GEO-ENVIRONMENTAL ASSESSMENT (GROUND INVESTIGATION) REPORT

FOR

GARAGES AT PLOUGH LANE, TEDDINGTON, TW11 9BN

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EXECUTIVE SUMMARY

Plough Lane Mews Limited commissioned Jomas Associates Ltd to undertake a Geo-environmental ground investigation at a site known as Garages at Plough Lane, Teddington.

The principle objectives of the study were as follows:

- To determine the nature and where possible, the extent of contaminants potentially present at the site;
- To establish the presence of significant pollutant linkages, in accordance with the procedures set out within the Environment Agency (EA) report R&D CLR11 and relevant guidance within the National Planning Policy Framework (NPPF);
- To assess whether the site is safe and suitable for the purpose for which it is intended, or can be made so by remedial action.

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Site History and Ground Investigation	
Current Site Use	Lock up garages.
Proposed Site Use	Conversion of existing structure of Unit 1 and 2 into dwellings. No associated soft landscaping is expected for the development.
Desk Study Overview	A Desk Study report has been produced for the site and issued separately (Jomas – December 2017). A brief overview of the desk study findings is presented below. Reference should be made to the full report for detailed information. Earliest available (1864) records show that the site was occupied by residential gardens. By the map dated 1915, the site is shown to be bordered by an access road with medium sized structures and a smaller structure on the western boundary. Few changes occur to the site until the map dated 1933 when this site is fully occupied by structures, most likely the storage/garage units currently found on site. No significant changes then occur to the site until the present day. The surrounding area has been utilised predominantly for agricultural followed by residential use, with occasional industrial features. Industrial uses of note include unspecified works or factories, telecommunications features and vehicle repair, testing and servicing. The British Geological Survey indicates that the site is directly underlain by superficial deposits of the Kempton Park Gravel. These superficial deposits are underlain by solid deposits of the London Clay Formation. No artificial deposits are reported within the site. Borehole records from approximately 76m north west of the site, indicated gravels extending to approximately 5.1mbgl, underlain by London Clay Formation. The superficial deposits underlying the site are identified as a Principal Aquifer with the underlying solid deposits identified as Unproductive. A review of the EnviroInsight Report indicates that there are no source protection zones within 500m of the site. The closest groundwater abstraction is identified 479m east of site boundary, for the purposes of spray irrigation. There are no surface water or potable water abstractions reported within 2km of the site.

Site History and Ground Investigation	
	There are no detailed river network within 500m or surface water feature within 250m of site boundary There are no Environment Agency Zone 2 or 3 floodplains reported within 250m of the site.
Intrusive Investigation	The ground investigation was undertaken on 9th April 2018, and consisted of the following: • 2No window sampling boreholes, drilled up to 2.50m below ground level (bgl), with associated in situ testing and sampling; • 1No hand excavated trial pit; • Laboratory analysis for chemical and geotechnical purposes; • 4No return visits to monitor ground gas concentrations and groundwater levels have been completed. A further 2No. are proposed.
Ground Conditions	The results of the ground investigation revealed a ground profile comprising concrete overlying sandy gravelly clay to a maximum proven depth of 2.10mbgl, overlying brown sandy gravel to a maximum proven depth of 2.50mbgl, at which point both boreholes refused on extremely dense gravel. No groundwater was recorded during the investigation.
Environmental Considerations	Following generic risk assessments, no contaminants have been found in excess of generic screening criteria for a "residential without plant uptake" end use. No asbestos fibres were detected in the samples analysed in the laboratory. The site is directly underlain by superficial deposits of the Kempton Park Gravel, designated as a Principal Aquifer. There are no source protection zones within 500m of the site, and no groundwater, surface water or potable water abstractions in close proximity of the site. The results of the investigation indicate that a source of contamination that poses a risk to controlled waters is not present within soils on site. On the basis of the findings of this investigation, the site is not considered to pose a significant risk to the identified sensitive receptors. As no potential sources of ground gas have been identified, and no evidence of materials suspected of producing ground gas were reported during the investigation, risks associated with potential ground gases are considered to be low, and no further action is considered necessary. No further remediation works are considered necessary, and the site is considered suitable for the proposed use. As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out. Should any contamination be encountered, a suitably qualified environmental consultant should be informed immediately, so that adequate measures may be recommended.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Plough Lane Mews Limited ("The Client") has commissioned Jomas Associates Ltd, to assess the risk of contamination posed by the ground conditions at a site referred to as Garages at Plough Lane, Teddington, TW11 9BN prior to the redevelopment of the site.

1.1.2 To this end a Desk Study has been produced for the site and issued separately (Jomas, December 2017), followed by an intrusive investigation (detailed in this report).

1.1.3 A full list of previous reports undertaken for the site by Jomas are detailed in Table 1.1:

Table 1.1: Previous Reports - Jomas

Title	Author	Reference	Date
Geo-Environmental Desk Study/Preliminary Risk Assessment Report	Jomas Associates Ltd	P1256J1265	20 December 2017

1.1.4 The intrusive investigation was undertaken in accordance with Jomas proposal dated 17 November 2017.

1.2 Proposed Development

1.2.1 It is understood that the proposed site use is for the change of use from storage to residential of a garage known as Unit 1, to be developed into 1No residential studio flat. Further later development of Units 3, 4 & 5 is also expected.

1.2.2 For the purposes of the contamination risk assessment, the proposed development is classified as 'residential without plant uptake'.

1.3 Objectives

1.3.1 The objectives of Jomas' investigation were as follows:

- To present a description of the present site status, based upon the published geology, hydrogeology and hydrology of the site and surrounding area;
- To provide an assessment of the environmental sensitivity at the site and the surrounding area, in relation to any suspected or known contamination which may significantly affect the site and the proposed development;
- To conduct an intrusive investigation, to determine the nature and extent of contaminants potentially present at the site;
- To establish the presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the EA report R&D CLR 11.

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- Intrusive ground investigation to determine shallow ground conditions, and potential for contamination at the site;
- Undertaking of laboratory chemical testing upon samples obtained;
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Limitations

1.5.1 Jomas Associates Ltd has prepared this report for the sole use of Plough Lane Mews Limited, in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas Associates Limited. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

1.5.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas Associates Limited has actual knowledge to the contrary, information obtained from public sources or provided to Jomas Associates Limited by site personnel and other information sources, have been assumed to be correct. Jomas Associates Limited does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.

1.5.3 Whilst every effort has been made to ensure the accuracy of the data supplied, and any analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.

1.5.4 Any reports provided to Jomas Associates Limited have been reviewed in good faith. Jomas Associates Limited cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.

1.5.5 This investigation and report has been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.

1.5.6 ***This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.***

2 SITE SETTING

2.1 Site Information

2.1.1 The site location plan is appended to this report in Appendix 1.

Table 2.1: Site Information

Name of Site	-
Address of Site	Unit 1 Plough Lane Teddington TW11 9BN
Approx. National Grid Ref.	516214 171078
Site Area (Approx)	0.02ha
Site Ownership	Unknown
Site Occupation	Storage
Local Authority	London Borough of Richmond upon Thames
Proposed Site Use	Change of use to residential.

2.2 Desk Study Overview

2.2.1 A Desk Study report has been produced for the site and issued separately (Jomas – December 2017). A brief overview of the desk study findings is presented below. Reference should be made to the full report for detailed information.

2.2.2 Earliest available (1864) records show that the site was occupied by residential gardens. By the map dated 1915, the site is shown to be bordered by an access road with medium sized structures and a smaller structure on the western boundary. Few changes occur to the site until the map dated 1933 when this site is fully occupied by structures, most likely the storage/garage units currently found on site. No significant changes then occur to the site until the present day.

2.2.3 The surrounding area has been utilised predominantly for agricultural followed by residential use, with occasional industrial features. Industrial uses of note include unspecified works or factories, telecommunications features and vehicle repair, testing and servicing.

2.2.4 The British Geological Survey indicates that the site is directly underlain by superficial deposits of the Kempton Park Gravel. These superficial deposits are underlain by solid deposits of the London Clay Formation. No artificial deposits are reported within the site.

2.2.5 Borehole records from approximately 76m north west of the site, indicated gravels extending to approximately 5.1mbgl, underlain by London Clay Formation.

2.2.6 The superficial deposits underlying the site are identified as a Principal Aquifer with the underlying solid deposits identified as Unproductive.

2.2.7 A review of the EnviroInsight Report indicates that there are no source protection zones within 500m of the site.

2.2.8 The closest groundwater abstraction is identified 479m east of site boundary, for the purposes of spray irrigation.

2.2.9 There are no surface water or potable water abstractions reported within 2km of the site.

2.2.10 There are no detailed river network within 500m or surface water feature within 250m of site boundary

2.2.11 There are no Environment Agency Zone 2 or 3 floodplains reported within 250m of the site.

2.2.12 The conceptual site model provided within the report identifies the following potential sources, pathways and receptors. The report indicates the following potential sources of contamination:

- Potential for contaminated ground associated with previous site use – on site (S1)
- Potential for Made Ground associated with previous development operations – on site (S2)
- Historical petrol & Fuel site – Garage 68m SE (S3)
- Historical off site industrial uses – Smithy 95m north, Works 10m north (S4)
- Current Industrial site use including garage 79m north (S5)

2.2.13 The conceptual site model identifies the following potential pathways:

- Ingestion and dermal contact with contaminated soil (P1)
- Inhalation or contact with potentially contaminated dust and vapours (P2)
- Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3)
- Horizontal and vertical migration of contaminants within groundwater (P4)
- Accumulation and Migration of Soil Gases (P5)

2.2.14 The conceptual site model identifies the following potential receptors:

- Construction workers (R1)
- Maintenance workers (R2)
- Neighbouring site users (R3)
- Future site users (R4)
- Building foundations and on site buried services (water mains, electricity and sewer) (R5)
- Controlled Waters (Principal Aquifer) (R6)

3 GROUND INVESTIGATION

3.1 Rationale for Ground Investigation

3.1.1 The site investigation has been undertaken generally in accordance with Contaminated Land Report 11, BS10175, NHBC Standards Chapter 4.1, and other associated Statutory Guidance. If required, further targeted investigations and remedial option appraisal would be dependent on the findings of this site investigation.

3.1.2 The soil sampling rationale for the site investigation was developed with reference to EA guidance 'Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination' (Technical Report P5-066/TR).

3.1.3 The sampling proposal was designed in order to gather data representative of the site conditions.

3.2 Scope of Ground Investigation

3.2.1 The ground investigation was undertaken on 9th April 2018.

3.2.2 The work was undertaken in accordance with BS5930 'Code of Practice for Site Investigation' and BS10175 'Investigation of Potentially Contaminated Sites'. All works were completed without incident.

3.2.3 The investigation focused on collecting data on the following:

- Quality of Made Ground/ natural ground within the site boundaries;
- Presence of groundwater beneath the site (if any), perched or otherwise;

3.2.4 A summary of the fieldwork carried out at the site, with justifications for exploratory hole positions, are offered in Table 3.1 below.

Table 3.1: Scope of Intrusive Investigation

Investigation Type	Number of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved (m BGL)	Justification
Window Sample Boreholes	2	WS2-WS3	Up to 2.5mbgl	Obtain shallow samples for contamination testing. Positioned for site coverage.
Hand dug Trial Pits	1	HTP1	Up to 1.2mbgl	Obtain shallow samples for contamination testing. Undertaken to replace WS1.

3.2.5 The exploratory holes were completed to allow soil samples to be taken in the areas of interest identified in Table 3.1 above. In all cases, all holes were logged in accordance with BS5930:2015.

3.2.6 Exploratory hole positions were located approximately with reference to known features on site, as shown in the exploratory hole location plan presented in Appendix 1. The exploratory hole records are included in Appendix 2.

3.2.7 The exploratory holes were backfilled with the arisings (in the reverse order in which they were drilled) and the ground surface was reinstated so that no depression was left.

3.3 Sampling Rationale

3.3.1 Our soil sampling rationale for the site investigation was developed with reference to EA guidance 'Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination' (Technical Report P5-066/TR).

3.3.2 The exploratory holes were positioned by applying a combined non-targeted sampling strategy, as well as sample locations positioned with reference to sources identified from the desk study.

3.3.3 Soil samples were taken from across the site at various depths as shown in the exploratory hole logs.

3.3.4 Jomas Associates Limited's engineers normally collect samples at appropriate depths based on field observations such as:

- appearance, colour and odour of the strata and other materials, and changes in these;
- the presence or otherwise of sub-surface features such as pipework, tanks, foundations and walls; and,
- areas of obvious damage, e.g. to the building fabric.

3.3.5 A number of the samples were taken from the top 0-1m to aid in the assessment of the pollutant linkages identified at the site. In addition, some deeper samples were taken to aid in the interpretation of fate and transport of any contamination identified.

3.3.6 Where groundwater samples are taken, all boreholes were purged of three well volumes prior to obtaining the sample for testing. This removes stagnant groundwater from the monitoring well.

3.3.7 Samples were stored in cool boxes (<4^{o}C) and preserved in accordance with laboratory guidance.

3.3.8 Groundwater strikes noted during drilling, are recorded within the exploratory hole records in Appendix 2.

3.4 Sampling Limitations

3.4.1 WS1 was completed as a hand dug pit (HDP) due to headroom restrictions preventing access for a window sample rig.

3.4.2 WS2 and WS3 were terminated at 2.5mbgl on very dense gravel.

3.5 Laboratory Analysis

3.5.1 A programme of chemical laboratory testing, scheduled by Jomas Associates Limited, was carried out on selected samples of Made Ground and natural strata. Soil samples were submitted to i2 Analytical (a UKAS and MCerts accredited laboratory), for analysis.

3.5.2 The samples were analysed for a wide range of contaminants as shown in Table 3.2 below:

Table 3.2: Chemical Tests Scheduled

	No. of tests	
Test Suite	**Made Ground / Topsoil**	**Natural**
Jomas S3 Suite	-	5
Jomas S5 Suite	-	2
Hydrocarbon Suite	-	2
Total Organic Carbon	-	3
Asbestos	-	6

3.5.3 The determinands contained in the basic suite are as detailed in Table 3.3 below:

Table 3.3: Basic Suite of Determinands

DETERMINAND	LIMIT OF DETECTION (mg/kg)	UKAS ACCREDITATION	TECHNIQUE
Arsenic	1	Y (MCERTS)	ICPMS
Cadmium	0.2	Y (MCERTS)	ICPMS
Chromium	1	Y (MCERTS)	ICPMS
Chromium (Hexavalent)	4	Y (MCERTS)	Colorimetry
Lead	1	Y (MCERTS)	ICPMS
Mercury	0.3	Y (MCERTS)	ICPMS
Nickel	1	Y (MCERTS)	ICPMS
Selenium	1	Y (MCERTS)	ICPMS
Copper	1	Y (MCERTS)	ICPMS
Zinc	1	Y (MCERTS)	ICPMS
Boron (Water Soluble)	0.2	Y (MCERTS)	ICPMS
pH Value	0.1 units	Y (MCERTS)	Electrometric
Sulphate (Water Soluble)	0.0125g/l	Y (MCERTS)	Ion Chromatography

DETERMINAND	LIMIT OF DETECTION (mg/kg)	UKAS ACCREDITATION	TECHNIQUE
Total Cyanide	1	Y (MCERTS)	Colorimetry
Speciated/Total PAH	0.05/0.80	Y (MCERTS)	GCFID
Phenols	1	Y (MCERTS)	HPLC
Total Petroleum Hydrocarbons (banded)	-	N Y (MCERTS)	Gas Chromatography

3.5.4 To support the selection of appropriate tier 1 screening values, 3No samples were analysed for total organic carbon.

3.5.5 Laboratory test results are summarised in Section 6, with raw laboratory data included in Appendix 3.

4 GROUND CONDITIONS

4.1 Soil

4.1.1 Ground conditions were logged in accordance with the requirements of BS5930:2015. Detailed exploratory hole logs are provided in Appendix 2. The ground conditions encountered are summarised in Table 4.1 below, based on the strata observed during the investigation.

Table 4.1: Ground Conditions Encountered

Stratum and Description	Encountered from (m bgl)	Base of strata (m bgl)	Thickness range (m)
Concrete (MADE GROUND).	GL	0.25	0.25
Soft consistency brown sandy gravelly CLAY. Sand is fine; gravel consists of fine to medium angular to sub-rounded flint. (KEMPTON PARK GRAVEL)	0.25	>1.20-2.10	>0.95-1.85
Very dense brown sandy GRAVEL. Sand is medium to coarse; gravel consists of fine to medium angular to sub-rounded flint. (KEMPTON PARK GRAVEL)	2.10	>2.50	>0.40

4.1.2 Given the likely ground strata profile identified in the Desk Study and the BGS descriptions of the materials given in Section 3 of the Desk Study it is considered that the encountered strata represent the Kempton Park Gravel

4.1.3 No materials considered to represent the London Clay that was noted in Section 3 as lying beneath the site were encountered.

4.2 Hydrogeology

4.2.1 Groundwater was not encountered in any of the exploratory holes.

4.3 Physical and Olfactory Evidence of Contamination

4.3.1 Visual or olfactory evidence of contamination was not observed during the course of the investigation.

5 RISK ASSESSMENT – ANALYTICAL FRAMEWORK

5.1 Context and Objectives

5.1.1 This section seeks to evaluate the level of risk pertaining to human health and the environment which may result from both the existing use and proposed future use of the site. It makes use of the site investigation findings, as described in the previous sections, to evaluate further the potential pollutant linkages identified in the desk study. A combination of qualitative and quantitative techniques is used, as described below.

5.1.2 The purpose of generic quantitative risk assessment is to compare concentrations of contaminants found on site against screening level generic assessment criteria (GAC) to establish whether there are actual or potential unacceptable risks. It also determines whether further detailed assessment is required. The approaches detailed all broadly fit within a tiered assessment structure in line with the framework set out in the Department of Environment, Food and Rural Affairs (DEFRA), EA and Institute for Environment and Health Publication, Guidelines for Environmental Risk Assessment and Management.

5.1.3 It should be noted that the statistical tests carried out in this report in accordance with CL:AIRE and CIEH (2008) recommendations, are for guidance purposes only and the conclusions of this report should be approved by the local authority prior to any redevelopment works being undertaken.

5.2 Analytical Framework – Soils

5.2.1 There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

5.2.2 The CLEA model provides a methodology for quantitative assessment of the long term risks posed to human health by exposure to contaminated soils. Toxicological data have been used to calculate Soil Guideline Values (SGV) for individual contaminants, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.

5.2.3 In the absence of any published SGVs for certain substances, or where the assumptions made in generating the SGVs do not apply to the site, Jomas Associates Limited have obtained Tier 1 screening values for initial assessment of the soil, based on available current UK guidance including the LQM/CIEH S4ULs and DEFRA C4SL. Site-specific assessments are undertaken wherever possible and/or applicable. All assessments are carried out in accordance with the CLEA protocol.

5.2.4 CLEA requires a statistical treatment of the test results to take into account the normal variations in concentration of potential contaminants in the soil and allow comparisons to be made with published guidance.

5.2.5 The assessment criteria used for the screening of determinands within soils are identified within Table 5.1.

Table 5.1: Selected Assessment Criteria – Contaminants in Soils

Substance Group	Determinand(s)	Assessment Criteria Selected
Organic Substances		
Non-halogenated Hydrocarbons	Total Petroleum Hydrocarbons (TPHCWG banded)	S4UL
	Total Phenols	S4UL
Polycyclic Aromatic Hydrocarbons (PAH-16)	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene	S4UL
Volatile Organic Compounds (VOCs/sVOCs).	Toluene, Ethylbenzene, Benzene, Xylenes	S4UL
Inorganic Substances		
Heavy Metals and Metalloids	Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Copper, Zinc	S4UL
	Copper, Zinc, Nickel	BS: 3882 (2015).
Cyanides	Free Cyanide	CLEA v1.06
Sulphates	Water Soluble Sulphate	BRE Special Digest 1:2005

5.3 BRE

5.3.1 The BRE Special Digest 1:2005, 'Concrete in Aggressive Ground' is used with soluble sulphate and pH results to assess the aggressive chemical environment of future underground concrete structures at the site.

5.4 Site Specific Criteria

5.4.1 The criteria adopted in the selection of correct screening criteria from published reports as previously described, are provided within Tables 5.3.

Table 5.3: Site Specific Data

Input Details	Value
Land Use	Residential without plant uptake
Soil Organic Matter	1%

5.4.2 As the published reports only offer the option of selecting an SOM value of 1%, 2.5% or 6%, an SOM value of 1% has been used for the generation of generic assessment criteria, as 0.40% was the mean value obtained from laboratory analysis.

5.4.3 It is understood that the site is to be converted to residential use with no private soft landscaping. As a result, the site has been assessed as residential without plant uptake.

6 GENERIC QUANTITATIVE RISK ASSESSMENT

6.1 Screening of Soil Chemical Analysis Results – Human Health Risk Assessment

6.1.1 To focus on the contaminants of potential concern (COPC), the results have been compared with the respective SGV/GAC. Those contaminants which exceed the SGV/GAC are considered to be the COPC. Those which do not exceed the respective SGV/GAC are not considered to be COPC and as such do not require further assessment in relation to the proposed development of the site.

6.1.2 Laboratory analysis for soils are summarised in Tables 6.1 to 6.3. Raw laboratory data is included in Appendix 7.

Table 6.1: Soil Laboratory Analysis Results – Metals, Metalloids, Phenol, Cyanide

Determinand	Unit	No. samples tested	Screening Criteria		Min	Max	No. Exceeding
Arsenic	mg/kg	7	40	S4UL	10.0	30.0	0
Cadmium	mg/kg	7	85	S4UL	<0.2	<0.2	0
Chromium	mg/kg	7	910	S4UL	16.0	23.0	0
Lead	mg/kg	7	310	C4SL	7.9	49.0	0
Mercury	mg/kg	7	1.2	S4UL	<0.3	<0.3	0
Nickel	mg/kg	7	180	S4UL	<0.3	<0.3	0
Copper	mg/kg	7	7100	S4UL	3.4	12.0	0
Zinc	mg/kg	7	40000	S4UL	20.0	31.0	0
Total Cyanide [A]	mg/kg	7	33	CLEA v 1.06	<1.0	<1.0	0
Selenium	mg/kg	7	430	S4UL	<1.0	<1.0	0
Boron Water Soluble	mg/kg	7	11000	S4UL	0.7	3.8	0
Phenols	mg/kg	7	440	S4UL	<1.0	<1.0	0

Table 6.2: Soil Laboratory Analysis Results – Polycyclic Aromatic Hydrocarbons (PAHs)

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Naphthalene	mg/kg	7	S4UL	2.3	<0.05	0.56	0
Acenaphthylene	mg/kg	7	S4UL	2900	<0.05	0.88	0
Acenaphthene	mg/kg	7	S4UL	3000	<0.05	0.14	0
Fluorene	mg/kg	7	S4UL	2800	<0.05	1.3	0
Phenanthrene	mg/kg	7	S4UL	1300	<0.05	11	0
Anthracene	mg/kg	7	S4UL	2300	<0.05	2.1	0
Fluoranthene	mg/kg	7	S4UL	1500	<0.05	11	0

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Pyrene	mg/kg	7	S4UL	3700	<0.05	8.1	0
Benzo(a)anthracene	mg/kg	7	S4UL	11.0	<0.05	3.5	0
Chrysene	mg/kg	7	S4UL	30	<0.05	3.1	0
Benzo(b)fluoranthene	mg/kg	7	S4UL	3.9	<0.05	2.8	0
Benzo(k)fluoranthene	mg/kg	7	S4UL	110	<0.05	1.3	0
Benzo(a)pyrene	mg/kg	7	S4UL	3.2	<0.05	2.1	0
Indeno(123-cd)pyrene	mg/kg	7	S4UL	45	<0.05	0.98	0
Dibenzo(ah)anthracene	mg/kg	7	S4UL	0.31	<0.05	0.28	0
Benzo(ghi)perylene	mg/kg	7	S4UL	360	<0.05	1.2	0
Total PAH	mg/kg	7	-	-	<0.05	50.5	-

Table 6.3: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPH)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
C_8-C_{10}	mg/kg	7	S4UL	27	<0.1	<0.1	0
>C_{10}-C_{12}	mg/kg	7	S4UL	130	<2.0	4.0	0
>C_{12}-C_{16}	mg/kg	7	S4UL	1100	<4.0	12	0
>C_{16}-C_{21}	mg/kg	7	S4UL	1900	<1.0	33	0
>C_{21}-C_{35}	mg/kg	7	S4UL	1900	<10	58	0
Total TPH	mg/kg	7	-	-	<17.1	107	-

Note: *The lower value of guidelines for Aromatic/Aliphatics has been selected

Table 6.4: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPHCWG)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C_5-C_6 Aliphatic	mg/kg	2	S4UL	42	<0.001	<0.001	0
>C_6-C_8 Aliphatic	mg/kg	2	S4UL	100	<0.001	<0.001	0
>C_8-C_{10} Aliphatic	mg/kg	2	S4UL	27	<0.001	<0.001	0
>C_{10}-C_{12} Aliphatic	mg/kg	2	S4UL	130	<1.0	<1.0	0
>C_{12}-C_{16} Aliphatic	mg/kg	2	S4UL	1100	<2.0	<2.0	0
>C_{16}-C_{35} Aliphatic	mg/kg	2	S4UL	65000	<8.0	<8.0	0
>C_5-C_7 Aromatic	mg/kg	2	S4UL	370	<0.001	<0.001	0
>C_7-C_8 Aromatic	mg/kg	2	S4UL	860	<0.001	<0.001	0
>C_8-C_{10} Aromatic	mg/kg	2	S4UL	47	<0.001	<0.001	0
>C_{10}-C_{12} Aromatic	mg/kg	2	S4UL	250	<1.0	<1.0	0
>C_{12}-C_{16} Aromatic	mg/kg	2	S4UL	1800	<2.0	<2.0	0

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C_{16}-C_{21} Aromatic	mg/kg	2	S4UL	1900	<10	<10	0
>C_{21}-C_{35} Aromatic	mg/kg	2	S4UL	1900	<10	12	0
Total TPH (Ali/Aro)	mg/kg	2	S4UL	1900	<20	≥20, <30	0

6.2 Asbestos in Soil

6.2.1 6No samples of the Made Ground were screened in the laboratory for the presence of asbestos. The results of the analysis are summarised below in Table 6.5 below

Table 6.5: Asbestos Analysis – Summary

Sample	Screening result.	Quantification result (%)	Comments
WS1 – 0.25mbgl	Not detected	-	-
WS1 – 0.50mbgl	Not detected	-	-
WS2 – 0.25mbgl	Not detected	-	-
WS2 – 0.50mbgl	Not detected	-	-
WS3 – 0.25mbgl	Not detected	-	-
WS3 – 0.50mbgl	Not detected	-	-

6.2.2 As summarised in the tables above, no asbestos fibres were detected within any of the samples screened.

6.3 Screening of Soil Chemical Analysis Results – Potential Risks to Plant Growth

6.3.1 Zinc, copper and nickel are phytotoxins and could therefore inhibit plant growth in soft landscaped areas. Concentrations measured in soil for these determinands have been compared with the pH dependent values given in BS: 3882 (2015).

6.3.2 Adopting a pH value of greater than 7, as indicated by the results of the laboratory analysis, the following is noted;

Table 6.6: Soil Laboratory Analysis Results – Phytotoxic Determinands

Determinand	Threshold level (mg/kg)	Min (mg/kg)	Max (mg/kg)	No. Exceeding
Zinc	300	25	31	0
Copper	200	3.4	12	0
Nickel	110	12	22	0

6.4 Screening for Water Pipes

6.4.1 The results of the analysis have been assessed for potential impact upon water supply pipes. Table 6.7 below summarises the findings of the assessment:

Table 6.7: Screening Guide for Water Pipes

Determinand	Threshold adopted for PE (mg/kg)	Min Value for site data	Max Value from site data
Total VOCs	0.5	<0.056	<0.056
BTEX	0.1	<0.001	<0.001
MTBE	0.1	<0.001	<0.001
EC5-EC10	1	<0.003	<0.1
EC10-EC16	10	<6.0	16.0
EC16-EC40	500	<11	91
Naphthalene	5	0.56	0.56
Phenols	2	<1.0	<1.0

6.4.2 The above results indicate that upgraded pipework are unlikely to be required.

6.4.3 The water supply pipe requirements for this site should be discussed at an early stage with the relevant utility provider.

6.5 Waste Disposal

6.5.1 The classification of materials for waste disposal purposes was outside the scope of this report. Should quantities of material require off-site disposal, Waste Acceptance Criteria testing will be required.

7 SUMMARY OF RESULTS

7.1 Land Quality Impact Summary

7.1.1 Following the ground investigation, the following is noted:

- It is understood that the proposed development will comprise conversion of the existing structures on site to residential use. No private soft landscaping is anticipated.
- Following generic risk assessments, no contaminants have been found in excess of generic screening criteria for a “residential without plant uptake” end use.
- No asbestos fibres were detected in the samples analysed in the laboratory.
- The site is directly underlain by superficial deposits of the Kempton Park Gravel, designated as a Principal Aquifer. There are no source protection zones within 500m of the site, and no groundwater, surface water or potable water abstractions in close proximity of the site. The results of the investigation indicate that a source of contamination that poses a risk to controlled waters is not present within soils on site.
- On the basis of the findings of this investigation, the site is not considered to pose a significant risk to the identified sensitive receptors.
- As no potential sources of ground gas have been identified, and no evidence of materials suspected of producing ground gas were reported during the investigation, risks associated with potential ground gases are considered to be low, and no further action is considered necessary.
- No further remediation works are considered necessary, and the site is considered suitable for the proposed use.
- As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out. Should any contamination be encountered, a suitably qualified environmental consultant should be informed immediately, so that adequate measures may be recommended.

7.1.2 The above conclusions are made subject to approval by the statutory regulatory bodies.

7.2 Review of Pollutant Linkages Following Site Investigation

7.2.1 The site CSM has been revised and updated from that suggested in the desk study in view of the ground investigation data, including soil laboratory analysis results. Table 8.1 highlights whether pollutant linkages identified in the original CSM are still relevant following the risk assessment, or whether pollutant linkages, not previously identified, exist.

Table 7.1: Plausible Pollutants Linkages Summary (Pre Remediation)

Potential Source (from desk study)	Pathway	Receptor	Relevant Pollutant Linkage?	Comment
• Potential for contaminated ground associated with previous site use – on site (S1) • Potential for Made Ground associated with previous development operations – on site (S2) • Historical petrol & Fuel site – Garage 68m SE (S3) • Historical off site industrial uses – Smithy 95m north, Works 10m north (S4) • Current Industrial site use including garage 79m north (S5)	• Ingestion and dermal contact with contaminated soil (P1) • Inhalation or contact with potentially contaminated dust and vapours (P2) • Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	• Construction workers (R1) • Maintenance workers (R2) • Neighbouring site users (R3) • Future site users (R4) • Building foundations and on site buried services (water mains, electricity and sewer) (R5)	**X**	The findings of this report should be included in the construction health and safety file, with adequate measures put in place for the protection of construction and maintenance workers.
	• Accumulation and migration of soil gases (P5)		**X**	No sources of ground gas identified.
	• Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3) Horizontal and vertical migration of contaminants within groundwater (P4)	• Neighbouring site users (R3) • Building foundations and on site buried services (water mains, electricity and sewer) (R5) • Controlled Waters (Principal Aquifer) (R6)	**X**	Contact should be made with relevant utility providers to confirm if upgraded materials are required.

8 REFERENCES

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CIEH & CL:AIRE (2008) *Guidance on comparing soil contamination data with a critical concentration*. London: Chartered Institute of Environmental Health (CIEH) and CL:AIRE

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LQM/CIEH S4ULs. LQM, 2014

National Planning Policy Framework. Department for Communities and Local Government, March 2012

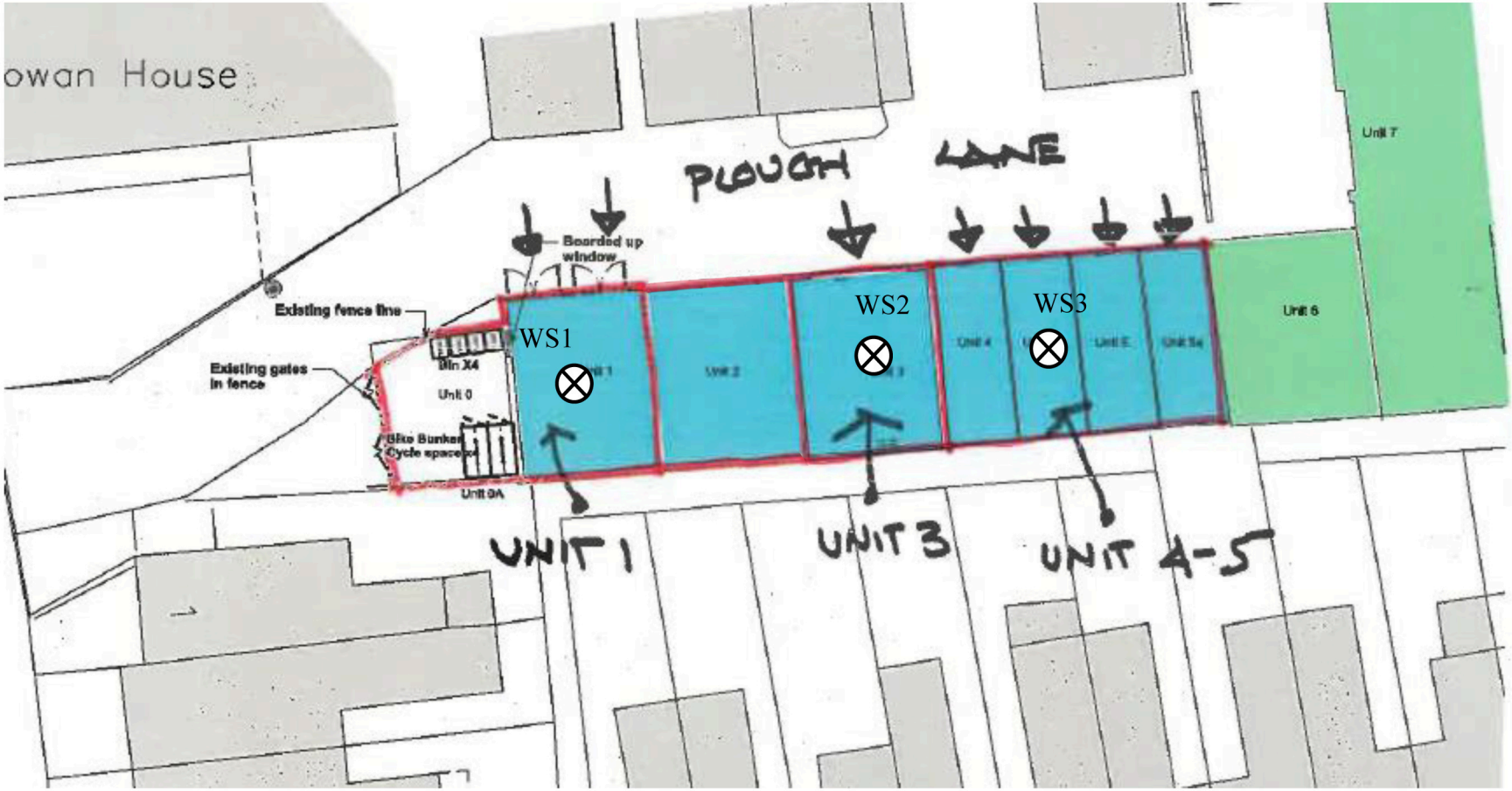
APPENDICES

APPENDIX 1 – FIGURES

JOMAS ASSOCIATES LTD
T: 0843 289 2187

Project Name	Plough Lane, Teddington	**Client**	Plough Lane Mews Limited
Project No.	P1256J1265	**Date**	18/12/2017
Title	Proposed GI Plan	**Prepared By**	SL

N



JOMAS ASSOCIATES LTD

Project Name	Plough Lane, Teddington	**Client**	Plough Lane Mews Limited
Title	WS Photo Plan	**Project**	P1256J1265

Photo 1: HTP1

Photo 2: WS2

JOMAS ASSOCIATES LTD

Project Name	Plough Lane, Teddington	**Client**	Plough Lane Mews Limited
Title	WS Photo Plan	**Project**	P1256J1265

Photo 3: WS3

APPENDIX 2 – EXPLORATORY HOLE RECORDS

WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS2		
Site Address:	Plough Lane, Teddington	Project No:	P1256J1265
Client:	Plough Lane Mews Limited	Ground Level:	
Logged By:	SB	Date Commenced:	09/04/2018
Checked By:	TE	Date Completed:	09/04/2018
Type and diameter of equipment:	Dando Terrier	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: Refusal at 2.50m

2: No water reported

3: * Field description

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N	0.00				Concrete. (MADE GROUND)	
PJV	0.25										0.25		Soft consistency* brown sandy gravelly CLAY. Sand is fine. Gravel consists of fine to medium angular to sub rounded flint.	
PJV	0.50								0.50					
PJV+D	1.00								1.00					
									1.50					
D	2.00								2.00		2.10		Very dense brown sandy GRAVEL. Sand is medium to coarse. Gravel consists of fine to medium angular to sub rounded flint.	
D+S	2.50	4	20	19	24	24	25	92	2.50		2.50			
									3.00					
									3.50					
									4.00					
									4.50					
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
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WINDOW/WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:	WS3		
Site Address:	Plough Lane, Teddington	Project No:	P1256J1265
Client:	Plough Lane Mews Limited	Ground Level:	
Logged By:	SB	Date Commenced:	09/04/2018
Checked By:	TE	Date Completed:	09/04/2018
Type and diameter of equipment:	Dando Terrier	Sheet No:	1 Of 1

Water levels recorded during boring, m

Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks

1: Refusal at 2.50m

2: No water reported

3: * Field description

4:

Sample or Tests										Strata				
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description	Installation
		75	75	75	75	75	75	N						
PJV	0.25								0.00		0.25		Concrete. (MADE GROUND)	
PJV	0.50								0.50				Soft consistency* brown sandy gravelly CLAY. Sand is fine. Gravel consists of fine to medium angular to sub rounded flint.	
PJV+D	1.00								1.00					
									1.50					
D	2.00								2.00		2.10			
D	2.50								2.50		2.50		Brown very sandy GRAVEL. Sand is coarse. Gravel consists of fine to medium angular to sub rounded flint.	
									3.00					
									3.50					
									4.00					
									4.50					
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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TRIAL PIT RECORD

					Exploratory Hole No:	HTP1	
Site Address:	Plough Lane, Teddington				Project No:	P1256J1265	
Client:	Plough Lane Mews Limited				Ground Level:		
Logged By:	SB				Date Commenced:	09/04/2018	
Checked By:	TE				Date Completed:	09/04/2018	
Type and diameter of equipment:	Dando Terrier				Sheet No:	1 Of 1	
Pit Dimension:	Length:	0.50	Width:	0.50	Depth:	1.20	

Remarks

1: * Field description

2: No water reported

3:

4:

Sample or Tests			Strata			
Type	Depth (mbgl)	Result	Legend	Depth (mbgl)	Water Strikes (mbgl)	Strata Description
PJV	0.25			0.25		Concrete. (MADE GROUND)
PJV	0.50					Soft consistency* brown sandy gravelly CLAY. Sand is fine. Gravel consists of fine to medium angular to sub rounded flint.
PJV+D	1.00			1.20		

0.00 — 0.50 — 1.00 — 1.50 — 2.00 — 2.50 — 3.00 — 3.50 — 4.00 — 4.50 — 5.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample

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APPENDIX 3 – CHEMICAL LABORATORY TEST RESULTS

Emma Hucker
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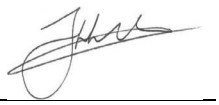
e: Jomas Associates -

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 18-82181

Project / Site name:	Plough Lane, Teddington	**Samples received on:**	13/04/2018
Your job number:	JJ1265	**Samples instructed on:**	13/04/2018
Your order number:	P1256JJ1265.3	**Analysis completed by:**	20/04/2018
Report Issue Number:	1	**Report issued on:**	20/04/2018
Samples Analysed:	10 soil samples		

Signed: 

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 18-82181

Project / Site name: Plough Lane, Teddington
Your Order No: P1256JJ1265.3

Lab Sample Number				943046	943047	943048	943049	943050
Sample Reference				WS1	WS1	WS2	WS2	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	0.50	0.25	0.50	1.00
Date Sampled				09/04/2018	09/04/2018	09/04/2018	09/04/2018	09/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	-	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	-	12	12	12	13
Total mass of sample received	kg	0.001	NONE	-	1.2	1.6	1.6	1.3
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	6.4	-	7.6	7.6
Total Cyanide	mg/kg	1	MCERTS	-	< 1	-	< 1	< 1
Total Sulphate as SO_4	mg/kg	50	MCERTS	-	430	-	370	250
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.095	-	0.058	0.039
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	95.2	-	57.9	38.5
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	0.6	0.5	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	0.56	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	0.88	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	0.14	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	1.3	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	11	-	0.40	0.14
Anthracene	mg/kg	0.05	MCERTS	-	2.1	-	0.13	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	11	-	1.2	0.58
Pyrene	mg/kg	0.05	MCERTS	-	8.1	-	0.98	0.46
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	3.5	-	0.65	0.32
Chrysene	mg/kg	0.05	MCERTS	-	3.1	-	0.58	0.33
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	2.8	-	0.65	0.26
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	1.3	-	0.19	0.13
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	2.1	-	0.40	0.20
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.98	-	0.30	0.19
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	0.28	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	1.2	-	0.34	0.23
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	50.5	-	5.86	2.84

Analytical Report Number: 18-82181

Project / Site name: Plough Lane, Teddington
Your Order No: P1256JJ1265.3

Lab Sample Number				943046	943047	943048	943049	943050
Sample Reference				WS1	WS1	WS2	WS2	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	0.50	0.25	0.50	1.00
Date Sampled				09/04/2018	09/04/2018	09/04/2018	09/04/2018	09/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	11	-	12	11
Boron (water soluble)	mg/kg	0.2	MCERTS	-	2.0	-	3.8	3.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	23	-	18	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	12	-	8.8	7.8
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	36	-	49	19
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	15	-	16	13
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	27	-	31	25
Monoaromatics								
Benzene	ug/kg	1	MCERTS	-	-	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	-	< 0.1	-	-	< 0.1
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	< 10	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	< 10	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	12	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	20	-
TPH (C10 - C12)	mg/kg	2	MCERTS	-	4.0	-	-	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	-	12	-	-	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	-	33	-	-	1.1
TPH (C21 - C40)	mg/kg	10	MCERTS	-	58	-	-	< 10

Analytical Report Number: 18-82181

Project / Site name: Plough Lane, Teddington
Your Order No: P1256JJ1265.3

Lab Sample Number				943046	943047	943048	943049	943050
Sample Reference				WS1	WS1	WS2	WS2	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	0.50	0.25	0.50	1.00
Date Sampled				09/04/2018	09/04/2018	09/04/2018	09/04/2018	09/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Chloroethane	µg/kg	1	NONE	-	-	-	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	< 1.0	-
Benzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Styrene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Tribromomethane	µg/kg	1	NONE	-	-	-	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	-

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Project / Site name: Plough Lane, Teddington
Your Order No: P1256JJ1265.3

Lab Sample Number				943046	943047	943048	943049	943050
Sample Reference				WS1	WS1	WS2	WS2	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.25	0.50	0.25	0.50	1.00
Date Sampled				09/04/2018	09/04/2018	09/04/2018	09/04/2018	09/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					

Analytical Report Number: 18-82181

Project / Site name: Plough Lane, Teddington
Your Order No: P1256JJ1265.3

Lab Sample Number				943051	943052	943053	943054	943055
Sample Reference				WS2	WS3	WS3	WS3	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.50	0.25	0.50	1.00	2.50
Date Sampled				09/04/2018	09/04/2018	09/04/2018	09/04/2018	09/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	20
Moisture Content	%	N/A	NONE	4.9	12	11	11	4.0
Total mass of sample received	kg	0.001	NONE	0.80	1.2	1.1	1.0	0.73
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	Not-detected	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.7	7.0	6.7	-	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	-	< 1
Total Sulphate as SO_4	mg/kg	50	MCERTS	230	390	280	-	250
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.025	0.049	0.051	-	0.023
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	24.9	48.8	50.8	-	23.1
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.1	-	-	0.4	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	-	< 0.80

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Project / Site name: Plough Lane, Teddington
Your Order No: P1256JJ1265.3

Lab Sample Number				943051	943052	943053	943054	943055
Sample Reference				WS2	WS3	WS3	WS3	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.50	0.25	0.50	1.00	2.50
Date Sampled				09/04/2018	09/04/2018	09/04/2018	09/04/2018	09/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	30	11	10	-	19
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	0.8	0.9	-	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	-	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	-	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	16	16	-	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	3.4	8.4	8.7	-	6.3
Lead (aqua regia extractable)	mg/kg	1	MCERTS	7.9	20	16	-	8.4
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	34	12	12	-	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	29	30	26	-	20
Monoaromatics								
Benzene	ug/kg	1	MCERTS	-	-	< 1.0	-	-
Toluene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
o-xylene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	< 0.1
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	< 1.0	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	< 8.0	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	< 8.0	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	< 10	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	< 1.0	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	< 10	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	< 10	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	< 10	-	-
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	-	-	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	< 1.0
TPH (C21 - C40)	mg/kg	10	MCERTS	< 10	< 10	-	-	< 10

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Project / Site name: Plough Lane, Teddington
Your Order No: P1256JJ1265.3

Lab Sample Number				943051	943052	943053	943054	943055
Sample Reference				WS2	WS3	WS3	WS3	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.50	0.25	0.50	1.00	2.50
Date Sampled				09/04/2018	09/04/2018	09/04/2018	09/04/2018	09/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Chloroethane	µg/kg	1	NONE	-	-	< 1.0	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	< 1.0	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	< 1.0	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	< 1.0	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	< 1.0	-	-
Benzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Toluene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	< 1.0	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Styrene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Tribromomethane	µg/kg	1	NONE	-	-	< 1.0	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-

Analytical Report Number: 18-82181

Project / Site name: Plough Lane, Teddington
Your Order No: P1256JJ1265.3

Lab Sample Number				943051	943052	943053	943054	943055
Sample Reference				WS2	WS3	WS3	WS3	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.50	0.25	0.50	1.00	2.50
Date Sampled				09/04/2018	09/04/2018	09/04/2018	09/04/2018	09/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					

Analytical Report Number : 18-82181

Project / Site name: Plough Lane, Teddington

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
943046	WS1	None Supplied	0.25	-
943047	WS1	None Supplied	0.50	Light brown clay and sand with gravel.
943048	WS2	None Supplied	0.25	Brown clay and sand with gravel.
943049	WS2	None Supplied	0.50	Brown clay and sand with gravel.
943050	WS2	None Supplied	1.00	Brown clay and sand.
943051	WS2	None Supplied	2.50	Brown sand with gravel.
943052	WS3	None Supplied	0.25	Brown clay and sand.
943053	WS3	None Supplied	0.50	Brown clay and sand.
943054	WS3	None Supplied	1.00	Brown sandy clay.
943055	WS3	None Supplied	2.50	Brown sand with gravel and stones.

Analytical Report Number : 18-82181

Project / Site name: Plough Lane, Teddington

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
PRO (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding.	L076-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

Analytical Report Number : 18-82181

Project / Site name: Plough Lane, Teddington

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

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

The results included within the report are representative of the samples submitted for analysis.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS2		S	18-82181	943051	b	Monohydric phenols in soil	L080-PL	b
WS2		S	18-82181	943051	b	PRO (Soil)	L088-PL	b
WS2		S	18-82181	943051	b	Speciated EPA-16 PAHs in soil	L064-PL	b
WS2		S	18-82181	943051	b	TPH in (Soil)	L076-PL	b
WS3		S	18-82181	943055	b	Monohydric phenols in soil	L080-PL	b
WS3		S	18-82181	943055	b	PRO (Soil)	L088-PL	b
WS3		S	18-82181	943055	b	Speciated EPA-16 PAHs in soil	L064-PL	b
WS3		S	18-82181	943055	b	TPH in (Soil)	L076-PL	b

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature