HILSON MORAN

Preliminary Phase II Contamination Assessment

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1. Executive Summary

Fortnum Development Ltd has instructed Hilson Moran Partnership Ltd (Hilson Moran) to design, coordinate and report on a preliminary ground contamination investigation of 19-37 Highgate Road and neighbouring A&A Self Storage unit located in Kentish Town, London.

The site investigation works follow from the findings of our Phase I Environmental Assessment and the requirement to ascertain the potential extent of any VOC contamination that may extend within the Site boundary and have likely arisen from past spillage/leakage associated with the former neighbouring ICI chemical warehouse.

Investigations conducted by others in 2013 identified elevated VOC concentrations in groundwater sampled from a borehole drilled in Greenwood Place and located approximately 10m northwest of the application Site boundary. The site investigation works were completed by Soil Consultants Ltd on 13th November 2015.

Shallow Made Ground (0.3 m to 0.68 m thickness) was found to underlie the ground slab of the A&A Storage unit. Firm natural London Clay was proven to 3.0 m depth in all three boreholes.

Evidence of low levels of historic solvent contamination (trichloroethene 'TCE' and tetrachloroethylene 'PCE') within Made Ground deposits was recorded. The source of these solvents is strongly suspected to originate from the former ICI warehouses.

No evidence on onsite sources of these contaminants has been identified.

The concentrations of TCE and PCE (and associated degradation VOCs) recorded in soil samples are low. There is no evidence from this preliminary investigation that significant contamination exist at the application Site or that significant harm is presented to its users by any suspected residual contamination of soil underlying the Greenwood Place Community Centre.

The concentrations of solvents recorded in the borehole gas samples were all many thousand times lower than the Health and Safety Executive's Workplace Exposure Limits.

The proposed development of the Site would entail the total removal of all Made Ground deposits and several metres of underlying clay for the construction of the basement. The basement foundations will be supported by a secant pile wall, effectively forming a barrier to soils and groundwater outside of the Site boundary.

It is possible that pocket of contamination may exist on the Site and further site investigation will be required post-planning and following the clearance of the existing site buildings. On the basis of this preliminary site investigation no significant constraints regarding difficult Made Ground or contamination have been identified that prohibit the redevelopment of the site for its intended residential and commercial use.

2. Instruction

Hilson Moran Partnership Ltd (Hilson Moran) was appointed by Fortnum Developments Ltd to undertake a Preliminary Phase II Contamination Assessment of the Site of 19-37 Highgate Road and neighbouring A&A Self Storage unit. This report follows from Hilson Moran's Phase 1 Environmental Assessment of the Site, dated 3rd July 2015.

The Site of 19-37 Highgate Road is presently used as a NHS Day Centre. The A&A Self Storage unit is operational and comprise typical self storage internal units.

The Site is proposed for redevelopment comprising mixed residential units, offices and the relocation of the self storage provision to new basement levels.

2.1. Background

The Site and surrounding premises have been earmarked for redevelopment for a number of years. In 2013, Ground Engineering Ltd completed a ground investigation on the area of the NHS centre (19-37 Highgate Road) and Greenwood Community Centre, located to the rear (west) of the Site. These works were carried out for the London Borough of Camden.

Samples of Made Ground and groundwater were taken and analysed. Elevated concentrations of metals were recorded in samples taken from the Made Ground (max lead concentration was 2,500 mg/kg). Elevated VOC concentrations (trichloroethene and vinyl chloride) were recorded in a single groundwater sample taken from DSC1 located on Greenwood Place.

The proposed redevelopment of the Site includes the construction of a large basement. The purpose of this preliminary Phase II Contamination Assessment is to provide Fortnum Development Ltd with an indication or whether VOC contamination is present in the western area of the Site, closest to location where it was previously identified on Greenwood Place and, if present, advice on potential development constraints and mitigation.

2.2. Scope of Service

Our instruction is to provide a preliminary contaminated land assessment based on the results of a limited intrusive site survey. Our scope of works broadly comprised:

- Design of targeted site investigation works to target shallow and contaminated soils and groundwater within Made Ground deposits and underlying London Clay;
- Supervise site investigation works, collection of samples and laboratory scheduling;
- Collect soil gas samples and submit to laboratory for VOC analysis;
- Production of a preliminary semi-quantitative Phase II Contaminated Land Assessment Report based on the review and assessment of laboratory results, drilling logs and gas monitoring records.

2.3. Environmental Risk Assessment

The contaminated land regime, set out in Part IIA of the Environmental Protection Act 1990, was introduced to identify and clean-up land where contamination poses unacceptable risks to human

health or the environment. Part IIA, its accompanying regulations and statutory guidance came into force on 1 April 2000.

The main objective of Part IIA is to "provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment given the current use and circumstances of the land."

Part IIA defines contaminated land as "any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, or under the land that:

- Significant harm is being caused or there is a significant possibility of such harm being caused.
- Or, pollution of controlled waters is being, or is likely to be caused."

The risk assessment presented in this report is quantitative. Assessment of risk is considered based on reported types and concentrations of contaminants at the Site and the perceived exposure of these contaminants on current and future Site users and sensitive environmental receptors. Where risk is identified to be potentially significant, then further works are recommended which will aim to determine the actual risk.

2.4. Legislation & Guidance

This report considers and is produced in accordance with the following environmental legislation and guidance documents:

- Environmental Protection Act 1990.
- Contaminated Land (England) Regulations 2006 (as amended 2012).
  Environmental Damage (Prevention and Remediation) Regulations 2009.
- Construction (Design and Management) Regulations – Managing health and safety in construction. HSE 2015.
- BS 10175 + A1: Investigation of potentially contaminated sites - Code of practice, 2013.
- Environment Agency CLR 11, Model Procedures for the Management of Land Contamination, 2004.
- BS 5930: Code of practice for site investigations, 2015
- BS 8576: Guidance on investigations for ground gas – Permanent gases and VOCs, 2013.
- CIRIA C665: Assessing risks posed by hazardous ground gases to buildings, 2007.
- CIRIA C682: The VOCs Handbook, 2009.
- CIRIA C733: Asbestos in soil and made ground, 2014.
- National Planning Policy Framework 2012, Communities and Local Government.
- Environment Agency GP3 (Groundwater Protection Policy and Practice).
- Environment Agency WM3 (Waste Classification), 2015.

2.5. Limitation and Copyright

This report has been prepared on behalf of and for the exclusive use of Highgate Road / A&A Self Storage, and is subject to and issued in connection with the provisions of the agreement set out by Hilson Moran Partnership Ltd. Hilson Moran Partnership Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

3. Site Setting and Development Intent

3.1. Site Description

The Site covers an area of approximately 0.27 ha and is centred on Ordnance Survey Grid Reference TQ 288 854.

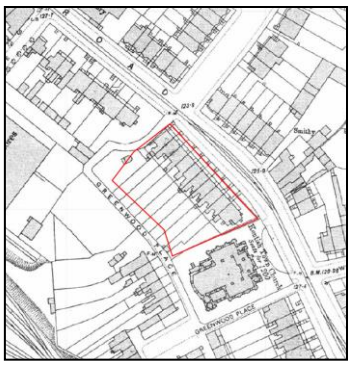
The area of 19-37 Highgate Road was developed in the mid 1970s and is used as a NHS day centre. The present area of A&A Self Storage was developed around the same time in the early 1970s and appears from reference to historical mapping to be based around an earlier development on the site dating to the early 1900s.

A site location is provided in Appendix A.

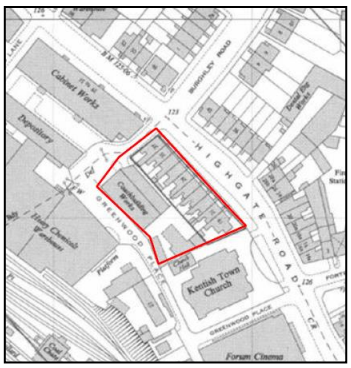
3.2. History

The Site was initially developed for terraced residential housing in the mid/late 1800s. The housing was located on the eastern area of the Site fronting onto Highgate Road and remained until the around the 1960s. Between 1973 and 1976 the eastern half of the Site was redeveloped to form a day centre. The use of the day centre since has included some light manual assembly work for Matchbox toy cars. This ceased in the 1980s.

The western half of the Site was occupied by residential gardens until the early 1900s and then development as an exhibition and coach works. The present building is understood to have been developed in around the early 1970s. Extracts of historical Ordnance Survey plans are provided in Figure 3.1 below.

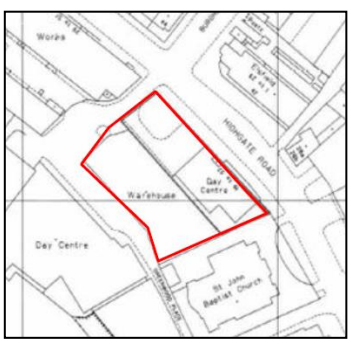


1894



1952

1977



1995

Figure 3.1 – Historical mapping extracts. Source: Ordnance Survey

The 1952 Ordnance Survey map shows that a heavy chemical storage warehouses operated to the west of the site. Anecdotal evidence contained in Campbell Reith's 2013 Preliminary Land Quality Statement (submitted in support of a former planning application) indicated the warehouses were operated by ICI.

Since the production of our Phase I Environmental Assessment, Hilson Moran has obtained copies of ICI's archive records of these works. These records are listed below and comprise notes of three site inspections conducted by ICI between 1947 and 1954. Copies of these reports are provided as Appendix B.

ICI General Chemicals Research Reports List - 1896 to 1998 - final version 18 November 2014.xls

Author(s)	Document Title or Description	Date	Report no.
G.H.Preston	Kentish Town - Trichloroethylene Packing.	04/03/1947	M/CK/286
A.Eastwood	Proposed Extensions at the ICI Warehouse at Kentish Town	02/10/1947	CED268
G.H.Preston	Visit to Kentish Town Depot 16/3/54 to Inspect Trichloroethylene Drum Filling Arrangements	24/05/1954	M/CK540

The documents record the storage arrangement and handling of trichloroethylene (TCE). Report on losses of TCE is noted and reference made to the unloading of TCE from railway wagon to the depot's storage tanks.

3.3. Development Intent

The proposed development comprises ground floor residential units and commercial offices. Office areas extend to second floor level, with residential accommodation developed up to eighth storey level. The existing A&A Storage is to be relocated within a new two storey basement underlying the whole site.

Figure 3.2 shows an indicative section across the site.

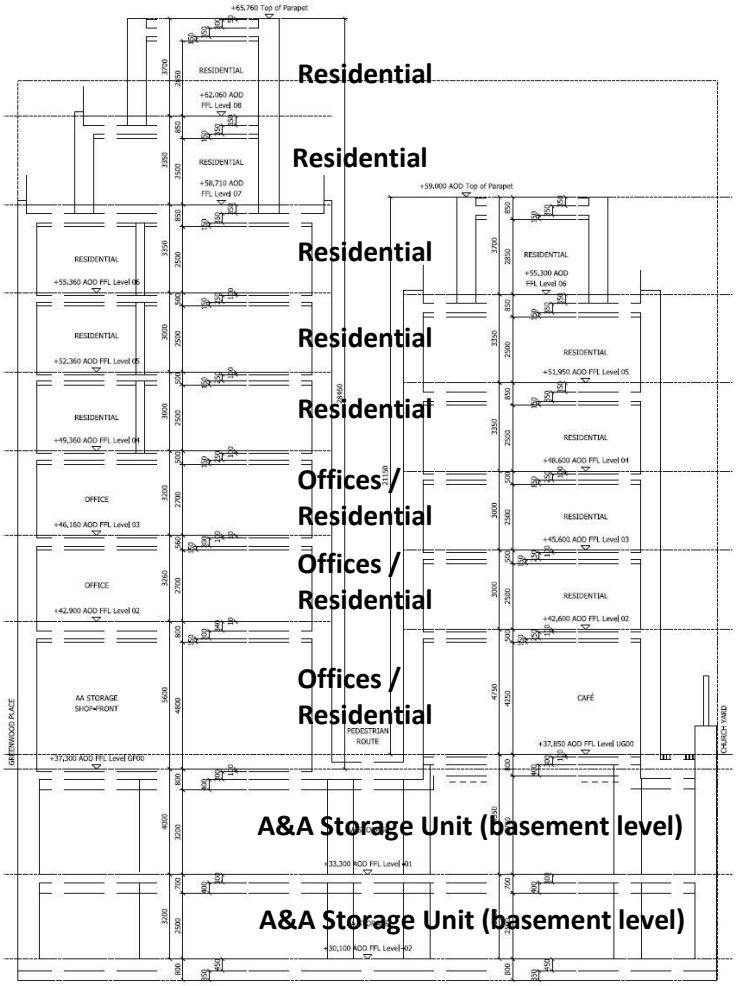


Figure 3.2 – Indicative Section. Source: Squires & Partners

4. Site Investigation

The site investigation works follow from the findings of our Phase I Environmental Assessment and the requirement to ascertain the potential extent of any VOC contamination that may extend within the Site boundary and have likely arisen from past spillage/leakage associated with the former neighbouring chemical warehouse.

Investigations conducted by others in 2013 identified elevated VOC concentrations in groundwater sampled from a borehole drilled in Greenwood Place and located approximately 10m northwest of the Site boundary.

Three shallow windowless boreholes were drilled along the west boundary of the Site to target the western area of the Site inside of the A&A Storage Unit. The locations of the drilled boreholes (HM-WS1, HM-WS2 and HM-WS3) are shown in Figure 4.1.

Drilling works were completed by Soil Consultants Ltd on 13th November 2015 and supervised by Hilson Moran. Works required coring through the ground floor slab followed by the shallow excavation by pneumatic driller through the Made Ground and into the natural London Clay.

Soil samples were taken at approximately 0.2m intervals through the soil column and logged to British Standard BS:5930. Selected samples were submitted to UKAS registered QTS Environmental Ltd laboratory (MCERTS and UKAS certified) on the day of sampling.

Groundwater was not encountered.

Gas monitoring standpipes were installed in each borehole. Pipes were screened between the base of the slab to the base of the borehole.

Drilling logs and soil chemical testing results are contained within Soil Consultants' Factual Report on Ground Investigation provided as Appendix C.

Photographs of the drilling works and exposed soils are provided in Appendix D.

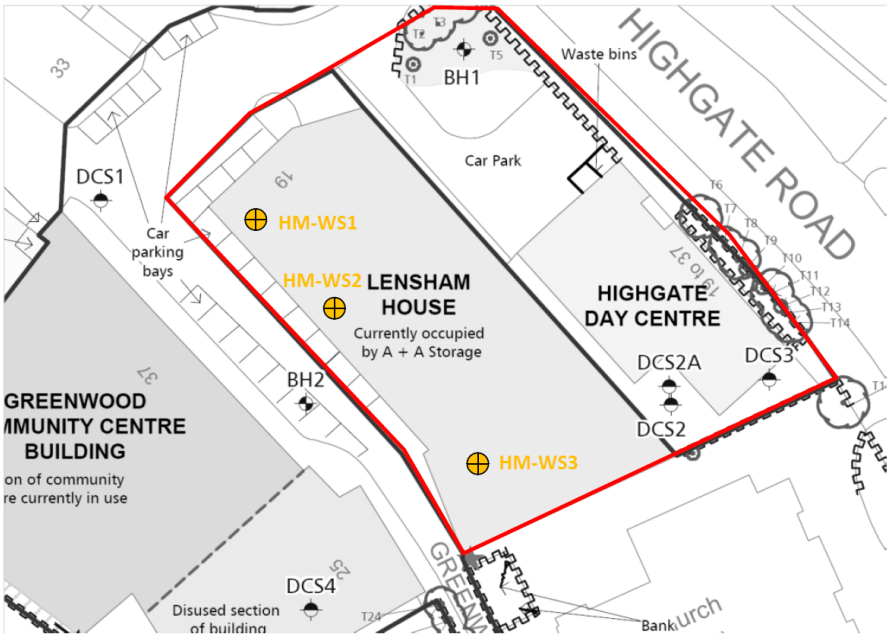


Figure 4.1 – Windowless Borehole Locations

4.1. Contamination Testing

Two soil samples were submitted for analysis from each of the three boreholes. The samples were taken from the Made Ground underlying the ground slab and at the interface between the Made Ground and natural London Clay. Samples were analysed for the following determinands:

- General soil suite comprising pH, cyanide, sulphate, organic matter, arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, phenols and petroleum hydrocarbons.
- Asbestos screen.
- Speciated Polyaromatic Hydrocarbons (16 USEPA).
- Speciated Volatile Organic Compounds.

Laboratory chemical results are provided in Appendix C.

4.2. Groundwater and Gas Monitoring

Groundwater was not encountered in sufficient volume to sample.

Soil gas data are recommended over other data, specifically soil matrix and groundwater data, because soil gas data represent a direct measurement of the contaminant that can potentially migrate into indoor air.[1]

VOC gas sampling was conducted from all three boreholes on Thursday 19th November. A fourth sample was taken on Tuesday 24th November from borehole DCS1 located on Greenwood Place (see Fig 4.1).

Samples were collected on Tenax VOC tubes using calibrated diffusion pumps sampling at 0.05 litres per minute. Analysis of the top-10 VOC compounds from thermal desorption was completed by Gradko International. Results are provided in Appendix E.

[1] ITRC – Vapor Intrusion Pathway: A Practical Guideline(2007)

5. Screening Assessment of Analytical Data and Ground Gas Data

5.1. Soils

Selected soil samples obtained during the investigation were scheduled for analysis for a range of determinands. Full laboratory results are presented within Appendix C.

5.1.1. Derivation of Soil Screening Thresholds

The purpose of this report is to provide a preliminary screening exercise as to whether migration of offsite contaminants (principally those suspected as originating from the former heavy chemical warehouse) have migrated onto the proposed development site.

Soil concentrations have been assessed against appropriate government and industry-derived Screening Values. Published Soil Guideline Values (SGVs) exist for a limited number of contaminants and where considered appropriate these have been used.

The tables presented in this Section provide a summary of reported concentration ranges together with assessment against published and derived assessment standards (Soil Critical Values – SCVs). For screening purposes, SCVs were selected based on a residential end use scenario.

5.1.2. Soil Organic Matter

The mobility of organic contaminants can be strongly influenced by the organic content of the soil. This particularly affects the exposure pathways involving inhalation of soil vapours as well as the leachability of these organics.

The average soil organic matter recorded was 1.2%.

5.1.3. Inorganics

No determinands detected within any sample recorded concentrations above respective environmental quality standards.

Low levels of soluble sulphates were measured (maximum 1,110 mg/l from sample WS2, taken at 0.5 m depth).

Soil pH values were all within the neutral to low alkaline range 7.4 and 8.2.

A summary of results is presented in table 5.1 below.

Table 5.1 – Reported inorganic concentration ranges and applied Soil Critical Values

Contaminant	No. of samples	Concentration range (mg/kg)	Soil Critical Value (mg/kg)	Exceedances
pH	6	7.4 – 8.2	-	-
Arsenic	6	7 – 18	32 (CLEA SGV)	None
Cadmium	6	<0.2	10 (CLEA SGV)	None
Chromium	6	18 – 49	627 (Cr III) (LQM/CIEH)	None
Copper	6	6 – 43	2330 (LQM/CIEH)	None
Cyanide (total)	6	<2		
Lead	6	10 – 496	450 (Former CLEA SGV)	None
Mercury	6	<1 – 1.5	170 (CLEA SGV)	None
Nickel	6	<11 – 41	75 (Former CLEA SGV)	None
Selenium	6	<3	350 (CLEA SGV)	None
Zinc	6	44 – 79	3750 (LQM/CIEH)	None
Total Sulphate	6	0.05 – 0.29%	-	-
W/S Sulphate	6	144 – 1,110 mg/l	-	-
Asbestos screen	6	Not Detected	Presence detected	None
Organic Matter	6	0.1% – 2.5%	-	-
EPH (C10 – C40)	6	<6 - 13	-	-

Notes
SGV: Soil guideline value published by DEFRA/EA for 'residential' scenario; SGV for lead withdrawn but not replaced.
LQM/CIEH: Generic assessment criteria published by Chartered Institute of Environmental Health and Land Quality Management Ltd, commercial land use scenario; 2nd Edition.

5.1.4. Hydrocarbon Analysis

Some hydrocarbon mixtures can pose a carcinogenic risk to human health primarily due to the presence of carcinogenic PAHs in the mixture. In addition the mixtures as a whole may pose a general non-cancer risk to human health. In order to assess these two aspects of the toxicology of hydrocarbons, assessment has been made of the carcinogenic PAHs to assess that risk to human health.

5.1.5. Polyaromatic Hydrocarbons (PAHs)

No PAH contaminant range concentrations from any of the three soil samples were reported above the applied Soil Critical Value.

Table 5.3 – Reported concentration ranges and applied Soil Critical Values

Contaminant	No. of samples	Concentration range (mg/kg)	Soil Critical Value (mg/kg)	Exceedances
Naphthalene	6	<0.1 – 0.17	76 LQM/CIEH GAC	None
Acenaphthylene	6	<0.1	86 LQM/CIEH GAC	None
Acenaphthene	6	<0.1	57 LQM/CIEH GAC	None
Fluorene	6	<0.1	31 LQM/CIEH GAC	None
Phenanthrene	6	<0.1 – 0.45	22000 LQM/CIEH GAC	None
Anthracene	6	<0.1	530000 LQM/CIEH GAC	None
Fluoranthene	6	<0.1 – 0.85	23000 LQM/CIEH GAC	None
Pyrene	6	<0.1 – 0.68	54000 LQM/CIEH GAC	None
Benzo(a)anthracene	6	<0.1 – 0.44	90 LQM/CIEH GAC	None
Chrysene	6	<0.1 – 0.45	140 LQM/CIEH GAC	None
Benzo(b)fluoranthene	6	<0.1 – 0.52	100 LQM/CIEH GAC	None
Benzo(k)fluoranthene	6	<0.1 – 0.22	140 LQM/CIEH GAC	None
Benzo(a)pyrene	6	<0.1 – 0.37	14 LQM/CIEH GAC	None
Indeno(1,2,3-cd)pyrene	6	<0.1 – 0.2	60 LQM/CIEH GAC	None
Dibenz(a,h)anthracene	6	<0.1	13 LQM/CIEH GAC	None
Benzo(ghi)perylene	6	<0.1 – 0.17	650 LQM/CIEH GAC	None

Notes
LQM/CIEH: Generic assessment criteria published by Chartered Institute of Environmental Health and Land Quality Management Ltd, commercial land use scenario; 2nd Edition.

5.1.6. Volatile Organic Compounds

Headspace sampling for volatile and semi-volatile compounds was conducted on all soils samples using a calibrated MiniRAE3000 photo-ionisation detector (PID). Concentrations of volatiles were all below the instrument detection limit.

Speciated VOC analysis was conducted on all six soil samples. A total of 57 compounds were tested and reported. The vast majority of VOC compounds were not present above laboratory detection limits. Low concentrations of Trichloroethene (TCE) and Tetrachloroethene (PCE) were recorded in soils sampled from boreholes WS1 and WS2 with the greatest concentrations recorded in shallow soils from WS1 (towards the northwest corner of the Site) on the underside of the ground slab (0.41 mg/kg and 0.44 mg/kg respectively). Concentrations were substantially lower in soils from borehole WS2 where the maximum concentrations of TCE and PERC were 0.064 mg/kg and 0.035 mg/kg respectively.

5.1.7. Asbestos

Asbestos screening carried out on all samples did not detect any asbestos fibres.

5.2. Groundwater

Groundwater was not encountered during the investigation works in sufficient volume to sample. No analysis of groundwater has therefore been completed.

5.3. Soil Gas

Soil gas samples were taken from each of the three site investigation wells (HM-WS1, HM-WS2 and HM-WS3) and from borehole DCS1 located in Greenwood Place (installed in 2013 by Ground Engineering Ltd in support of the former planning application for the redevelopment of Greenwood Place Community Centre).

Samples were analysed by Gradko Environmental and the Top 10 VOCs reported (by adsorbed mass). A summary of results are presented in Table 6.4. Note, the table only lists those VOCs recorded above laboratory detection limits.

Concentrations of trichloroethene (TCE) and tetrachloroethene (PCE) were detected in soil gas sampled from DCS1 and HM-WS2. Concentrations of TCE and PCE were greatest in DCS1 (0.1 mg/m^3 and 1.7 mg/m^3 respectively). PCE and TCE degradation compounds, dichloroethylene and chloroethene (vinyl chloride), were also recorded at lesser concentrations.

Concentrations of TCE and PCE recorded from HM-WS2 were substantially less than those recorded from DCS1 at 0.04 mg/m^3 and 0.09 mg/m^3).

Table 6.3 – Reported concentration ranges and applied Soil Critical Values

VOC	ng on tube	µgm-3*
Borehole HM-WS1		
Tridecane	11.25	5.63
Ethylbenzene	8.52	4.26
Heptane, 2,2,4,6,6-pentamethyl-	6.20	3.10
m/p-Xylene	5.80	2.90
Dodecane	5.12	2.56
Borehole HM-WS2		
Tetrachloroethylene	192.45	96.23
Trichloroethylene	80.59	40.29
Naphthalene	39.50	19.75
Borehole HM-WS3		
1-Hexanol, 2-ethyl-	165.18	82.59
1-Butanol	12.43	6.21
Decane	7.17	3.58
Borehole DCS1		
Tetrachloroethylene	4040	1719.2
Trichloroethylene	258.55	110.02
Ethylene, 1,2-dichloro-, (Z)-	187.56	79.81
Heptane, 2,2,4,6,6-pentamethyl-	184.94	78.7
Ethene, chloro-	148.33	63.12
Ethylene, 1,2-dichloro-, (E)-	92.83	39.5
1-Hexanol, 2-ethyl-	33.47	14.24
Butane, 2-methyl-	10.5	4.47
Cyclohexane, methyl-	5.04	2.15

6. Conceptual Site Model & Preliminary Risk Assessment

A Conceptual Site Model (CSM) is a simplified representation of environmental conditions that enables an understanding of a site and its surroundings to be formulated. It describes the possible relationships between contaminants (sources), pathways and receptors and so underpins the entire risk assessment process. The development of a CSM also highlights data gaps (identifying the data that is required to be collected through further site investigation where required) and is iterative with further data collection phases.

The conceptual mode takes into account the potential contamination pathways that exist for the present and proposed Site development together with the risks that may be presented to neighbouring human and sensitive environmental receptors.

Identified potential on and off site existing receptors are listed in Table 6.1. These have been identified from our earlier reporting, site investigation works and understanding of the wider environmental context.

Table 6.1 – Sensitive Receptors for inclusion in the CSM

Potential Receptor	Reason for Inclusion/Exclusion (potential pathway)
On site	
Shallow Contaminated Soils and Groundwater	Shallow groundwater has not been recorded in sufficient volume to sample. The groundwater where present will be perched and isolated. Prolonged periods of wet weather over winter months may see flows of shallow groundwater. The migration of groundwater and mobility of shallow contaminants within soils may present risk to neighbouring receptors and local surface water. Excavation in the development of basement structures are likely to involve dewatering and may encounter contaminated groundwater. Foundations will comprise a piled solution. Without mitigation, potential exists for contamination in the Made Ground to be drawn down into the Chalk aquifer. The construction of piles also potentially introduces vertical migration pathways.
Site users and staff (future users)	No significant risk is identified to current site users. Risks to site construction workers and future site users are possible from direct contact with underlying Made Ground deposits and from the accumulation and exposure of ground gas and volatiles within building voids and basement structures.
Construction workers and maintenance contractors	The excavation of foundations and exposed soils may expose potential contaminants to construction workers. Contaminants, where present, are likely to be contained in the shallow Made Ground soils. Infilled basements from former residential properties may be presents. Asbestos has not been identified in soils samples but its presence cannot be discounted.
Landscaping	Minimal landscaping is proposed and is limited to roof areas and ground level planters. No risk is considered to be present to future landscaping intention.

Table 6.1 – Sensitive Receptors for inclusion in the CSM

Potential Receptor	Reason for Inclusion/Exclusion (potential pathway)
Building and Services	Entry of soil volatiles into service corridors. Risk of permeation of solvents (TCE and PCE) to water supply pipes.
Off site	
Greenwood Place community centre and neighbouring premises	Neighbouring premises are a potential receptor for onsite contamination to migrate towards through permeable Made Ground and shallow perched groundwater.

There is evidence of low levels of historic solvent contamination within soils underlying the Site. The source of these solvent is strongly suspected to originate from the former neighbouring ICI chemical warehouses to the rear of Greenwood Place. The warehouses are not thought to have operated past the 1960s and this area is now occupied by Greenwood Place Community Centre.

Concentrations of TCE and PCE detected in soil samples and borehole gas samples have all been low. No evidence on onsite sources of these contaminants has been identified.

This preliminary site investigation has recorded shallow Made Ground underlying the ground slab of the A&A Storage unit. Slab thickness ranged between 0.20 m to 0.50 m underlain by between 0.3 m to 0.68 m Made Ground. Firm natural London Clay was proven to 3.0 m depth in all three boreholes.

The redevelopment of the former warehouses in the 1960/70s will likely have removed all above ground chemical storage facilities. It is however possible that pits and drainage runs/trenches (as is reported to have existed) may have been infilled and developed over. Furthermore, it is likely that contamination of soils and perched groundwater will have occurred from leakages and spillages of solvents during the operation of the warehouses.

The concentrations of TCE and PCE (and associated degradation VOCs) recorded in soil samples are low. There is no evidence from this preliminary investigation that significant contamination exist at the Site or that significant harm is presented by any suspected residual contamination of soil underlying the Greenwood Place Community Centre.

Migration of solvents from the former warehouses on to the Site is likely to have been caused historically either by intermittent shallow groundwater flows such as during such as during wet winter period causing TCE and PCE to migrate along the interface between the Made Ground and London Clay, or by lateral permeation of solvent vapour through permeable Made Ground deposits.

As an initial screening exercise, the concentrations of solvents recorded in the borehole gas samples were compared against the Health and Safety Executive's Workplace Exposure Limits EH40 (2011). For TCE, the short and long term workplace limits are 820 mg/m^3 and 550 mg/m^3 respectively. For PCE, the short and long term workplace limits are 689 mg/m^3 and 345 mg/m^3 respectively. The concentrations of TCE and PCE recorded in Site boreholes were all at least several thousand times lower than these limits.

As an absolute worst-case scenario, assuming current worker are exposed to airborne solvent concentrations equivalent to those detected in soil gas samples, no risk to current site worker is identified.

Furthermore, the proposed development of the Site would entail the total removal of all Made Ground deposits and several metres of underlying clay for the construction of the basement. The basement foundations will be supported by a secant pile wall, effectively forming a barrier to soils and groundwater outside of the Site boundary.

It is possible that pocket of contamination may exist on Site and further site investigation will be required post-planning the following the clearance of the existing site buildings. On the basis of this preliminary site investigation no significant constraints regarding difficult Made Ground or contamination have been identified that prohibit the redevelopment of the site for residential use.

Although subject to further investigation, special precaution will likely be required for the handling, stockpiling and disposal of excavation arisings during the development of the basement. Suitable measures may include the monitoring of perimeter air quality and dust deposition, provision of clean and dirty working areas, vehicle wash, limiting of stockpile volumes, dust suppression water sprays and waste classification. These actions will fall to the responsibility of the groundworks contractor and protocols set out within their Construction Environmental Management Plan.

7. Conclusions and Recommendations

This preliminary site investigation has recorded the present of TCE and PCE solvents in soils underlying the site. The levels of contamination are low and no risk is identified to current site users.

The source of contamination is strongly suspected to have originated from the neighbouring former chemical warehouse (now Greenwood Place Community Centre) that was operated by ICI in around the 1950s. Site attendance records by ICI in the 1940s and 1950 confirm the storage and distribution of TCE solvent from this warehouse.

No other evidence of contamination was identified.

Further investigation will be necessary post planning and following clearance of existing Site buildings.

7.1. BREEAM 2014 New Construction

The redevelopment of the Site will be subject to the BREEAM 2014 New Construction assessment. BREEAM credit LE 01 'Site selection' considers development on Contaminated Land. The credit requirements are as follows:

- A contaminated land professional's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified:

  a. The degree of contamination

  b. The contaminant sources/types

  c. The options for remediating sources of contamination which present an unacceptable risk.

- The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land professional.

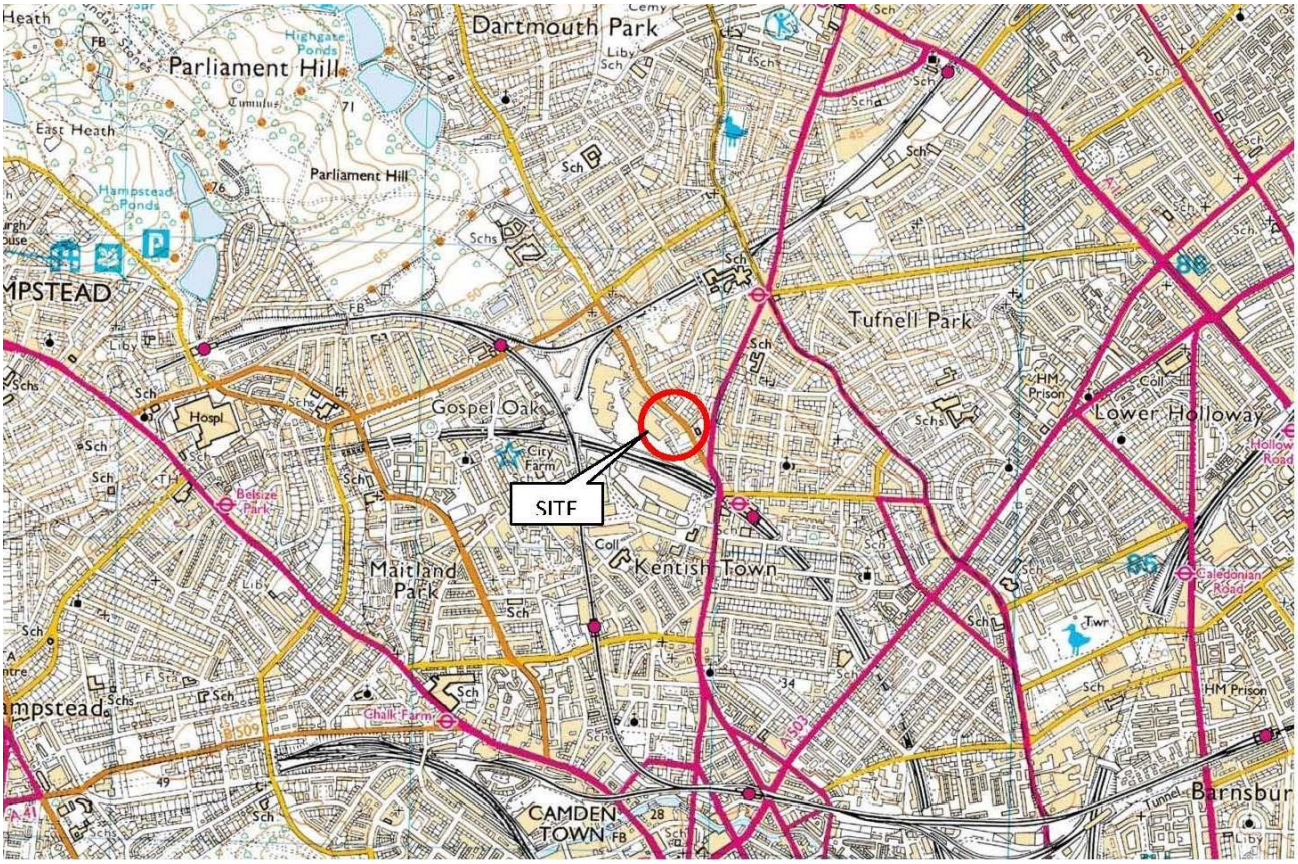
This preliminary site investigation has identified contamination on the Site that without mitigation could present harm to construction worker and future site users.

Further assessment is required to conduct more detailed site investigation and risk assessment. The remediation strategy for the Site would comprise mitigation including the total excavation and removal of all Made Ground and from across the application site and the construction of a secant pile wall around basement development.

Development of the remediation strategy would follow the completion of further studies and form an integral element of the Contractor's Construction Environmental Management Plan. Special precaution will likely be required for the handling, stockpiling and disposal of excavation arisings during the development of the basement. Suitable measures may include the monitoring of perimeter air quality and dust deposition, provision of clean and dirty working areas, vehicle wash, limiting of stockpile volumes, dust suppression water sprays and waste classification.

Subject to confirmation by the BREEAM assessor, one credit is achieved for the redevelopment of site on contaminated land.

Appendix A – Site Location Plan



Site Location Plan – Source Ordnance Survey © Crown copyright Licence 150000033

Appendix B – ICI Greenwood Place – Notes of Site Attendance

M/CK/286

IMPERIAL CHEMICAL INDUSTRIES, LIMITED.
GENERAL CHEMICALS DIVISION.
CASTNER-KELLNER WORKS.

14198

KENTISH TOWN - TRICHLORETHYLENE.

CIRCULATION:

Mr. E. V. Ashall
Mr. J. A. Robertson (3)
Mr. H. Shaw
Mr. G. E. Wainwright
Mr. T. Wallace

ISSUED BY : H. SHAW

AUTHOR : G. H. PRESTON

REPORT NO. : M/CK/286.

DATE : 4th March, 1947.

A visit was made on 14th January to the I.C.I. depot at Kentish Town, London, to see their Trichlorethylene drum packing arrangements, so that a considered reply could be made to a request from the Sales depot manager for comment on the man hours used to maintain the required drum output from the depot.

GENERAL.

The distribution of Trichlorethylene to the London area is handled largely through the depot at Kentish Town and delivery of material is made therefrom either in drums or in bulk by road tanker.

The drum orders for M.D. and Triklone grades are supplied from a stock of packed drums of the various standard sizes which is maintained there by shipment from Runcorn, and/or by packing on the spot from storage tanks filled by bulk transfer in rail tanks from either Runcorn or Hillhouse.

The Trichlorethylene packing section is located in one of the rooms on the ground floor of the depot and is equipped with three overhead storage tanks, each of 20 tons capacity, two being for M.D. grade and the third for Triklone. These are filled by blowing Trichlorethylene from rail tanks, located on an adjacent siding, by means of a small air compressor; the time taken to discharge a 16 ton rail tank is about 3 hours at present, but modifications to the general handling facilities at the depot are under consideration and include for an increase in the capacity of this machine to speed up the operation.

The storage tanks are connected through independent lines, filters and valves for the M.D. and Triklone grades to a weighing machine for drum filling and also via a booster pump to a point on the road frontage of the depot for the filling of the road tank.

Empty drums are fed into the shed from road or rail discharge points and stocked therein ready for attention by the reconditioning and filling labour. Full drums are similarly shipped either by road or rail, the handling being carried out by a general labouring gang.

DRUM PACKING.

The reconditioning and filling of the drums with Trichlorethylene are carried out by two men working on days, whose duties also include the discharge of the full rail tanks into the plant storage vessels and the filling of the road tanker. These latter items are outside the present examination and allowance will be made for the time allocated to them.

The work carried out by the men on the drums is as follows:

(a) Reconditioning.

The drums are taken from the empty drum stock pile and examined internally and externally. If the drum is in poor mechanical condition, or if sound but dirty internally, it is put on one side for return to Runcorn. If the drum is sound and reasonably clean, the end bung is examined, re-washered if necessary, and tightened up.

The drum is then rinsed out with clean Trichlorethylene and the main bung replaced loosely. Finally the drum number from the previous trip is painted over, and the drum placed close to the scale for the attention of the filler.

(b) Packing.

The drum is taken by the second man and transferred to the scale, the tareweight checked, the bung removed and the filling nozzle placed in the drum. The drum is then filled with either M.D. or Triklone to the correct weight, the bung re-fitted and tightened down and the drum rolled from the scale to a suitable position for shipping. The new drum number is stencilled on the drum, and the bung sealed if the shipment is to be by rail.

The filling time varies with the head in the overhead tanks but averages three to four minutes, during part of which the operator is attending to the positioning and stencilling of the previous drum.

ANALYSIS OF OPERATION.

The number of drums handled by the men during the September quarter, 1946, has been taken as the basis for an analysis of the rate of working on the Trichlorethylene packing operation at Kentish Town, and the following basic information has been extracted from the relevant packing and time sheets.

1. The weight of Trichlorethylene packed into drums varied from 5 to 18 tons/day with a total for the period of 1186 tons.

2. The number of drums handled during the period was:

	50 gall.	20 gall.	10 gall.	5 gall.
M.D.	2108	549	325	34
Triklone	1048	409	67	30
Total	3156	958	392	64

giving a total for all sizes of 4566, the daily quantity varying from 12 to 73 drums.

3. The total hours worked by the two men in the quarter = 1626.5 hours. The number of hours engaged on rail tank discharging and road tank filling has been estimated, assuming that the time for road tanks is two man-hours/tank, and on rail tanks 50 man-minutes/tank. These figures have been suggested by the Kentish Town staff and appear reasonable as the operations are performed at present.

This gives an estimated tank figure of 266 man hours,

whence the hours engaged on drum filling were 1360.5 hrs.

From this information the average figures are:

Drums/man hour	3.35 drums
Minutes/drum	17.9 minutes
Man hours/ton	1.15 hours

It is not possible to compare these figures directly with those obtained at Runcorn, since the operation as performed at Kentish Town includes items which are allocated in the case of the Castner-Kellner plant, to the three main heads of Package Maintenance, Packing and Weighing, and Loading and Shipping, and consequently, the analysis of the C.K. cost sheets is of little use.

It is possible, however, to assess the work done for a reasonable rate of working in preparing and filling the drums, using as a basis the figures obtained during a recent study of the Castner-Kellner packing plant made by the Time and Motion Study Department.

The values suggested in this study have been modified slightly to allow for the differences in the routine followed and the plant layout at Kentish Town and the figures used are as follows, the unit being the 'stam', i.e., the standard time unit used in Time Study.

Operation.	50 gall.	20 gall.	10 gall.	5 gall.
1. Obtain empty drum, wash and prepare for filling.	6.0	6.0	4.2	2.7
2. Fill drum and place aside.	3.0	2.5	2.3	2.1
3. Roll away to storage point, stencil number on drum and seal, if necessary.	3.0	3.0	3.0	3.0

Now applying these values to the Kentish Town data, the average number of drums handled/man hour was 2.32 x 50 gall. + 0.7 x 20 gall. + 0.29 x 10 gall. + 0.05 x 5 gall., and hence the stams performed on the various operations during each man hour while engaged on drum packing, were as follows:

Operation.	50 gall.	20 gall.	10 gall.	5 gall.	stams.
1	14	4.2	1.2	0.13	19.53
2	7	1.75	0.66	0.10	9.51
3	7	2.1	0.87	0.15	10.12
Total					39.16

3. continued.

This figure of 39.2 stams/man hour indicates a reasonable rate of working for the men, a total of 40 stams/hour having been found to be the average working rate on various other jobs investigated.

CONCLUSION.

The analysis of the production figures on the Trichlorethylene drum packing at Kentish Town shows that the men are working at a reasonable average rate and have averaged a daily packing programme of:

39.5	x 50-gallon drums
12	x 20-gallon drums
5	x 10-gallon drums
1	x 5-gallon drums

This is rather below the required daily figures but it is apparent from the examination of the daily sheet that this has been exceeded on many occasions, a total of 73 drums being obtained in several cases, indicating a rate of working above the normal average.

On other occasions the daily figures fell to twelve drums and while this was in part due to the time taken in discharging rail tanks and filling road tanks, it is reported by the Kentish Town staff that some reduction in rate was certainly due to shortage of either drums or material.

It is felt, therefore, that, providing no shortage of drums and/or material is experienced, a daily packing programme of 45 x 50, 15 x 20, 5 x 10 and 1 x 5-gallon drums, corresponding to an output of 45.3 stams/man hour, could be handled in a normal 47-hour week, but that time taken in handling tanks would have to be made up in overtime working, unless alternative arrangements could be made.

Some improvement could be made in the tank handling times, but the plans in hand for the general re-organisation of the handling facilities at the depot will probably produce the required effect.

G. H. Preston.

C.E.D. File.

gc063/1/4852

S/CED.47.268

IMPERIAL CHEMICAL INDUSTRIES LIMITED

GENERAL CHEMICALS DIVISION

CHIEF ENGINEER'S DEPARTMENT.

CONFIDENTIAL

PROPOSED EXTENSIONS AT THE I.C.I. WAREHOUSE AT KENTISH TOWN.

Circulation:-

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   Mr. G.K. Hampshire.)
   Mr. J.A. Robertson.)
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6. Mr. E.V. Ashall.
7. Mr. T.E. Houghton.
8. Mr. P. Brett.)
   Mr. A. Eastwood.)

9/10 C.E.D. File.

AUTHOR: A. Eastwood.

SUBMITTED BY: P. Brett.

REPORT NO: S/CED/47/268.

ISSUED BY: F.H. Bramwell.

DATE: 2.10.47.

COPY NO: 9.

SUMMARY:

This estimate which has been prepared at the request of Mr. T. Jeavons of the Sales Depot Department covers the cost of purchase and installation of the mechanical equipment required for a proposed extension. The cost estimate for the building and civil engineering work has been prepared and submitted by I.C.I. Estates Department, Winnington.

The extension consists of equipping the depot for bulk storage and packing of Sodium Hypochlorite, increasing the storage capacity for Trichlorethylene, and providing improved facilities for dealing with rail traffic. A more detailed description of the work involved in the various sections is appended together with a list of drawings.

According to contractors quotations, on which the cost of the major items of equipment and erection are based, it will take about two years from the date of sanction to complete the work.

The total estimated cost of the mechanical portion of the project is summarised as follows:-

	£.
(a) Sodium Hypochlorite bulk storage and packing	3,770
(b) Extension to Trichlorethylene storage	1,020
(c) Discharge points for rail tanks	1,110
(d) Air compressor and Sodium Hypochlorite pump	630
(e) Loading platform for rail traffic	650
(f) Electric winch on railway siding	650
(g) Power wiring and lighting	670
	8,500
G.C. Division engineering services 7½%	637
	9,137
Contingencies 10%	913
	10,050
Slewing railway siding (to be carried out by L.M.S. Rly. Co.)	120
Total	£10,170

The estimated weight of steel required for plant and plant structures is 63½ tons.

GENERAL DESCRIPTION OF PROJECT:

(a) Sodium Hypochlorite bulk storage and packing.

Storage for the product will be provided by four 18 ton capacity tanks elevated on a structure above the roof of 'S' section of the warehouse. The tanks will be of Mild Steel Welded Construction lined with cement and will be provided with depth gauges indicating at ground floor level the liquor depth in the tanks.

The pipework interconnecting the tanks, which will be partly asbestos cement and partly rubber lined mild steel will incorporate branches and valves at ground floor level to which hoses may be connected for packing the product into carboys and jars.

Facilities will be provided in Section 'S' for package washing consisting of jets arranged in a sump and connected to the water service.

(b) Extension to the Trichlorethylene storage.

An additional storage tank of similar construction to the existing ones but of 40 gallons capacity will be installed, equipped with depth gauge, filter, and pipe connections to the present packing point. The existing structures will require to be extended to support the new tank.

(c) Discharging points for rail tanks.

Three berths for discharging tank wagons will be arranged on the outer siding in positions agreed by the L.M.S. Railway Company. Each berth will have discharge pipes for Ammonia, Trichlorethylene and Sodium Hypochlorite, which will be carried in a trench under the inner siding to the main building and on to the respective stock tanks. A compressed air service will also be connected to each berth for discharging Ammonia and Trichlorethylene and for clearing the Hypochlorite pipes when not in use.

It will be necessary to slew the outer siding in order to provide the required clearance between the two sidings for discharging operations, and the L.M.S. Railway Company have undertaken to carry out this work and will debit I.C.I. with the cost.

(d) Air Compressor and Sodium Hypochlorite pump.

A new air compressor of larger capacity will replace the present small one to facilitate quicker discharge of rail tanks. The capacity of the new machine will be 30 cu. ft. per min. free air compressing to 80 lb. per sq. inch. (gauge) pressure.

A pump of rubber lined mild steel construction will be provided for transferring Hypochlorite from rail tanks to stock. It is proposed to use a 'Tungstone' air operated pump for this duty.

(e) Loading platform for rail traffic.

A platform extending the full length of the warehouse on the railway side will be erected at wagon height to provide access between the warehouse and any point on the inner siding for loading and offloading packed goods.

(f) Siding Winch.

To facilitate marshalling of railway trucks on the inner and outer sidings, an electrically operated capstan will be provided in a convenient position between the two sidings. The equipment visualised will be capable of handling 5 wagons at a speed of 75 ft. per min.

(g) Electric power wiring and lighting.

The local electricity authority (The Metropolitan Borough of St. Pancras) have confirmed that the existing incoming electrical service is adequate for the additional load. The electrical work involved, therefore, is confined to the installation within the warehouse which comprises additional distribution boards, power wiring to the goods lifts, air compressor and siding winch, and lighting wiring and fittings in Section 'S' for Sodium Hypochlorite packing.

DRAWINGS:

The following drawings have been prepared as a basis for estimating and tendering:-

(1) General arrangement of extension to depot at Kentish Town Drg. No.SVM.78507A.

(2) Details of cement lined storage tank 18 tons capacity Sodium Hypochlorite Drg. No.SVM.78439.

(3) Steel structure for 18 ton Sodium Hypochlorite tanks Drg. No.SVM.78424.

(4) Arrangement for carboy washing. Drg. No.SVM.78486.

(5) Details of 40 ton Trichlorethylene tank Drg. No.SVM.77963.

(6) Details of Rail Tank discharge points. Drg. No.SVM.78402A.

(7) Arrangement of pump and compressor house. Drg. No.SVM.78497.

(8) Loading platform. Drg. No.SVM.78506.

CED/AE/VBW.
2.10.47.

MR. H. SHAW.

GCD 63/1/5169

3026
6 copies

M/CK/540

IMPERIAL CHEMICAL INDUSTRIES LIMITED
GENERAL CHEMICALS DIVISION
CASTNER-KELLNER WORKS

VISIT TO KENTISH TOWN DEPOT ON 16TH MARCH, 1954, TO INSPECT TRICHLORETHYLENE DRUM FILLING ARRANGEMENTS.

The purpose of this note is to describe the present arrangements and to recommend certain modifications to the filling procedure used for solvent drums at the Kentish Town Depot.

CIRCULATION:

Mr. James A. Robertson for attention,

Mr. T. Wallace)
Mr. D. R. Hunter) for information.

Mr. H. Shaw,
Dr. G. H. Preston.

Report No: M/CK/540.

Author: G. H. Preston.

Issued by: H. Shaw.

Date: 24th May, 1954.

VISIT TO KENTISH TOWN DEPOT ON 16TH MARCH, 1954,
TO INSPECT TRICHLORETHYLENE DRUM FILLING ARRANGEMENTS.

PRESENT:

Mr. P. E. Elmore - Distribution Manager, Southern Region,
Mr. G. W. Towler - Superintendent, Kentish Town Depot,
Mr. H. Miller - Deputy " " " "
Dr. G. H. Preston - Castner-Kellner Works.

The visit was made to see the procedure adopted at the Kentish Town depot for the reconditioning and filling of trichlorethylene drums and to discuss any alterations needed to avoid repetition of recent complaints of contamination in material supplied from this point.

Other matters reviewed during the visit included the high loss of material during the repacking.

1. Reconditioning.

Drums returned to Kentish Town are inspected on receipt and sorted according to their condition. Those in poor physical condition or heavily contaminated with oil, water or scale or showing internal rusting are collected and ultimately returned to Runcorn for appropriate treatment. Of the remainder about 15% are washed out with trichlorethylene before filling, while the rest are filled without any further treatment.

The drums available during the visit were inspected and the action that would normally have been taken in the various cases was discussed with the reconditioners and with Mr. Elmore.

In all, ten drums were examined with the following results:

(a) One drum was in poor internal condition showing much zinc oxide scale and some exposed steel which had rusted. This container would rightly have been rejected by the team.

(b) Two showed a deposit of whitish material inside the drum and would have been washed out by the reconditioners. This is the correct procedure.

(c) Four were in reasonable internal state but showed traces of moisture. There is no method available at Kentish Town by which this contamination could have been removed and these drums would have been re-filled without further treatment since the amount of moisture was small. Drums containing much water would have been put on one side for return to Runcorn.

These drums should have been dried out with hot air before filling and equipment to do this should be installed at Kentish Town.

(d) The remaining three were in good condition and appeared to be satisfactory for re-filling. This would normally be done without rinsing out.

The preferred method would be to rinse out all drums before filling.

This assortment of drums provided examples of the various types of drums normally encountered and enabled the position to be properly assessed and discussed.

Two main points of difference between the procedure used at Kentish Town and Runcorn are apparent, namely

(i) The drums containing moisture are not dried before filling and

(ii) Only a relatively small proportion of the drums are rinsed out before re-packing.

At present drum drying cannot be adopted as there is no equipment available. This should therefore be provided as soon as possible and since no steam is available in the building, it will be necessary to use an electrical heater to provide the hot air for drying the drums.

The rinsing out of the drums should be extended and arrangements made to wash out all the containers. The best means of doing this was discussed with the staff and mention was made of a unit now being designed for the Runcorn plant which would replace the present method of adding a small quantity of solvent to the container, rolling it about or agitating by some method and emptying it away. This system is not efficient and is wasteful. In the new technique the drum will be positioned over a nozzle and the inside sprayed with solvent which will discharge into a sump carrying any scale or other contamination away with it. This unit is not yet completed, as was hoped, but trials have shown promise and it is expected that the prototype will be in operation shortly. Details will be forwarded later but in the meantime the present method should be used.

The incorporation of these modifications into the drum reconditioning process at Kentish Town will require an alteration in the bonus scheme now in use. This matter was briefly discussed and it is understood that it should not present any great difficulty.

The disposal of drums unsuitable for filling on account of physical condition or serious contamination with oil or water was discussed and the possibility of sending obviously scrap drums to a local scrap merchant was raised. It is, however, considered that the present practice of sending such drums to Runcorn should be continued.

2. Solvent Losses.

It was reported that the losses occurring during re-packing amounted to about 3% of the total turnover. This represents about 330 tons/year and was naturally causing some concern.. The various possible sources of known losses had been considered and these were reviewed during the visit.

(a) Amount left in the Tankers. It was pointed out that tankers returned to the Works were weighed and credit allowed for any appreciable amount left in them. As far as was known at the time, it was rarely necessary to do this and the material lost in this way was thought not likely to be significant. It was agreed, however, that tare weights of tankers returned to the Works would be obtained to confirm this point. This has been done and the weights have shown that the difference between actual weight of the wagon and its tare weight was about two quarters as an average figure. This amounts to about 0.25% on the contents of the tank.

It was suggested thatthis point should be checked at Kentish Town by passing the tankers over a weighbridge in and out of the depot.

(b) Losses during blowing over into the stock tanks. It is apparently sometimes the case that when the rail tank is empty the air from it is allowed to discharge through the stock tanks. This will blow to atmosphere over the surface of the solvent in the head tanks and will carry some vapour away with it. This will undoubtedly increase the losses but the amount will normally be small and a calculation showed that even if the rail tank were full of air, at say 20 lbs./sq.in. pressure, and all this discharged to atmosphere over the tanks, it would carry away as vapour only about 15/20 lbs. for each rail tank, or about 0.08%. Spray losses might increase this but not, it is felt, significantly.

(c) Inaccurate weighing. The weighing machines in use have an illuminated scale showing the weight on the platform. It was stated that owing to occasional spillage the knife edges lost their protective film of grease and became worn and inaccurate. A device to protect them from such solvent action was being made.

A number of drums were seen filled during the visit and some were check-weighed on another machine. Two of these taken at random contained 16 lbs. above the scheduledamount which corresponds to 2.2% overweight. The reason for this could have been the condition of the knife edges but it is thought that a contributory cause was the filling nozzle catching the edge of the charging hole. This was pointed out to Mr.Elmore and the packers and it was recommended that care should be taken to ensure that the drum was positioned properly in order to avoid any interference between the nozzle and the drum.

Recommendations.

As a result of this visit the following modifications to procedure were recommended to Mr. Elmore and are now confirmed:

(1) That a hot air drum drier should be installed at Kentish Town so that any drums containing moisture can be dried before filling.

(2) That in future all drums should be rinsed out with solvent before re-filling.

(3) That care should be taken to ensure that the drum is properly positioned on the scale to avoid the filling nozzle fouling the side of the bung hole.

----- oOo -----

Appendix C – Factual Report on Ground Investigation

FACTUAL REPORT ON GROUND INVESTIGATION

GREENWOOD PLACE, KENTISH TOWN, LONDON NW5 1LB

Client: **FORTNUM DEVELOPMENTS LTD**
c/o 19 Greenwood Place, Kentish Town, London NW5 1LB

Consulting Engineers: **HILSON MORAN**
Shackleton House, Hay's Galleria
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Report ref: **9886/JRCB/OT**

Date: **3rd December 2015**

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FACTUAL REPORT ON GROUND INVESTIGATION

GREENWOOD PLACE, KENTISH TOWN, LONDON NW5 1LB

DOCUMENT ISSUE STATUS:

Issue	Date	Description	Author	Checked
Rev 0	03/12/15	First issue	John Bartley BSc, MSc, CGeol, FGS	Opher Tolkovsky BSc, MSc, DIC, CGeol, FGS

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2.0 Site Description 1
3.0 Exploratory Work 1

APPENDIX

- Borehole records
- General soil suite and VOC/SVOC analyses
- Site Plan

1.0 INTRODUCTION

A ground investigation has been carried out at this site on behalf of Fortnum Developments Ltd. The investigation was commissioned by Hilson Moran, who specified the scope of works, and comprised the following elements:

- Window sample boreholes
- Identification of ground sequence and ground-water levels
- Analysis for a general suite of contaminants and VOC/SVOC measurement

A factual report was requested.

2.0 SITE DESCRIPTION

The site is located in the Kentish Town area and fronts onto Greenwood Place, which forms the north-western and south-western site boundaries. A car park and Day Centre are present to the north-east and the Christ Apostolic Church is present to the south-east.

At the time of our investigation the site was formed by a two-storey warehouse type building which was being use as a self-storage facility.

3.0 EXPLORATORY WORK

The ground investigation was carried out in November 2015 and comprised the following elements:

Window sample boreholes

Three boreholes (WS1 to WS3) were completed within the existing building at locations indicated by Hilson Moran. All three boreholes were taken to a depth of 3.0m below existing slab level and 35mmID monitoring pipes were installed to the full borehole depths. Gas taps and flush steel covers were fitted on completion.

Contamination

Soil samples were delivered to a specialist laboratory (QTS Environmental Ltd) and the following analyses were completed:

- 6no general contamination suite
- 6no SVOC/VOC suites

The borehole records and the results of the laboratory testing are included in the Appendix, together with a Site Plan which identifies the borehole locations.

GENERAL INFORMATION, LIMITATIONS AND EXCEPTIONS

Unless otherwise stated, our Report should be construed as being a Ground Investigation Report (GIR) as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report (GDR) as defined in EN1997-2. Any 'design' recommendations which are provided are for guidance only and are intended to allow the designer to assess the results and implications of our investigation/testing and to permit preliminary design of relevant elements of the proposed scheme.

The methods of investigation used have been chosen taking into account the constraints of the site including but not limited to access and space limitations. Where it has not been possible to reasonably use an EC7 compliant investigation technique we have adopted a practical technique to obtain indicative soil parameters and any interpretation is based upon our engineering experience and relevant published information.

The Report is issued on the condition that Soil Consultants Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during our investigation. In addition Soil Consultants Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata both between the exploratory points and/or below the maximum depth of the investigation; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.

Comments made relating to ground-water or ground-gas are based upon observations made during our investigation unless otherwise stated. Ground-water and ground-gas conditions may vary with time from those reported due to factors such as seasonal effects, atmospheric effects and and/or tidal conditions. We recommend that if monitoring installations have been included as part of our investigation, continued monitoring should be carried out to maximise the information gained.

Specific geotechnical features/hazards such as (but not limited to) areas of root-related desiccation and dissolution features in chalk/soluble rock can exist in discrete localised areas - there can be no certainty that any or all of such features/hazards have been located, sampled or identified. Where a risk is identified the designer should provide appropriate contingencies to mitigate the risk through additional exploratory work and/or an engineered solution.

Where a specific risk of ground dissolution features has been identified in our Report (anything above a 'low' risk rating), reference should be made to the local building control to establish whether there are any specific local requirements for foundation design and appropriate allowances should be incorporated into the design. If such a risk assessment was not within the scope of our investigation and where it is deemed that the ground sequence may give rise to such a risk (for example near-surface chalk strata) it is recommended that an appropriate assessment should be undertaken prior to design of foundations.

Where spread foundations are used, we recommend that all excavations are inspected and approved by suitably experienced personnel; appropriate inspection records should be kept. This should also apply to any structures which are in direct contact with the soil where the soil could have a detrimental effect on performance or integrity of the structure.

Ground contamination often exists in small discrete areas - there can be no certainty that any or all such areas have been located, sampled or identified.

The findings and opinions conveyed in this Report may be based on information from a variety of sources such as previous desk studies, investigations or chemical analyses. Soil Consultants Limited cannot and does not provide any guarantee as to the authenticity, accuracy or reliability of such information from third parties; such information has not been independently verified unless stated in our Report.

Our Report is written in the context of an agreed scope of work between Soil Consultants Ltd and the Client and should not be used in any different context. In light of additional information becoming available, improved practices and changes in legislation, amendment or re-interpretation of the assessment or the Report in part or in whole may be necessary after its original publication.

Unless otherwise stated our investigation does not include an arboricultural survey, asbestos survey, ecological survey or flood risk assessment and these should be deemed to be outside the scope of our investigation.

(Rev_1_08_03_2013)

APPENDIX

- Borehole records
- General soil suite and VOC/SVOC analyses
- Site Plan

Site & Location:	**Greenwood Place** **Kentish Town, London NW5 1LB**	Borehole No:	**WS1**
Client:	**Fortnum Developments Ltd**	Coordinates:	Sheet 1 of 1
Engineer:	**Hilson Moran**	Ground Level:	Report No: 9886/JRCB

Progress & Observations	Samples & Tests Type	Samples & Tests Depth (m)	Field Test Results	Strata Depth (m)	Strata Level (m)	Legend	Strata Descriptions	Backfill / Installation
BH carried out on 13 November 2015							CONCRETE	
				0.22				
	PID	0.30	0.0	0.30			MADE GROUND: silty sandy crushed brick fragments and hardcore	
BH dia: 95mm reducing with depth	E	0.30					MADE GROUND: soft to firm brown silty clay with occasional brick fragments and pockets of ash	
	E	0.50						
	PID	0.75	0.2					
	PID	0.90	0.2	0.90			Firm brown slightly silty CLAY with occasional fine gravel	
	E	0.90						
	PID	1.00	0.1					
	D	1.75						
	D	2.25						
				2.50			Firm brown very gravelly CLAY	
	D	2.75						
BH complete at 3.00m Dry on completion				2.80			Firm to stiff brown slightly silty CLAY with occasional black flecks	
	D	3.00		3.00			End of borehole at 3.00m	

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub SPT/S = split spoon SPT/C = solid cone HV = Hand Vane [kPa]
PP = Pocket Penetrometer [kg/cm²] PID = Photo Ionisation Detector [ppmv] * = full SPT penetration not achieved - see summary sheet

Borehole type: Window Sample

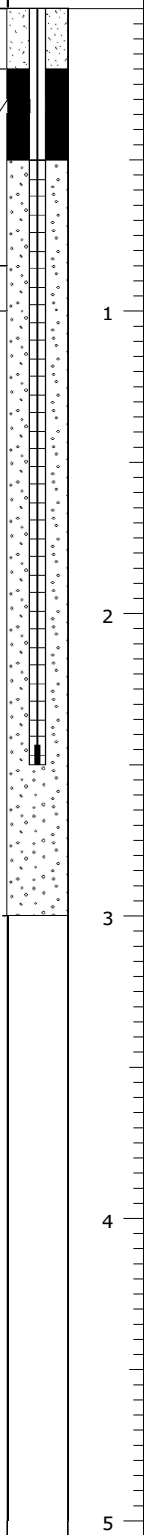
Remarks: Monitoring pipe (35mm ID) installed to 3.00m depth

Borehole No: **WS1**

Soil Consultants

Site & Location:	**Greenwood Place** **Kentish Town, London NW5 1LB**	Borehole No:	**WS2**
Client:	**Fortnum Developments Ltd**	Coordinates:	Sheet 1 of 1
Engineer:	**Hilson Moran**	Ground Level:	Report No: 9886/JRCB

Progress & Observations	Samples & Tests Type	Samples & Tests Depth (m)	Field Test Results	Strata Depth (m)	Strata Level (m)	Legend	Strata Descriptions	Backfill / Installation
BH carried out on 13 November 2015							CONCRETE	
	PID	0.25	0.2	0.20			MADE GROUND: silty sandy brick hardcore with occasional flint gravel	
	E	0.25		0.30			MADE GROUND: firm brown and brown/grey silty gravelly clay with frequent brick fragments. Occasional pockets of ash, mortar and grey slightly humic silty sand	
BH dia: 95mm reducing with depth	PID	0.50	0.1					
	E	0.50						
	PID	0.75	0.1					
	PID	0.85	0.1	0.85			MADE GROUND: firm brown slightly silty clay with black flecks and occasional brick fragments	
	E	0.85						
	PID	1.00	0.1	1.00			Soft to firm becoming stiff brown silty CLAY with occasional grey/blue veins and pale brown silt partings	
	E	1.00						
	D	1.25						
	D	1.75						
	D	2.00						
	D	2.50						
BH complete at 3.00m Dry on completion								
	D	3.00		3.00			End of borehole at 3.00m	



Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub SPT/S = split spoon SPT/C = solid cone HV = Hand Vane [kPa]
PP = Pocket Penetrometer [kg/cm²] PID = Photo Ionisation Detector [ppmv] * = full SPT penetration not achieved - see summary sheet

Borehole type: Window Sample

Remarks: Monitoring pipe (35mm ID) installed to 3.00m depth

Borehole No: **WS2**

Soil Consultants

Site & Location:	**Greenwood Place** **Kentish Town, London NW5 1LB**	Borehole No:	**WS3**
Client:	**Fortnum Developments Ltd**	Coordinates:	Sheet 1 of 1
Engineer:	**Hilson Moran**	Ground Level:	Report No: 9886/JRCB

Progress & Observations	Samples & Tests Type	Samples & Tests Depth (m)	Field Test Results	Strata Depth (m)	Strata Level (m)	Legend	Strata Descriptions	Backfill / Installation
BH carried out on 13 November 2015							CONCRETE (two layers)	
BH dia: 95mm reducing with depth				0.50			MADE GROUND: silty sandy brick hardcore with occasional flint gravel	
	PID E	0.60 0.60	0.1	0.70			MADE GROUND: dark brown very silty clay/clayey silt with black ash pockets and occasional brick and clinker fragments	
	PID E	0.80 0.80	0.1	0.80			Firm brown silty CLAY with occasional black flecks	
	E	1.00		1.00			Firm becoming stiff brown silty CLAY with occasional grey/ blue veins and pale brown silt partings	
	PID D	1.50 1.50	0.1					
	PID D	2.00 2.00	0.0					
	D	2.50						
BH complete at 3.00m Dry on completion								
	PID D	3.00 3.00	0.0	3.00			End of borehole at 3.00m	

1 2 3 4 5

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub SPT/S = split spoon SPT/C = solid cone HV = Hand Vane [kPa]
PP = Pocket Penetrometer [kg/cm²] PID = Photo Ionisation Detector [ppmv] * = full SPT penetration not achieved - see summary sheet

Borehole type: Window Sample

Remarks: Monitoring pipe (35mm ID) installed to 3.00m depth

Borehole No: **WS3**

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John Bartley
Soil Consultants Ltd
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Lenham Heath
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ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 15-37817

Site Reference:	Greenwood Place, Kentish Town, London NW5 1LB
Project / Job Ref:	9886/JRCB
Order No:	None Supplied
Sample Receipt Date:	18/11/2015
Sample Scheduled Date:	18/11/2015
Report Issue Number:	1
Reporting Date:	02/12/2015

Authorised by:

Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Director
On behalf of QTS Environmental Ltd

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
QTS Environmental Report No: 15-37817	**Date Sampled**	13/11/15	13/11/15	13/11/15	13/11/15	13/11/15
Soil Consultants Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Greenwood Place, Kentish Town, London NW5 1LB	**TP / BH No**	WS1	WS2	WS3	WS1	WS2
Project / Job Ref: 9886/JRCB	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.50	0.50	0.80	0.90	1.00
Reporting Date: 02/12/2015	**QTSE Sample No**	178402	178404	178406	179596	179598

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.4	7.4	7.5	8.2	8.0
Electrical Conductivity	uS/cm	< 5	NONE	482	640	463	604	447
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Total Sulphate as SO_4	mg/kg	< 200	NONE	973	2900	922	668	530
Total Sulphate as SO_4	%	< 0.02	NONE	0.10	0.29	0.09	0.07	0.05
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	152	1110	310	154	154
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.15	1.11	0.31	0.15	0.15
Total Sulphur	%	< 0.02	NONE	0.03	0.11	0.05	0.02	< 0.02
Organic Matter	%	< 0.1	MCERTS	2.5	2	1	0.7	0.1
Arsenic (As)	mg/kg	< 2	MCERTS	18	16	10	9	7
W/S Boron	mg/kg	< 1	NONE	1.6	1.8	1.7	1.1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	20	18	49	23	29
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	36	43	27	16	6
Lead (Pb)	mg/kg	< 3	MCERTS	272	496	84	65	12
Mercury (Hg)	mg/kg	< 1	NONE	1.5	1.3	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	16	14	29	13	11
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	68	73	79	48	44
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	< 6	13	< 6	< 6	< 6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

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

Asbestos Analyst: Graham Revell

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported “Loose Fibres - PT” with type(s).

Subcontracted analysis (S)

QTS Environmental Ltd
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Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate							
QTS Environmental Report No: 15-37817	**Date Sampled**	13/11/15					
Soil Consultants Ltd	**Time Sampled**	None Supplied					
Site Reference: Greenwood Place, Kentish Town, London NW5 1LB	**TP / BH No**	WS3					
Project / Job Ref: 9886/JRCB	**Additional Refs**	None Supplied					
Order No: None Supplied	**Depth (m)**	1.00					
Reporting Date: 02/12/2015	**QTSE Sample No**	179600					

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025	Not Detected				
pH	pH Units	N/a	MCERTS	7.9				
Electrical Conductivity	uS/cm	< 5	NONE	413				
Total Cyanide	mg/kg	< 2	NONE	< 2				
Total Sulphate as SO_4	mg/kg	< 200	NONE	544				
Total Sulphate as SO_4	%	< 0.02	NONE	0.05				
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	144				
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.14				
Total Sulphur	%	< 0.02	NONE	< 0.02				
Organic Matter	%	< 0.1	MCERTS	1				
Arsenic (As)	mg/kg	< 2	MCERTS	7				
W/S Boron	mg/kg	< 1	NONE	1.2				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2				
Chromium (Cr)	mg/kg	< 2	MCERTS	37				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	17				
Lead (Pb)	mg/kg	< 3	MCERTS	10				
Mercury (Hg)	mg/kg	< 1	NONE	< 1				
Nickel (Ni)	mg/kg	< 3	MCERTS	41				
Selenium (Se)	mg/kg	< 3	NONE	< 3				
Zinc (Zn)	mg/kg	< 3	MCERTS	59				
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				
EPH (C10 - C40)	mg/kg	< 6	MCERTS	< 6				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

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

Asbestos Analyst: Graham Revell

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported “Loose Fibres - PT” with type(s).

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 15-37817	Date Sampled	13/11/15	13/11/15	13/11/15	13/11/15	13/11/15
Soil Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Greenwood Place, Kentish Town, London NW5 1LB	TP / BH No	WS1	WS2	WS3	WS1	WS2
Project / Job Ref: 9886/JRCB	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.50	0.50	0.80	0.90	1.00
Reporting Date: 02/12/2015	QTSE Sample No	178402	178404	178406	179596	179598

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.17	< 0.1	< 0.1	0.17
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.45	< 0.1	< 0.1	0.34
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.85	< 0.1	< 0.1	0.34
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.68	< 0.1	< 0.1	0.28
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.44	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.45	< 0.1	< 0.1	0.16
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.52	< 0.1	< 0.1	0.15
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.22	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.37	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.20	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.17	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	4.5	< 1.6	< 1.6	< 1.6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

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Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 15-37817	Date Sampled	13/11/15				
Soil Consultants Ltd	Time Sampled	None Supplied				
Site Reference: Greenwood Place, Kentish Town, London NW5 1LB	TP / BH No	WS3				
Project / Job Ref: 9886/JRCB	Additional Refs	None Supplied				
Order No: None Supplied	Depth (m)	1.00				
Reporting Date: 02/12/2015	QTSE Sample No	179600				

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1				
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1				
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1				
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
QTS Environmental Report No: 15-37817	Date Sampled	13/11/15	13/11/15	13/11/15	13/11/15	13/11/15
Soil Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Greenwood Place, Kentish Town, London NW5 1LB	TP / BH No	WS1	WS2	WS3	WS1	WS2
Project / Job Ref: 9886/JRCB	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.90	1.00	1.00	0.50	0.50
Reporting Date: 02/12/2015	QTSE Sample No	178403	178405	178407	179595	179597

Determinand	Unit	RL	Accreditation					
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Trichloroethene	ug/kg	< 5	MCERTS	52	< 5	< 5	408	64
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	ug/kg	< 5	MCERTS	100	15	< 5	437	35
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
m,p-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
QTS Environmental Report No: 15-37817	Date Sampled	13/11/15				
Soil Consultants Ltd	Time Sampled	None Supplied				
Site Reference: Greenwood Place, Kentish Town, London NW5 1LB	TP / BH No	WS3				
Project / Job Ref: 9886/JRCB	Additional Refs	None Supplied				
Order No: None Supplied	Depth (m)	0.80				
Reporting Date: 02/12/2015	QTSE Sample No	179599				

Determinand	Unit	RL	Accreditation					
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5				
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5				
Chloromethane	ug/kg	< 10	MCERTS	< 10				
Chloroethane	ug/kg	< 5	MCERTS	< 5				
Bromomethane	ug/kg	< 10	MCERTS	< 10				
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5				
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5				
MTBE	ug/kg	< 5	MCERTS	< 5				
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5				
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5				
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5				
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5				
Chloroform	ug/kg	< 5	MCERTS	< 5				
Bromochloromethane	ug/kg	< 5	MCERTS	< 5				
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5				
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10				
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5				
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5				
Benzene	ug/kg	< 2	MCERTS	< 2				
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5				
Trichloroethene	ug/kg	< 5	MCERTS	< 5				
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5				
Dibromomethane	ug/kg	< 5	MCERTS	< 5				
TAME	ug/kg	< 5	MCERTS	< 5				
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5				
Toluene	ug/kg	< 5	MCERTS	< 5				
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5				
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10				
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5				
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5				
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5				
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5				
Chlorobenzene	ug/kg	< 5	MCERTS	< 5				
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5				
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2				
m,p-Xylene	ug/kg	< 2	MCERTS	< 2				
o-Xylene	ug/kg	< 2	MCERTS	< 2				
Styrene	ug/kg	< 5	MCERTS	< 5				
Bromoform	ug/kg	< 10	MCERTS	< 10				
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5				
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5				
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5				
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5				
Bromobenzene	ug/kg	< 5	MCERTS	< 5				
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5				
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5				
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5				
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5				
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5				
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5				
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5				
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5				
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5				
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5				
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5				
,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10				
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

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4480

Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 15-37817	
Soil Consultants Ltd	
Site Reference: Greenwood Place, Kentish Town, London NW5 1LB	
Project / Job Ref: 9886/JRCB	
Order No: None Supplied	
Reporting Date: 02/12/2015	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
178402	WS1	None Supplied	0.50	14.3	Brown clayey gravel
178403	WS1	None Supplied	0.90	19.4	Light brown clay
178404	WS2	None Supplied	0.50	15.2	Brown clayey gravel
178405	WS2	None Supplied	1.00	45.7	Light brown clay
178406	WS3	None Supplied	0.80	24.3	Light brown clay
178407	WS3	None Supplied	1.00	24.1	Light brown clay
$ 179595	WS1	None Supplied	0.50	14.3	Brown clayey gravel
$ 179596	WS1	None Supplied	0.90	19.4	Light brown clay
$ 179597	WS2	None Supplied	0.50	15.2	Brown clayey gravel
$ 179598	WS2	None Supplied	1.00	45.7	Light brown clay
$ 179599	WS3	None Supplied	0.80	24.3	Light brown clay
$ 179600	WS3	None Supplied	1.00	24.1	Light brown clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

$ samples exceeded recommended holding times

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4480

Soil Analysis Certificate - Methodology & Miscellaneous Information

QTS Environmental Report No: 15-37817

Soil Consultants Ltd

Site Reference: Greenwood Place, Kentish Town, London NW5 1LB

Project / Job Ref: 9886/JRCB

Order No: None Supplied

Reporting Date: 02/12/2015

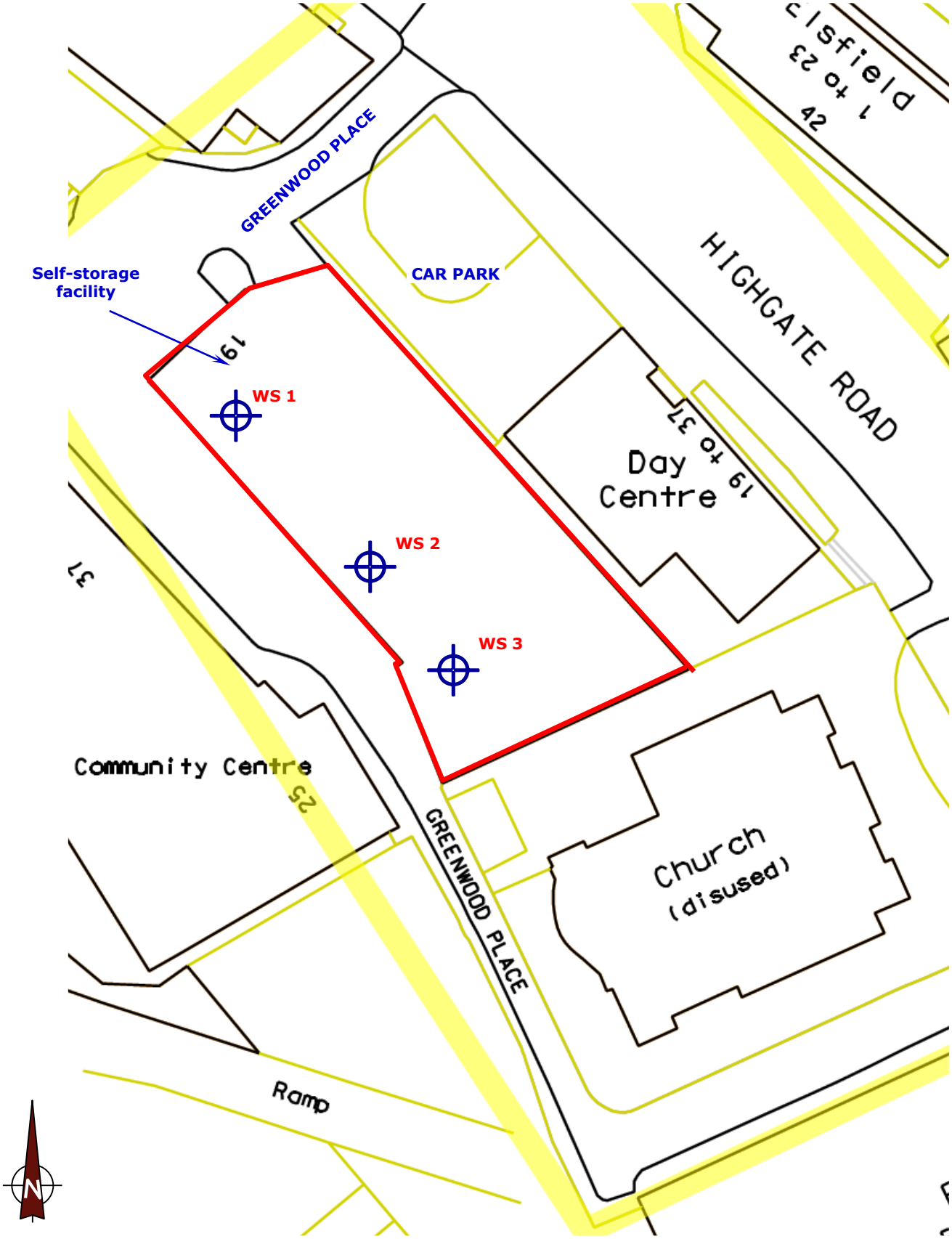
Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10 C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Site Location	Greenwood Place Kentish Town, London NW5 1LB	Report No: 9886/JRCB

Site Plan

(Fieldwork: November 2015)



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Appendix D – Site investigation photos

Photo 1 - Coring of borehole HM-WS1

Photo 2 – View of cored slab and underlying granular Made Ground (location HM-WS2)

Photo 3 – Coring of HM-WS3

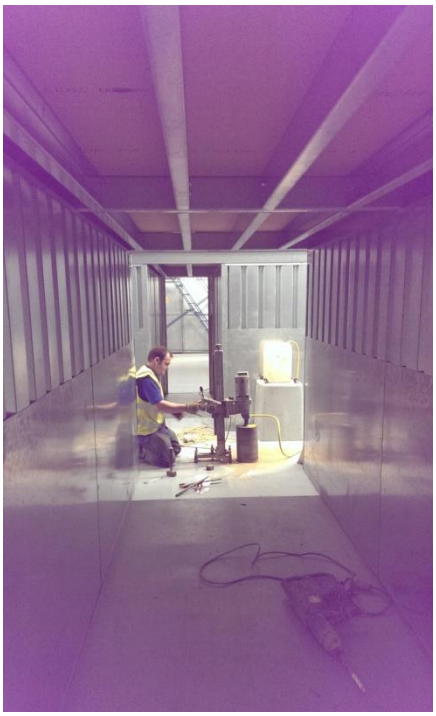

Photo 4 – Coring of HM-WS3

Appendix E – Borehole Gas Sample Results

gradko environmental
(A division of Gradko International Ltd.)
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tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

2187

LABORATORY ANALYSIS REPORT

REPORT NUMBER	**J06435R**
CUSTOMER	**Hilson Moran Partnership Ltd**
	One Discovery Place
	Columbus Drive
	Southwood West
	Farnborough GU14 0NZ
GRADKO LAB REFERENCE	**03J0788-0792**
DESPATCH NOTE No.	**26462**
DATE SAMPLES RECEIVED	**20.11.15 & 25.11.15**
BOOKING IN REF.	**X4829**

IDENTIFICATION AND ESTIMATION (SEMI-QUANTITATIVE ANALYSIS) OF TOP10 VOC ON SLS-2BSULPHI DIFFUSION TUBES BY GC/MS
Analysis has been carried out in accordance with in-house method GLM 13

Index to UKAS Accreditation Status	
U	Analysis is UKAS accredited under our Fixed Scope
F	Analysis is UKAS accredited under our Flexible Scope
N	Analysis is not UKAS accredited

Tube Number	**GRA 05861**
Sample Volume(L)	**2.00**
Sample ID	**WS1**
Sample Location	**HM-WS1**

Top 10 VOC	Accreditation Status	ng on tube	µgm^{-3}*
Tridecane	F	11.25	5.63
Ethylbenzene	F	8.52	4.26
Heptane, 2,2,4,6,6-pentamethyl-	N	6.20	3.10
m/p-Xylene	F	5.80	2.90
Dodecane	F	5.12	2.56
Butane, 2-methyl-	N	<5.00	<2.50
1-Hexanol, 2-ethyl-	F	<5.00	<2.50
o-Xylene	F	<5.00	<2.50
Nonanal**	N	<5.00	<2.50
Benzene	F	<5.00	<2.50

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

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LABORATORY ANALYSIS REPORT

Tube Number	**MI 142963**
Sample Volume(L)	**2.00**
Sample ID	**WS2**
Sample Location	**HM-WS2**

Top 10 VOC	Accreditation Status	ng on tube	µgm^{-3}*
Tetrachloroethylene	F	192.45	96.23
Trichloroethylene	F	80.59	40.29
Naphthalene	F	39.50	19.75
Naphthalene, 1-methyl-	F	<5.00	<2.50
Acenaphthene	N	<5.00	<2.50
Naphthalene, 2-methyl-	F	<5.00	<2.50
Toluene	F	<5.00	<2.50
Benzene	F	<5.00	<2.50
m/p-Xylene	F	<5.00	<2.50
Ethylbenzene	F	<5.00	<2.50

Tube Number	**GRA 05585**
Sample Volume(L)	**2.00**
Sample ID	**WS3**
Sample Location	**HM-WS3**

Top 10 VOC	Accreditation Status	ng on tube	µgm^{-3}*
1-Hexanol, 2-ethyl-	F	165.18	82.59
1-Butanol	N	12.43	6.21
Decane	F	7.17	3.58
Toluene	F	<5.00	<2.50
Heptane, 2,2,4,6,6-pentamethyl-	N	<5.00	<2.50
m/p-Xylene	F	<5.00	<2.50
Benzene	F	<5.00	<2.50
Dodecane	F	<5.00	<2.50
Nonane	F	<5.00	<2.50
Ethylbenzene	F	<5.00	<2.50

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

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LABORATORY ANALYSIS REPORT

Tube Number	**GRA 05507**
Sample Volume(L)	**2.35**
Sample ID	**DSC1**
Sample Location	**Greenwood Place**

Top 10 VOC	Accreditation Status	ng on tube	µgm^{-3}*
Tetrachloroethylene	F	4040	1719.2
Trichloroethylene	F	258.55	110.02
Ethylene, 1,2-dichloro-, (Z)-	F	187.56	79.81
Heptane, 2,2,4,6,6-pentamethyl-	N	184.94	78.70
Ethene, chloro-	F	148.33	63.12
Ethylene, 1,2-dichloro-, (E)-	F	92.83	39.50
1-Hexanol, 2-ethyl-	F	33.47	14.24
Butane, 2-methyl-	N	10.50	4.47
Cyclohexane, methyl-	F	5.04	2.15
Benzene	F	<5.00	<2.13

Tube Number	**GRA 01066**
Sample ID	**BLANK**

Top 10 VOC	Accreditation Status	ng on tube
Benzene	F	<5

1 Compound Detected

Results greater than 1000ng are outside our UKAS accredited calibration range.
Identification and estimation results for ng on tube are calculated using toluene standards.
****Compounds may be an artifact due to reaction of ozone with the Tenax sorbent.**
Results reported as < a concentration on tube are below the reporting limit.
Reporting limit for non BTEX compounds are derived from the non-specific standard Toluene.

		Date of Analysis	**01.12.15**
Analysts Name	**G. Aikman**	**Date of Report**	**02.12.15**

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
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L. Gates, Laboratory Manager