening Levels) have been utilised.

It should be noted that the above GAC Values are derived from a risk-based modelling software which has limited functionality and is based on assumptions and contains algorithms which the DEFRA and Environment Agency (EA) has publicly expressed its intention to update. As a consequence of this, some of the screening values generated by the CLEA (Contaminated Land Exposure Assessment) software may not adequately reflect specific site conditions and in some instances are unduly conservative. In addition, it should also be noted that the figures given in the appended Table are, with the exception of TPH and PAHs based on a 6% soil organic matter (SOM) content. The LQM/CIEH S4ULs for metals and metalloids are only presented for the scenario of 6% SOM content.

Total Petroleum Hydrocarbons are considered in accordance with the fractions proposed by The Environment Agency, drawing on the TPHCWG methodology. These are Petroleum Hydrocarbon Fractions for use in UK human health risk assessment, based on Equivalent Carbon (EC) number, contained in Science Report P5-080/TR3, *The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils.*

It is proposed in this instance that the soil chemical analytical results would be compared against the *Residential with plant uptake/with home grown produce land usage*. This is due to the proposed end use; which will involve amongst other alterations;

- Adjoined single-storey basements beneath the entire footprint of both houses. Each basement includes a Kitchen/Diner, Utility, Bedroom, WC and stairs up to the ground floor.
- Full depth front lightwells with grilles over.
- Rear lightwells with tiered flower beds and steps up to private rear gardens

Neither CLEA or ATRISK currently publish values for Hexavalent Chromium. Therefore, both Total Chromium and Hexavalent Chromium values have been compared against the Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) Generic Assessment Criteria published in 2017 and based on CLEA v1.04 and v1.071 with Total Chromium values based on Chromium III.

The SSV levels represent "intervention" levels above which the levels of contamination may pose an unacceptable risk to the health of site-users such that further investigation and/or remediation is required.

10.0 Assessment of Results

Soil

The samples collected from the locations of TP3 and TP4 at depths of 0.35m bgl contained elevated levels of Benzo(a)pyrene of (3.50 mg/kg) and 2.70 mg/kg) respectively, when compared to a threshold level of 2.05 mg/kg.

The samples tested from the locations of TP4 and BH2 contained elevated levels of Arsenic of 40 mg/kg and 53 mg/kg respectively, when compared to a threshold level of 37 mg/kg.

In addition to the above all six samples collected and tested from across the site contained levels of lead that exceed the relevant threshold value of 200 mg/kg.

Due to the exceedances noted above, mean value tests have been undertaken, to generate a normalised upper bound (95th percentile), and thus determine if further action was required.

In all three cases above, further action was found necessary in regard to the levels recorded.

No other constituents within the soil sampled and tested exceeded the criteria set out by the ATRISK contaminated Land Screening Values (SSVs), the CLEA Soil Guideline Values (SGVs) and the LQM/CIEH Generic Assessment Criteria (GAC) for *Residential with plant uptake/with home grown consumption* criteria.

Of the six samples collected and screened from across the site only one was found to contain Asbestos. Asbestos in the form of Chrysotile (Loose Fibres) were detected within the sample analysed from the location of TP2 at a depth of 0.25m bgl.

Following the detection of the ACM, quantification testing was undertaken on the sample recovered to determine whether the asbestos can be classed as hazardous or non-hazardous. The percentage content was reported to be <0.001 and therefore this sample was found to be non-hazardous.

Asbestos within the soil may pose a potential risk to human health. This may present a potential risk during the development stages, especially during groundworks. It is therefore recommended that a Demolition or Refurbishment Asbestos Survey (previously known as a Type 3 Asbestos Survey) be undertaken prior to development.

A review of the PCB test results reported from the near surface sample tested determined that the concentrations were all below their respective laboratory detection limits.

Given the proposed development, a low risk to site end users (excluding groundworkers) is considered, given the proposed hard standing and limited proposed soft landscaping, and the removal of potential source material during basement excavation process effectively breaking the pathway between source and receptor.

In addition to the above, only one of the samples screened recorded any ACM with this sample containing a percentage content that indicated it to be 'Non-hazardous'. However, while soil observations and testing doesn't appear to have identified the presence of dangerous levels of asbestos, its presence cannot be ruled out. Observations of significant quantities of asbestos should be picked up as part of a discovery strategy/watching brief.

Although samples collected and tested from across the site contained elevated levels of Arsenic and Benzo(a)pyrene when compared against the residential threshold levels, the values fell well below that set for the Commercial/industrial end usage.

It is worth noting that the elevated levels of lead recorded appear consistent across the site and are not unusual within an urban environment.

In addition, given that the proposed development will involve a large amount of excavation, it is likely that any 'source' contamination will be removed from site, including the area around TP6 that was noted to contain a pungent hydrocarbon odour.

Soil Disposal & Waste Acceptance Criteria

A single EN 14473/02 Waste Acceptance Criteria (WAC) test has been undertaken to classify for waste disposal purposes, from a sample of Made Ground collected from TP6 at 0.50m bgl.

The results of the WAC test indicate that both the Made Ground beneath this site, would probably be classified as suitable for disposal at a site which accepts "**Stable Non-Reactive Hazardous**" material. Prior to disposal, it may be beneficial to undertake further testing for further assessment/classification in consultation with the relevant waste disposal facility.

Acceptance of any waste stream is the responsibility of the landfill operator and we therefore strongly recommend that the WAC data should be presented to potential Waste Management Companies in order for them to confirm the waste classification of surplus soils to be removed from this site and to determine its acceptability at appropriate landfill sites for disposal/treatment.

Gas

During the return groundwater/ground gas monitoring visit, the maximum concentration of methane was recorded at 4.6% v/v, the maximum carbon dioxide concentration was recorded at 4.7% v/v and the maximum VOC concentration was recorded at 12.6ppm. Carbon monoxide was recorded at 2ppm with hydrogen sulphide recorded at a maximum of 0ppm. A maximum positive flow rate of 0.6 l/hr was recorded.

It is noted that the elevated levels of gases recorded during the first return visit had dissipated prior to the second visit being completed.

The Gas Screening Values (GSVs) are very low, due to the low flow rates recorded). However, given the elevated levels of both methane and carbon dioxide recoded during the first return monitoring visit it is considered that gas protection measures are required at this stage. This is in line with the 'Low risk' classification associated with **Characteristic Situation 2**. However, this should be agreed with the local Building Control / Environmental Health Officer.

As a matter of course, we would recommend regular monitoring visits up to the point of construction, to not only fully establish/confirm gas requirements but also fluctuation in groundwater.

Water

No samples of groundwater were analysed as part of the current survey.

11.0 Conclusions

Based on observations of contamination, together with the results of the chemical testing undertaken, no significant impact or constraint to the proposed development is considered present. In our opinion, based on the information in this instance, land contamination issues are not considered to be significant.

As a result, it is considered highly unlikely based on the above recorded results that action would ever be taken under Part 2A of the EPA 1990.

Soil

All the samples tested contained slightly elevated levels of Lead, which in some instance not only exceeded the threshold value for residential usage, but also for that of Commercial/Industrial usage.

Therefore, as a precaution it is recommended that if any new areas of soft landscaping/gardens are proposed across the site that a clean cover system be used. This will break the pollution pathway between source and receptor on site and thus reduce the risk to future users. This would include excavating site soils to an agreed depth within all gardens and soft landscaping areas, to be replaced with clean soils.

It is noted that as part of the basement construction process a large amount of material beneath the site will be excavated and removed from site. Therefore, it is considered that the majority of any existing made ground and any low-level potential 'source' contamination will be removed from site as part of the construction process.

It is not recommended that any material/soil be re-used on site.

We therefore consider that a large amount of any source material will be removed and therefore as this linkage will be removed then any soil contamination can be considered to be low level, to not impact the site and not reach the end user or occupier.

Water

No groundwater entries were recorded in any of the exploratory holes during drilling/excavation. Furthermore, during the return monitoring visits the standpipe installed at the location of borehole BH1 was found to be 'dry'. However, the water level recorded at the location of borehole BH2 was found to be as high as 6.00m bgl during the second visit on the 10th June.

It is assumed that the water encountered across the site is trapped surface water, perched over the relatively impermeable London Clay stratum.

No water samples were collected from site as no significant volume was encountered within the installed standpipes. Given the relatively low levels of soil contamination recorded across the site, together with the relatively impermeable nature of the natural clay underlying the site, a low risk is considered to be present in relation to controlled waters.

The low levels of contamination recorded together with the broken pathway link leads us to conclude that water contamination is not an issue at this site.

Gas

The Gas Screening Values (GSVs) are low, due to the low flow rates recorded). However, given the elevated levels of both methane and Carbon dioxide recoded during the first return monitoring visit it is considered that gas protection measures are required at this stage. This is in line with the 'Low risk' classification associated with **Characteristic Situation 2**. However, this should be agreed with the local Building Control / Environmental Health Officer.

As a matter of course, we would recommend regular monitoring visits up to the point of construction, to not only fully establish/confirm gas requirements but also fluctuation in groundwater.

Again, as a large amount of made ground will be removed from site, any source of ground gas emissions will also be removed, further reducing the protection measures required for the proposed new structure.

12.0 Recommendations

We would recommend that, as a preventative measure, appropriate Personal Protective Equipment (PPE) and other measures (e.g. good standards of hygiene, washing facilities) should be utilised to mitigate the risk and protect future ground workers.

With regard to the installation of any future water supply pipe work, the current guidance on selection of materials for potable water supply pipes to be laid in contaminated land is contained in a document published jointly by Water UK and the Home Builders Federation (Water UK HBF (2014)).

The protocols in that document are for guidance and are not subject to enforcement by Water UK or any agency but have been adopted by Water UK and by HBF as best practice for their members. It is recommended that the results of the soil chemical analyses undertaken on the site should be provided to the potable water supply company in order to ensure that any pipe provided complies with their requirements.

As previously stated, as a matter of course, we would recommend regular monitoring visits up to the point of construction, to not only fully establish/confirm gas requirements but also fluctuation in groundwater.

In regard to gas monitoring it would be prudent to complete at least 4 No. further return visits, including one during a period of low or significantly falling pressure (fall of 1.6 to 3.5 hPa over the preceding 3 hours), especially if significant concentrations of ground gases are identified. This would assist in fully assessing any gas emission risks to the proposed new development.

Due to the Lead levels recorded across the site it is not recommended that any material excavated on site be re-used a fill material, particularly in soft landscaping areas. If any new material is brought onto site, then this material should be analysed prior to placement in order to assess suitability for use. Validation testing should be completed, with and associated Verification report produced reporting the relevant findings.

A discovery strategy/watching brief should be adopted during all groundworks, whereby CGL should be contacted if any suspect contamination is observed. In particular observations of significant quantities of asbestos should be picked up as part of any discovery strategy/watching brief.

Examples of unexpected contaminated land include soils stained by oil/fuel, uncharacteristically coloured liquids/soils or groundwater, debris such as asbestos and pungent or pleasant odours arising from the soil of groundwater. Unexpected ground conditions for this development site would include where made ground is found to be consistently deeper than 2m below ground level across the property or there is a high proportion of putrescible material found in the soil.

Should any visual or olfactory evidence of contamination be observed during construction, head space testing using a photoionisation detector (PID) will be undertaken, then the soil will be sampled and scheduled for contamination testing. Samples are to be stored in amber glass jars where hydrocarbons are to be analysed. Chemical analysis will include a range of commonly occurring contaminants such as heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn), speciated PAHs (EPA16), phenols, hydrocarbons (TPH CWG), VOC's (Volatile Organic Compounds), PCB's, BTEX (benzene, toluene, ethylbenzene, xylene), MTBE (Methyl tert-butyl ether) and asbestos screening. Samples will be stored in cool boxes and removed from site as soon as possible.

It is recommended that an unexploded ordnance (UXO) screening report should be obtained from a suitably experience specialist before excavations are undertaken.

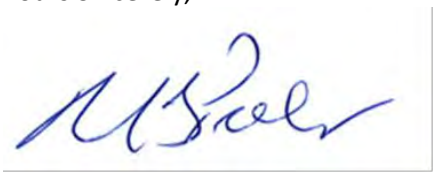
13.0 Additional Comments

As always, the above recommendations are based on a selected number of representative samples, with sampling locations based on the information available at the time of this investigation.

At present no further ground investigation works are required prior to development commencing other than the recommended continued gas and water monitoring.

If you have any queries, please do not hesitate to contact us.

Yours Sincerely,



M B Proctor BEng. (Hons), FGS, IAEG
Technical Director
for Chelmer Global Ltd

References

The following site-specific documents in relation to the proposed development have been considered:

Granit Architecture + Interiors:

- Drg No.1850/EX/001 Existing Location Plan
- Drg No.1850/EX/002 Existing Site Plan
- Drg No.1850/P/100/1 Site Plan (Proposed)
- Drg No.1850/P/100/2 Site Plan – Existing Garages vs Proposed
- Drg No.1850/P/100/3 Basement Floor Plan
- Drg No.1850/P/100/4 Basement Floor Plan (OVERLAY)
- Drg No.1850/P/100/5 Ground Floor Plan
- Drg No.1850/P/100/6 First Floor Plan
- Drg No.1850/P/100/7 Roof Plan

Granit Architecture + Interiors (continued)**:**

- Drg No.1850/P/100/8 Front Elevation
- Drg No.1850/P/100/9 Rear Elevation
- Drg No.1850/P/100/10 Side Elevation 1 (South-east)
- Drg No.1850/P/100/11 Side Elevation 2 (North-west)
- Drg No.1850/P/100/12 Section AA
- Drg No.1850/P/100/13 Contextual Front Elevation

Spatial Dimensions (Surveyors):

- Drg No.18301_01 Topographical Survey

Mitchinson Macken (Structural Engineers):

- Drg No.19313/101 Temporary Works
- Drg No.19313/102 Rev.A Ground Floor Plan showing Foundation Layout (with load takedown)
- 19313 Sheet 101 Load Take Down (flank wall calculation)
- 19313 Calc'n Sheets 1-11 Retaining Wall A-A Analysis (Cantilever RC 3250)
- 19313 Method Statement for Construction of Retaining Wall

a) This report has been prepared for the purpose of providing advice to the client pursuant to its appointment of Chelmer Global Limited (CGL) to act as a consultant.

b) Save for the client no duty is undertaken or warranty or representation made to any party in respect of the opinions, advice, recommendations or conclusions herein set out.

c) All work carried out in preparing this report has used, and is based upon, our professional knowledge and understanding of the current relevant English and European Community standards, approved codes of practice, technology and legislation.

d) Changes in the above may cause the opinion, advice, recommendations or conclusions set out in this report to become inappropriate or incorrect. However, in giving its opinions, advice, recommendations and conclusions, CGL has considered pending changes to environmental legislation and regulations of which it is currently aware. Following delivery of this report, we will have no obligation to advise the client of any such changes, or of their repercussions.

e) CGL acknowledges that it is being retained, in part, because of its knowledge and experience with respect to environmental matters. CGL will consider and analyse all information provided to it in the context of our knowledge and experience and all other relevant information known to us. To the extent that the information provided to us is not inconsistent or incompatible therewith, CGL shall be entitled to rely upon and assume, without independent verification, the accuracy and completeness of such information.

f) The content of this report represents the professional opinion of experienced environmental consultants. CGL does not provide specialist legal advice and the advice of lawyers may be required.

g) In the Summary and Recommendations sections of this report, CGL has set out our key findings and provided a summary and overview of our advice, opinions and recommendations. However, other parts of this report will often indicate the limitations of the information obtained by CGL and therefore any advice, opinions or recommendations set out in the Executive Summary, Summary and Recommendations sections ought not to be relied upon unless they are considered in the context of the whole report.

h) The assessments made in this report are based on the ground conditions as revealed by walkover survey and/or intrusive investigations, together with the results of any field or laboratory testing or chemical analysis undertaken and other relevant data, which may have been obtained including previous site investigations. In any event, ground contamination often exists as small discrete areas of contamination (hot spots) and there can be no certainty that any or all such areas have been located and/or sampled.

i) There may be special conditions appertaining to the site, which have not been taken into account in the report. The assessment may be subject to amendment in light of additional information becoming available.

j) Where any data supplied by the client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by CGL for inaccuracies within the data supplied by other parties.

k) Whilst the report may express an opinion on possible ground conditions between or beyond trial pit or borehole locations, or on the possible presence of features based on either visual, verbal or published evidence this is for guidance only and no liability can be accepted for the accuracy thereof.

l) Comments on groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. Groundwater conditions may vary due to seasonal or other effects.

m) This report is prepared and written in the context of the agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a reinterpretation of the report in whole or part after its original submission.

n) The copyright in the written materials shall remain the property of the CGL but with a royalty-free perpetual license to the client deemed to be granted on payment in full to CGL by the client of the outstanding amounts.

o) These terms apply in addition to the CGL Standard Terms of Engagement (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms of Engagement the said Standard Terms of Engagement shall prevail). In the absence of such a written contract the Standard Terms of Engagement will apply.

p) This report is issued on the condition that CGL will under no circumstances be liable for any loss arising directly or indirectly from subsequent information arising but not presented or discussed within the current Report.

q) In addition, CGL will not be liable for any loss whatsoever arising directly or indirectly from any opinion within this report.

Factual Report

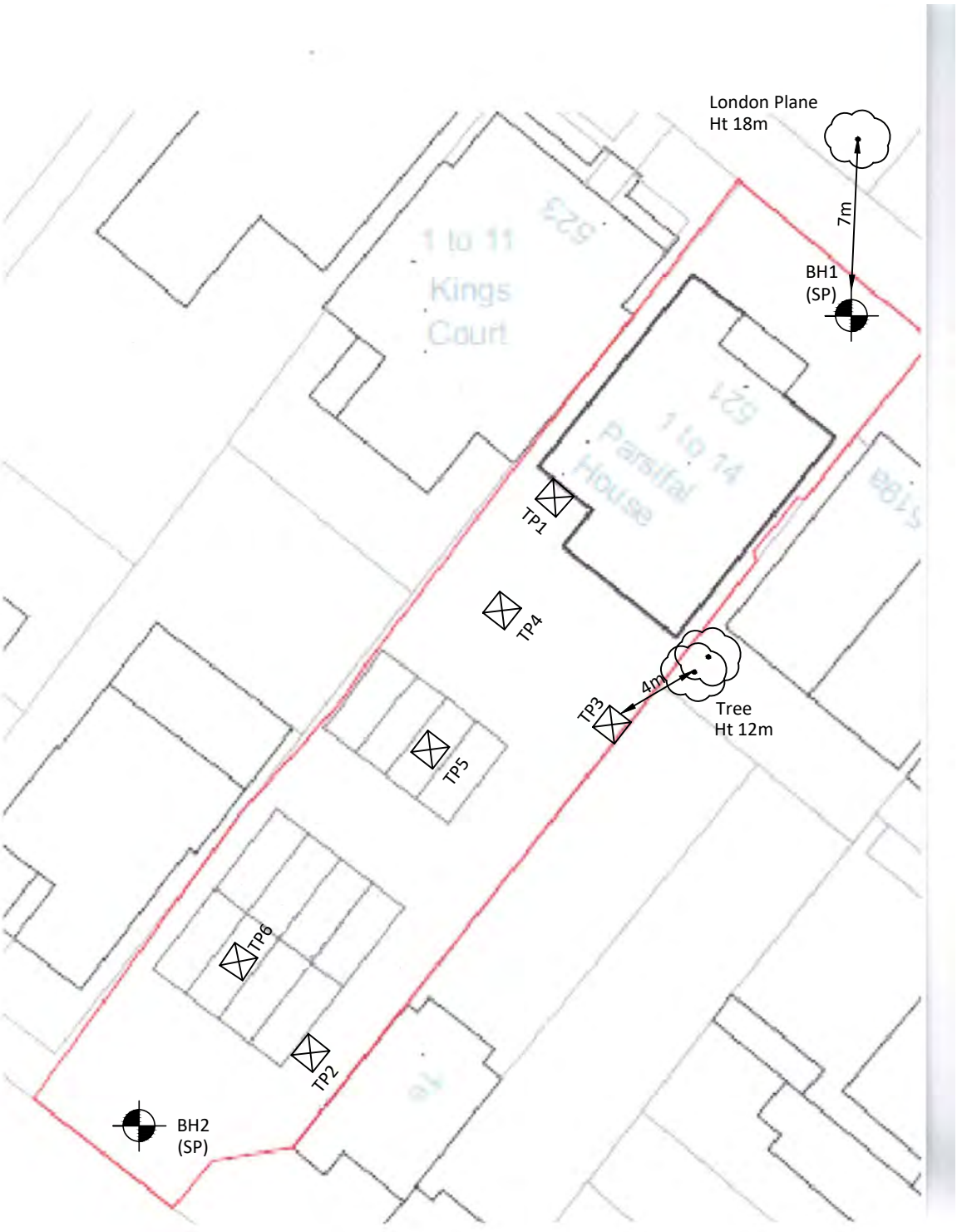
Site	Garages at Parsifal Behind 521 Finchley Road London NW3
Client	Gary Sugarman
Date	21/05/20
Our Ref	FACT/11384

Chelmer Global Ltd
Unit 7 Hall Road Industrial Estate, Hall Road, Southminster, Essex CM0 7DA
Essex: 01245 400930 | info@siteinvestigations.co.uk | www.siteinvestigations.co.uk

FACTUAL REPORT CONTENT

Site:		Client:			Identification:
Garages Parsifal, (Behind 521 Finchley Road), London, NW3 7BT		Gary Sugarman			SP
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Drawn by:**	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Plan:**	**Weather:**	**Scale:**
ND	ND	ND	ND	Sunny	NTS

Sketch Site Plan



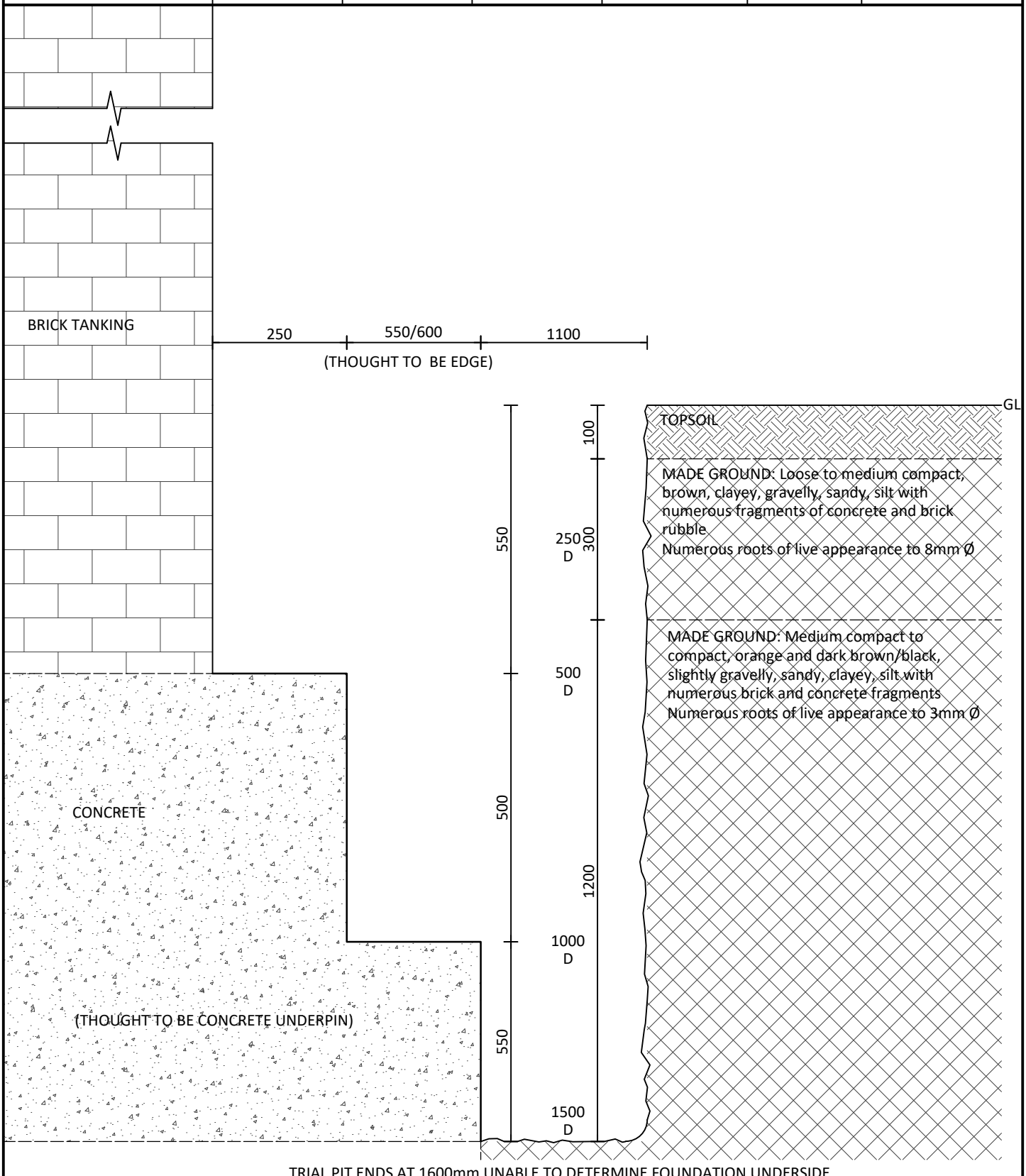
Remarks: On site tree identification for guidance only. Not authenticated.
All dimension in metres.

Key:

ND – No Data
NTS – Not to Scale
Trial Pit and Borehole
TP – Trial Pit
BH – Borehole
MH – Manhole
G – Gully
RWP – Rainwater Pipe
Tree/Shrub

Site:			Client:		Identification
Garages at Parsifal, (Behind 521 Finchley Road), London, NW3 7BT			Gary Sugarman		TP1
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Drawn by:**	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Excavation Method:**	**Weather:**	**Scale:**
ND	ND	ND	Hand Tools	Sunny	NTS

Trial Pit Log



TRIAL PIT ENDS AT 1600mm UNABLE TO DETERMINE FOUNDATION UNDERSIDE

Remarks:

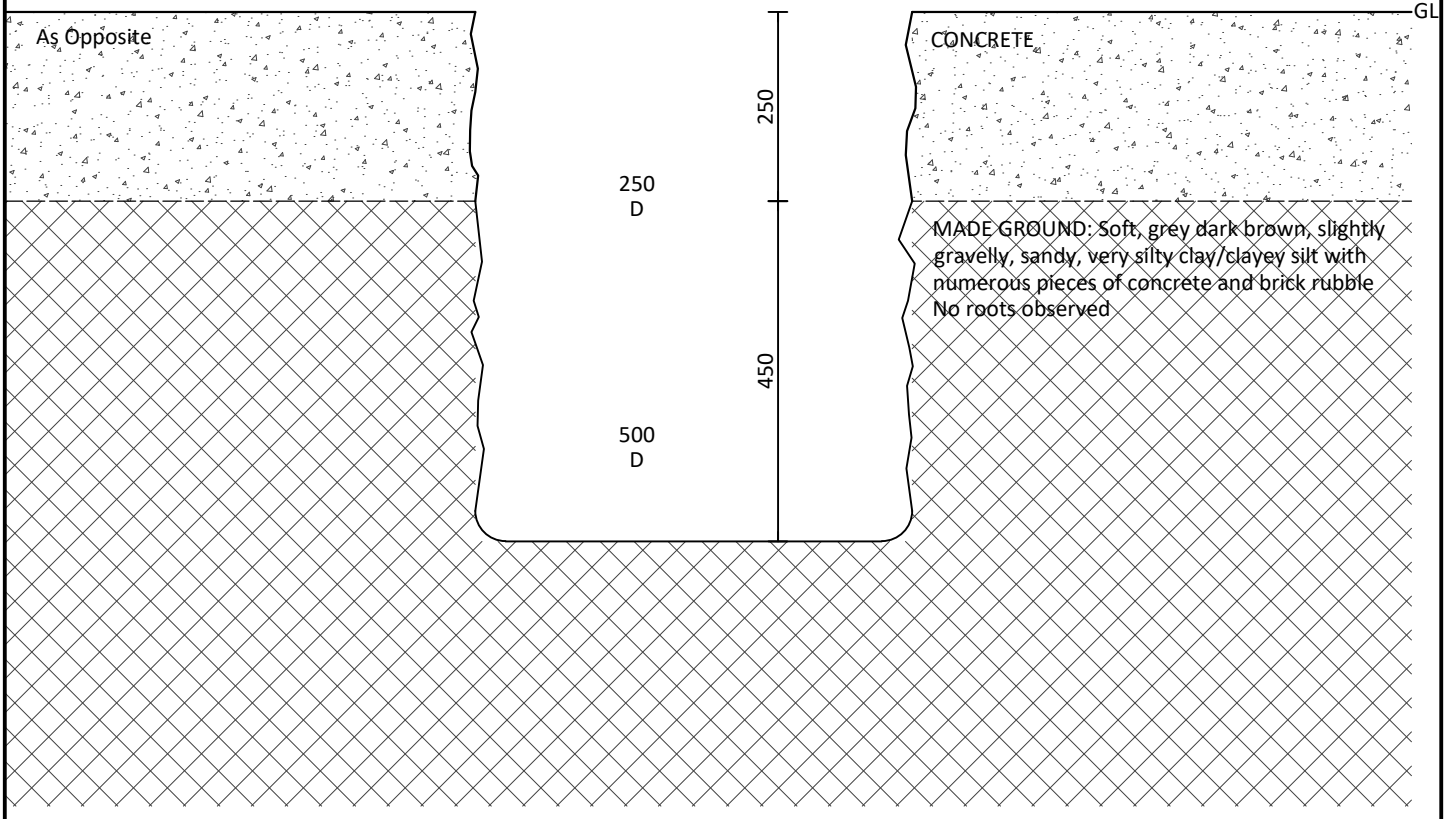
Groundwater was not encountered.
All dimensions in millimetres.

Key:

ND	No Data	V	Pilcon Vane (kPa)
NTS	Not to Scale	B	Bulk Disturbed Sample
GL	Ground Level	TDTD	Too Dense to Drive
D	Small Disturbed Sample		
M	Mackintosh Probe		

Site:			Client:		Identification
Garages at Parsifal, (Behind 521 Finchley Road), London, NW3 7BT			Gary Sugarman		TP2
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Drawn by:**	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Excavation Method:**	**Weather:**	**Scale:**
ND	ND	ND	Hand Tools	Sunny	NTS

Trial Pit Log

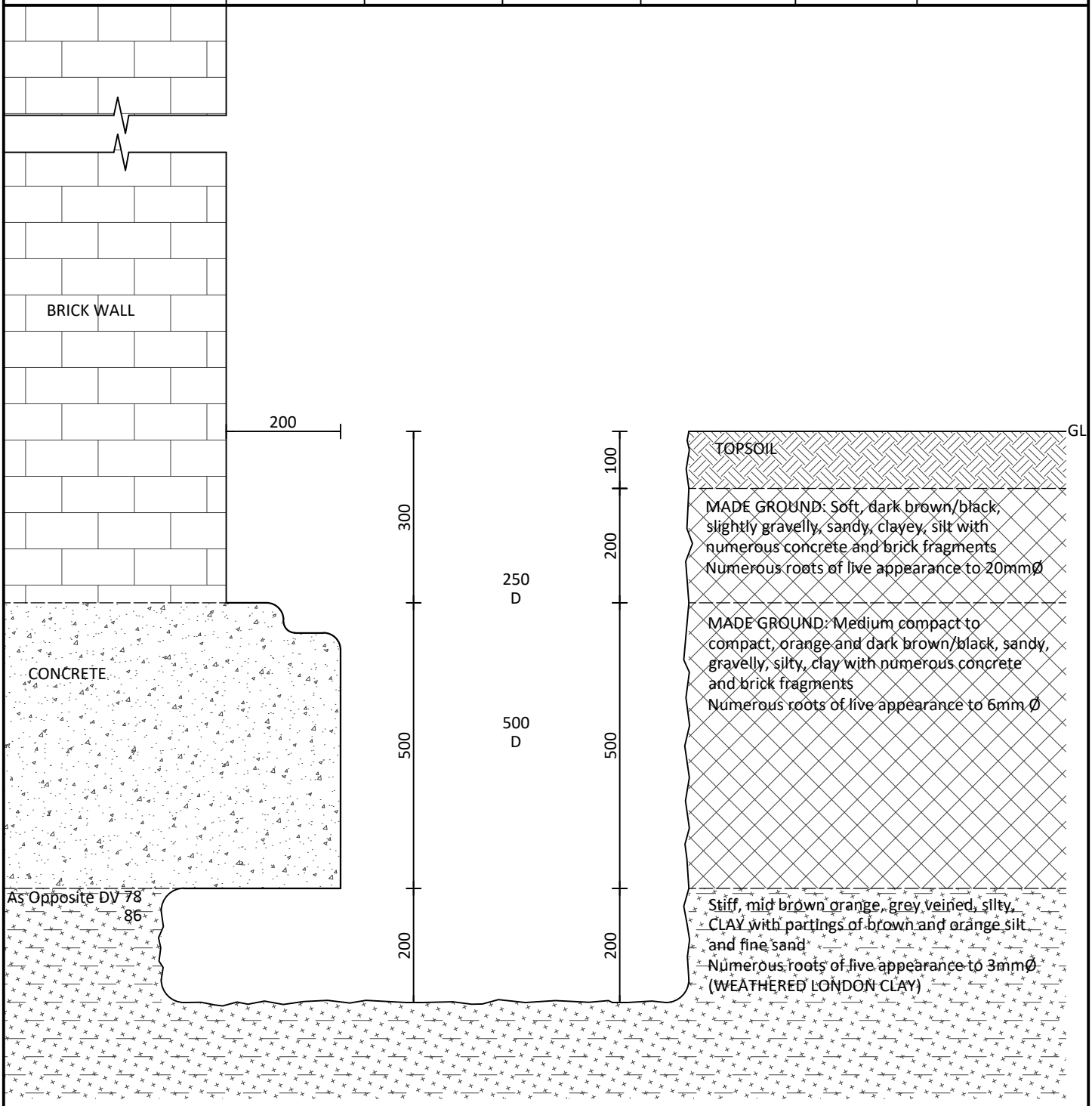


TRIAL PIT ENDS AT 700

Remarks:	Key:			
Groundwater was not encountered. All dimensions in millimetres.	ND	No Data	V	Pilcon Vane (kPa)
	NTS	Not to Scale	B	Bulk Disturbed Sample
	GL	Ground Level	TDTD	Too Dense to Drive
	D	Small Disturbed Sample		
	M	Mackintosh Probe		

Site:			Client:		Identification
Garages at Parsifal, (Behind 521 Finchley Road), London, NW3 7BT			Gary Sugarman		TP3
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Drawn by:**	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Excavation Method:**	**Weather:**	**Scale:**
ND	ND	ND	Hand Tools	Sunny	NTS

Trial Pit Log

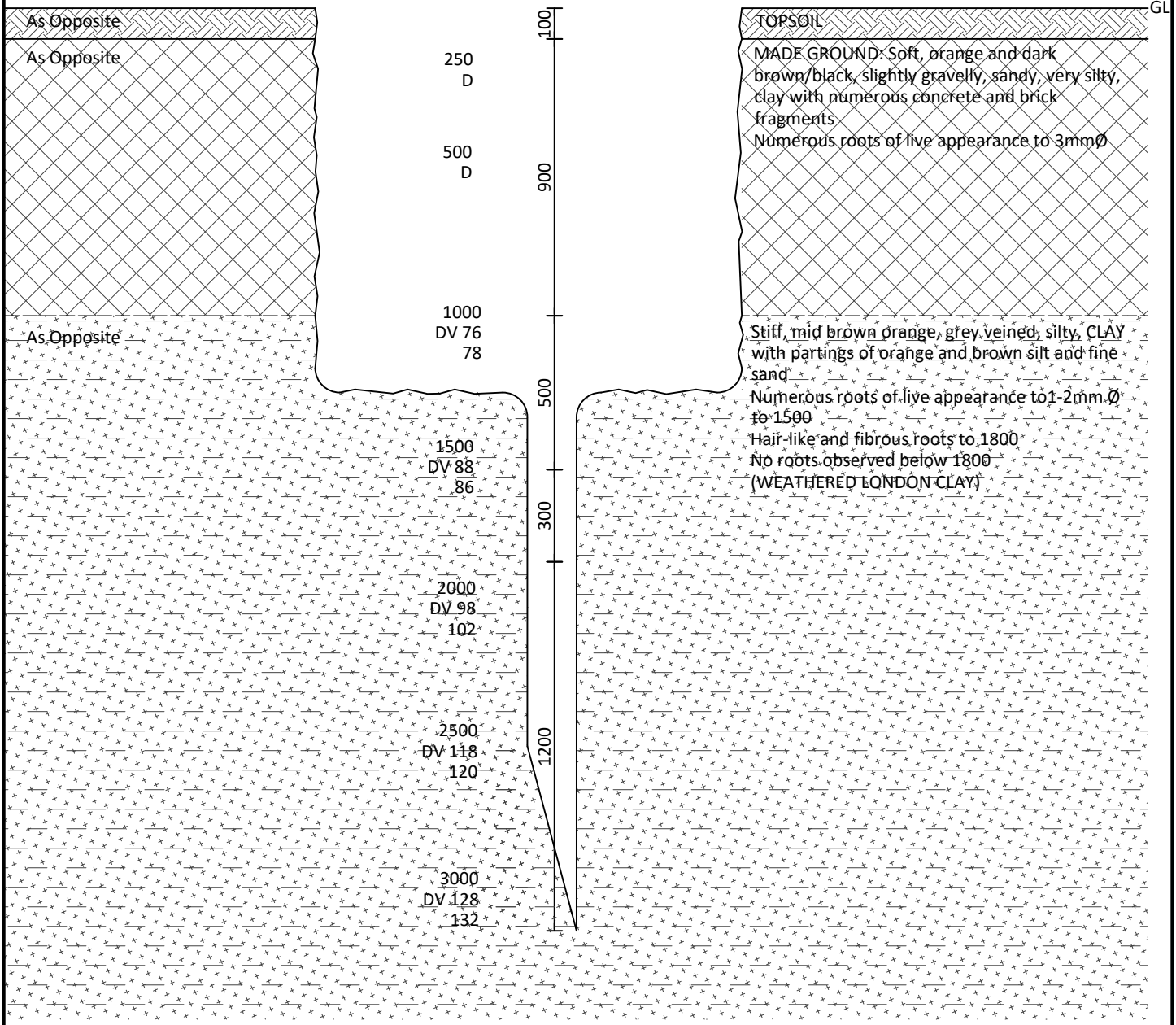


TRIAL PIT ENDS AT 1000

Remarks:	Key:			
Groundwater was not encountered. All dimensions in millimetres.	ND	No Data	V	Pilcon Vane (kPa)
	NTS	Not to Scale	B	Bulk Disturbed Sample
	GL	Ground Level	TDTD	Too Dense to Drive
	D	Small Disturbed Sample		
	M	Mackintosh Probe		

Site:			Client:		Identification
Garages at Parsifal, (Behind 521 Finchley Road), London, NW3 7BT			Gary Sugarman		TP4
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Drawn by:**	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Excavation Method:**	**Weather:**	**Scale:**
ND	ND	ND	Hand Tools	Sunny	NTS

Trial Pit Log

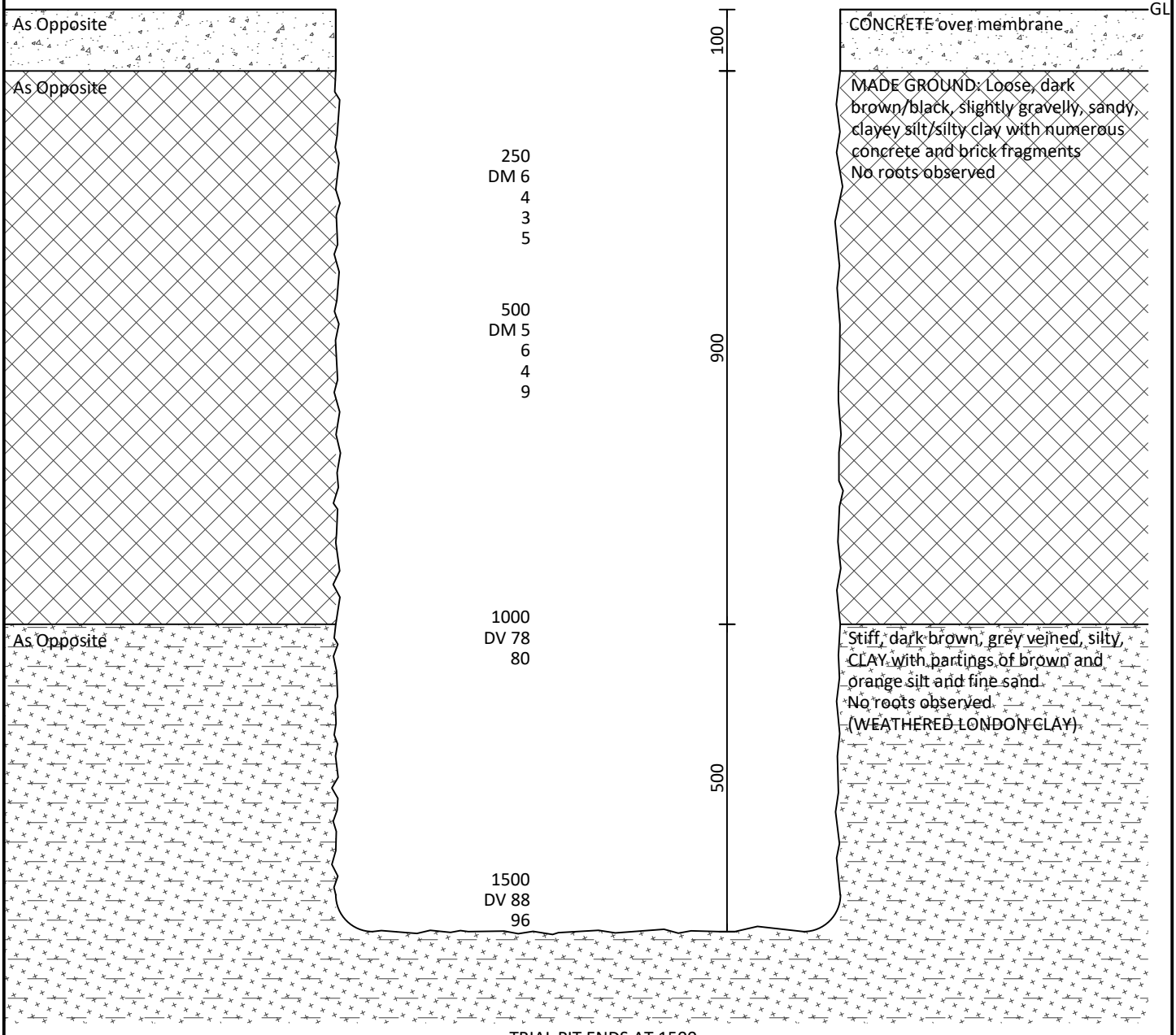


TRIAL PIT/BORHEOLE ENDS AT 3000

Remarks:	Key:			
Groundwater was not encountered.	ND	No Data	V	Pilcon Vane (kPa)
All dimensions in millimetres.	NTS	Not to Scale	B	Bulk Disturbed Sample
Trial pit extended by hand auger.	GL	Ground Level	TDTD	Too Dense to Drive
Borehole dry and open on completion.	D	Small Disturbed Sample		
	M	Mackintosh Probe		

Site:			Client:		Identification
Garages at Parsifal, (Behind 521 Finchley Road), London, NW3 7BT			Gary Sugarman		TP5
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Drawn by:**	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Excavation Method:**	**Weather:**	**Scale:**
ND	ND	ND	Hand Tools	Sunny	NTS

Trial Pit Log

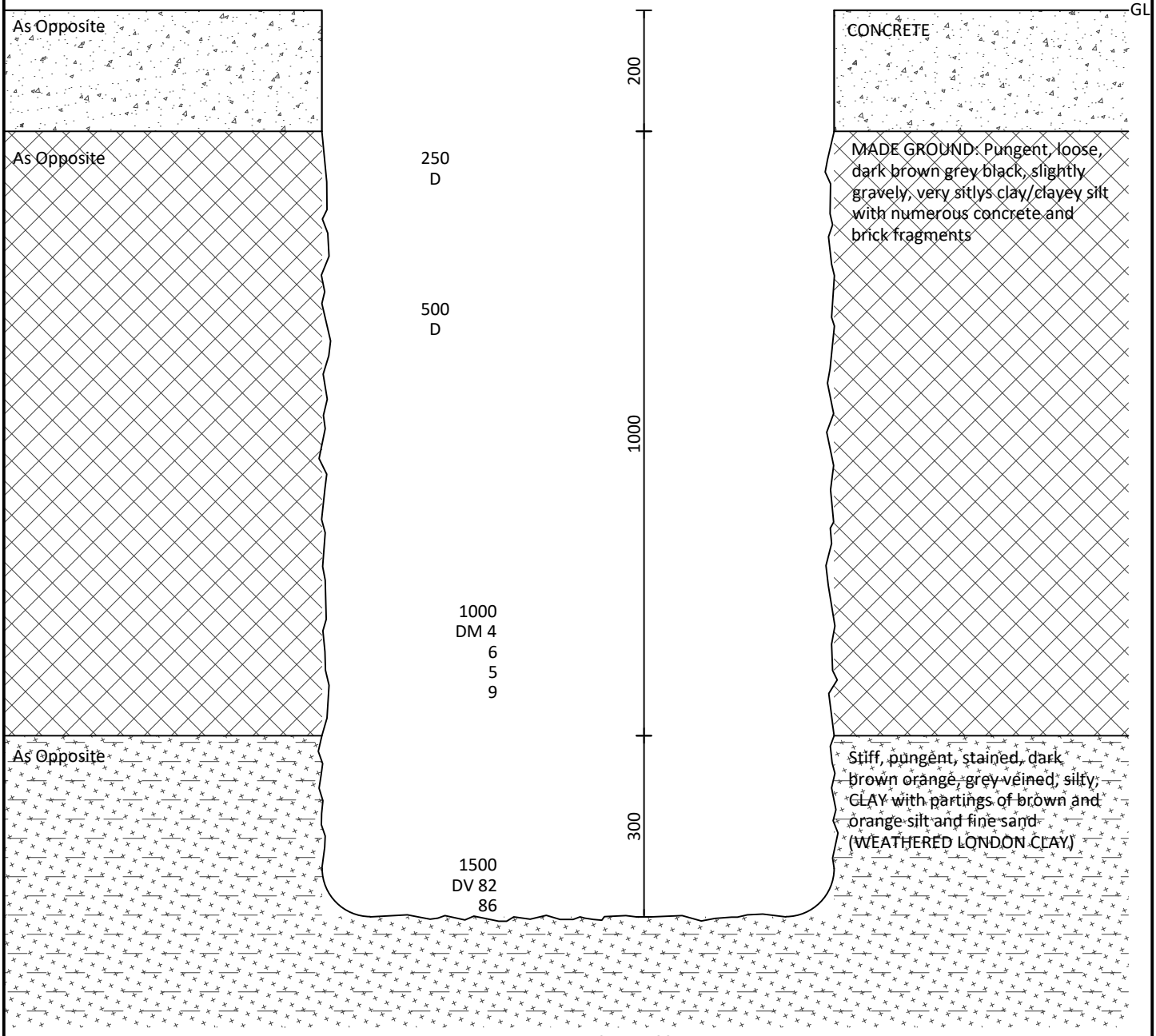


TRIAL PIT ENDS AT 1500

Remarks:	Key:			
Groundwater was not encountered. All dimensions in millimetres.	ND	No Data	V	Pilcon Vane (kPa)
	NTS	Not to Scale	B	Bulk Disturbed Sample
	GL	Ground Level	TDTD	Too Dense to Drive
	D	Small Disturbed Sample		
	M	Mackintosh Probe		

Site:			Client:		Identification
Garages at Parsifal, (Behind 521 Finchley Road), London, NW3 7BT			Gary Sugarman		TP6
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Drawn by:**	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Excavation Method:**	**Weather:**	**Scale:**
ND	ND	ND	Hand Tools	Sunny	NTS

Trial Pit Log



TRIAL PIT ENDS AT 1500

Remarks:

Groundwater was not encountered.
All dimensions in millimetres.
Pungent odor noted throughout MADE GROUND and top of natural material encountered.

Key:

ND	No Data	V	Pilcon Vane (kPa)
NTS	Not to Scale	B	Bulk Disturbed Sample
GL	Ground Level	TDTD	Too Dense to Drive
D	Small Disturbed Sample		
M	Mackintosh Probe		

Borehole Log

Site:	Client:	Identification
Garages at Parsifal, (Behind 521 Finchley Road), London, NW3 7BT	Gary Sugarman	BH1

Contract Number:	Date:	Logged By:	Checked by:	Drawn by:	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Plant Used:**	**Weather:**	**Scale:**
ND	ND	ND	Secondman	Sunny	NTS

Samples & In Situ Testing			Strata Details				Roots and Groundwater	
Depth (m)	Sample	Test Result	Depth (m)	Thickness (m)	Legend	Strata Description	Roots Information	Groundwater (m)
GL			GL					
0.25	D					PAVING over MADE GROND: Medium compact to compact, dark brown/black, gravelly, sandy, clayey, silt with numerous pieces of concrete and brick rubble	Roots of live and dead appearance to 1-2mmØ to 2.20.	
0.50	D			1.20				
1.00	D							
			1.20			Stiff, mid orange-brown, grey veined, silty, CLAY with partings of orange and brown silt and fine sand		
1.50	D	V 128 130				(WEATHERED LONDON CLAY)		
2.00	D	V 134 138					Hair-like and fibrous roots to 3.40.	
2.50	D					.....becoming very stiff from 2.50		
3.00	D	V 140+ 140+						
3.50	D						No roots observed below 3.40.	
4.00	D	V 140+ 140+						
4.50	D			6.80				
5.00	D	V 140+ 140+						
6.00	D	V 140+ 140+						
7.00	D	V 140+ 140+						
8.00	D	V 140+ 140+	8.00			BOREHOLE ENDS AT 8.00		

Remarks:

Borehole 'dry' and 'open' on completion.
All dimensions in metres.
Standpipe installed at 8m on completion (1m plain plastic pipe and 7m slotted plastic pipe)

Key:

ND	No Data	V	Pilcon Vane (KPa)
CFA	Continuous Flight Auger	M	Mackintosh Probe
NTS	Not to Scale	SPT	Standard Penetration Test
GL	Ground Level	N	Blow Count
D	Small Disturbed Sample	TDTD	Too Dense to Drive

Borehole Log

Site:	Client:	Identification
Garages at Parsifal, (Behind 521 Finchley Road), London, NW3 7BT	Gary Sugarman	BH2

Contract Number:	Date:	Logged By:	Checked by:	Drawn by:	
11384	21/05/2020	PE	MCE	CCP	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Plant Used:**	**Weather:**	**Scale:**
ND	ND	ND	Secondman	Sunny	NTS

Samples & In Situ Testing			Strata Details				Roots and Groundwater	
Depth (m)	Sample	Test Result	Depth (m)	Thickness (m)	Legend	Strata Description	Roots Information	Groundwater (m)
GL			GL					
0.25	D					CONCRETE over MADE GROUND: Loose, dark brown/black, slightly gravelly, sandy, very silty clay/clayey silt with numerous concrete and brick fragments	No roots observed	
0.50	D			1.20				
1.00	D	M 5 9 7 9	1.20			Stiff, mid orange-brown, grey veined, silty, CLAY with partings of orange and brown silt and fine sand (WEATHERED LONDON CLAY)		
1.50	D	V 110 108						
2.00	D	V 116 118						
2.50	D							
3.00	D	V 122 126						
3.50	D							
4.00	D	V 140+ 140+				.....becoming very stiff from 3.80.		
4.50	D			6.80				
5.00	D	V 140+ 140+						
6.00	D	V 140+ 140+						
7.00	D	V 140+ 140+						
8.00	D	V 140+ 140+	8.00			BOREHOLE ENDS AT 8.00		

Remarks:

Borehole 'dry' and 'open' on completion.
All dimensions in metres.
Standpipe installed at 8m on completion (1m plain plastic pipe and 7m slotted plastic pipe)

Key:

ND	No Data	V	Pilcon Vane (KPa)
CFA	Continuous Flight Auger	M	Mackintosh Probe
NTS	Not to Scale	SPT	Standard Penetration Test
GL	Ground Level	N	Blow Count
D	Small Disturbed Sample	TDTD	Too Dense to Drive

Laboratory Report

Site	**Garages @ Parsifal, Finchley Road, London, NW3 7BT**
Client	**Gary Sugarman**
Date	**05-Jun-20**
Our Ref	**CSI/11384**
CGL Ref	**11384**

Chelmer Global Ltd
Unit 7 Hall Road Industrial Estate, Hall Road, Southminster, Essex CM0 7DA
Essex: 01245 400930 | info@siteinvestigations.co.uk | www.siteinvestigations.co.uk

Content Summary

This report contains all test results as indicated on the test instruction/summary.

CGL Reference :	11384	
Client Reference :	CSI/11384	
For the attention of :	Gary Sugarman	
This report comprises of the following :	1	Cover Page
	1	Inside Cover/Contents Page
	4	Pages of Results
	1	Moisture/Shear Strength Chart
	1	Plasticity Chart
	1	Limitations of Report Page

Notes :

General

Please refer to report summary notes for details pertaining to methods undertaken and their subsequent accreditations

Samples were supplied by Chelmer Global Ltd

All tests performed in-house unless otherwise stated

Deviant Samples

Samples were received in suitable containers	Yes
A date and time of sampling was provided	Yes
Arrived damaged and/or denatured	No

Laboratory Testing Results

BS 1377 : 1990

Job Number : 11384
Client : Gary Sugarman
Client Reference : CSI/11384
Site Name : Garages @ Parsifal, Finchley Road, London, NW3 7BT

Date Received : 26/05/2020
Date Testing Started : 26/05/2020
Date Testing Completed : 05/06/2020
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
BH1	1.5		D	28	<5	69	29	40	-0.02	38	CH			129					
BH1	3.0		D	27	<5	70	28	42	-0.01	40	CV			140					
BH1	4.0		D	28	<5	72	27	45	0.02	43	CV			140					
BH1	6.0		D	31	<5	73	28	45	0.06	42	CV			140					
BH1	8.0		D	28	<5	71	30	41	-0.06	39	CV			140					

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Global using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

Comments :-

Technician :- MW

Checked & Authorised By:- Martin Edwards- **Chelmer Global Company Director**

Date Checked :- 08/06/2020

Laboratory Testing Results

BS 1377 : 1990

Job Number : 11384
Client : Gary Sugarman
Client Reference : CSI/11384
Site Name : Garages @ Parsifal, Finchley Road, London, NW3 7BT

Date Received : 26/05/2020
Date Testing Started : 26/05/2020
Date Testing Completed : 05/06/2020
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
BH2	1.5		D	36	<5	77	29	48	0.14	45	CV			109					
BH2	2.0		D	34	<5	74	30	44	0.09	41	CV			117					
BH2	2.5		D	36	<5	74	32	42	0.09	40	CV								
BH2	3.5		D	34	<5	76	30	46	0.08	44	CV								
BH2	5.0		D	33	<5	74	31	43	0.06	41	CV			140					
BH2	7.0		D	33	<5	75	28	47	0.10	45	CV			140					

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Global using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

Comments :-

Technician :- MW

Checked & Authorised By:- Martin Edwards- **Chelmer Global Company Director**

Date Checked :- 08/06/2020

Laboratory Testing Results

BS 1377 : 1990

Job Number : 11384
Client : Gary Sugarman
Client Reference : CSI/11384
Site Name : Garages @ Parsifal, Finchley Road, London, NW3 7BT

Date Received : 26/05/2020
Date Testing Started : 26/05/2020
Date Testing Completed : 05/06/2020
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
TP3	0.8		D	31	<5	71	31	40	-0.01	38	CV			79					

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Global using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

Comments :-

Technician :- MW

Checked & Authorised By:- Martin Edwards- **Chelmer Global Company Director**

Date Checked :- 08/06/2020

Laboratory Testing Results

BS 1377 : 1990

Job Number : 11384
Client : Gary Sugarman
Client Reference : CSI/11384
Site Name : Garages @ Parsifal, Finchley Road, London, NW3 7BT

Date Received : 26/05/2020
Date Testing Started : 26/05/2020
Date Testing Completed : 05/06/2020
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
TP4	1.0		D	37	<5	74	31	43	0.13	41	CV			77					

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Global using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

Comments :-

Technician :- MW

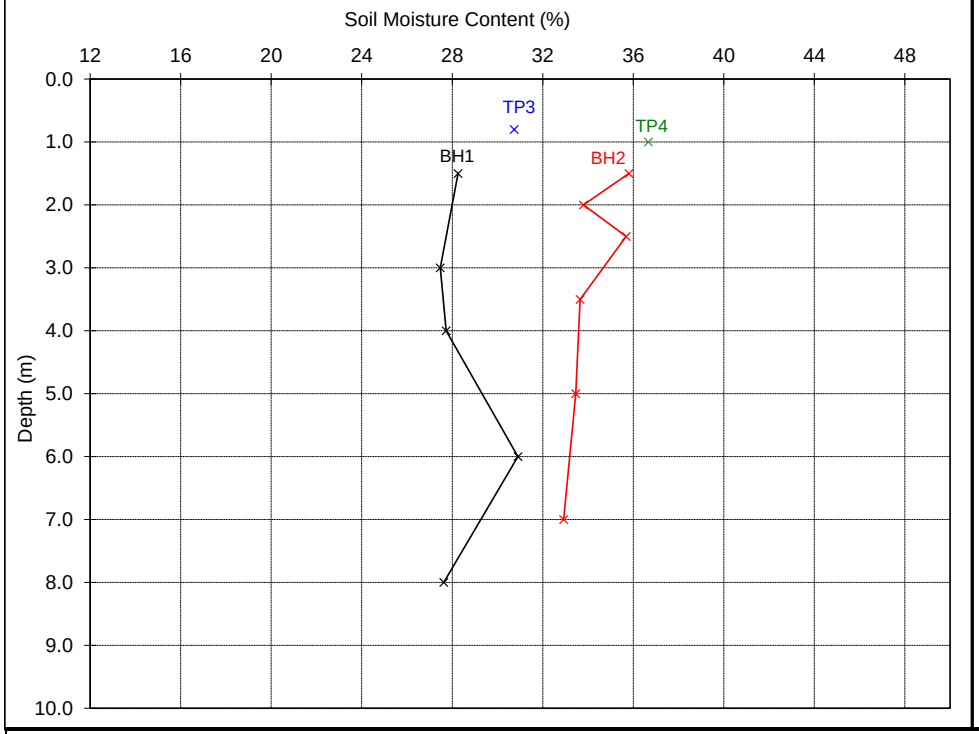
Checked & Authorised By:- Martin Edwards- **Chelmer Global Company Director**

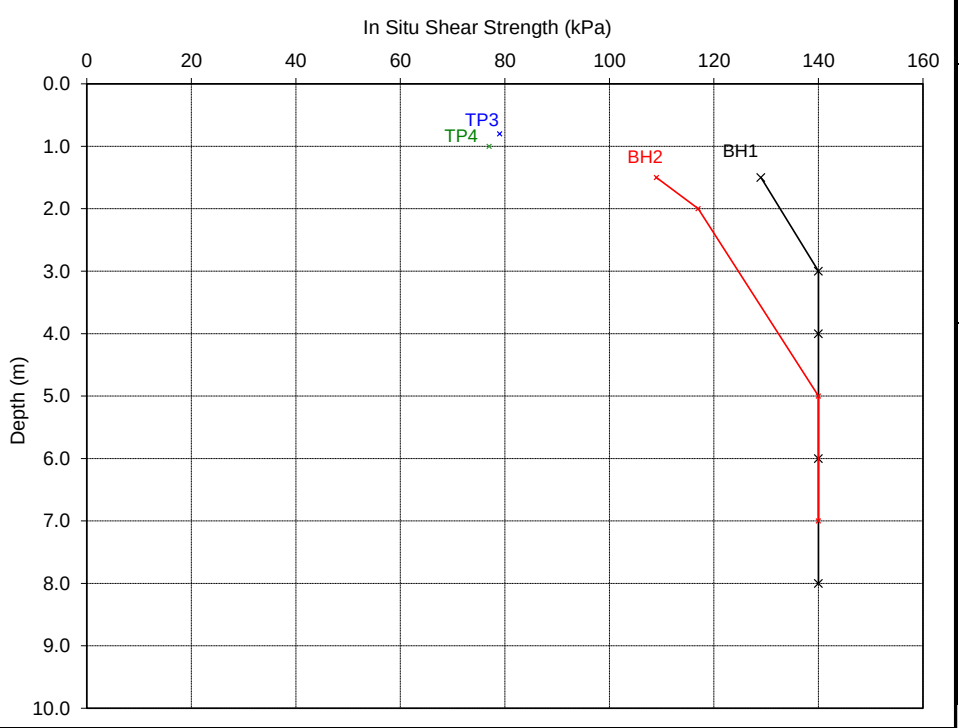
Date Checked :- 08/06/2020

Laboratory Testing Results

Moisture Content/Shear Strength Profile

Job Number :	11384	Date Received :	26/05/2020
Client :	Gary Sugarman	Date Testing Started :	26/05/2020
Client Reference :	CSI/11384	Date Testing Completed :	05/06/2020
Site Name :	Garages @ Parsifal, Finchley Road, London, NW3 7BT	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB





Notes :-

1. If the Soil Fraction > 0.425mm exceeds 5% the Equivalent Moisture Content of the remainder (calculated in accordance with BS 1377: Part 2 : 1990, cl.3.2.4 note 1) is also plotted and the alternative profile additionally shown as an appropriately coloured broken line.
2. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly over consolidated clays) at shallow depths.

Unless otherwise stated, values of Shear Strength were determined in situ by Chelmer Global Ltd using a Pilcon Hand Vane the calibration of which is limited to a maximum reading of 140 kPa. (Not UKAS accredited)

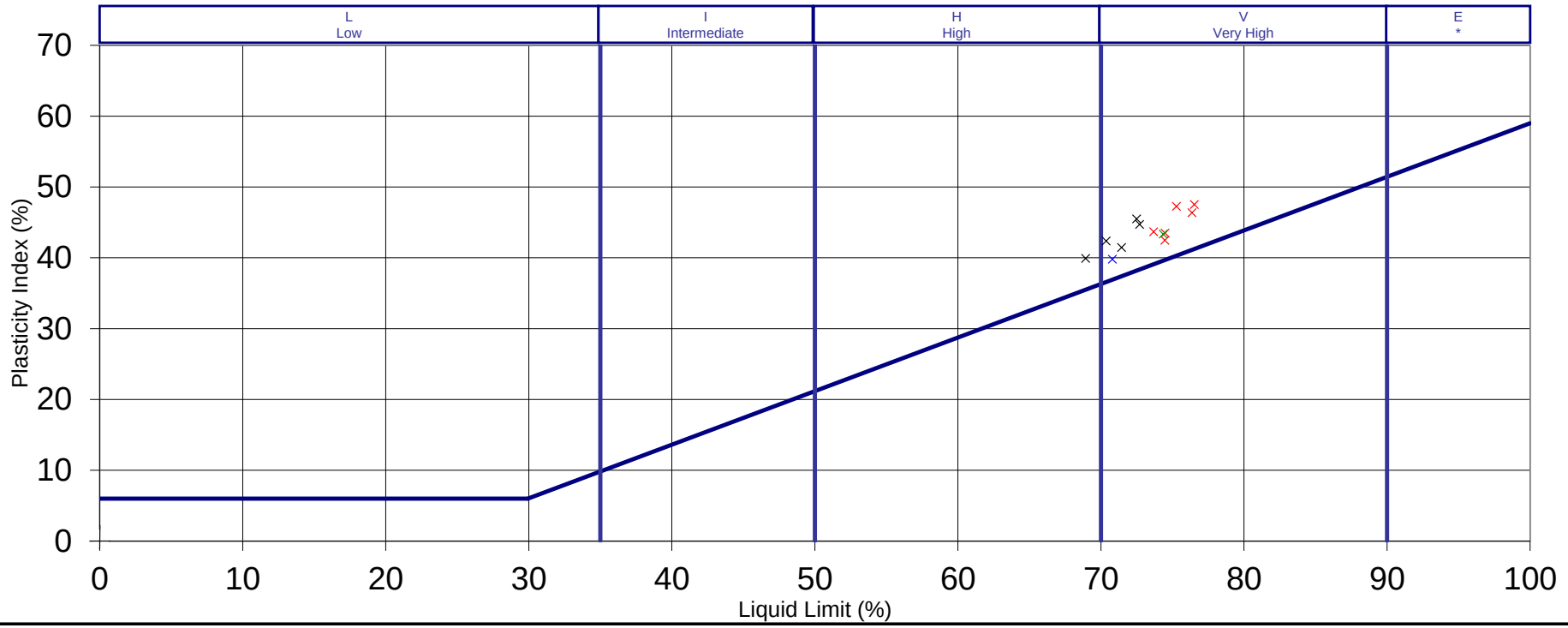
Comments :-

Checked & Authorised By:- Martin Edwards- **Chelmer Global Company Director** Date: 08/06/2020

Laboratory Testing Results

Plasticity Chart for the classification of fine soils and the finer part of coarse soils
In Compliance with BS5930 : 1999

Job Number :	11384	Date Received :	26/05/2020
Client :	Gary Sugarman	Date Testing Started :	26/05/2020
Client Reference :	CSI/11384	Date Testing Completed :	05/06/2020
Site Name :	Garages @ Parsifal, Finchley Road, London, NW3 7BT	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB



Notes :-

SILT (M-SOIL), M, plots below A-Line
CLAY, C, plots above A-Line }M and C may be combined as FINE SOIL, F.

Key :- BH1
BH2
TP3
TP4

Comments :-

Checked & Authorised By:- Martin Edwards- **Chelmer Global Company Director** Date: 08/06/2020

Where our involvement consists exclusively of testing samples, the results and comments (if provided) relate only to the samples tested.

Any samples that are deemed to be subject to deviation will be recorded as such within the test summary.

Landborne Gas Assessment

Site Ref: 11384
Site Name: Garages @ Parsifal, 521 Finchley Road, London

Well	Date	Methane Peak	Methane Steady	Methane GSV	Carbon Dioxide Peak	Carbon Dioxide Steady	Carbon Dioxide GSV	Oxygen	Atmos.	Flow	Response Zone	Depth to Water	CO	H2S	VOC
		%v/v	%v/v	l/hr	%v/v	%v/v	l/hr	%v/v	mbar	l/hr	m bgl	m bgl	ppm	ppm	ppm
BH2				0.0000			0.0000				1.0-8.0				
				0.0000			0.0000								
	03/06/2020	0.5	0.5	0.0020	4.7	4.7	0.0188	17.4	1000	0.4		6.62	2	0	12.6
	10/06/2020	0.5	0.5	0.0020	2.7	2.0	0.0108	19.4	1007	0.4		6.00	1	0	2.6
				0.0000			0.0000								
				0.0000			0.0000								
BH1				0.0000			0.0000				1.0-8.0				
				0.0000			0.0000								
	03/06/2020	4.6	4.6	0.0184	4.6	4.6	0.0184	13.8	999	0.4		dry	1	0	6.6
	10/06/2020	0.5	0.5	0.0030	3.8	3.8	0.0228	14.5	1007	0.6		dry	1	0	4.4
				0.0000			0.0000								
				0.0000			0.0000								

Notes

NR = Not Recorded
Values in Red exceed CIRIA 665 criteria (CO_2 >5.0% and CH_4 >1.0%)

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Analytical Report Number : 20-11532

Replaces Analytical Report Number : 20-11532, issue no. 1

Additional analysis undertaken.

Project / Site name:	Garages Parsifal behind 521 Finchley Road NW3	**Samples received on:**	28/05/2020
Your job number:	11384	**Sample instructed/ Analysis started on:**	28/05/2020
Your order number:		**Analysis completed by:**	05/08/2020
Report Issue Number:	2	**Report issued on:**	07/08/2020
Samples Analysed:	9 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)

For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 20-11532

Project / Site name: Garages Parsifal behind 521 Finchley Road NW3

Lab Sample Number				1520080	1520081	1520082	1520083	1520084
Sample Reference				TP2	TP3	TP4	TP5	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	0.25	0.25	0.25	0.50
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	21/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	18	16	2.5	20	22
Total mass of sample received	kg	0.001	NONE	1.5	1.0	1.6	1.5	0.50
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Not-detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.8	8.5	7.9	8.9	-
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	-
Organic Matter	%	0.1	MCERTS	3.3	4.9	9.5	3.7	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.34	< 0.05	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.57	< 0.05	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	1.8	5.6	1.5	0.50	-
Anthracene	mg/kg	0.05	MCERTS	0.30	1.1	0.28	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	2.8	7.3	4.0	1.2	-
Pyrene	mg/kg	0.05	MCERTS	2.3	6.1	3.6	1.1	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.5	3.6	2.6	0.75	-
Chrysene	mg/kg	0.05	MCERTS	1.3	2.7	2.3	0.60	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.8	4.6	4.0	0.86	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.67	1.5	0.91	0.31	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	3.5	2.7	0.75	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.84	1.9	1.5	0.48	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.26	0.48	0.41	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.95	2.2	1.7	0.53	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	16.0	41.4	25.4	7.06	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	29	28	40	21	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	0.6	0.8	< 0.2	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	33	37	43	33	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	98	88	190	68	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	1100	410	2500	560	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	2.2	1.5	2.1	1.9	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	29	28	40	22	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	640	380	1200	170	-

Analytical Report Number: 20-11532

Project / Site name: Garages Parsifal behind 521 Finchley Road NW3

Lab Sample Number				1520080	1520081	1520082	1520083	1520084
Sample Reference				TP2	TP3	TP4	TP5	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	0.25	0.25	0.25	0.50
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	21/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	32	< 8.0	< 8.0	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	32	< 10	< 10	< 10	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	6.4	< 2.0	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	25	15	< 10	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	26	34	30	14	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	34	66	45	22	-
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	< 0.001
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	< 0.007

Analytical Report Number: 20-11532

Project / Site name: Garages Parsifal behind 521 Finchley Road NW3

Lab Sample Number				1520085	1520086	1520087	1520088	
Sample Reference				TP6	BH1	BH2	BH2	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.25	0.25	0.25	0.50	
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	-	-	< 0.1	
Moisture Content	%	N/A	NONE	10	-	-	21	
Total mass of sample received	kg	0.001	NONE	1.5	-	-	1.0	
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	-	
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	11.0	-	-	9.3	
Free Cyanide	mg/kg	1	MCERTS	< 1	-	-	< 1	
Organic Matter	%	0.1	MCERTS	2.2	-	-	4.2	
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	0.27	-	-	0.74	
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.18	
Fluoranthene	mg/kg	0.05	MCERTS	0.60	-	-	2.1	
Pyrene	mg/kg	0.05	MCERTS	0.53	-	-	1.9	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.37	-	-	1.5	
Chrysene	mg/kg	0.05	MCERTS	0.33	-	-	1.4	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.51	-	-	1.9	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.27	-	-	1.1	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.38	-	-	1.8	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.25	-	-	1.0	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.25	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.28	-	-	1.2	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	3.79	-	-	15.0	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	-	-	53	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	-	1.0	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	46	-	-	34	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	42	-	-	75	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	720	-	-	880	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	-	-	1.6	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	-	-	25	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	280	-	-	730	

Analytical Report Number: 20-11532

Project / Site name: Garages Parsifal behind 521 Finchley Road NW3

Lab Sample Number				1520085	1520086	1520087	1520088	
Sample Reference				TP6	BH1	BH2	BH2	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.25	0.25	0.25	0.50	
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
p & m-xylene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
o-xylene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	-	-	< 8.0	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	-	-	< 8.0	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	-	-	< 10	
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	-	-	< 0.001	
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	-	-	< 10	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	-	-	15	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	-	-	22	
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	

Analytical Report Number: 20-11532
Project / Site name: Garages Parsifal behind 521 Finchley Road NW3
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1520080	TP2	0.25	132	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1520080	TP2	None Supplied	0.25	Brown loam and clay with gravel.
1520081	TP3	None Supplied	0.25	Brown loam and clay with gravel.
1520082	TP4	None Supplied	0.25	Brown loam and clay with gravel.
1520083	TP5	None Supplied	0.25	Brown loam and clay with gravel.
1520084	TP5	None Supplied	0.50	Brown loam and clay with gravel.
1520085	TP6	None Supplied	0.25	Brown loam and clay with gravel.
1520086	BH1	None Supplied	0.25	-
1520087	BH2	None Supplied	0.25	-
1520088	BH2	None Supplied	0.50	Brown clay with gravel.

Analytical Report Number : 20-11532

Project / Site name: Garages Parsifal behind 521 Finchley Road NW3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

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

REPORT NOTES

Equipment Used

Hand tools, Mechanical Concrete Breaker and Spade, Hand Augers, 100mm/150mm diameter Mechanical Flight Auger Rig, GEO205 Flight Auger Rig, Window Sampling Rig, and Large or Limited Access Shell & Auger Rig upon request and/or access permitting.

On Site Tests

By Pilcon Shear-Vane Tester (kN/m) in clay soils, and/or Mackintosh Probe in granular soils or made ground and/or upon request Continuous Dynamic Probe Testing and Standard Penetration Testing.

Note:

Details reported in trial-pits and boreholes relate to positions investigated only as instructed by the client or engineer on the date shown.

We are therefore unable to accept any responsibility for changes in soil conditions not investigated i.e. variations due to climate, season, vegetation and varying ground water levels.

Full terms and conditions are available upon request.