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GEO-ENVIRONMENTAL & GEOTECHNICAL ASSESSMENT REPORT

ELLERAY HALL & NORTH LANE DEPOT/EAST CAR PARK
TEDDINGTON, TW11

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Report Title: **Geo-environmental & Geotechnical Assessment Report for Elleray Hall & North Lane Depot/East Car Park, Teddington**

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EXECUTIVE SUMMARY

Richmond and Wandsworth Council commissioned Jomas Associates Ltd to act as environmental consultants to oversee a Geo-environmental and Geotechnical ground investigation at the site located at Elleray Hall and North Lane Depot/East Car Park, Teddington. The works were undertaken by others, under instruction and supervision by Jomas Associates. This interpretive report is based on the factual report provided by the contractor.

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	Site is comprised of two separate but neighbouring plots; northern site is currently a car park and disused former works and the southern plot is occupied by a community hall.
Proposed Site Use	Demolition of Elleray Hall and the construction of a two-storey block of flats with soft landscaping, and the construction of a community centre on the currently vacant North Lane Depot/East Car Park plots.
Desk Study Overview	A Desk Study report has been produced for the site and issued separately (Jomas – November 2020). A brief overview of the desk study findings is presented below. Reference should be made to the full report for detailed information. A review of the earliest available (1865) historical maps indicates that the northern plot was occupied by residential/agricultural structures until the late 1800s when only a single structure is shown along the western boundary (use unclear), with the very north of the site comprising the end of neighbouring gardens. Throughout the first half of the 20th century there are various reconfigurations of the site with commercial style buildings shown along the eastern and southern boundaries, with no usage indicated. By 1963 the east of the site is shown as vacant and by 1988 the east is indicated to be a car park. Structures remain along the western boundary up to the most recent map edition, however the area is shown vacant on an aerial photograph from 2011, indicating demolition between 2008 and 2011. The southern plot was occupied by residential properties and gardens from 1865 until at least 1898; by 1915 the east of the site is occupied by a large “hall” building with a smaller structure identified in the south-west of the site. By 1959 the hall structure is identified as “works”, and remains in this use until the 1988 map edition identifies a “hall” once again with an extension to the west of the structure. By 1991 the structure is identified as a “day centre” which remains up to the most recent map edition. The surrounding area has been predominantly residential with occasional industrial features. Industrial features of note include various works, a warehouse, garage and an unspecified tank, all located within 250m of the site. The British Geological Survey indicates that the site is directly underlain by superficial deposits of the Kempton Park Gravel Member. 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 160m northeast of the site indicated sand and gravels extending to approximately 4mbgl, underlain by clay. The superficial deposits underlying the site are identified as a Principal Aquifer with the underlying solid deposits identified as unproductive. A review of the Enviro+Geoinsight Report indicates that there are no source protection zones within 500m of the site and there are no groundwater, surface water or potable water abstractions reported within 1km of the site. No detailed river entries or surface water features reported within 250m of the site and there are no Environment Agency Zone 2 or 3 floodplains reported within 50m of the site.

Site History and Ground Investigation	
	Due to the potential for hydrocarbon contamination to be present beneath the site from the identified historical uses as "works" (southern site) and reported depot usage on the northern site, it was recommended that a ground investigation includes provision of gas and groundwater monitoring wells to allow for gas monitoring and groundwater sampling should viable sources be reported during the ground investigation. If deep Made Ground containing significant organic inclusions is encountered, gas monitoring should also be undertaken in accordance with CIRIA C655.
Intrusive Investigation	The ground investigation was undertaken by Concept between 22nd February and 5th March 2021, and consisted of the following: - 10No window sampling boreholes, drilled up to 2.00m below ground level (bgl), with associated in situ testing and sampling; - 2No cable percussion boreholes to 20mbgl; - 3No machine excavated trial pits for BRE365 infiltration testing; - Laboratory analysis for chemical and geotechnical purposes, - 4No. return visits to monitor ground gas concentrations and groundwater levels have been completed..
Ground Conditions	The results of the ground investigation revealed a ground profile comprising Made Ground up to 1.7mbgl overlying both cohesive and granular deposits of the Kempton Park Gravel Member to a maximum depth of 6.60mbgl, overlying London Clay Formation to at least the depth of the deepest borehole at 20.0mbgl. The base of this stratum was not proven. During the investigation, groundwater was reported within boreholes BH1 and BH2 at 10.00mbgl and 19.30mbgl respectively. During return monitoring groundwater was reported at depths of between 4.00-4.30mbgl. It is considered that these results represent a shallow ground water table within the superficial Kempton Park Gravel deposits.
Environmental Considerations	Northern Plot Following generic risk assessments, elevated concentrations of naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(ah)anthracene and C10-C12 aromatic petroleum hydrocarbons were detected in soils in excess of generic assessment criteria for the protection of human health within a "commercial" end-use scenario. No asbestos fibres were detected in the samples analysed in the laboratory. The site proposal indicates that large areas of site will remain covered by a combination of the proposed building footprints and hard surfacing. Where this is the case, no formal remedial measures are considered necessary in terms of human health (beyond the removal of the material described above), as the building and hard surfacing are expected to provide a barrier to potential receptors. In areas of soft landscaping, a cover layer of 450mm of clean imported sub/topsoil should be placed above a geotextile membrane. Exceedances were of generic assessment criteria for potentially volatile compounds (naphthalene and the aromatic hydrocarbon fraction >C10-C12) were detected within made ground soils in WS5, and concentrations of volatile contaminants including BTEX compounds were detected above laboratory method detection limits in the made ground in WS5 and WS3. These concentrations of volatile contaminants were only detected in a sub-stratum of made ground comprising Light to dark brown - dark grey slightly clayey slightly silty very sandy gravel/gravelly sand with gravel consists of flint, brick, concrete, ceramic and asphalt, within which hydrocarbon odours were commonly noted. Pockets of a black tar substance were noted within this substratum in WS5. Given the relatively thin nature of the stratum, and the lack of visual / olfactory evidence

Site History and Ground Investigation	
	of hydrocarbon or volatile contamination in soils underlying the stratum, as well as the low photo-ionisation detector readings recorded in monitoring well headspaces during monitoring events, it is considered unlikely that a significant risk to end users of the development exists via vapour inhalation pathways. A groundwater sample obtained from BH1 in the northern plot did not report any contaminants in excess of generic assessment criteria, and therefore the contaminants identified on site are not considered to be impacting on the groundwater beneath the site. Following four gas monitoring visits, concentrations of carbon dioxide are raised at the site, with corresponding depleted oxygen. Calculating the Gas Screening Value using worst case results indicates Characteristic Situation 1. However, due to the elevated concentrations of carbon dioxide measured in excess of 5%, consideration should be given to upgrading the sites to CS2. Given that no significant sources of ground gases were identified during the desk study, and no significant sources of potential ground gases were identified during the intrusive works it is considered that the site should not be classified as CS2, and a CS1 designation is appropriate (for which no gas protection measures are required). Barrier pipe is likely to be required for potable water supply pipes. The requirements should be confirmed with the relevant utility provider. <u>Southern Plot</u> Following generic risk assessments, elevated concentrations of arsenic, lead, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(ah)anthracene and C21-C352 grouped petroleum hydrocarbons were detected in soils in excess of generic assessment criteria for the protection of human health within a "residential with plant uptake" end-use scenario on the southern plot No asbestos fibres were detected in the samples analysed in the laboratory. The site proposals indicate that large areas of the site will be covered by a combination of the proposed building footprint and hard surfacing. Where this is the case, no formal remedial measures are considered necessary in terms of human health, as the building and hard surfacing are expected to provide a barrier to potential receptors. In areas of soft landscaping, a cover layer of 450mm of clean imported sub/topsoil should be placed above a geotextile membrane. It is possible that further soil sampling and assessment may allow for zoning and delineation of areas requiring clean cover in soft landscaped areas. Groundwater analysis of a sample obtained from the southern plot did not report any contaminants contained within the testing suite above the limit of detection. Risks to controlled waters are considered to be low. Following four gas monitoring visits, concentrations of carbon dioxide are raised at the site, with corresponding depleted oxygen. Calculating the Gas Screening Value using worst case results indicates Characteristic Situation 1. However, due to the elevated concentrations of carbon dioxide measured in excess of 5%, consideration should be given to upgrading the sites to CS2. Given that no significant sources of ground gases were identified during the desk study, and no significant sources of potential ground gases were identified during the intrusive works it is considered that the site should not be classified as CS2, and a CS1 designation is appropriate (for which no gas protection measures are required).
Geotechnical Considerations	Based on the findings of this investigation, it is considered that reinforced strip footings of up to 1m breadth may be formed at a minimum depth of 0.75mbgl within the underlying Kempton Park Gravel Member for an allowable bearing capacity of 120kPa.

Site History and Ground Investigation	
	This depth, however, does not take into account the depth of Made Ground (encountered up to 1.7m bgl) or the distance to and species of any previous, existing and proposed trees, and foundations may need to be deepened further accordingly, in accordance with NHBC requirements. It is recommended that a layer of light mesh reinforcement is added to the base of all foundations to mitigate the potential for excessive differential settlement, given the variable properties (cohesive/granular) encountered within the Kempton Park Gravel Member. Alternatively, piled foundations could be considered and preliminary pile carrying capacities are provided in Table 10.2. Suspended floor slabs are recommended due to the presence of shrinkable soils and due to the depths of Made Ground encountered. Groundwater was encountered at depths ranging between 4.00m and 4.30mbgl during return monitoring. Any groundwater encountered during construction works should be addressed by conventional pumping from a sump. Excavations during the intrusive works, although open for a relatively short period of time remained reasonably stable. However, it is recommended that the stability of all excavations should be assessed during construction. The sides of any excavations into which personnel are required to enter should be assessed and battered back to a safe angle. Based on the results of chemical testing, the required concrete class for the site is DS-1 assuming an Aggressive Chemical Environment for Concrete classification of AC-1 in accordance with the procedures outlined in BRE Special Digest 1. CBR values of <2.5% and 5% are recommended for use in preliminary design where the formation is within Made Ground and the superficial deposits respectively.
Recommended Further Work	The following works are recommended: - Seek approval of the Generic Quantitative Risk Assessment and Soil Gas Assessment from the Local Authority, NHBC and other relevant stakeholders; - Production of a Remediation Method Statement (RMS); - Seek confirmation of the water supply pipe requirements by the appropriate service provider.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Richmond and Wandsworth Council ("The Client") has commissioned Jomas Associates Ltd, to assess the risk of contamination posed by the ground conditions reported at a site referred to as Elleray Hall and North Lane Depot/East Car Park, Teddington and to provide indicative recommendations for foundation design 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, November 2020), followed by an intrusive investigation undertaken and factually reported by Concept

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

Table 1.1: Previous Reports

Title	Author	Reference	Date
Desk Study / Preliminary Risk Assessment Report for Elleray Hall & North Lane Depot/East Car Park, Teddington, TW11	Jomas Associates Ltd	P3152J2114 Final	November 2020
Ground Investigation Specification For Elleray Hall & North Lane Depot / East Car Park Teddington TW11	Jomas Associates Ltd	P3152J2114 Final	November 2020
Factual Report	Concept	20/3521/-FR01	9th April 2021

1.1.4 In accordance with our proposal dated 19th October 2021, Jomas was instructed to act as an environmental consultant, to specify, and supervise intrusive works undertaken by the ground investigation contractor and prepare an interpretative report based on the factual findings of the investigation.

1.2 Proposed Development

1.2.1 The proposed development is to involve the demolition of Elleray Hall and the construction of a two-storey block of flats with soft landscaping to the south of Middle Lane, and the construction of a community centre on the currently vacant North Lane Depot/East Car Park plots to the north of Middle Lane.

1.2.2 Plans of the proposed development are included in Figures 3 and 4, Appendix 1.

1.2.3 For the purposes of the contamination risk assessment, the proposed development on the southern site is classified as a "residential with plant uptake" end-use scenario. The community centre on the northern plot is considered as a "commercial" end-use scenario.

1.2.4 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997. GC 2 projects are defined as involving:

- Conventional structures.

- Quantitative investigation and analysis.
- Normal risk.
- No difficult soil and site conditions.
- No difficult loading conditions.
- Routine design and construction methods.

1.3 Objectives

1.3.1 The objectives of Jomas' investigation were as follows:

- To commission and oversee 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; and,
- To recommend geotechnical parameters to inform preliminary foundation design.

1.4 Scope of Works

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

- Specify, instruct and oversee an intrusive ground investigation to determine shallow ground conditions, and potential for contamination at the site;
- Scheduling of laboratory chemical and geotechnical 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 Richmond and Wandsworth Council, 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 Figure 1, Appendix 1. The site comprises 2no distinct sections with the North Lane Depot and East Car Park located to the north of Middle Lane, and with the Elleray Hall site located ca 5m to the south east at its closest point, and to the south of Middle Lane.

Table 2.1: Site Information

Name of Site	Elleray Hall & North Lane Depot/East Car Park
Address of Site	North Lane/Elleray Road Teddington TW11
Approx. National Grid Ref.	515688 170873
Site Area (Approx.)	0.24ha
Site Occupation	Community centre, disused depot and car park
Local Authority	London Borough of Richmond upon Thames

2.2 Desk Study Overview

2.2.1 A Desk Study report has been produced for the site and issued separately (Jomas – November 2020). 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 A review of the earliest available (1865) historical maps indicates that the northern plot was occupied by residential/agricultural structures until the late 1800s when only a single structure is shown along the western boundary (use unclear), and with the very north of the site comprising parts of neighbouring gardens. Throughout the first half of the 20th century there are various reconfigurations of the site with commercial style buildings shown along the eastern and southern boundaries, with no usage indicated. By 1963 the east of the site is shown as vacant and by 1988 the east is indicated to be a car park. Structures remain along the western boundary up to the most recent map edition, however the area is shown vacant on an aerial photograph from 2011, indicating demolition between 2008 and 2011.

2.2.3 The southern plot was occupied by residential properties and gardens from 1865 until at least 1898; by 1915 the east of the site is occupied by a large “hall” building with a smaller structure identified in the south-west of the site. By 1959 the hall structure is identified as “works”, and remains in this use until the 1988 map edition identifies a “hall” once again with an extension to the west of the structure. By 1991 the structure is identified as a “day centre” which remains up to the most recent map edition.

2.2.4 The surrounding area has been predominantly residential with occasional industrial features. Industrial features of note include various works, a warehouse, garage and an unspecified tank, all located within 250m of the site.

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

2.2.6 Borehole records from approximately 160m northeast of the site indicated sand and gravels extending to approximately 4mbgl, underlain by clay.

2.2.7 The superficial deposits underlying the site are identified as a Principal Aquifer with the underlying solid deposits identified as unproductive. A review of the Enviro+Geoinsight Report indicates that there are no source protection zones within 500m of the site and there are no groundwater, surface water or potable water abstractions reported within 1km of the site. No detailed river entries or surface water features reported within 250m of the site and there are no Environment Agency Zone 2 or 3 floodplains reported within 50m of the site.

2.2.1 Due to the potential for hydrocarbon contamination to be present beneath the site from the identified historical uses as "works" (southern site) and reported depot usage on the northern site, it was recommended that a ground investigation includes provision of gas and groundwater monitoring wells to allow for gas monitoring and groundwater sampling should viable sources be reported during the ground investigation. If deep Made Ground containing significant organic inclusions is encountered, gas monitoring was also recommended to be undertaken in accordance with CIRIA C655.

2.2.2 The conceptual site model is reproduced in Table 2.2 overleaf.

Table 2.2: Preliminary Risk Assessment for the Site

<table>
<tr><th>Sources</th><th>Pathways (P)</th><th>Receptors</th><th>Consequence of Impact</th><th>Probability of Impact</th><th>Risk Estimation</th><th>Hazard Assessment</th></tr>
<tr><td rowspan="3">• Potential for contaminated ground associated with previous site use – on site (S1)
o depot,
o works,
o car park,
o unspecified industrial/commercial
• Potential for Made Ground associated with previous development operations – on site (S2)
• Potential for asbestos impacted soils from demolition of previous structures – on site (S3)
• Previous industrial use – off site (S4)
o Works (40m NW, 100m, 180m, 230m W)
o Garage (60m NE)
o Industrial unit with tanks (240m W)</td><td>• 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)</td><td rowspan="2">• 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)</td><td>Medium</td><td>Low</td><td>Moderate</td><td rowspan="3">GI – Ground Investigation</td></tr>
<tr><td>• Accumulation and migration of soil gases (P5)</td><td>Severe</td><td>Unlikely</td><td>Low</td></tr>
<tr><td>• 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)</td><td>• Neighbouring site users (R3)
• Building foundations and on site buried services (water mains, electricity and sewer) (R5)
• Controlled waters - Principal Aquifer (R6)</td><td>Medium</td><td>Low</td><td>Moderate</td></tr>
</table>

3 GROUND INVESTIGATION

3.1 Rationale and Scope of Ground Investigation

3.1.1 The Rationale and Scope of the Ground Investigation is detailed with the Ground Investigation Specification prepared by Jomas Associates, ref. P3152J2114, dated 26th November 2020.

3.2 Factual Ground Investigation

3.2.1 The ground investigation was undertaken by Concept Engineering Consultants Limited (Concept) between 22nd February and 5th March 2021, and is reported by Concept in their Factual Report dated 9th April 2021, ref 20/3521 FR01. The full factual report is provided as Appendix 2.

3.2.2 A summary of the fieldwork carried out at the site by Concept is presented in Table 3.1 below. Exploratory locations are shown in Figure 2.

Table 3.1: Scope of Intrusive Investigation

Investigation Type	Number of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved (m BGL)	Limitations
Window Sample Boreholes	10	WS1 – 10	Maximum 2mbgl	All windowless sampler boreholes were terminated at 2.00mbgl due to refusal in very dense granular material interpreted to represent the Kempton Park Gravel Member.
Cable Percussion Boreholes	2	BH1-BH2	20mbgl	No deviation from agreed specification.
Monitoring Wells	6	BH1, BH2, WS1, WS2, WS6, WS10	Maximum 6.3mbgl	Installations within windowless sampler boreholes shallower than proposed due to shallow refusals.
Machine Excavated Trial Pits	3	STP1-STP3	Maximum 2.70mbgl	No deviation from agreed specification.

3.3 Observations by Jomas During Site Works

3.3.1 A Jomas engineer supervised the initial set up of the site works on 21st February 2021. All works observed were in accordance with the agreed specification.

3.4 Laboratory Analysis

3.4.1 A programme of laboratory testing was scheduled by Jomas Associates Limited, based on the ground investigation data obtained by Concept.

Chemical Testing

3.4.2 Soil samples were obtained by Concept and submitted to Eurofins Chemtest Ltd (a UKAS and MCerts accredited laboratory), for analysis.

3.4.3 The samples were analysed for a suite of contaminants as shown in Table 3.2 below:

Table 3.2: Chemical Tests Scheduled

Test Suite	No. of tests: Made Ground / Topsoil	No. of tests: Natural
Basic Suite 3	11	1
Basic Suite 5	9	1
Total Organic Carbon	4	-
Water Soluble Sulphate	11	17
TPHCWG (inc BTEX)	9	1
VOC	9	1
Waste Acceptance Criteria	2	-
Asbestos Screen & ID	16	-

3.4.4 The determinands contained in the Basic Suite 3 are as detailed in Table 3.3 below. Basic Suite 5 contains the same determinands but without the hydrocarbon compounds to avoid overlapping with the hydrocarbon testing.

Table 3.3: Basic Suite of Determinands

DETERMINAND	LIMIT OF DETECTION (mg/kg)	UKAS ACCREDITATION	TECHNIQUE
Arsenic	1	Y (MCERTS)	ICPMS
Cadmium	0.1	Y (MCERTS)	ICPMS
Chromium	1	Y (MCERTS)	ICPMS
Chromium (Hexavalent)	0.5	Y (MCERTS)	"Aquakem 600" Discrete Analyser using 1,5-diphenylcarbazide.
Lead	0.5	Y (MCERTS)	ICPMS
Mercury	0.1	Y (MCERTS)	ICPMS
Nickel	0.5	Y (MCERTS)	ICPMS
Selenium	0.2	Y (MCERTS)	ICPMS
Copper	0.5	Y (MCERTS)	ICPMS
Zinc	0.5	Y (MCERTS)	ICPMS
Boron (Water Soluble)	0.4	Y (MCERTS)	ICPMS
pH Value	4.0	Y (MCERTS)	pH Meter
Sulphate (Water Soluble)	0.01g/l	Y (MCERTS)	Aqueous extraction/ICP-OES
Total Cyanide	0.5	Y (MCERTS)	Colorimetry
Speciated/Total PAH	0.10/5.0	Y (MCERTS)	GCFID
Phenols	0.3	Y (MCERTS)	HPLC

Total Petroleum Hydrocarbons (banded)	10.0	N Y (MCERTS)	GCxGC FID

3.4.5 To support the selection of appropriate tier 1 screening values, 10No samples were analysed for total organic carbon.

Geotechnical Laboratory Testing

3.4.6 In addition to the contamination assessment, soil samples were submitted to Concept's laboratory for a series of analyses.

3.4.7 This testing was specifically designed to:

- classify the samples; and
- obtain parameters (either directly or sufficient to allow relevant correlations to be used) relevant to the technical objectives of the investigation.

3.4.8 The following laboratory geotechnical testing (as summarised in Table 3.4) was carried out:

Table 3.4 Laboratory Geotechnical Analysis

BS 1377 (1990) Test Number	Test Description	Number of tests
Part 2		
3.2	Moisture Content Determination	20
4.3 and 5.3	Liquid and Plastic Limit Determination (Atterberg Limits)	20
9.2 and 9.3	Particle Size Distribution - Sieving	4
Part 7		
8	Determination of the undrained shear strength in triaxial compression with single stage loading and without measurement of pore pressure	8

4 GROUND CONDITIONS

4.1 Soil

4.1.1 Jomas' summary interpretation of the ground profile described by Concept is provided in Table 4.1 below, based on the strata observed during the investigation.

Table 4.1: Ground Conditions Encountered

Stratum and Description	Encountered from (mbgl)	Base of strata (mbgl)	Thickness range (m)
Asphalt (MADE GROUND) Overlying concrete in WS5. (BH1, BH2, WS1, WS3, WS4, WS5, WS6, WS7, WS8, STP1)	GL	0.03 – 0.20	0.10 – 0.20
Paving slabs overlying gravelly sand. Gravel consists of flint. (MADE GROUND) (WS9)	GL	0.10	0.10
Dark brown silty clay with frequent rootlets. (WS2, STP2) (TOPSOIL)	GL	0.15	0.15
Light to dark brown - dark grey slightly clayey slightly silty very sandy gravel/gravelly sand. Gravel consists of flint, brick, concrete, ceramic and asphalt. Hydrocarbon odour reported in BH1, WS3, WS4, WS5, STP1, STP2 (MADE GROUND)	GL – 0.20	0.10 – 1.00	0.10 – 0.90
Greenish-grey to orangish-brown dark brown silty slightly sandy gravelly clay/silt. Gravel consists of flint, brick and concrete. Hydrocarbon odour reported in WS1 (MADE GROUND)	0.10 - 0.90	0.55 - 1.70	0.25 - 0.95
Orangish-brown to greenish-grey clayey sandy gravelly SILT/sandy slightly gravelly CLAY. Gravel consists of flint. (KEMPTON PARK GRAVEL MEMBER – Cohesive)	0.55 - 1.00	1.50 - 2.20	0.70 – 1.35
Orangish-brown to greyish brown sometimes clayey gravelly SAND/sandy GRAVEL. Gravel consists of flint. (KEMPTON PARK GRAVEL MEMBER – Granular)	1.20 - 2.20	>2.00 – 6.60	>0.1 – 5.1
Greyish brown to dark brown silty sandy CLAY with pockets of dark grey silt. Occasional shell fragments and dark grey staining. (LONDON CLAY FORMATION)	6.30 – 6.60	>20.00 (Base not proven)	>13.40 – >13.70 (Thickness not proven)

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 superficial deposits of the Kempton Park Gravel Member overlying solid deposits of the London Clay Formation. The base of this deposit was not proven.

4.2 Hydrogeology

4.2.1 Groundwater strikes and groundwater monitoring are summarised below in Table 4.2. It is noted that water was added to aid drilling through the Kempton Park Gravel Member in the cable percussive boreholes BH1 and BH2, which may have masked groundwater strikes or seepages.

Table 4.2: Groundwater Strikes During Drilling

Exploratory Hole ID	Depth Encountered (mbgl)	Depth After 20mins (mbgl)	Stratum
BH1	10.00	no rise	London Clay Formation
BH2	19.30	no rise	London Clay Formation
WS1	No water strike		
WS2	No water strike		
WS3	No water strike		
WS4	No water strike		
WS5	No water strike		
WS6	No water strike		
WS7	No water strike		
WS8	No water strike		
WS9	No water strike		
WS10	No water strike		

4.2.2 4No return groundwater monitoring visits were undertaken between 10/03/2021 and 09/06/2021. The results are summarised below.

Table 4.3: Groundwater Monitoring Records

Exploratory Hole ID	Depth Encountered (mbgl)	Depth to Base of Well (mbgl)	Strata targeted by response zone
BH1	4.00-4.15	6.30	Kempton Park Gravel Member
BH2	4.14-4.30	6.30	Kempton Park Gravel Member
WS1	Dry	2.00	Kempton Park Gravel Member
WS2	Dry	2.00	Made Ground/Kempton Park Gravel Member
WS6	Dry	2.00	Kempton Park Gravel Member
WS10	Dry	2.00	Kempton Park Gravel Member

4.2.3 The monitoring results are considered to reflect a groundwater table within the Kempton Park Gravel at a depth of ca 4m bgl, at the time of monitoring.

4.3 Physical and Olfactory Evidence of Contamination

4.3.1 Hydrocarbon odours were reported at the following locations in the northern plot:

- STP1: GL – 0.25mbgl
- STP2: 0.10 – 0.30mbgl
- BH1: 0.10 – 0.30mbgl
- WS1: 0.30 – 0.55mbgl
- WS3: 0.10 – 0.50mbgl
- WS4: 0.10 – 0.50mbgl
- WS5: 0.20 – 0.75mbgl

4.3.2 In addition, a “black tar substance” was reported between 0.20-0.22mbgl in WS5.

4.3.3 Asphalt gravel was reported throughout the Made Ground in the northern plot.

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.

5.2 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 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

5.2.5 As the published reports only offer the option of selecting a SOM value of 1%, 2.5% or 6%, a SOM value of 1% has been used for the selection of generic assessment criteria, as this provides the most conservative assessment.

5.2.6 The proposed development is to involve the demolition of Elleray Hall and the construction of a two-storey block of flats with associated soft landscaping, and the construction of a community centre on the currently vacant North Lane Depot/East Car Park plots.

5.2.7 As a result, the proposed development on the southern site is classified as "residential with plant uptake". The community centre on the northern plot may be considered "commercial". Due to these differing end uses, the results from each pot have been assessed separately against their respective assessment criteria.

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 Analytical Framework – Groundwater and Leachate

5.4.1 The requirement to protect groundwater from pollution is outlined in Groundwater protection: Principles and practice (GP3, EA, August 2013, v1.1).

5.4.2 Where undertaken, the groundwater quality analysis comprises a Level 1 assessment in accordance with the EA Remedial Targets Methodology Document (EA, 2006).

5.4.3 The criteria used by Jomas' in the Level 1 assessment of groundwater and leachate quality are shown in Table 5.2.

Table 5.2: Selected Assessment Criteria – Contaminants in Water

Substance Group	Determinand(s)	Assessment Criteria Selected
Metals	Arsenic, Copper, Cyanide, Mercury, Nickel, Lead, Zinc, Chromium	EQS/DWS
	Selenium	DWS
PAHs	Sum of Four – benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, indeno(1,2,3-c,d)pyrene	DWS
PAHs	Benzo(a)pyrene,	DWS
PAHs	Remainder	LEC
Total Petroleum Hydrocarbons	Aliphatic C5-C6, Aliphatic >C6-C8, Aliphatic >C8-C10. Aliphatic >C10-C12, Aliphatic >C12-C16, Aliphatic >C16-C21, Aromatic C5-C7, Aromatic >C7-C8, Aromatic >C8-C10, Aromatic >C10-C12, Aromatic >C12-C16, Aromatic >C16-C21, Aromatic> C21-C35	DWS/WHO
Benzene	Benzene	DWS
Toluene	Toluene	EQS
Ethylbenzene	Ethylbenzene	EQS
Xylene	Xylene	EQS
Oxygen Demand	Chemical Oxygen Demand and Biological Oxygen Demand	Urban Waste Water Treatment (England and Wales) Regulations

<u>Environmental Quality Standards EQS</u>
Environmental Quality Standards (EQS) have been released by the EA for dangerous substances, as identified by the EC Dangerous Substances Directive. EQS can vary for each substance, for the hardness of the water and can be different for fresh, estuarine or coastal waters.

Lowest Effect Concentration (LEC)
These criteria relate to the concentration of PAHs in groundwater. They are taken from the EA R&D Technical Report P45 – Polycyclic Aromatic Hydrocarbons (PAH): Priorities for Environmental Quality Standard Development (2001).

WHO Health
These screening criteria have been taken from the World Health Organisation Guidelines for Drinking Water Quality (1984). The health value is a guideline value representing the concentration of a contaminant that does not result in any significant risk to the receptor over a lifetime of exposure.
Further criteria have been obtained from 'Petroleum Products in Drinking-water' - Background document for development of WHO Guidelines for Drinking-water Quality (2005).

UK Drinking Water Standards (DWS)
These comprise screening criteria provided by the Drinking Water Inspectorate (DWI) in the Water Supply (Water Quality) Regulations 2006,

Urban Waste Water Treatment (England and Wales) Regulations - UWWT Regs
The Urban Waste Water Treatment (England and Wales) Regulations SI/1994/2841 as amended by SI/2003/1788 sets down minimum standards for the discharge of treated effluent from waste water treatment works to inland surface waters, groundwater, estuaries or coastal waters. Standards of (125mg/L) COD and (25mg/L) BOD have been set.

6 GENERIC QUANTITATIVE RISK ASSESSMENT

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

Laboratory analysis for soils obtained by Concept (with laboratory certificates included in their Factual Report) are summarised in the tables below.

Northern Plot (current car park and former depot site): Proposed Commercial Use

6.1.1 The results below represent samples obtained from the northern site, currently in use as a car park and former depot and proposed to be redeveloped to provide a new community centre facility. Based on this proposed end use, comparison of results is made against criteria protective of human health within a "commercial" end use setting.

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

Determinand	Unit	No. samples tested	Screening Criteria		Min	Max	No. Exceeding
Arsenic	mg/kg	15	S4UL	640	11	30	0
Cadmium	mg/kg	15	S4UL	190	<0.1	3.2	0
Chromium	mg/kg	15	S4UL	8600	3.5	38	0
Lead	mg/kg	15	C4SL	2330	50	1200	0
Mercury	mg/kg	15	S4UL	320	<0.1	5.3	0
Nickel	mg/kg	15	S4UL	980	3.7	36	0
Copper	mg/kg	15	S4UL	68000	8.4	2000	0
Zinc	mg/kg	15	S4UL	730000	33	470	0
Total Cyanide [A]	mg/kg	15	CLEA v 1.06	33	<0.50	12	0
Selenium	mg/kg	15	S4UL	12000	<0.20	0.37	0
Boron Water Soluble	mg/kg	15	S4UL	240000	<0.4	1.8	0
Phenols	mg/kg	15	S4UL	440	<0.3	170	0

Notes: [A] Generic assessment criteria derived for free inorganic cyanide.

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

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Naphthalene	mg/kg	15	S4UL	190	<0.10	370	1No (WS5@0.25mbgl)
Acenaphthylene	mg/kg	15	S4UL	83000	<0.10	66	-
Acenaphthene	mg/kg	15	S4UL	84000	<0.10	59	-
Fluorene	mg/kg	15	S4UL	63000	<0.10	150	-

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Phenanthrene	mg/kg	15	S4UL	22000	<0.10	710	-
Anthracene	mg/kg	15	S4UL	520000	<0.10	200	-
Fluoranthene	mg/kg	15	S4UL	23000	<0.10	760	-
Pyrene	mg/kg	15	S4UL	54000	<0.10	680	-
Benzo(a)anthracene	mg/kg	15	S4UL	170	<0.10	360	2No (WS3@0.25mbgl, BH1@0.25mbgl)
Chrysene	mg/kg	15	S4UL	350	<0.10	270	-
Benzo(b)fluoranthene	mg/kg	15	S4UL	44	<0.10	160	6No (WS1@0.30mbgl, WS3@0.25mbgl, WS4@0.10mbgl, WS5@0.25mbgl, BH1@0.25mbgl, BH1@0.40mbgl)
Benzo(k)fluoranthene	mg/kg	15	S4UL	1200	<0.10	160	-
Benzo(a)pyrene	mg/kg	15	S4UL	35	<0.10	340	6No (WS1@0.30mbgl, WS3@0.25mbgl, WS4@0.10mbgl, WS5@0.25mbgl, BH1@0.25mbgl, BH1@0.40mbgl)
Indeno(123-cd)pyrene	mg/kg	15	S4UL	500	<0.10	220	-
Dibenzo(ah)anthracene	mg/kg	15	S4UL	3.5	<0.10	59	6No (WS1@0.30mbgl, WS3@0.25mbgl, WS4@0.10mbgl, WS5@0.25mbgl, BH1@0.25mbgl, BH1@0.40mbgl)
Benzo(ghi)perylene	mg/kg	15	S4UL	3900	<0.10	200	-
Total PAH	mg/kg	15	-		<2.0	4400	-

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

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
C_8-C_{10}	mg/kg	6	S4UL	2000	<1.0	6.7	0
>C_{10}-C_{12}	mg/kg	6	S4UL	9700	<1.0	18	0
>C_{12}-C_{16}	mg/kg	6	S4UL	36000	<1.0	200	0
>C_{16}-C_{21}	mg/kg	6	S4UL	28000	11	1200	0

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
$>C_{21}$-C_{35}	mg/kg	6	S4UL	28000	16.7	1520	0
Total TPH	mg/kg	6	-	-	34	3200	-

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

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

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
$>C_5$-C_6 Aliphatic	mg/kg	9	S4UL	3200	<1.0	<1.0	0
$>C_6$-C_8 Aliphatic	mg/kg	9	S4UL	7800	<1.0	<1.0	0
$>C_8$-C_{10} Aliphatic	mg/kg	9	S4UL	2000	<1.0	72	0
$>C_{10}$-C_{12} Aliphatic	mg/kg	9	S4UL	9700	<1.0	120	0
$>C_{12}$-C_{16} Aliphatic	mg/kg	9	S4UL	59000	<1.0	450	0
$>C_{16}$-C_{35} Aliphatic	mg/kg	9	S4UL	1600000	20.3	1670	0
$>C_5$-C_7 Aromatic	mg/kg	9	S4UL	1600000	<1.0	<1.0	0
$>C_7$-C_8 Aromatic	mg/kg	9	S4UL	26000	<1.0	<1.0	0
$>C_8$-C_{10} Aromatic	mg/kg	9	S4UL	56000	<1.0	280	0
$>C_{10}$-C_{12} Aromatic	mg/kg	9	S4UL	3500	<1.0	5200	1No (WS5@0.25mbgl)
$>C_{12}$-C_{16} Aromatic	mg/kg	9	S4UL	16000	<1.0	9900	0
$>C_{16}$-C_{21} Aromatic	mg/kg	9	S4UL	36000	27	19000	0
$>C_{21}$-C_{35} Aromatic	mg/kg	9	S4UL	28000	97	27000	0
Total TPH (Ali/Aro)	mg/kg	9	-		150	67000	-

6.1.2 In addition to the suites above, 9No samples were also screened for the presence of volatile organic compounds (VOCs). VOCs were detected above method detection limits only in samples of the made ground in WS5 and WS3. The table below summarises the results for the compounds reported above detection limit.

Table 6.5: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPHCWG) – Northern Plot

Volatile Organic Compound	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Benzene	mg/kg	9	S4UL	27	<0.001	0.51	0
Toluene	mg/kg	9	S4UL	56000	<0.001	2.2	0
Ethylbenzene	mg/kg	9	S4UL	57000	<0.001	0.16	0
M & p xylene	mg/kg	9	S4UL	12100	<0.001	2.2	0

Volatile Organic Compound	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
o-xylene	mg/kg	9	S4UL	6600	<0.001	1.2	0
Styrene	mg/kg	9	S4UL	3300	<0.001	0.73	0
Isopropylbenzene	mg/kg	9	S4UL	1400	<0.001	0.014	0
1,3,5-trimethylbenzene	mg/kg	9	-	-	<0.001	0.18	0
1,2,4-trimethylbenzene	mg/kg	9	S4UL	42	<0.001	1.1	0

6.2 Vapour Risk Assessment from a Soil Source (Northern Pot)

6.2.1 As outlined in Tables 6.2-6.4, a number of polyaromatic hydrocarbons and a single petroleum hydrocarbon fraction have been found in excess of their generic screening criteria for the protection of human health within a 'commercial' end-use scenario. The generic screening criteria considers all possible pathways between the source and the receptor. In order to assess potential risks from inhalation of vapour, each organic compound that has been found in excess of its GAC will be assessed in terms of the contribution to total exposure from vapour inhalation inside a structure as reported within the LQM/CIEH S4UL document. Where a significant proportion of the total exposure is reported from vapour inhalation, there could be a potential risk from vapour inhalation.

Table 6.6: Soil Laboratory Analysis Results – Contribution to Total Exposure from Vapour Inhalation (Indoor)

Compound	Contribution of Vapour Inhalation to Total Exposure (%)	Screening Criteria (mg/kg)	Maximum recorded value (mg/kg)	Potential Vapour Risk?
Naphthalene	52.3	190	370	✓
Benzo(a)anthracene	<0.1	170	360	X
Benzo(b)fluoranthene	0.1	44	160	X
Benzo(a)pyrene	0.0	35	340	X
Dibenzo(ah)anthracene	0.0	3.5	3.5	X
>C_{10}-C_{12} Aromatic	16.3	3500	5200	✓

6.2.2 As shown in the table above, the concentrations of naphthalene and C10-C12 aromatic hydrocarbons detected in a sample from WS5 at 0.25m bgl theoretically pose a significant risk via vapour inhalation pathways. These exceedances of assessment criteria correlate approximately with the records of "pockets of a black tar substance" reported on the WS5 log between 0.20-0.22mbgl.

Southern Plot (current town hall site): Proposed Residential Use

6.2.3 The results below represent samples obtained from the southern site, currently in use as a town hall/community centre and proposed to be redeveloped to provide a new residential development.

6.2.4 Based on this proposed end use, comparison of results is made against criteria protective of human health within a "residential with plant uptake" end use setting.

Table 6.7: Soil Laboratory Analysis Results – Metals, Metalloids, Phenol, Cyanide – Southern Plot

Determinand	Unit	No. samples tested	Screening Criteria		Min	Max	No. Exceeding
Arsenic	mg/kg	8	S4UL	37	9.9	39	1No (BH2@0.30mbgl)
Cadmium	mg/kg	8	S4UL	11	<0.10	1.0	0
Chromium	mg/kg	8	S4UL	910	12	23	0
Lead	mg/kg	8	C4SL	200	33	620	3No (WS7@0.30mbgl, WS10@0.30mbgl, BH2@0.20mbgl)
Mercury	mg/kg	8	S4UL	40	<0.10	1.1	0
Nickel	mg/kg	8	S4UL	180	9.6	23	0
Copper	mg/kg	8	S4UL	2400	11	89	0
Zinc	mg/kg	8	S4UL	3700	32	430	0
Total Cyanide [A]	mg/kg	8	CLEA v 1.06	33	<0.50	0.50	0
Selenium	mg/kg	8	S4UL	250	<0.20	0.67	0
Boron Water Soluble	mg/kg	8	S4UL	290	0.58	0.90	0
Phenols	mg/kg	8	S4UL	120	<0.3	<0.3	0

Notes: [A] Generic assessment criteria derived for free inorganic cyanide.

Table 6.8: Soil Laboratory Analysis Results – Polycyclic Aromatic Hydrocarbons (PAHs) – Southern Plot

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Naphthalene	mg/kg	8	S4UL	2.3	<0.10	0.63	0
Acenaphthylene	mg/kg	8	S4UL	170	<0.10	0.80	0
Acenaphthene	mg/kg	8	S4UL	210	<0.10	0.14	0
Fluorene	mg/kg	8	S4UL	170	<0.10	0.43	0
Phenanthrene	mg/kg	8	S4UL	95	<0.10	3.4	0
Anthracene	mg/kg	8	S4UL	2400	<0.10	0.74	0
Fluoranthene	mg/kg	8	S4UL	280	<0.10	10	0

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Pyrene	mg/kg	8	S4UL	620	<0.10	9.4	0
Benzo(a)anthracene	mg/kg	8	S4UL	7.2	<0.10	4.5	0
Chrysene	mg/kg	8	S4UL	15	<0.10	4.2	0
Benzo(b)fluoranthene	mg/kg	8	S4UL	2.6	<0.10	7.1	3No (WS7@0.30mbgl, WS10@0.30mbgl, BH2@0.30mbgl)
Benzo(k)fluoranthene	mg/kg	8	S4UL	77	<0.10	2.9	0
Benzo(a)pyrene	mg/kg	8	S4UL	2.2	<0.10	5.5	3No (WS7@0.30mbgl, WS10@0.30mbgl, BH2@0.30mbgl)
Indeno(123-cd)pyrene	mg/kg	8	S4UL	27	<0.10	3.9	0
Dibenzo(ah)anthracene	mg/kg	8	S4UL	0.24	<0.10	1.1	4No (WS9@0.60mbgl, WS7@0.30mbgl, WS10@0.30mbgl, BH2@0.30mbgl)
Benzo(ghi)perylene	mg/kg	8	S4UL	320	<0.10	4.2	0
Total PAH	mg/kg	8	-	-	<2.0	59	-

Table 6.9: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPH) – Southern Plot

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
C_8-C_{10}	mg/kg	6	S4UL	27	<1.0	<1.0	
>C_{10}-C_{12}	mg/kg	6	S4UL	74	<1.0	20	
>C_{12}-C_{16}	mg/kg	6	S4UL	140	<1.0	52	
>C_{16}-C_{21}	mg/kg	6	S4UL	260	<1.0	29	
>C_{21}-C_{35}	mg/kg	6	S4UL	1100	<1.0	3420	1No (WS6@0.10mbgl)
Total TPH	mg/kg	6	-	-	<10	5500	-

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

Table 6.10: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPHCWG) – Southern Plot

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C_5-C_6 Aliphatic	mg/kg	3	S4UL	42	<1.0	<1.0	0
>C_6-C_8 Aliphatic	mg/kg	3	S4UL	100	<1.0	<1.0	0

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
$>C_8-C_{10}$ Aliphatic	mg/kg	3	S4UL	27	<1.0	<1.0	0
$>C_{10}-C_{12}$ Aliphatic	mg/kg	3	S4UL	130	<1.0	<1.0	0
$>C_{12}-C_{16}$ Aliphatic	mg/kg	3	S4UL	1100	<1.0	<1.0	0
$>C_{16}-C_{35}$ Aliphatic	mg/kg	3	S4UL	65000	<2.0	<2.0	0
$>C_5-C_7$ Aromatic	mg/kg	3	S4UL	70	<1.0	<1.0	0
$>C_7-C_8$ Aromatic	mg/kg	3	S4UL	130	<1.0	<1.0	0
$>C_8-C_{10}$ Aromatic	mg/kg	3	S4UL	34	<1.0	<1.0	0
$>C_{10}-C_{12}$ Aromatic	mg/kg	3	S4UL	74	<1.0	<1.0	0
$>C_{12}-C_{16}$ Aromatic	mg/kg	3	S4UL	140	<1.0	<1.0	0
$>C_{16}-C_{21}$ Aromatic	mg/kg	3	S4UL	260	<1.0	<1.0	0
$>C_{21}-C_{35}$ Aromatic	mg/kg	3	S4UL	1100	<2.0	<2.0	0
Total TPH (Ali/Aro)	mg/kg	3	-	-	<10	<10	-

6.3 Volatile Organic Compounds

6.3.1 In addition to the suites outlined previously, 3No samples were tested for the presence of volatile organic compounds including BTEX compounds (benzene, toluene, ethylbenzene, xylene). No VOCs were reported above the laboratory detection limit within any tested sample.

6.4 Vapour Risk Assessment from a Soil Source (Southern Plot)

6.4.1 As outlined in Tables 6.8-6.9, a number of polyaromatic hydrocarbons and a single petroleum hydrocarbon fraction have been found in excess of their generic screening criteria for the protection of human health within a 'residential with plant uptake' end-use scenario. The generic screening criteria considers all possible pathways between the source and the receptor. In order to assess potential risks from inhalation of vapour, each organic compound that has been found in excess of its GAC will be assessed in terms of the contribution to total exposure from vapour inhalation inside a structure as reported within the LQM/CIEH S4UL document. Where a significant proportion of the total exposure is reported from vapour inhalation, there could be a potential risk from vapour inhalation.

Table 6.11: Soil Laboratory Analysis Results – Contribution to Total Exposure from Vapour Inhalation (Indoor)

Compound	Contribution of Vapour Inhalation to Total Exposure (%)	Screening Criteria (mg/kg)	Maximum recorded value (mg/kg)	Potential Vapour Risk?
Benzo(b)fluoranthene	<0.1	2.6	7.1	**X**
Benzo(a)pyrene	0.0	2.2	5.5	**X**
Dibenzo(ah)anthracene	<0.1	0.24	1.1	**X**
C21-C35	7.0/0.0*	6500/1100*	3420	**X**

*aliphatic/aromatic

6.4.2 As shown in the table above, all of the PAHs detected in soils in excess of generic assessment criteria have a negligible contribution to total exposure via inhalation pathway (less or equal to 0.1%).

6.4.3 The petroleum hydrocarbon exceedance relates to a grouped hydrocarbon analysis, not split into aliphatic and aromatic fractions. The total reported hydrocarbons within the fraction in question does not exceed the criteria for aliphatic fractions, for which the contribution to exposure from vapour is 7%, and only exceeds the criteria for aromatic fractions which have a 0% contribution to exposure from vapour. On this basis, the petroleum hydrocarbons identified on the southern site are not considered to pose a significant risk from vapour inhalation.

6.4.4 Therefore, it is considered that there is a negligible risk to end users of the proposed development on the southern plot associated with vapour risk inhalation from soils.

6.5 Asbestos in Soil

6.5.1 15No samples of the Made Ground were screened in the laboratory for the presence of asbestos across the two sites.

6.5.2 No asbestos fibres were reported in samples analysed in the laboratory.

6.6 Screening of Groundwater Chemical Analysis Results

6.6.1 Samples of groundwater obtained from the borehole installations installed within exploratory locations BH1 and BH2 were obtained by low-flow methodology and submitted for analysis.

6.6.2 The results of the laboratory testing are summarised in Tables 6.12 to 6.14 below.

Table 6.12: Groundwater Analysis Results – Metals, Cyanide, Phenol

Determinand	Unit	No. samples tested	Screening Criteria		Minimum	Maximum	No of Exceedances
Arsenic	µg/l	2	10	DWS	0.57	0.57	0
	µg/l		50	EQS	0.57	0.57	0
Cadmium	µg/l	2	5	DWS	<0.11	<0.12	0
Chromium	µg/l	2	50	DWS	6.9	7.0	0
Lead	µg/l	2	10	DWS	<0.50	<0.50	0
	µg/l		1.2*	EQS	<0.50	<0.50	0
Nickel	µg/l	2	20	DWS	0.59	1.0	0
	µg/l		4*	EQS	0.59	1.0	0
Copper	µg/l	2	12	EQS	1.5	1.5	0
			2000	DWS	1.5	1.5	0
Zinc	µg/l	2	5000	DWS	<2.5	4.0	0
	µg/l		12.9**	EQS	<2.5	4.0	0

Determinand	Unit	No. samples tested	Screening Criteria		Minimum	Maximum	No of Exceedances
Mercury	µg/l	2	1	DWS	<0.05	<0.05	0
Selenium	µg/l	2	10	DWS	1.2	1.4	0
Boron	µg/l	2	1000	DWS	84	110	0
	µg/l		2000	EQS	84	110	0
Cyanide (Total)	µg/l	2	50	DWS	<0.05	<0.05	0
	µg/l		1	EQS	<0.05	<0.05	0
Phenols (Total)	µg/l	2	7.7	EQS	<0.030	<0.03	0

* bioavailable concentration
**bioavailable concentration + ambient background concentration dissolved for Thames Groundwater (2 µg/L)

Table 6.13: Groundwater Analysis Results – Polycyclic Aromatic Hydrocarbons (PAHs)

Determinand	Unit	No. samples tested	Screening Criteria		Minimum	Maximum	No. of Exceedances
Naphthalene	µg/l	2	2.4	EQS	<0.10	<0.10	0
Acenaphthylene	µg/l	2	-	-	<0.10	<0.10	-
Acenaphthene	µg/l	2	-	-	<0.10	<0.10	-
Fluorene	µg/l	2	-	-	<0.10	<0.10	-
Phenanthrene	µg/l	2	-	-	<0.10	<0.10	-
Anthracene	µg/l	2	0.1	EQS	<0.10	<0.10	0
Fluoranthene	µg/l	2	0.0063	EQS	<0.10	<0.10	0
Pyrene	µg/l	2	-	-	<0.10	<0.10	-
Benzo(a)anthracene	µg/l	2	-	-	<0.10	<0.10	-
Chrysene	µg/l	2	-	-	<0.10	<0.10	-
Sum of four Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(ghi)perylene Indeno(123-cd)pyrene	µg/l	2	0.1	DWS	<0.40	<0.40	0
Benzo(a)pyrene	µg/l	2	0.01	DWS	<0.10	<0.10	0
Dibenzo(ah)anthracene	µg/l	2	0.00017	EQS	<0.10	<0.10	0

Table 6.14: Groundwater Analysis Results – TPHCWG – Controlled Waters

Determinand	Unit	No. Samples tested	Screening Criteria		Minimum	Maximum	No. of Exceedances
>C5-C6 Aliphatic	µg/l	2	15000	WHO	<0.10	<0.10	0
>C6-C8 Aliphatic	µg/l	2	15000	WHO	<0.10	<0.10	0
>C8-C10 Aliphatic	µg/l	2	300	WHO	<0.10	<0.10	0
>C10-C12 Aliphatic	µg/l	2	300	WHO	<0.10	<0.10	0

Determinand	Unit	No. Samples tested	Screening Criteria		Minimum	Maximum	No. of Exceedances
>C12-C16 Aliphatic	µg/l	2	300	WHO	<0.10	<0.10	0
>C16-C21 Aliphatic	µg/l	2	-	-	<0.10	<0.10	-
>C21-C35 Aliphatic	µg/l	2	90	WHO	<0.10	<0.10	0
>C5-C7 Aromatic	µg/l	2	10	WHO	<0.10	<0.10	0
>C7-C8 Aromatic	µg/l	2	700	WHO	<0.10	<0.10	0
>C8-C10 Aromatic	µg/l	2	300	WHO	<0.10	<0.10	0
>C10-C12 Aromatic	µg/l	2	90	WHO	<0.10	<0.10	0
>C12-C16 Aromatic	µg/l	2	90	WHO	<0.10	<0.10	0
>C16-C21 Aromatic	µg/l	2	90	WHO	<0.10	<0.10	0
>C21-C35 Aromatic	µg/l	2	90	WHO	<0.10	<0.10	0

6.6.3 In addition to the suite outlined above, the water samples were also analysed for a suite of volatile organic compounds including BTEX. None of the compounds analysed for were reported above the laboratory method detection limit.

6.6.4 The results summarised above are considered to show that a pollutant linkage to controlled waters does not exist within either plot.

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

6.7.1 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).

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

Table 6.15: Soil Laboratory Analysis Results – Phytotoxic Determinands – Northern Plot

Determinand	Threshold level (mg/kg)	Min (mg/kg)	Max (mg/kg)	No. Exceeding
Nickel	110	3.7	36	0
Copper	200	8.4	2000	1No (WS2@0.30mbgl)
Zinc	300	33	470	2No (WS1@0.60mbgl, WS2@0.30mbgl)

Table 6.16: Soil Laboratory Analysis Results – Phytotoxic Determinands – Southern Plot

Determinand	Threshold level (mg/kg)	Min (mg/kg)	Max (mg/kg)	No. Exceeding
Nickel	110	9.6	23	0
Copper	200	11	89	0
Zinc	300	32	430	1No (WS10@0.30mbgl)

6.8 Screening for Water Pipes

6.8.1 The results of the analysis have been assessed for potential impact upon water supply pipes. Tables 6.17-6.18 below summarise the findings of the assessment:

Table 6.17: Screening Guide for Water Pipes – Northern Plot

Determinand	No. of tests	Threshold adopted for PE (mg/kg)	Value for site data (mg/kg)		No of Exceedances
			Min	Max	
Total VOCs	9	0.5	ND	8.294	1No (WS5@0.25mbgl)
BTEX	9	0.1	ND	6.27	1No (WS5@0.25mbgl)
MTBE	9	0.1	ND	ND	0
EC5-EC10	15	1	ND	352	7No (WS3@0.25mbgl, WS5@0.25mbgl, WS5@0.40mbgl, BH1@0.25mbgl, BH1@0.40mbgl, STP1@0.10mbgl, STP2@0.40mbgl)
EC10-EC16	15	10	ND	15670	11No (WS1@0.30mbgl, WS2@1.0mbgl, WS3@0.25mbgl, WS3@1.00mbgl, WS4@0.10mbgl, WS5@0.25mbgl, WS5@0.40mbgl, BH1@0.25mbgl, BH1@0.40mbgl, STP1@0.10mbgl, STP2@0.40mbgl)
EC16-EC40	15	500	ND	47670	11No (WS1@0.30mbgl, WS3@0.25mbgl, WS4@0.10mbgl, WS5@0.25mbgl, WS5@0.40mbgl, BH1@0.25mbgl,

Determinand	No. of tests	Threshold adopted for PE (mg/kg)	Value for site data (mg/kg)		No of Exceedances
			Min	Max	
					BH1@0.40mbgl, STP1@0.10mbgl)
Naphthalene	15	5	ND	370	6No (WS3@0.25mbgl, WS3@1.00mbgl, WS5@0.25mbgl, WS5@0.40mbgl, BH1@0.25mbgl, BH1@0.40mbgl)
Phenols	15	2	ND	170	1No (WS5@0.25mbgl)

ND – None detected

Table 6.18: Screening Guide for Water Pipes – Southern Plot

Determinand	No. of tests	Threshold adopted for PE (mg/kg)	Value for site data (mg/kg)		No of Exceedances
			Min	Max	
Total VOCs	3	0.5	ND	ND	0
BTEX	3	0.1	ND	ND	0
MTBE	3	0.1	ND	ND	0
EC5-EC10	9	1	ND	1.4	2No (WS6@0.10mbgl, WS8@0.60mbgl)
EC10-EC16	9	10	ND	72	2No (WS6@0.10mbgl, WS8@0.60mbgl)
EC16-EC40	9	500	ND	5349	1No (WS6@0.10mbgl)
Naphthalene	9	5	ND	0.63	0
Phenols	9	2	ND	ND	0

ND – None detected

6.8.2 The above suggests that upgraded pipe work is likely to be required across both plots.

6.8.3 Alternatively, it may be possible to utilise other protection methods including (but not limited to):

- diversion of the pipe,
- localised remediation
- embedding the pipe in a sufficient thickness of clean granular material

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

6.9 Waste Characterisation and Disposal

6.9.1 The following comments are given as guidance and should be confirmed by the waste disposal facility accepting the waste. The waste disposal facility may have their own classification methodology and are under no obligation to honour the comments given below.

6.9.2 Samples from WS5 – 0.25mbgl (northern plot) and BH2 – 0.6mbgl (southern plot) were scheduled for single stage WAC analysis.

6.9.3 The sample from WS5 – 0.25mbgl was reported to exceed the hazardous waste landfill limits for total organic carbon and therefore may require treatment before disposal. Inert waste landfill criteria were also exceeded for total petroleum hydrocarbons and total polyaromatic hydrocarbons.

6.9.4 The sample from BH2 -0.60mbgl was reported to exceed inert waste thresholds for antimony and fluoride. Criteria for “stable non-reactive hazardous waste in non-hazardous landfill” were not exceeded.

7 SOIL GAS RISK ASSESSMENT

7.1 Soil Gas Results

7.1.1 Four return monitoring visits have been undertaken by Concept between 10th March 2021 and 24th March 2021, to monitor wells installed within boreholes at the site for soil gas concentrations and groundwater levels..

7.1.2 Atmospheric pressures recorded during the existing monitoring visits ranged between 1009 and 1032 mbar.

7.1.3 The results of the monitoring undertaken are presented in full in the Concept Factual Report and summarised in Table 7.1 below.

Table 7.1: Summary of Gas Monitoring Data

Hole No.	CH_4 (%)	CO_2 (%)	O_2 (%)	H_2S (ppm)	VOCs (ppm)	Steady Flow Rate (l/hr)	Peak Flow Rate (l/hr)	Depth to water (mbgl)	Depth of installation (mbgl)
Northern Plot									
BH1	<0.1	0.0-4.6	18.7-19.3	<0.1	1.1-1.7	<0.1	<0.1	4.06-4.15	6.30
WS1	<0.1	0.0-5.2	18.1-19.8	<0.1	0.5-4.3	<0.1	-0.3-<0.1	Dry	2.00
WS2	<0.1	0.0-5.8	16.2-19.9	<0.1	0.4-2.8	<0.1	<0.1	Dry	2.00
Southern Plot									
BH2	<0.1	0.0-4.1	19.1-20.1	<0.1	0.2-2.7	<0.1	<0.1	4.15-4.24	6.30
WS6	<0.1	0.0-5.3	19.7-20.2	<0.1	0.9-4.6	<0.1	<0.1	Dry	2.00
WS10	<0.1	0.0-0.8	19.3-20.2	<0.1	0.7-3.9	<0.1	<0.1	Dry	2.00

7.2 Screening of Results

7.2.1 As shown in Table 7.1, no methane has been reported to date. Carbon dioxide has been reported to a maximum concentration of 5.8% v/v. Screening of the monitoring well headspaces with a photo-ionisation detector (PID) has detected maximum Volatile Organic Compound (VOC) concentration to a maximum level of 3.2ppm. A maximum flow rate of -0.3l/hr has been reported.

7.2.2 In the assessment of risks posed by hazardous ground gases and selection of appropriate mitigation measures, BS8485 (2015) + A1 (2019) identifies four types of development, termed Type A to Type D.

7.2.3 Type A buildings are defined as

> *"private ownership with no building management controls on alternations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises."*

7.2.4 Type A has been adopted as the relevant category for the proposed development on the southern plot.

7.2.5 Type B buildings are defined as

> *" private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small to medium size rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels."*

7.2.6 Type B has been adopted as the relevant category for the proposed development for the northern plot.

7.2.7 The soil gas assessment method is based on that proposed by Wilson & Card (1999), which was a development of a method proposed in CIRIA publication R149 (CIRIA, 1995). The method uses both gas concentrations and borehole flow rates to define a characteristic situation based on the limiting borehole gas volume flow for methane and carbon dioxide. In both these methods, the limiting borehole gas volume flow is renamed as the Gas Screening Value (GSV).

7.2.8 The Gas Screening Value (litres of gas per hour) is calculated by using the following equation

GSV = (Concentration/100) X Flow rate

Where concentration is measured in percent (%)
and flow rate is measured in litres per hour (l/hr)

7.2.9 The Characteristic Situation is then determined from Table 8.5 of CIRIA C665.

7.2.10 To accord with C665, worst case conditions are used in the calculation of GSVs for the site.

7.2.11 A worst case flow rate of 0.3l/hr (maximum reported) will be used in the calculation of GSVs for the northern plot, and 0.1l/hr will be used for the southern plot. The Characteristic Situation is then determined from Table 8.5 of CIRIA C665.

7.2.12 To accord with C665, worst case conditions are used in the calculation of GSVs for the site. These have been summarised below in Tables 7.2-7.3

Table 7.2: Summary of Gas Monitoring Data – Northern Plot

Gas	Concentration (v/v %)	Peak Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (after CIRIA C665)
CO_2	5.8	0.3	0.0174	**1**
CH_4	0.1	0.3	0.003	**1**

Table 7.3: Summary of Gas Monitoring Data – Southern Plot

Gas	Concentration (v/v %)	Peak Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (after CIRIA C665)
CO_2	5.3	0.1	0.0053	**1**
CH_4	0.1	0.1	0.001	**1**

7.2.13 As shown in the tables above, on the basis of the data obtained, both sites could be considered Characteristic Situation 1, for which no formal gas protection measures are considered necessary; however, in accordance with BS8485, as both sites have reported carbon dioxide concentrations in excess of 5%, consideration should be given to upgrading the sites to CS2.

7.2.14 Given that no significant sources of ground gases were identified during the desk study, and no significant sources of potential ground gases were identified during the intrusive works it is considered that the site should not be classified as CS2, and a CS1 designation considered appropriate (for which no gas protection measures are required). Although no ground gas monitoring events were completed at atmospheric pressures of <1000 mbar, it is considered that this should not materially affect the conclusion that the site can be considered as CS1, given the absence of identified, significant sources.

7.2.15 PID screening of the monitoring well headspace has revealed maximum concentrations of VOCs of 3.9ppm. It is considered that the PID screening of monitoring well provides an additional supporting line of evidence to a conclusion that risks to human health receptors via vapour inhalation pathways are low.

8 SUMMARY OF RESULTS

8.1 Land Quality Impact Summary

8.1.1 Following the ground investigation, the following is noted:

- The proposed development is to involve the demolition of Elleray Hall and the construction of a two-storey block of flats with communal gardens (southern plot), and the construction of a community centre on the currently vacant North Lane Depot/East Car Park plots (northern plot).

  Northern Plot

- Following generic risk assessments, elevated concentrations of naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(ah)anthracene and C10-C12 aromatic petroleum hydrocarbons were detected in soils in excess of generic assessment criteria for the protection of human health within a "commercial" end-use scenario.

- No asbestos fibres were detected in the samples analysed in the laboratory.

- The site proposal indicates that large areas of site will remain covered by a combination of the proposed building footprints and hard surfacing. Where this is the case, no formal remedial measures are considered necessary in terms of human health, as the building and hard surfacing are expected to provide a barrier to potential receptors. In areas of soft landscaping, a cover layer of 450mm of clean imported sub/topsoil should be placed above a geotextile membrane.

- Exceedances of generic assessment criteria for potentially volatile compounds (naphthalene and the aromatic hydrocarbon fraction >C10-C12) were detected within made ground soils in WS5, and concentrations of volatile contaminants including BTEX compounds were detected above laboratory method detection limits in the made ground in WS5 and WS3. These concentrations of volatile contaminants were only detected in a sub-stratum of granular made ground with various anthropogenic inclusions, within which hydrocarbon odours were commonly noted. Pockets of a black tar substance were noted within this substratum in WS5. Given the relatively thin nature of the stratum, and the lack of visual / olfactory evidence of hydrocarbon or volatile contamination in soils underlying the stratum, as well as the low photo-ionisation detector readings recorded in monitoring well headspaces during monitoring events, it is considered unlikely that a significant risk to end users of the development exists via vapour inhalation pathways.

- Following groundwater sampling and laboratory analysis from monitoring wells BH1, a pollutant linkage to controlled waters is not considered to exist.

- Following four gas monitoring visits, concentrations of carbon dioxide are raised at the site, with corresponding depleted oxygen. Calculating the Gas Screening Value using worst case results indicates Characteristic Situation 1. However, due to the elevated concentrations of carbon dioxide measured in excess of 5%, consideration should be given to upgrading the sites to CS2. Given that no significant sources of ground gases were identified during the desk study, and no significant sources of potential ground gases were identified during the intrusive works it is considered that the site should not be classified as CS2, and a CS1 designation is appropriate (for which no gas protection measures are required).

- Barrier pipe is likely to be required for potable water supply pipes. The requirements should be confirmed with the relevant utility provider.

Southern Plot

- Following generic risk assessments, elevated concentrations of arsenic, lead, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(ah)anthracene and C21-C352 grouped petroleum hydrocarbons were detected in soils in excess of generic assessment criteria for the protection of human health within a "residential with plant uptake" end-use scenario on the southern plot.

- No evidence of a possible source of volatile contaminants was detected in the southern site.

- No asbestos fibres were detected in the samples analysed in the laboratory.

- The site proposals indicate that large areas of the site will be covered by a combination of the proposed building footprint and hard surfacing. Where this is the case, no formal remedial measures are considered necessary in terms of human health, as the building and hard surfacing are expected to provide a barrier to potential receptors. In areas of soft landscaping, a cover layer of 450mm of clean imported sub/topsoil should be placed above a geotextile membrane.

- It is possible that further soil sampling and assessment may allow for zoning and delineation of areas requiring clean cover in soft landscaped area.

- Following groundwater sampling and laboratory analysis from monitoring wells BH2, a pollutant linkage to controlled waters is not considered to exist.

- Following four gas monitoring visits, concentrations of carbon dioxide are raised at the site, with corresponding depleted oxygen. Calculating the Gas Screening Value using worst case results indicates Characteristic Situation 1. However, due to the elevated concentrations of carbon dioxide measured in excess of 5%, consideration should be given to upgrading the sites to CS2. Given that no significant sources of ground gases were identified during the desk study, and no significant sources of potential ground gases were identified during the intrusive works it is considered that the site should not be classified as CS2, and a CS1 designation is appropriate (for which no gas protection measures are required).

General Comments

8.1.2 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.

8.1.3 Remedial strategies will be required for the proposed developments.

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

8.2 Review of Pollutant Linkages Following Site Investigation

8.2.1 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 8.1: 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) o depot, o works, o car park, o unspecified industrial/commercial • Potential for Made Ground associated with previous development operations – on site (S2) • Potential for asbestos impacted soils from demolition of previous structures – on site (S3) • Previous industrial use – off site (S4) o Works (40m NW, 100m, 180m, 230m W) o Garage (60m NE) o Industrial unit with tanks (240m W)	• 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)	Y	See section 8.1 above for remedial measures. 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. Contact should be made with relevant utility providers to confirm if upgraded materials are required. The concrete classification to protect buried concrete is discussed in Section 10.6
	• Accumulation and migration of soil gases (P5)		X	Site is considered Characteristic Situation 1 and no formal gas protection measures are considered necessary.
	• 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	Groundwater analysis from both plots did not report any elevated contaminant concentrations. The concrete classification to protect buried concrete is discussed in Section 10.6

9 GEOTECHNICAL GROUND INVESTIGATION

9.1 Proposed Development

9.1.1 The proposed development is to involve the demolition of Elleray Hall and the construction of a two-storey block of flats with communal gardens, and the construction of a community centre on the currently vacant North Lane Depot/East Car Park plots.

9.1.2 Preliminary foundation plans and unfactored anticipated loads have been provided for the proposed new community centre site (northern plot); however, no detailed structural engineering design information, with respect to the type of construction and associated structural loadings was provided for the proposed residential development (southern plot) at the time of preparing this report. Consequently, a detailed discussion of all the problems that may arise during the proposed redevelopment scheme is beyond the scope of this report.

9.1.3 Practical solutions to the difficulties encountered, both prior to, and during construction, are frequently decided by structural constraints or economic factors. For these reasons, this discussion is predominantly confined to remarks of a general nature, which are based on site conditions encountered during the intrusive investigations.

9.2 Geotechnical Classification

9.2.1 At the Desk Study stage this development was deemed to be a GC2 development in accordance with BS EN: 1997.

9.2.2 The findings of the investigation undertaken and discussed previously do not change this assessment.

9.2.3 As the site and the proposed development has been deemed to be a GC2 project, and each plot is a single-build (i.e. there are not proposed to be multiple structures on the same site) it is not considered necessary at this point to require a Geotechnical Feedback Report following construction. However, this will need to be confirmed within the Geotechnical Design Report (to be undertaken by others).

9.3 Geotechnical Ground Investigation Report

9.3.1 This report should only be read as a Geotechnical Ground Investigation Report (as defined by BS EN 1997) and as such outlines and discusses Geotechnical Derived Parameters for a range of geotechnical parameters that have been obtained and are discussed in the various sections below.

9.3.2 These derived values have been determined using a combination of field tests (see Section – Insitu testing), laboratory testing (see Section 3.6) or by "theory, correlation or empiricism from test results" (EN 1997-1). Laboratory analysis to determine Derived Geotechnical Parameters was undertaken as described in Section 3.6.

9.3.3 Suggestions for characteristic parameters are provided to be carried forward to determine design parameters in the final geotechnical design report (to be carried out by others).

9.3.4 It should be noted that if other parts of the development have not been designed to Eurocodes then the following comments may not be relevant or may need revising.

9.3.5 Practical solutions to the difficulties encountered, both prior to, and during construction, are frequently decided by structural constraints or economic factors. For these reasons, this discussion is predominantly confined to remarks of a general nature, which are based on site conditions encountered during the intrusive investigations.

9.4 Ground Investigation Summary

9.4.1 A summary of ground conditions obtained from the ground investigation is provided in Table 4.1.

9.4.2 The interpretation and name given to the various strata are used for identification purposes in the rest of this report.

9.4.3 The results of the ground investigation revealed a ground profile comprising Made Ground up to 1.7mbgl overlying both cohesive and granular deposits of the Kempton Park Gravel Member to a maximum depth of 6.60mbgl, overlying London Clay Formation to at least the depth of the deepest borehole at 20.0mbgl. The base of this stratum was not proven.

9.4.4 The derived geotechnical parameters, from in-situ and laboratory testing, empirical correlations and literature review are discussed below.

9.4.5 A summary of ground conditions obtained from the ground investigation and the recommended characteristic geotechnical parameters, is provided in Table 9.1 below.

9.5 Atterberg Limits

9.5.1 Samples of the cohesive Made Ground, Kempton Park Gravel Member and London Clay Formation deposits were subjected to Atterberg analysis using the 4-point methodology in accordance with BS1377-2: 1990: Clause 4.3 & 5: Definitive Method to determine the Liquid Limit, Plastic Limit and Plasticity Index as well as Moisture Content.

9.5.2 In addition, the moisture contents of the samples subjected to determination of the undrained shear strength using the quick undrained triaxial methodology were also determined as part of the analysis.

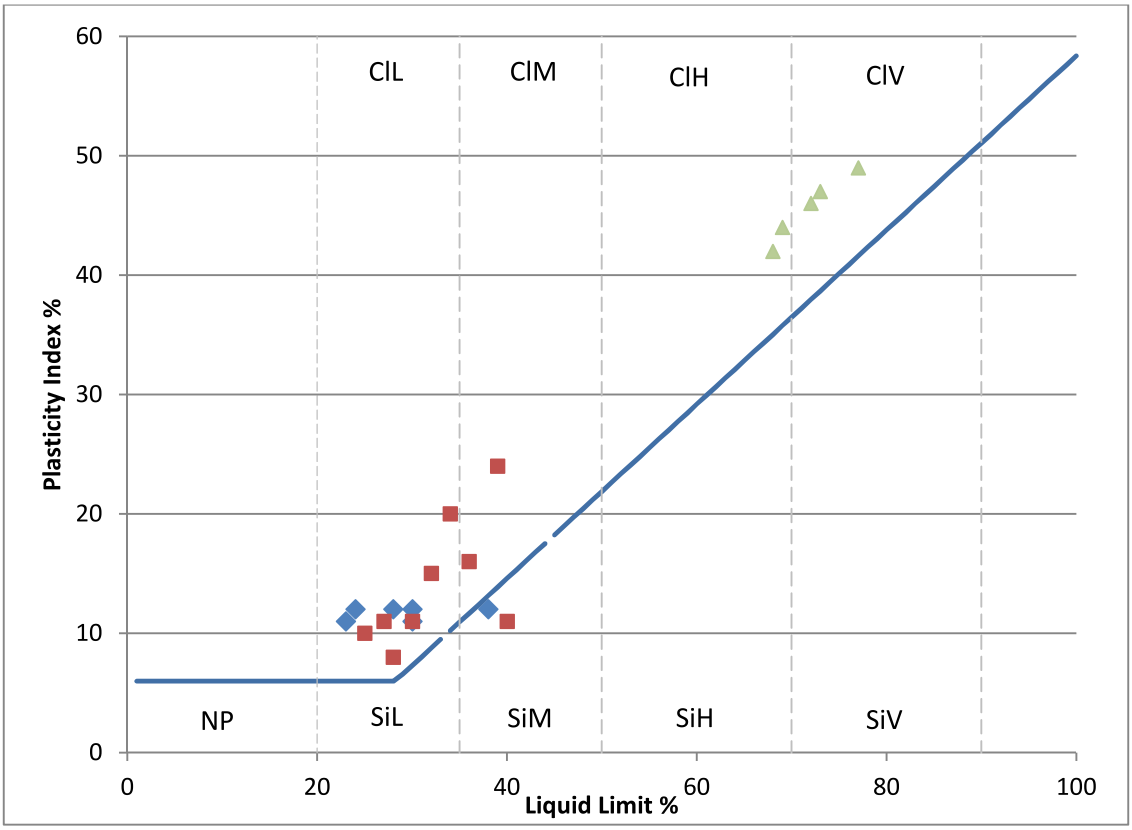
9.5.3 The results are summarised below in Table 9.1 below. The NHBC Volume Change Classification has been determined using Chapter 4.2 of the NHBC Guidelines.

Table 9.1 Moisture Content and Atterberg Limit Analysis

Property	Made Ground	Kempton Park Gravel Member (Cohesive)	Kempton Park Gravel Member (Granular)	London Clay Formation
Moisture Content (%)	13-24	10-22	10-13	24-29
Liquid Limit (%)	23-28	25-40	30-34	68-73
Plastic Limit (%)	12-26	15-29	14-19	25-26
Plasticity Index (%)	11-15	8-24	11-20	42-47
Plasticity term	Low to medium	Low to medium	Low to medium	High to Very High
Corrected Plasticity Index (%)	5.06-10.2	6.0-14.64	6.82-15.4	42-47
NHBC Volume Change Classification	None – Low	None – Low	None - Low	High

9.5.4 Due to the range of values determined for the Atterberg limit results they have been plotted onto a Casagrande A-Line graph.

Figure 9.1 Atterberg Analysis Plotted onto a Casagrande (A-line) Graph



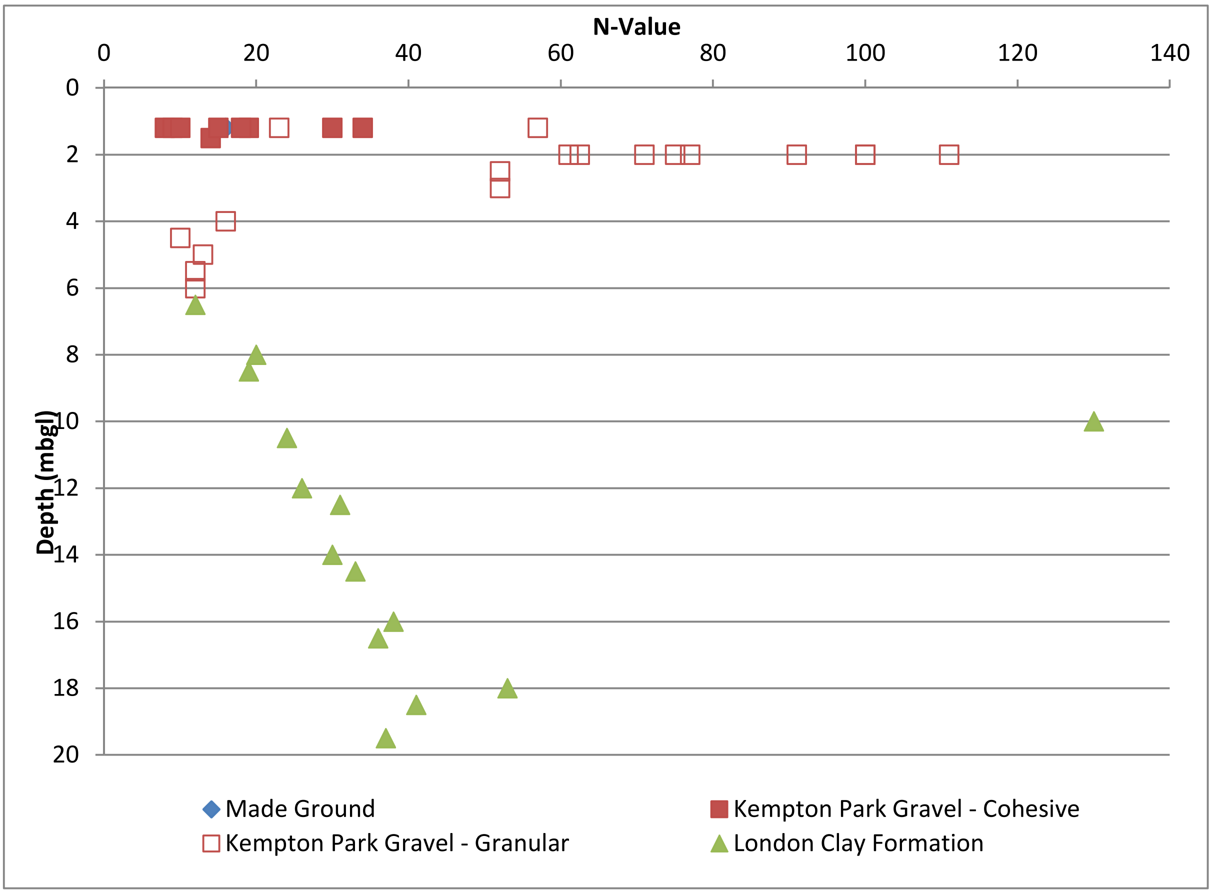
9.6 Standard Penetration Tests

9.6.1 Standard Penetration Tests were undertaken at regular intervals throughout the window sampler holes and cable percussive boreholes. The results of the SPTs are plotted against depth in Figure 9.2 below.

9.6.2 The strata have been grouped into “Made Ground”, “Kempton Park Gravel Member – Cohesive”, “Kempton Park Gravel – Granular”, and “London Clay Formation”.

9.6.3 N_{equi} results have been calculated where the full 300mm of penetration could not be achieved for 50 or more blows.

Figure 9.2: SPT ‘N’ Value v Depth



9.6.4 The results are broadly consistent between the two sites, as would be expected between two plots in close proximity with very similar geology. The N-values increase sharply within the granular superficial deposits, before dropping within the London Clay Formation where they start to increase with depth.

9.7 Undrained Shear Strength

9.7.1 As discussed above the N values recorded in the clay vary with depth, this infers that the undrained shear strength of the clay similarly varies. Figure 9.3 below shows the undrained shear strength inferred by the correlation suggested by Stroud (1974),

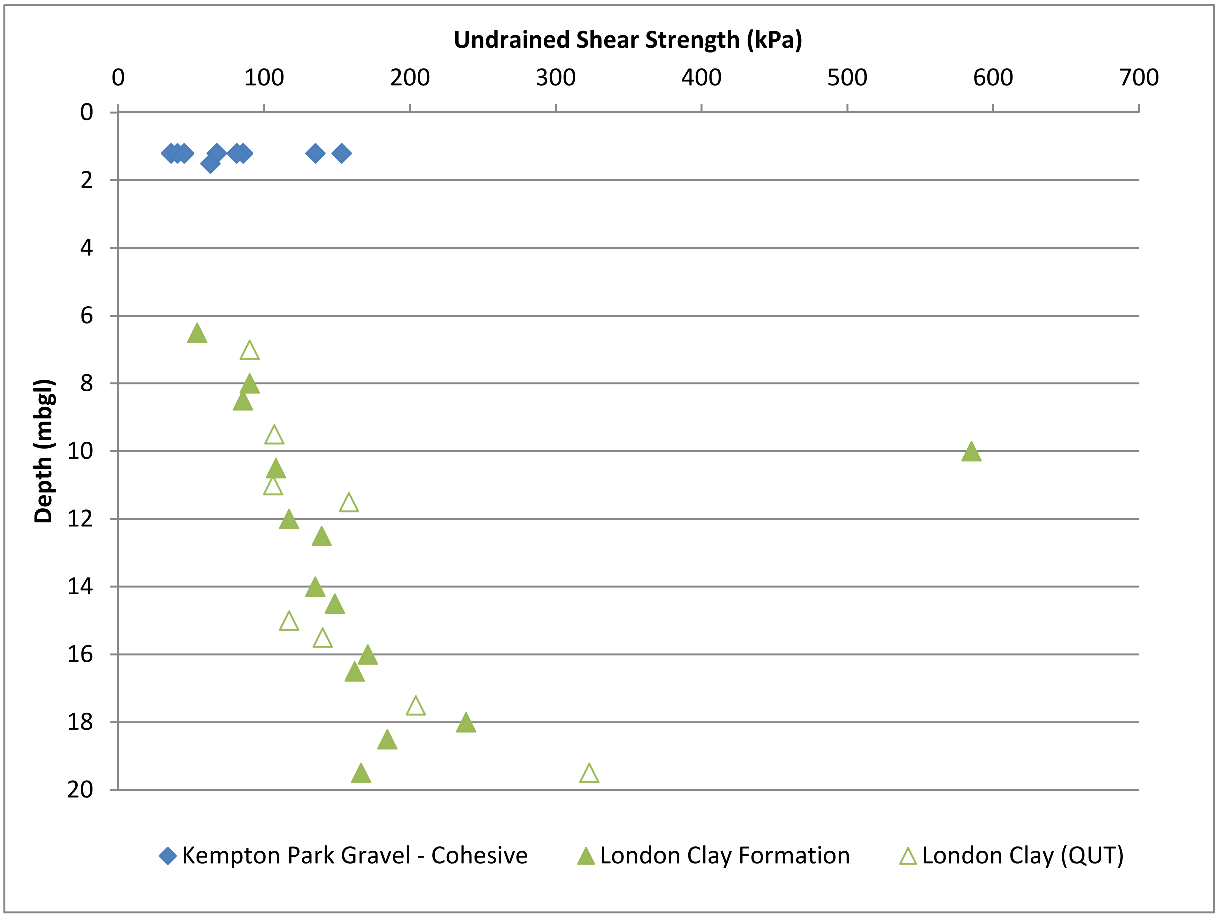
$c_u = f_1 \times N$ can be applied,

in which
c_u= mass undrained shear strength (kN)
f_1 = constant
N= SPT Value achieved during boring operations

9.7.2 In the above equation f_1 is dependent on the plasticity of the material that the SPT is being carried out in. As the plasticity indices were shown to be greater than 27% a value for f_1 of 4.5 has been adopted after Tomlinson (2001).

9.7.3 The graph below shows the shear strength profile of the London Clay Formation encountered at the site, based on the SPT to shear strength correlation described above, as well as the results of undrained triaxial tests on undisturbed samples taken from the boreholes.

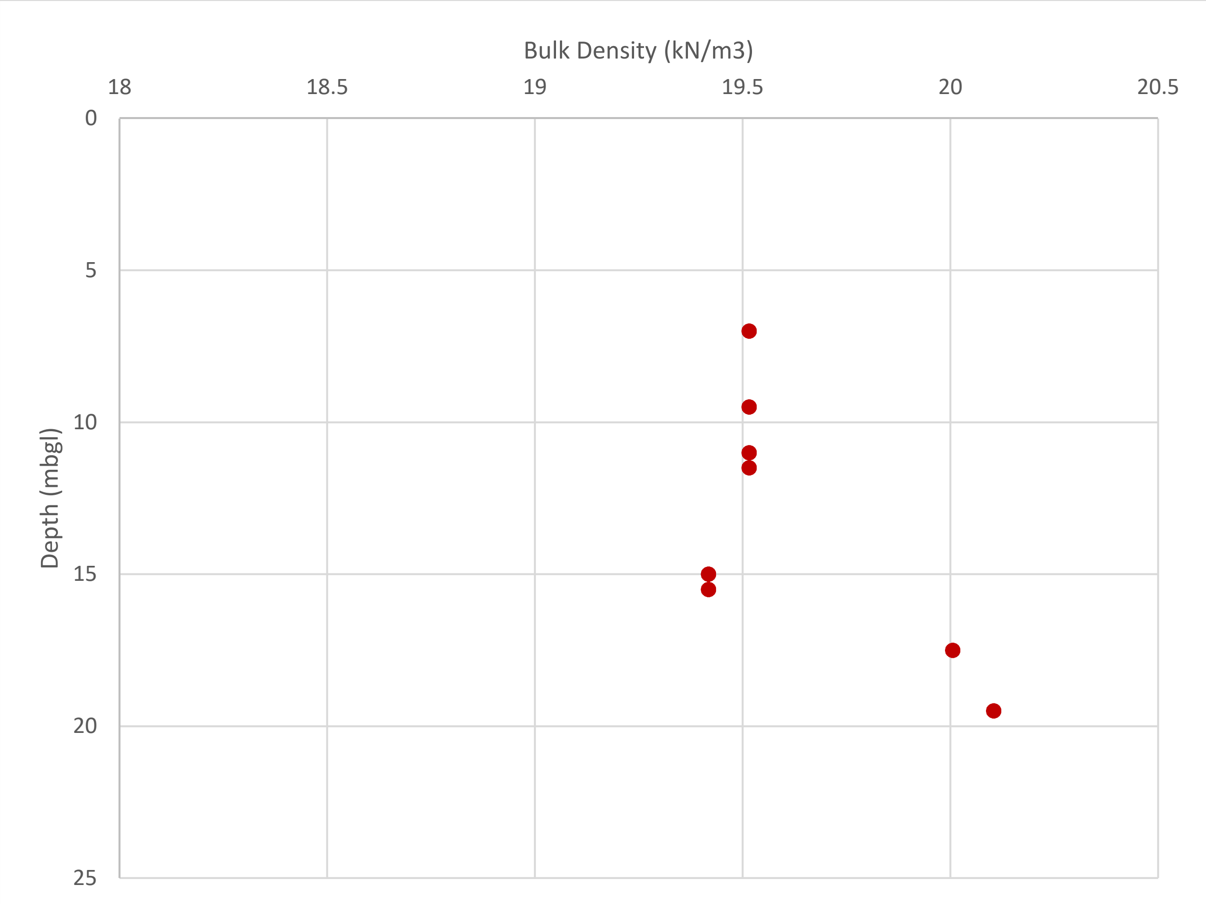
Figure 9.3: Undrained Shear Strength v Depth



9.8 Bulk Density

9.8.1 In order to calculate the undrained shear strength of undisturbed sample of London Clay, using the quick undrained triaxial methodology, the bulk density of the materials has to be calculated. These values are provided on the quick undrained triaxial testing certificates in the Concept Factual Report. These results are summarised in the figure below.

Figure 9.4: Bulk Density of London Clay v Depth



9.8.2 For materials encountered other than the London Clay, the correlations and suggested values for both cohesive and granular materials given in Carter and Butler (1991) have been used. The derived bulk densities are summarised below in Table 9.2.

Table 9.2 – Derived Bulk Densities

Strata	Bulk Density (kN/m^3)
Made Ground	16
Kempton Park Gravel Member - Cohesive	19.5
Kempton Park Gravel Member - Granular	21.5

9.9 Coefficient of Compressibility

9.9.1 Stroud and Butler (1974) developed a relationship between the coefficient of compressibility (m_v) and SPT 'N' value.

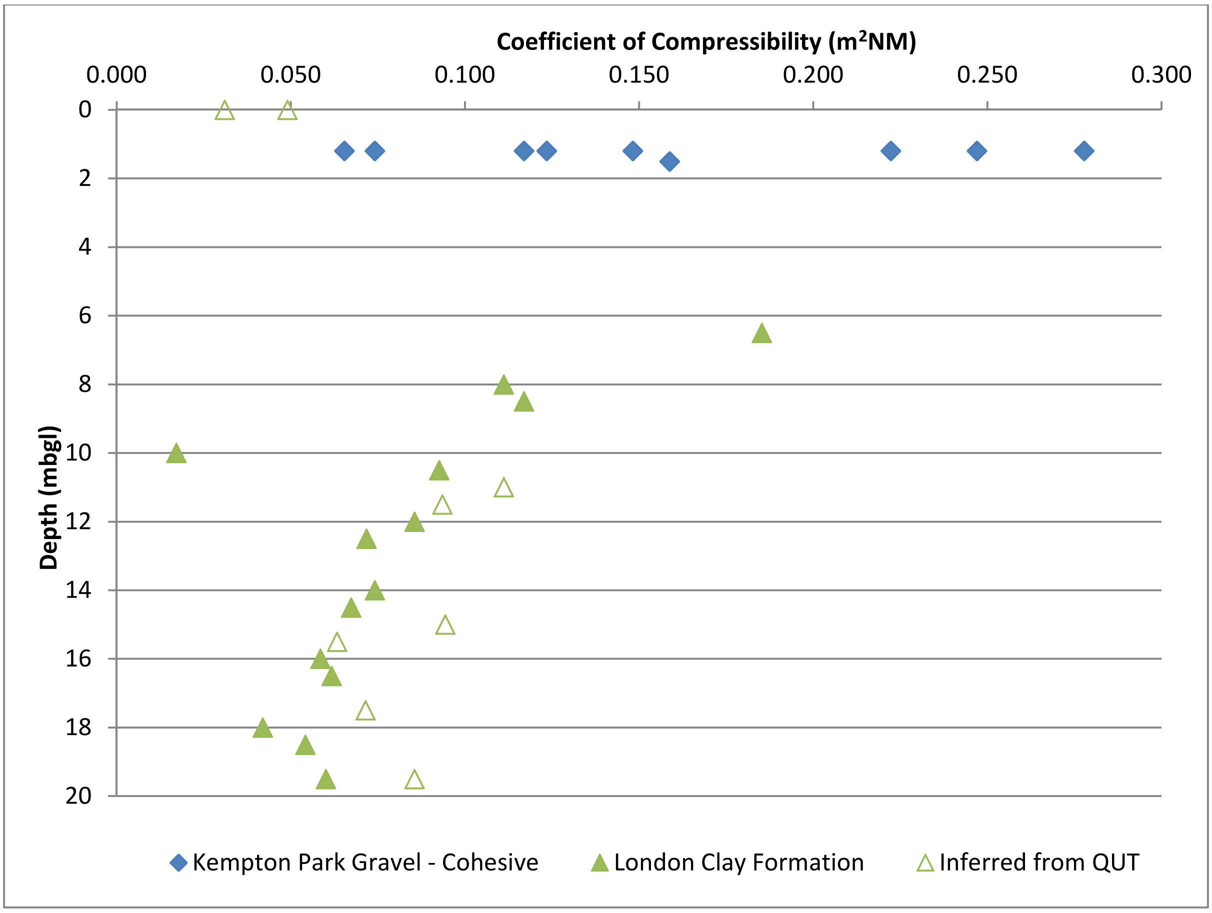
$m_v = 1/ f_2 \times N$ can be applied,

in which
m_v = coefficient of compressibility (m^2/MN)
f_2 = constant dependant on the plasticity index
N = SPT Value achieved during boring operations

9.9.2 Using the plasticity indices obtained (See Table 9.1) and the graphs provided in Tomlinson (2001) a value of f_2 of 0.45 has been taken and used with the SPT 'N' values to infer coefficient of compressibility (m_v).

9.9.3 Where the undrained shear strength of the clays was obtained using the quick undrained triaxial methodology, the m_v value has been obtained by rearranging the equations for f_1 and f_2 and substituting in the measured undrained shear strength. These are plotted against depth below in Figure 9.5.

Figure 9.5: Coefficient of Volume Compressibility (m_v) v Depth



9.9.4 As would be expected, the results reduce with depth as the clay increases in strength and the over burden increases, reducing the potential for compressibility.

9.9.5 The results from of the London Clay are generally of "low compressibility" with some near surface clays of "medium compressibility". This is due to the lack of overburden pressure at shallow depth allowing the clays to relax and so compress slightly when loaded.

9.10 In-Situ CBR Testing

9.10.1 Concept undertook California Bearing Ratio tests using a Dynamic Cone Penetrometer (DCP) at each windowless sampler location across both sites as shown on the exploratory position plan provided as Figure 2.

9.10.2 The results have then been used to calculate CBR values using the methodology outlined in Interim Advice Notice 73/06 and using the method laid out in the Transport Research Laboratory document TRL 587.

9.10.3 The recorded penetration and the calculated CBR values from each position are included in the Concept Factual Report.

9.10.4 The results are summarised in the table below, however, it is noted that the DCP often reports a higher than true CBR value due to the nature of the test and due to possible effects from coarse grained inclusions.

Table 9.3: CBR Test Results

Position	CBR (%)	From/To (mm)	Stratum
WS1	39	20 – 286	Made Ground
	7	286 – 1021	Made Ground/Cohesive Kempton Park Gravel Member
	10	1021 - 1623	Cohesive Kempton Park Gravel Member
WS2	30	20 – 450	Topsoil/Made Ground
	6	450 – 680	Made Ground
	16	680 – 1285	Made Ground
	32	1285 – 1615	Made Ground/Granular Kempton Park Gravel Member
	57	1615 - 1745	Granular Kempton Park Gravel Member
WS3	46	20 – 91	Made Ground
	6	91 – 855	Made Ground/Cohesive Kempton Park Gravel Member
	63	855 – 1245	Cohesive Kempton Park Gravel Member
	29	1245 – 1400	Cohesive Kempton Park Gravel Member
WS4	40	20 – 150	Made Ground
	87	150 – 305	Made Ground
	7	305 – 1040	Made Ground
	40	1040 - 1485	Made Ground/Granular Kempton Park Gravel Member
WS5	84	20 – 360	Made Ground
	33	360 – 590	Made Ground
	9	590 – 1325	Made Ground
	39	1325 – 1740	Made Ground/Granular Kempton Park Gravel Member
WS6	27	20 – 360	Made Ground
	3	360 – 1430	Made Ground/Cohesive Kempton Park Gravel Member
	12	1430 – 1725	Cohesive Kempton Park Gravel Member
	53	1725 – 1840	Cohesive Kempton Park Gravel Member
WS7	20	20 – 135	Made Ground
	7	135 – 835	Made Ground

Position	CBR (%)	From/To (mm)	Stratum
	12	835 – 1245	Made Ground/Cohesive Kempton Park Gravel Member
	41	1245 - 1350	Cohesive Kempton Park Gravel Member
WS8	2	20 – 695	Made Ground/Cohesive Kempton Park Gravel Member
	5	695 – 1055	Cohesive Kempton Park Gravel Member
	13	1055 – 1245	Cohesive Kempton Park Gravel Member
	43	1245 – 1415	Cohesive Kempton Park Gravel Member
WS9	1	20 – 700	Made Ground
	2	700 – 992	Made Ground
	20	992 – 1415	Made Ground/ Cohesive Kempton Park Gravel Member
WS10	3	20 – 786	Made Ground/ Cohesive Kempton Park Gravel Member
	2	786 – 1400	Cohesive Kempton Park Gravel Member
	11	1400 – 1710	Cohesive Kempton Park Gravel Member

9.11 BRE 365 Soakage Tests

9.11.1 Concept undertook BRE365 soakaway testing at the site.

9.11.2 3No tests were undertaken at STP1 and STP3, 2No tests were completed at STP2.

9.11.3 The recorded results and calculations included in the Concept Factual Report, with the results summarised in Table 9.4 below.

Table 9.4: Summary of Calculated Infiltration Rate and Permeability

Test Location	Calculated Infiltration Rate (m/s)			Relative Permeability	Drainage Conditions
	Test 1	Test 2	Test 3		
STP1	1.32×10^{-4}	8.45×10^{-5}	7.73×10^{-5}	Medium - Low	Good
STP2	6.70×10^{-6}	7.09×10^{-6}	-	Low	Good
STP3	5.34×10^{-5}	4.42×10^{-5}	8.36×10^{-5}	Medium - Low	Good

9.11.4 All drainage for the site should be designed by a suitably qualified and experienced specialist in accordance with the recommendations provided in BRE DG 365 (2015).

9.12 Geotechnical Characteristic Parameter Summary

9.12.1 BS EN 1997-1 defines the Geotechnical Characteristic Parameter as being selected taking into account "worst credible (most conservative) results" from the investigation and derived results, which are "complemented by well-established experience".

9.12.2 By definition, as well as being based on the Geotechnical Derived Parameters, accepted published values for specific strata can also be included.

9.12.3 These values are selected with regards to the limit state that is being designed for and the structure that is being designed. Their selection is therefore part of the design process. It therefore follows that until the final limit state and structure is known the following Geotechnical Characteristic Parameters should only be used for guidance.

9.12.4 A summary of ground conditions obtained from the ground investigation and subsequently chosen Geotechnical Characteristic Parameters for each plot provided in the tables below

Table 9.5: Ground Conditions and Characteristic Geotechnical Parameters

Parameter	Material			
	Made Ground	Kempton Park Gravel Member - Cohesive	Kempton Park Gravel Member - Granular	London Clay Formation
Undrained Shear Strength (kPa)	-	65	NA	Cu = (z – 3.75)/0.0722
Moisture content (%)	20	15	-	27
Liquid Limit (%)	26	32	32	68
Plastic Limit (%)	18	20	16	26
Plasticity Index (%)	13	11	15	45
Corrected Plasticity Index (%)	8.0	11	10	43
NHBC Volume Change Classification	Low	Low	Low	High
Coefficient of Compressibility m_v (m^2NM)	-	0.156	NA	0.07
Internal Angle of Friction	0° (undrained cohesive) ≤30° (granular)	27°	30°	21°
Bulk Density (kN/m^3)	16*	19.5	21.5	19.6
California Bearing Ratio (%)	≤2.5	5	5	NA
Permeability (m/s)	N/A	N/A	$6.1x10^{-5}$	N/A

Where z = depth below ground level in metres

10 GEOTECHNICAL ENGINEERING CONSIDERATIONS

10.1 Design Methodologies

10.1.1 This is not a Geotechnical Design Report and as such will not “design” any item or provide Geotechnical Design Values (see Section 11.2 below). The purpose of this section is to identify geotechnical issues that may affect the development and the subsequent design process.

10.1.2 There are four design methodologies that are allowed under EC7. These are:

- Design by calculation;
- Design by prescriptive measures;
- Design by the observational method;
- Design based on experimental models or site / load tests.

10.1.3 The first three methodologies will be generally used within this section. The use of experimental models or load tests is only really relevant where the specialist contractor can demonstrate similar results in similar ground conditions or where a structure is being converted with little or no change to the imposed loads.

10.1.4 The final two can be used to confirm and complement the recommendations made by the first two methodologies.

10.1.5 BS EN 1997 (Eurocode 7 (EC7)) requires the consideration of 5No separate limit states to ensure that the proposed design is suitable. Jomas has not been supplied with sufficient information to undertake these. The design principle laid out in EC7 is iterative, i.e. a solution is analysed, if that works then something of reduced capacity is analysed. The comments made below are there to aid the design and are not meant to provide designed solutions.

10.2 Geotechnical Design values

10.2.1 Geotechnical Design Values, sometimes referred to as Factored Parameters, will need to be selected as part of the Geotechnical Design Report by applying partial factors as outlined in BS EN 1997. These partial factors will depend on the Design Approach (normally taken as UK Design Approach 1 (DS1) within the UK), and which design case (Case A – C) applies to the item being designed.

10.2.2 For the verification of serviceability limit state, the Geotechnical Characteristic Parameter and the actions (both permanent and variable) are used without having been factored.

10.2.3 It should be noted that different cases and therefore Geotechnical Design values for the same parameter may be used for different parts of the design and may depend on the particular case being modelled.

10.2.4 The comments below are indicative only based on limited ground investigation data. Foundations should be designed by a suitably qualified Engineer. Once structural loads have been fully determined a full design check in accordance with BS EN 1997 should be undertaken to confirm suitability of the proposed design values.

10.3 Building Near Trees

Design Methodology:

- Design by prescriptive measures – NHBC Standards, Chapter 4.2

Notes:

10.3.2 The underlying soil conditions have been shown to be of “low” volume change potential at shallow depth, with “high” volume change potential in the London Clay Formation.

10.3.3 Using the geotechnical testing obtained (summarised in Table 9.1) and with reference to NHBC Standards Chapter 4.2 it can be seen that a minimum founding depth of 0.75m will be required.

10.3.4 Presence of existing and proposed trees may increase this minimum depth. It is recommended that a tree survey that should include: location, species and height of all trees on and near to the proposed development is recommended.

10.3.5 Although geotechnical laboratory testing has indicated the London Clay Formation to be of high volume change potential, given that this stratum is reported in excess of 6m bgl, it is considered highly unlikely that the clay would exhibit significant shrink/swelling due to limited changes in moisture content at this depth.

10.3.6 Guidance is also given in relation to other aspects of construction where the shrink / swell potential of the soils may be needed to take into consideration. This guidance is summarised in the appropriate sections below.

10.4 Shallow Foundations

Design Methodology:

- Design by prescriptive measures – NHBC Standards, Chapter 4.2
- Design by calculation

Notes:

10.4.2 Foundations should not be formed in either the Made Ground or the topsoil due to the unacceptable risk of total and differential settlement.

10.4.3 It should be noted that the demolition and removal of existing structures, foundations and services may increase the depth of Made Ground on the site.

10.4.4 Traditional shallow foundations may be appropriate to support at least part of the proposed structures.

10.4.5 Drawings provided to Jomas indicate that the proposed development on the northern plot will impose unfactored loads of up to 50kN/m for strip footings and up to 132kN for pad foundations.

10.4.6 Based on the findings of this investigation, it is considered that reinforced strip footings of up to 1m breadth may be formed at a minimum depth of 0.75mbgl within the underlying Kempton Park Gravel Member for an allowable bearing capacity of 120kPa.

10.4.7 This depth, however, does not take into account the depth of Made Ground or the distance to and species of any previous, existing and proposed trees, and foundations may need to be deepened further accordingly, in accordance with NHBC requirements.

10.4.8 It is recommended that a layer of light mesh reinforcement is added to the base of all foundations to mitigate the potential for excessive differential settlement, given the variable properties (cohesive/granular) encountered within the Kempton Park Gravel Member.

10.4.9 Where foundations need to change levels, the foundations should be stepped. These steps should be no deeper than half of the width of the foundation and each step should not exceed 0.5m. For practical purposes, steps are unlikely to be less than 0.15m deep. The steps should be suitably reinforced for an adequate distance either side of the step.

10.4.10 It is recommended that formations are inspected by a geotechnical engineer prior to the pouring of concrete to confirm the bearing capacity.

10.5 Piled Foundations

Design Methodology:

- Design by calculation
- Design based on experimental models or site / load tests.

Notes:

10.5.2 If a greater bearing capacity is required for the proposed development, a piled foundation solution extended into the underlying London Clay Formation could be considered.

10.5.3 The piled foundations will carry their working load in a combination of skin friction along the sides of the pile and end bearing at the base of the pile. The piles should be designed by a suitably qualified and experienced piling specialist using a suitable factor of safety with the settlement at working load specified to meet any structural requirements. Table 10.2 provides indicative capacities for a single pile for the diameter and depths shown.

10.5.4 In order to calculate the provided indicative allowable pile capacities, the following ground model and characteristic ground parameters, separated for each plot, were used.

Table 10.1: Characteristic Parameters Used to Calculate Allowable Indicative Pile Carry Capacities

Strata	Depth (m bgl)	Bulk Density (kN/m³)	Design c_u or N
Made Ground	GL to 1.7	16	
Kempton Park Gravel Member – Cohesive	1.7 to 2.2	19.5	cu = 65
Kempton Park Gravel Member - Granular	2.2 to 6.3	21.5	N = 30
London Clay	6.3 to 20	19.6	Cu = (z – 3.75)/0.0722
Groundwater	4	9.81	

Table 10.2: Indicative Piles Capacities (kN)

Pile toe depth (m bgl)	Pile diameter (m)				
	0.3	0.45	0.6	0.75	0.9
	Indicative Allowable Pile Capacity (kN)				
9	165	215	275	350	440
10	180	235	305	395	495
11	190	255	340	435	550
12	205	280	370	475	600
13	215	295	395	515	650
14	225	315	420	550	695
15	235	330	445	580	735

10.5.5 To comply with BS EN 1997 and the guidance given by the Federation of Piling Specialists the ground must be proven to a minimum of 5m below the proposed toe of the piles. Consequently, the above table is limited to 15mbgl.

10.5.6 It should be noted that the above assumes a bored piling system. Other methods of piling and equipment may provide different results.

10.5.7 An alternative approach to piling could be to consider ground improvement techniques.

10.5.8 The use of a piling foundation solution will require the emplacement of an engineered granular piling mat to support the piling rig and prevent overturning. This should be designed and constructed in accordance with BRE 470.

10.5.9 The above comments are indicative only based on limited ground investigation data. Foundations should be designed by a suitably qualified Engineer. Once structural loads have been fully determined a full design check in accordance with BS EN 1997 should be undertaken to confirm suitability of foundation choice.

10.6 Concrete in the Ground

Design Methodology:

- Design by prescriptive measures – BRE SD-1
- Design by prescriptive measures and Design by Calculation BS EN 1992-1-1:2004+A1:2014 (Eurocode 2)

Notes:

10.6.2 Sulphate attack on building foundations occurs where sulphate solutions react with the various products of hydration in Ordinary Portland Cement (OPC) or converted High-Alumina Cement (HAC). The reaction is expansive, and therefore disruptive, not only due to the formation of minute cracks, but also due to loss of cohesion in the matrix.

10.6.1 In accordance with BRE Special Digest 1, the characteristic values of sulphate used to determine the concrete classification are determined using the methodology summarised in the tables below for each plot.

Table 10.3: Concrete in the Ground Classes

No. Samples in the dataset	Method for determining the sulphate characteristic value
1 - 4	Highest value
5-9	Mean of the top 2no. highest results
10 or greater	Mean of the top 20% highest results

10.6.2 Tables 10.4 summarise the analysis of the aggressive nature of the ground for each of the strata encountered within the ground investigation.

Table 10.4: Concrete in the Ground Classes

Stratum	No. Samples	pH range	Characteristic WS Sulphate (mg/l)	Design Sulphate Class	ACEC Class
Made Ground	19	7.2-9.3	230	DS-1	AC-1
Kempton Park Gravel Member – Cohesive	6	7.6-8.7	85	DS-1	AC-1
Kempton Park Gravel Member – Granular	5	8.3-9.0	17.5	DS-1	AC-1
London Clay Formation	7	8.7-8.9	174	DS-1	AC-1

10.6.3 It should be noted that the BGS description of the London Clay Formation notes that it includes "disseminated pyrite". It is therefore common practice to ensure that buried concrete formed in London Clay Formation has a Design Sulphate Class of at least DS-2.

10.6.4 The concrete structures, including foundations, will need to be designed in accordance with BS EN 1992-1-1:2004+A1:2014.

10.7 Ground Floor Slabs

Design Methodology:

- Design by prescriptive measures – NHBC Standards, Chapter 4.2
- Design by calculation

Notes:

10.7.2 Due to the presence of cohesive ground with a low volume change potential, and presence of Made Ground in excess of 600mm in thickness, in accordance with NHBC Standards Chapter 4.2, a suspended floor slab is recommended. The depth of clear void beneath the suspended floor slab will be dependent on the floor type used.

10.7.3 Under suspended in-situ concrete ground floor a minimum void of 50mm is required; under suspended precast concrete and timber floors a minimum of 200mm is required.

10.7.4 The loadings from the suspended floor slab will need to be carried by the foundations, which will need to be designed to not only carry the structural loadings but the additional floor loadings.

10.7.5 Alternatively, a ground bearing floor slab, could be used if emplaced on a blanket of suitable granular materials. The granular blanket should be at least 50% of the foundation depth and no more than 1.25m deep (measured from ground level). Assuming that there the proposed and current trees do not increase the required depth for shallow foundations this would mean a blanket of granular material between 0.5m and 1.25m thick.

10.7.6 The granular blanket should extend beyond the edge of the foundation by a distance equal to its natural angle of repose, plus 0.5m. The angle of repose will depend on the material used.

10.7.7 It is possible that following simple sorting and processing that demolition waste could be used for this purpose.

10.8 Excavations

Design Methodology:

- Design by calculation
- Design by the observational method
- Design based on experimental models or site / load tests

Notes:

10.8.2 It is likely that some shallow excavations will be required at the site for services etc., in addition to larger excavations during the remediation and construction works. These are anticipated to remain stable for the short term only.

10.8.3 The stability of all excavations should be assessed during construction. The sides of any excavations into which personnel are required to enter should be assessed and fully supported or battered back to a safe angle.

10.8.4 Any vertically sided excavations require support to provide safe man access and to support the sides of the excavation. Supports should be installed as excavation proceeds. For service excavations, overlapping trench sheets could be used as close support in the Made Ground deposits to minimise ground loss. Alternatively, consideration could be given to the use of trench boxes provided excavations take place within the boxes.

10.9 Pavement Design

Design Methodology:

- Design by prescriptive measures – Interim Advice Notice 73/06
- Design by prescriptive measures – Transport Research Laboratory document TRL 587
- Design by calculation
- Design based on experimental models or site / load tests

Notes:

10.9.2 The CBR value is dependent on the condition of the strata and could be different upon excavation to the formation, subject to seasonal conditions.

10.9.3 Clay sub grades will be liable to deteriorate if exposed to poor weather conditions (including extreme temperature (hot or cold with clays likely to be frost susceptible) or excessive site traffic. Therefore, care should be taken to protect prepared formations by minimising their exposure to the elements and ensuring the prompt placement of sub-base layers. All formation levels should be proof rolled and any 'soft spots' removed and replaced with suitably engineered granular material.

10.9.4 Due to the potential presence of mixed strata at formation level, the use of a geotextile is recommended where variable ground conditions are encountered, or across changes in strata, to protect against potential differential settlement.

10.9.5 It is recommended that a CBR value of <2.5% is adopted for pavement design on Made Ground.

10.9.6 Based on the in-situ test results and taking into account the variability of the results and ground conditions (i.e. cohesive and granular materials) it is recommended that a CBR value of 5% be used for pavement construction within the superficial deposits.

10.9.7 Proof rolling/compaction of granular materials may provide a greater result.

10.9.8 Additional CBR testing should be undertaken after detailed design is complete to confirm suitability.

10.10 Groundwater Control

Design Methodology:

- Design by calculation
- Design based on experimental models or site / load tests.

Notes:

10.10.2 During the investigation, groundwater was reported within boreholes BH1 and BH2 at 10.00mbgl and 19.30mbgl respectively.

10.10.3 During return monitoring groundwater was reported at depths of between 4.00-4.30mbgl. It is considered that these results represent a shallow ground water table within the superficial Kempton Park Gravel deposits.

10.10.4 Subject to seasonal variations, any groundwater encountered during site works could be readily dealt with by conventional pumping from a sump used to collate waters.

10.10.5 Surface water or rainfall ingress is likely to freely drain through the granular materials. If this does not occur, then they too could be dealt with by traditional sump and pump.

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APPENDICES

APPENDIX 1 – FIGURES

PROJECT NAME	North lane depot East car park	CLIENT	Richmond and Wandsworth Councils
TITLE	Site Location Plan	PROJECT NO.	P3152J2114
DATE	November 2020	FIGURE NO.	1

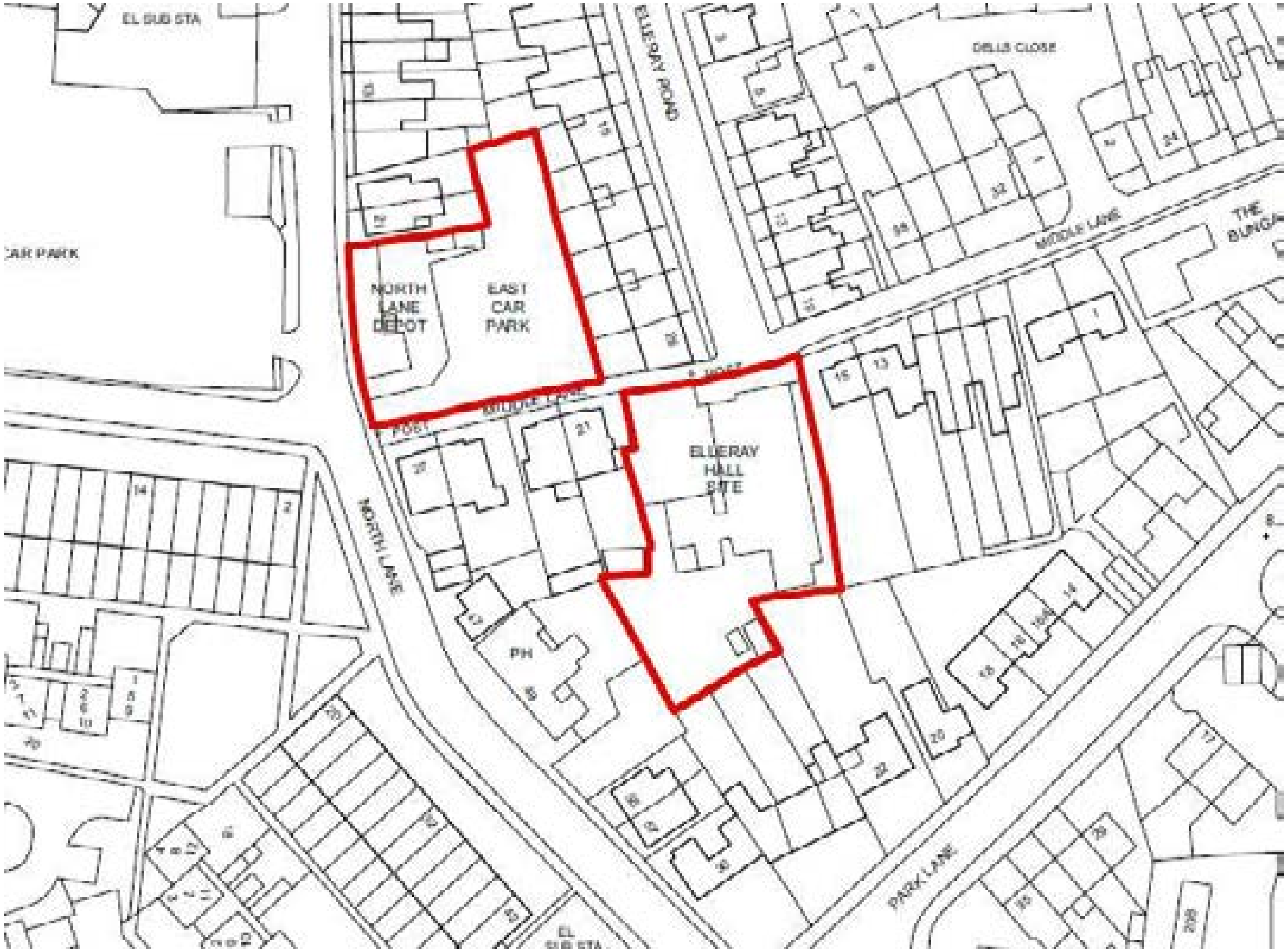
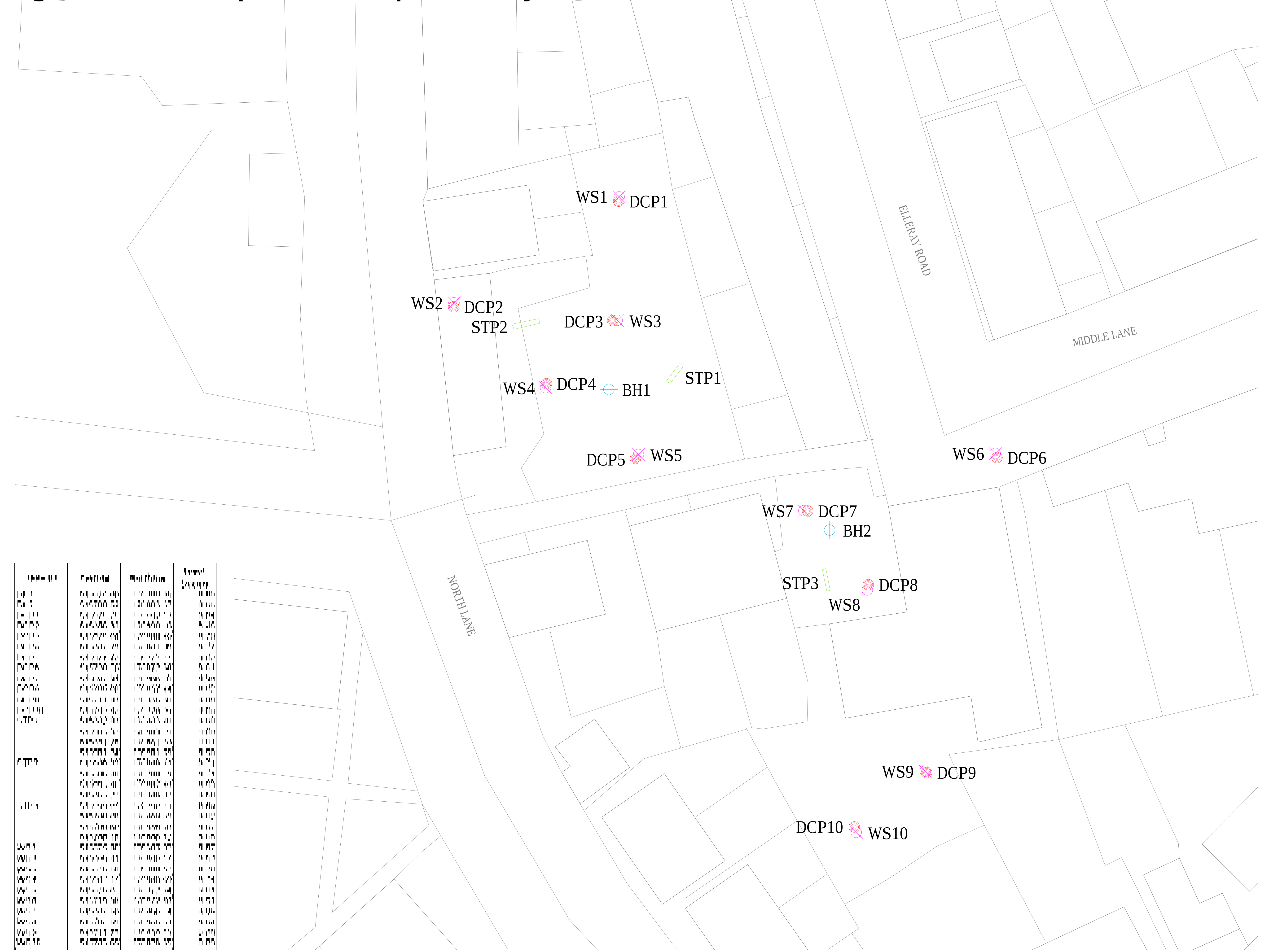


Figure 2: Completed Exploratory Hole Plan



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North (indicative)

N W E S

KEY

- BH - Cable Percussion Borehole
- DCP - Dynamic Cone Penetration Test
- STP - Trial Pit / Soakaway Test
- WS - Dynamic Sampling Borehole

NOTES

1. Coordinates and levels quoted refer to Ordnance Survey (OS) National Grid.
2. Base drawing provided by Landmark Information Group Ltd., with licence number 100022432.
3. This drawing should not be scaled.
4. All levels are in mOD (metres above Ordnance Datum).

ISSUES

Revision	Details	By	Date
00	Drawing completed and corrected	AC	31/03/21

Client: Richmond & Wandsworth Council

Project: Elleray Hall & North Lane Depot/East Car Park

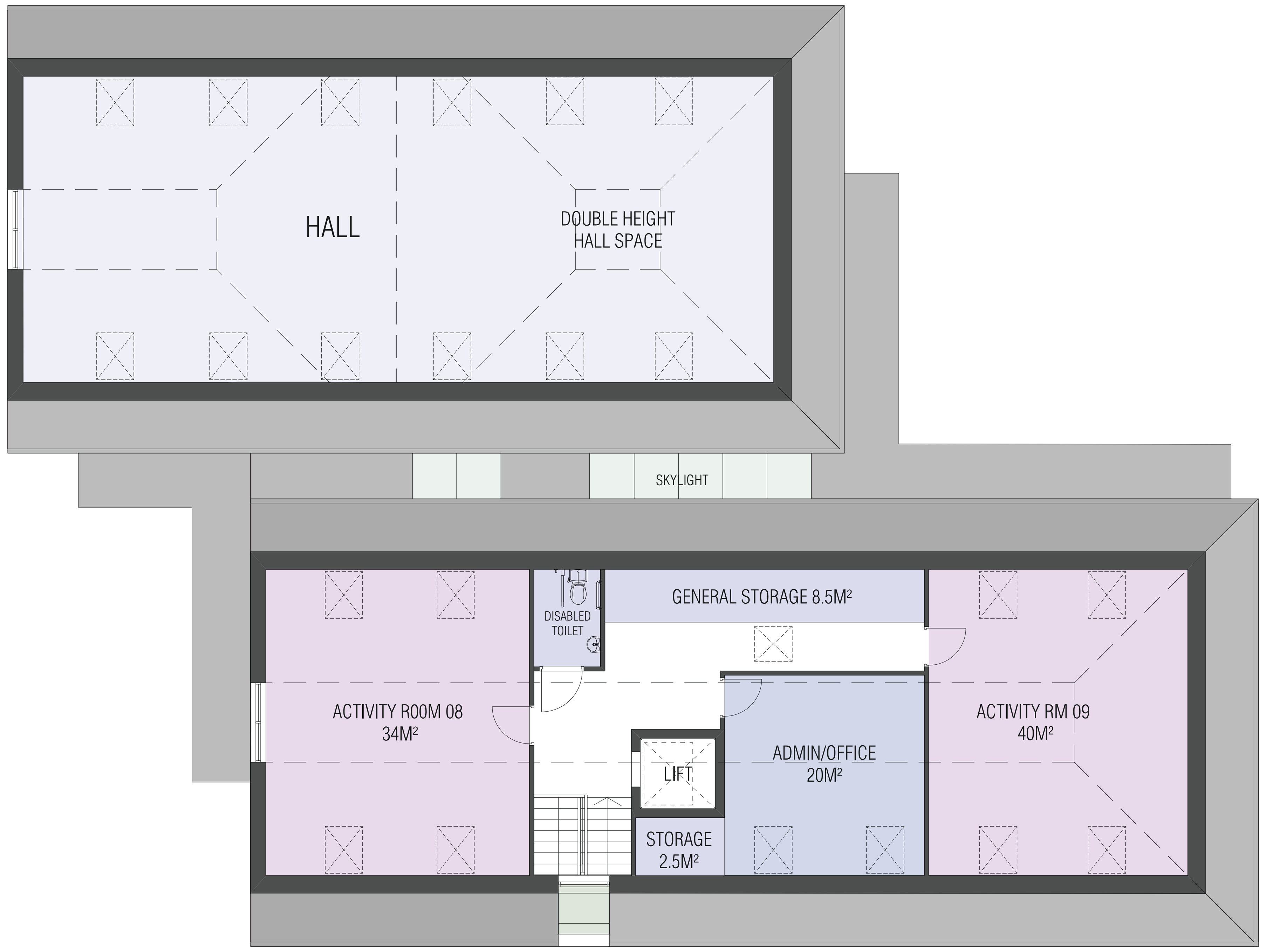
Address: Elleray Rd, Teddington TW11 0HG

Plan title: Exploratory Hole Location Plan

Project no 20/3521	Drawing no 01	Revision 00
Scale NTS	Sheet size A3 (297.00x420.00mm)	
Date March 2021	Status Issue	

Surveyed by	Drawn by	Checked by	Passed by
C	AC	AB	OS

Figure 3: Proposed Development Plan - Northern Plot



FIRST FLOOR (ROOF SPACE)

GROUND FLOOR

SITE PLAN 1:200

ACCOMMODATION SCHEDULE

COMMUNITY CENTRE:
GIFA 536M²

SITE AREA
TOTAL SITE AREA 1,097M² OR 0.1 HECTARES

PARKING
3 STANDARD BAYS
1 DISABLED BAY
1 CAR CLUB SPACE (FOR AFFORDABLE HOUSING SCHEME)
1 MINIBUS BAY

SCALE BAR 1:100
0 1 2 3 4 5M

Revisions:
A - 17.07.20 Additional disabled WC added to first floor, external garden storage added.
B - 27.07.20 Internal storage adjusted.
C - 07.08.20 Additional survey information added.

Project: ELLERAY HALL, ELLERAY ROAD, TEDDINGTON		
Drawing: SITE LAYOUT, ROOF PLAN & FLOOR PLANS		
Drawing No.: EHT- 03C	Scale: 1:200 / 1:100 @ A1	Date: 03 09 19

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Figure 4: Proposed Development Plan - Southern Plot

APPENDIX 2 – FACTUAL REPORT

FACTUAL REPORT

Elleray Hall & North Lane Depot/East Car Park

Prepared For: Richmond & Wandsworth Council

ISSUE 01

Concept: 20/3521- FR01 21/06/2021

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DOCUMENT ISSUE REGISTER

Project Name:	Elleray Hall & North Lane Depot/East Car Park		
Project Number:	20/3521		
Document Reference:	20/3521 - FR01	**Current Issue**	Issue 01
Document Type:	Site Investigation Report		

DEVELOPMENT	Name	Signature	Date
Prepared by:	N Carsandas		21/06/2021
Checked by:	O Savvidou		21/06/2021
Approved by:	M Dedic		21/06/2021

Issued to:	Jomas Associates Ltd

Date	Issue	Amendment Details/ Reason for issue	Issued to
09/04/2021	Issue 00	DRAFT	Jomas Associates
21/06/2021	Issue 01	FINAL: Monitoring and water sampling complete	Jomas Associates

Notes:

CONTENTS

1. PROJECT PARTICULARS

Site Location:	Elleray Hall & North Lane Depot/East Car Park
Client:	Richmond & Wandsworth Council
Investigation Supervisor:	Jomas Associates Ltd
Fieldwork:	22/02/2021 – 03/03/2021
Laboratory Work:	26/02/2021 – 08/04/2021

2. PURPOSE AND SCOPE OF WORKS

The purpose of the investigation was to understand the ground and groundwater conditions at the site and to determine the nature and extent of any ground and groundwater contamination.

The site comprised two irregular-shaped plots of land to the north and south of Middle Lane, Teddington.

The south plot was situated adjacent to the junction of Elleray Road and Middle Lane and was occupied by a single storey iron-clad commercial-style building identified as Elleray Hall Social Centre.

The north plot was located adjacent to the north of Middle Lane and east of North Lane with the western section of the plot secured with hoarding enclosing a demolished building. The eastern section was car parking area accessed off North Lane.

The scope of the works comprised the following:

- 2 No. Cable Percussion Boreholes to a depth of 20.00m;
- 10 No. Dynamic Sampler Boreholes to a depth of 2.00m;
- 3 No. Machine Excavated Trial Trenches to a maximum depth of 2.70m;
- Dynamic Cone Penetrometer (DCP) Testing;
- Soakaway Tests;
- Logging and Photographing;
- Instrumentation Monitoring and Sampling;
- Geotechnical & Chemical Testing.

Table 1 – Exploratory Hole List

Hole ID	Hole Type	Depth (m)	Easting	Northing	Level (mOD)
BH1	CP	20.00	515674.60	170880.38	8.85
BH2	CP	20.00	515700.52	170863.87	8.96

Hole ID	Hole Type	Depth (m)	Easting	Northing	Level (mOD)
WS1	DS/DCP	2.00	515675.80	170903.02	8.87
WS2	DS/DCP	2.00	515656.41	170890.57	8.52
WS3	DS/DCP	2.00	515675.58	170888.52	8.78
WS4	DS/DCP	2.00	515667.17	170880.60	8.74
WS5	DS/DCP	2.00	515678.06	170872.74	9.01
WS6	DS/DCP	2.00	515719.98	170872.86	8.91
WS7	DS/DCP	2.00	515697.50	170866.14	8.98
WS8	DS/DCP	2.00	515704.96	170856.83	8.94
WS9	DS/DCP	2.00	515711.76	170835.53	9.00
WS10	DS/DCP	2.00	515703.65	170828.35	9.09
STP1	TT	2.60	515682.35	170882.26	9.00
STP2	TT	2.50	515664.87	170888.10	8.66
STP3	TT	2.70	515700.13	170858.01	8.93

Key

CP – Cable Percussion Borehole
DS/DCP – Dynamic Sampler Borehole & DCP Location
TT – Trial Trench

3. DESCRIPTION OF WORKS

The works were carried out in accordance with the Jomas Associates' "Elleyray Hall & North Lane Depot/ East Car Park" Ground Investigation Specification document with reference P3152J2114/TE, Rv00, dated 26/11/2020 and Concept's Method Statement with reference no: 20/3521, Rv00, dated 01/0/2021.

The northern plot was bounded by residential property to the north and east, North Lane on the west and Middle Lane in the south. The southern plot was bounded by Middle Lane to the north and residential property to the south, east and west. The approximate centre of the site was located at National Grid Reference: E515702, N170871.

The locations of all exploratory holes are shown in the Exploratory Hole Location Plan presented in Section 7 of this report.

4. INVESTIGATION METHODS

4.1 Ground Penetrating Radar Survey (GPR)

The GPR survey was undertaken by subcontractor Terrascan.

The survey was designed to obtain information from the subsurface on the position of any additional underground services not locatable using conventional electromagnetic locators and to identify additional ground anomalies, voids and obstructions that may be present.

All the services were marked out in the ground.

4.2 Utilities Survey and Inspection Pits

Prior to boring commencing all exploratory hole locations were checked for utilities /buried services using a CAT and genny, existing utility information and hand dug inspection pits to an appropriate depth as identified by the services plans. A hand dug inspection pit was excavated at each exploratory hole location to an appropriate depth as identified by the services plans typically to a maximum depth of 1.20m.

Where surface asphalt was encountered it was broken out by hand held electric breaker.

4.3 Detailed Unexploded Ordnance Risk Assessment

A Detailed Unexploded Ordnance Risk Assessment was carried out by Primely Ltd on behalf of Jomas Associates Ltd with Document titled "Elleyray Hall & North Lane Deport, Teddington TW11 And East car Park, Teddington TW11", dated 16/01/2021. The report is included in Appendix A.

The site was assessed as low risk of items of unexploded German aerial delivered and other types of munitions. Therefore, a UXO survey clearance was not undertaken during drilling.

4.4 Cable Percussion Drilling

2 No Cable Percussion Boreholes (BH1 and BH2) were drilled to a depth of 20.00m using a standard cable percussion rig (Dando 175) with 150mm diameter casing.

4.4.1 Sampling and Testing during Cable Percussion Drilling

Bulk samples were taken at regular intervals in the Made Ground and thereafter at each change in strata. Undisturbed Thin Walled samples (UT) were taken in accordance with EC7 using a down-hole sliding hammer in cohesive material at regular intervals or as instructed by the Investigation Supervisor.

Standard Penetration Tests (SPT) were carried out at specified intervals or as otherwise instructed by the Investigation Supervisor. The resulting SPT "N" blowcount values are presented in the relevant borehole records. Where an SPT using a split spoon sampler was not possible, due to the granular nature of the material, a solid cone was used. The SPT hammer calibration sheet is included in Section 8 of this report.

Small, disturbed samples were retrieved from the cutting shoe of the UT100 sampler, the SPT split spoon sampler and at intervals specified by the Investigation Supervisor.

Environmental samples (tubs, jars and vials) were taken for chemical analysis in the Made Ground or at each change of strata and where visual or olfactory evidence of contamination was noted or as instructed by the Investigation Supervisor. Headspace readings for volatile organic compound (VOC) content were taken in all the samples using a Phocheck Tiger photoionization detector.

The borehole logs are presented in Section 8 of this report.

4.5 Dynamic Sampling Boreholes

10 No. Dynamic Sampling Boreholes (WS1-WS10) were carried out to a depth of 2.00m. The boreholes were drilled using a tracked Geo drive-tube sampling rig.

Semi-rigid plastic core liners were recovered from each borehole location. The excavated soil was logged in accordance with BS 5930:2020 and photographed.

Environmental samples (tubs, jars and vials) were taken for chemical analysis mostly from the inspection pits. Headspace readings for volatile organic compound (VOC) content were taken using a Phocheck Tiger photoionization detector. Representative bulk and disturbed samples were taken for soil analysis.

SPTs were carried out at the base of the inspection pit at 1.20m depth and at 2.00m. All boreholes were aborted at 2.00m depth due to refusal.

The borehole logs along with the SPT hammer calibration sheet are presented in Section 9 and the core photographs are presented in Section 16 .

4.6 Machine Excavated Trial Trenches

3 No. Trial pits (STP1-STP3) were machine excavated to a maximum depth of 2.70m using a JCB 3CX backhoe with extension arm. The pits were carried out to for sample collection and to conduct soakaway testing to determine suitability of soakaway drainage.

Environmental samples (tubs, jars and vials) were taken for chemical analysis in the Made Ground or at each change of strata and where visual or olfactory evidence of contamination was noted or as instructed by the Investigation Supervisor. Headspace readings for volatile organic compound (VOC) content were taken in all the samples using a Phocheck Tiger photoionization detector. Bulk samples were also taken for soils analysis.

The trial trenches were logged and photographed. The logs and photographs are presented respectively in Section 10 and Section 16 of this report.

4.7 Dynamic Cone Penetrometer Testing (DCP)

10 No. TRL DCP Tests were carried out at locations adjacent to the dynamic sampling boreholes shown on the Exploratory Site Location Plan in Section 7.

An 8 kg free fall hammer is lifted and dropped through a height of 575mm. The penetration distance of the cone tip is then recorded and the cycle repeated. Continuous measurements can be made down to a depth of approximately 850mm or when extension shafts are fitted to a maximum recommended depth of 2.00m. Where sub-pavement layers have different strengths, the boundaries can be identified and the thickness determined.

The DCP results and graphs are presented in Section 11 of this report.

4.8 Soakaway Tests

Soakaway Tests were carried out in trial pits STP1-STP3 using 50mm diameter pipes installed at the base of each pit, backfield with pea shingle to 1.20m depth. Water was then rapidly pumped in the pipes using a bowser. The water levels were recorded at the start of each test and at regular intervals. The results of the tests are presented in Section 12 of this report.

4.9 Standpipe Installations and Backfill

Monitoring wells were installed in the boreholes as follows:

Table 2 – Monitoring Installation Details

Hole ID	Base of Borehole (m bgl)	Diameter of Installation (mm)	Type of Installation	Base of Installation (m bgl)	Response Zone	
					Top (m bgl)	Bottom (m bgl)
BH1	20.00	50	GMP	6.30	1.00	6.30
BH2	20.00	50	GMP	6.60	1.00	6.60
WS1	2.00	50	GMP	2.00	1.00	2.00
WS2	2.00	50	GMP	2.00	1.00	2.00
WS6	2.00	50	GMP	2.00	1.00	2.00
WS10	2.00	50	GMP	2.00	1.00	2.00

KEY
GMP – Gas and groundwater Standpipe

The boreholes were backfilled with bentonite pellets with gas/groundwater response zones backfilled with a 10mm pea shingle filter with a geosock surround. All installations were finished with bentonite pellets to the surface with concrete and a lockable stopcock cover flush with the ground.

The boreholes with no installations were backfilled with bentonite pellets upon completion.

4.10 Instrumentation Monitoring and Sampling

Groundwater monitoring was carried out during fieldworks. Gas and groundwater monitoring and sampling was carried out by Concept subsequent to completion of the boreholes on 4No scheduled visits between 10/03/2021 and 09/06/2021.

All boreholes were developed least one week prior to sampling using a Wasp pump which provides a relatively high pumping rate to remove water and entrained sediment. Development continued until either the well ran dry, the water ran clear or at least 10 well volumes were removed.

Water sampling was carried in BH2 on 17/03/2021 and in BH1 on 09/06/2021. Water samples were taken using a peristaltic pump at a low pumping rate. The pump tubing was lowered to target the standpipe response zone and a dipmeter was used during purging to ensure that the pumping rate did not reduce the water level. Generally, the water level remained steady at pumping rates of 1 litre every 3 minutes. Water parameters (pH, conductivity, dissolved oxygen, temperature and Redox levels) were recorded during purging using a flow cell and a YSI Professional Probe. Purging was considered complete when parameters stabilised to within 10%. Generally the water was noted as clear and the purging complete after 3 litres were removed. On completion of purging, the water samples were collected in bottles Eurofins (1No glass, 1No plastic and 1No vial). They were then transferred to Concept laboratory inside cool boxes protected by bubble wrap and kept in the fridge until collection from the chemical laboratory was arranged. The borehole was purged and sampled using a new length of tubing.

An In-Situ Rugged interface was used to prove/disprove the presence LNAPL and DNAPL. However, neither LNAPL nor DNAPL were detected throughout the water column in the boreholes therefore a Geosense dipmeter was used for the subsequent visits. The gas concentrations were recorded using a Gas data GFM436 monitor. Where 0.00 is shown on the results indicates value lower than the detection limit of the machine. The accuracy of the instruments is summarised in Section 13 where the gas monitoring reports and groundwater results are presented.

4.11 Logging / Laboratory Testing

Logging of all soil samples was carried out in accordance with BS 5930:2020.

Geotechnical testing was performed at Concept Site Investigations laboratory in accordance with BS1377:1990 unless otherwise stated in the report. Concept is accredited by UKAS for tests where the UKAS logo is appended to the individual test report or summary. Approved signatories for laboratory testing are as follows:

- LG – Lynn Griffin (Quality Manager)
- KM – Kasia Mazerant (Laboratory Manager)

Where subcontracted analysis has been carried out, the details of the laboratory (and accreditation where applicable) are shown in the individual test report or summary.

The results are presented in tabular format in Section 14 of this report.

All chemical testing was specified and scheduled by Jomas Associates and carried out by Chemest in accordance with the requirements of UKAS ISO17025 and MCERTS. The results are presented in tabular format in Section 15 of this report.

4.12 Setting Out

The locations of all exploratory holes were agreed with the Investigation Supervisor and set out prior to commencement of the site works.

Following completion of the ground works the locations and elevations of the boreholes and pits were established by Concept using GPS equipment with accuracy between +/- 10mm and 30mm.

The co-ordinates and levels of the as-built locations of the boreholes and pits are shown in the Exploratory Hole Location Plan presented in Section 7 of this report.

5. GEOLOGICAL GROUND PROFILE

The geological strata encountered during the investigation are summarised in the table below. The Top and Bottom of the strata noted in the table indicates the highest and lowest boundaries encountered in all exploratory holes.

Table 3 - Geological Ground Profile

STRATUM	TOP (mOD)	BASE (mOD)	DESCRIPTION
TOPSOIL	8.66	8.37	Soft, dark brown silty CLAY with frequent rootlets.
MADE GROUND	9.09	7.04	Asphalt/ Brickwork/ Concrete over, Dark brownish grey sandy GRAVEL with low flint and concrete cobble content, occasional roots and strong hydrocarbon odour. Gravel comprises angular to subrounded fine to coarse flint, brick, concrete, coal, glass, bone, ceramic pipe and asphalt fragments. Brown slightly gravelly clayey silty fine to coarse SAND with occasional pockets of orangish brown clayey silt, shell fragments), roots and orange and black staining. Greyish brown slightly gravelly slightly sandy clayey SILT with low flint and brick cobble content and occasional roots. Soft, greenish grey slightly gravelly slightly sandy silty CLAY with occasional pockets of reddish brown silty fine sand and orangish brown silt, frequent dark grey flecks, slight hydrocarbon odour and dark grey staining.
ALLUVIUM	8.34	6.86	Firm, orangish brown mottled greenish grey slightly gravelly sandy clayey SILT with occasional pockets of reddish brown silty fine sand, frequent roots and occasional dark grey staining. Gravel is angular to subangular fine to medium flint. Greenish grey slightly gravelly sandy CLAY with occasional pockets of yellowish brown silt and reddish brown silty fine sand and frequent dark grey staining. Gravel is angular to rounded fine to medium flint. Sand is fine to medium.
KEMPTON PARK GRAVEL MEMBER	7.96	2.36	Very dense, brown silty sandy angular to subrounded fine to medium flint GRAVEL. Sand is fine to coarse.

STRATUM	TOP (mOD)	BASE (mOD)	DESCRIPTION
			Medium dense, brown clayey gravelly fine to medium SAND with occasional pockets of greyish brown and reddish brown sandy clay. Gravel is subangular to subrounded fine to coarse flint. Firm, orangish brown gravelly sandy clayey SILT.
LONDON CLAY FORMATION	2.55	Extent not proven	Very stiff, dark brown slightly sandy slightly micaceous silty CLAY with occasional partings of light grey silty fine sand, off-white shell fragments, white flecks and dark grey staining.

REFERENCES

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British Standards Institution BS EN 1997:2 (2007) EuroCode 7 - Geotechnical Design. Part 2 - Ground Investigation and Testing.

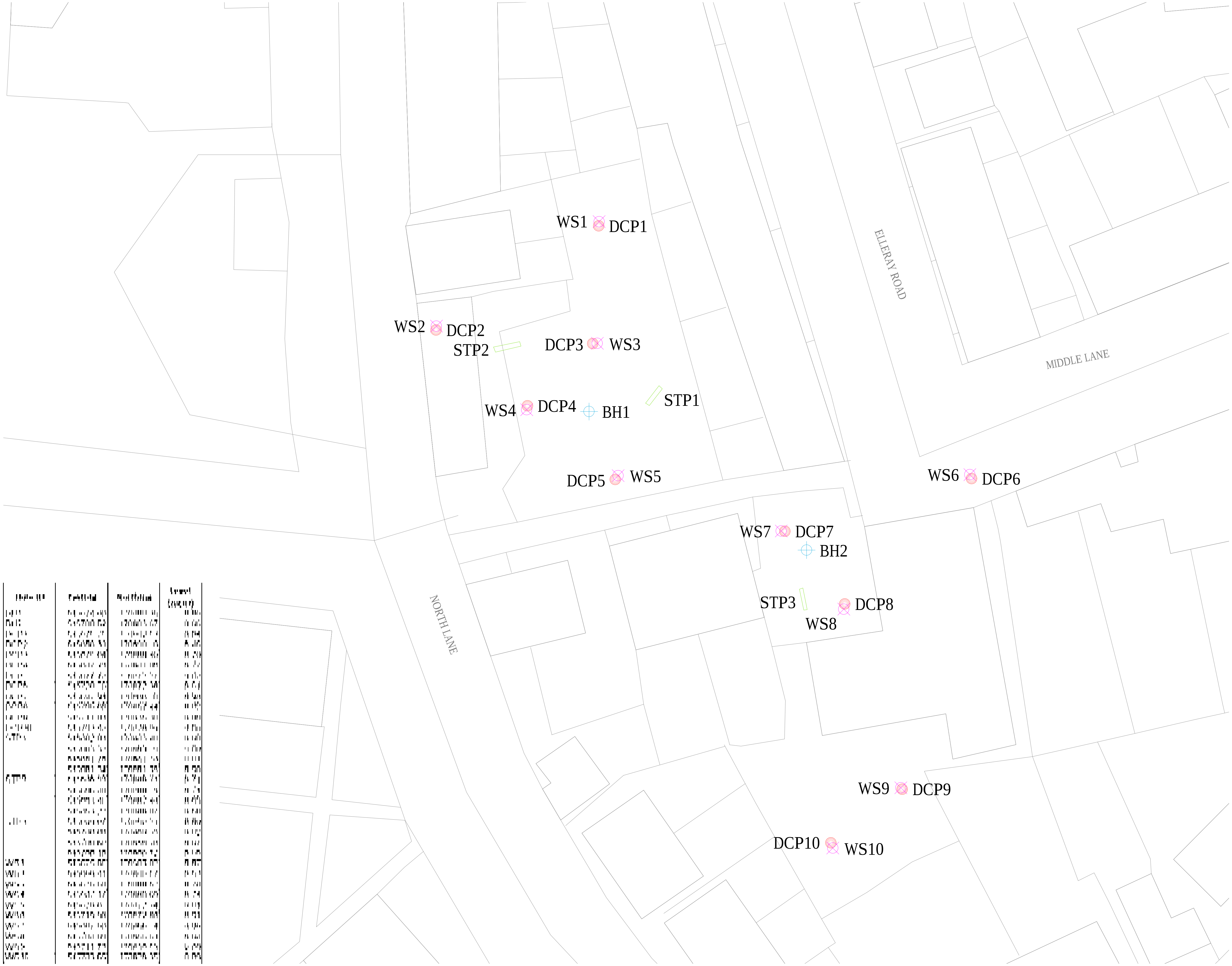
King C. (1981) The stratigraphy of the London Basin and associated deposits. Tertiary Research Special Paper, Vol. 6, Backhuys, Rotterdam, p158.

Aldiss, D. T. (2012) The stratigraphical framework for the Palaeogene successions of the London Basin, UK. British Geological Survey Open Report. British Geological Survey.

6. SITE LOCATION PLAN

Not to Scale / Map data ©2021 Google

7. EXPLORATORY HOLE LOCATION PLAN



[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

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North (indicative)

N
W E
S

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3. This drawing should not be scaled.
4. All levels are in mOD (metres above Ordnance Datum).

ISSUES

Revision	Details	By	Date
00	Drawing completed and corrected	AC	31/03/21

Client	Richmond & Wandsworth Council
Project	Elleray Hall & North Lane Depot/East Car Park
Address	Elleray Rd, Teddington TW11 0HG
Plan title	Exploratory Hole Location Plan

Project no	Drawing no	Revision
20/3521	01	00

Scale	Sheet size
NTS	A3 (297.00x420.00mm)

Date	Status
March 2021	Issue

Surveyed by	Drawn by	Checked by	Passed by
C	AC	AB	OS

8. CABLE PERCUSSION BOREHOLE LOGS

CONCEPT
Warple Mews, 8 Warple Way
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E-mail: si@conceptconsultants.co.uk

Borehole No BH1

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started / Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	Date Started 24/02/21 Date Completed 26/02/21	8.85	E 515674.60 N 170880.38	20.00m

Client Richmond & Wandsworth Council

BOREHOLE SUMMARY

Top (m)	Base (m)	Type	Date Started	Date Ended	Crew	Logged By	Barrel Type	Core Bit	Plant Used/ Method	SPT Hammer Reference
0.00	1.20	IP	24/02/2021	24/02/2021	DR	DH/JM			Hand Excavated	
1.20	20.00	CP	24/02/2021	25/02/2021	DR	JM			Dando 175	AR779

WATER STRIKES

Strike at (m)	Rise to (m)	Time to Rise (min)	Casing Depth (m)	Sealed (m)
10.00	10.00	20	6.80	

WATER ADDED

From (m)	To (m)
2.00	6.30

CHISELLING / SLOW DRILLING

From (m)	To (m)	Duration (hr)	Remarks
10.00	10.40	01:00	Claystone

HOLE / CASING

Hole Depth (m)	Hole Diameter (mm)	Casing Depth (m)	Casing Diameter (mm)
0.00	150	0.00	150
20.00	150	6.80	150

ROTARY RECOVERY

From (m)	To (m)	Duration (hr)	Recovery (%)

ROTARY FLUSH DETAIL

From (m)	To (m)	Flush Type	Flush Return (%)	Flush Colour

INSTALLATION DETAILS

Type	Diameter (mm)	Depth of Installation (m)	Top of Response Zone (m)	Bottom of Response Zone (m)	Date of Installation
GMP		6.30	1.00	6.30	26/02/2021

BACKFILL DETAILS

Top (m)	Bottom (m)	Material	Backfill Date	Remarks
0.00	0.30	Concrete	26/02/2021	Flush Cover
0.30	1.00	Bentonite Pellets		
1.00	6.30	Pea Shingle		
6.30	20.00	Bentonite Pellets		

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Borehole No
BH1

Project
Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started		Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	Date Started	24/02/21	8.85	E 515674.60 N 170880.38	20.00m
	Date Completed	26/02/21			

Client
Richmond & Wandsworth Council

PROGRESS

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Remarks
24/02/21	0.00		Dry	
24/02/21	1.20		Dry	
24/02/21	2.00	2.00	Wet	... Water Added
24/02/21	2.70	2.70	1.00	
24/02/21	3.00	3.00	1.50	
24/02/21	4.00	4.00	2.00	
24/02/21	4.50	4.50	4.00	
25/02/21	4.50	4.50	4.00	... Water Added
25/02/21	4.70	4.70	3.50	
25/02/21	5.70	5.70	4.50	
25/02/21	6.50	6.50	Dry	
25/02/21	10.00	6.80	10.00	... Water Strike
25/02/21	10.70	6.80	Dry	
25/02/21	20.00	6.80	Dry	

SPT DETAILS

Type	Depth (m)	N Value	Blow Count / 75mm	Casing Depth (m)	Water Depth (m)
C	1.20	N19	2, 3 / 5, 4, 4, 6		Dry
C	2.00	N50/0.265	3, 5 / 8, 13, 18, 11	2.00	1.00
C	3.00	N50/0.29	2, 5 / 8, 12, 16, 14	3.00	1.50
C	4.00	N16	1, 4 / 4, 4, 3, 5	4.00	2.00
C	5.00	N13	1, 3 / 4, 3, 3, 3	5.00	3.50
C	6.00	N12	1, 2 / 3, 3, 3, 3	6.00	4.50
S	8.00	N20	2, 3 / 4, 5, 5, 6	6.80	Dry
S	10.00	N50/0.115	24 / 26, 24	6.80	Dry
S	12.00	N26	3, 4 / 5, 6, 7, 8	6.80	Dry
S	14.00	N30	3, 5 / 6, 7, 8, 9	6.80	Dry
S	16.00	N38	6, 7 / 7, 9, 10, 12	6.80	Dry
S	18.00	N50/0.285	15, 10 / 10, 11, 16, 13	6.80	Dry

GENERAL REMARKS

1. Borehole blowing in the gravels.
2. Slight water seepage encountered at 10.00m depth with no rise.

KEY
SAMPLES
ES - Environmental Sample (Tub, Vial, Jar)
AZCL:Assumed Zone of Core Loss
U - 100mm Diameter Undisturbed Sample
UT - 100mm Diameter Thin Wall Undisturbed Sample
U38 - 38mm Diameter Undisturbed Sample
D - Disturbed Sample, B-Bulk Sample, LB- Large Bulk Sample, BLK-Block Sample
C - Core Sample, W-Water Sample, R-Root Sample

INSTALLATION DETAILS
SPIE - Standpipe Piezometer
SPGW - Groundwater Monitor Standpipe
SPG/GW - Gas / Groundwater Monitor Standpipe
VWP - Vibrating Wire Piezometer
ICM - Inclinometer

HOLE TYPES
IP -Inspection Pit, TP-Trial Pit TT - Trial Trench
CP -Cable Percussion, RC-Rotary Coring, R/S-Rotary/Sonic
DS -Dynamic Sampling, DS/R-Dynamic Sampling /Rotary
DC -Diamond Coring, CP/R-Cable Percussion Rotary follow on

TESTS S/C-SPT / CPT, V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds

Note: All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:46	AGS

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Borehole No BH1

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started	Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	24/02/21	26/02/21	8.85	E 515674.60 N 170880.38	20.00m

Client Richmond & Wandsworth Council

Method/Plant Used Cable Percussion

Sheet 1 of 2

PROGRESS

Date	Casing	Water
24/02/21		Dry
24/02/21		Dry
24/02/21	2.00	Wet
24/02/21	2.70	1.00
24/02/21	3.00	1.50
24/02/21	4.00	2.00
24/02/21	4.50	4.00
25/02/21	4.50	4.00
25/02/21	4.70	3.50
25/02/21	5.70	4.50
25/02/21	6.50	Dry
25/02/21	6.80	10.00 (1)
25/02/21	6.80	Dry

STRATA

Level (mOD)	Depth (Thickness)	Strata Description
8.75	0.10	Asphalt. (MADE GROUND)
8.55	0.30	Dark grey slightly silty very sandy GRAVEL with slight hydrocarbon odour. Gravel comprises angular to subrounded fine to coarse flint, brick, concrete and asphalt fragments. Sand is fine to coarse. (MADE GROUND)
8.50	0.35	Brickwork. (MADE GROUND)
8.30	0.55	Dark grey very gravelly fine to coarse SAND. Gravel comprises angular to subrounded fine to coarse flint, brick, concrete and ceramic fragments. (MADE GROUND)
7.65	(0.65) 1.20	Firm, dark brown slightly sandy gravelly silty CLAY. Gravel comprises angular to subrounded fine to coarse flint and brick fragments. Sand is fine to coarse. (MADE GROUND) 0.90 ... becoming brown mottled orangish brown, greyish brown and slightly gravelly
6.85	(0.80) 2.00	Medium dense, brown clayey gravelly fine to medium SAND with occasional pockets of greyish brown and reddish brown sandy clay. Gravel is subangular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL MEMBER)
2.55	(4.30) 6.30	Very dense, light brown sandy subangular to rounded fine to coarse GRAVEL. Sand is fine to coarse. (KEMPTON PARK GRAVEL MEMBER) 3.70 ... with low flint cobble content 4.00 ... becoming medium dense and very sandy 5.00 ... becoming sandy
		Stiff, greyish brown CLAY with rare pockets of dark grey silt (<20mm), occasional white flecks, off-white shell fragments and dark grey staining. (THAMES GROUP: LONDON CLAY FORMATION - B) 7.50 ... with rare white flecks 8.00 - 8.50 ... with frequent bioturbation and occasional shell fragments (<3mm) 8.70 ... with rare shell fragments (<2mm) 9.50 ... with occasional bioturbation 10.00 - 10.20 ... with band of claystone 10.70 ... with occasional white flecks

SAMPLES & TESTS

Depth (m)	Type No	Test Result	Field Records
0.25	ES1		VOC 1ppm
0.25	B2		VOC 0.7ppm
0.40	ES3		VOC 0.4ppm
0.40	B4		
0.60	ES5		
0.60	B6		VOC 0.5ppm
1.00-1.20	ES7		
1.00-1.20	B8		
1.20		N19	2, 3 / 5, 4, 4, 6
1.20-1.65	B10		
1.20	B9		
1.80	D11		
2.00		N50/ 265 mm	3, 5 / 8, 13, 18, 11
2.00-2.40	B12		
2.70	D13		
3.00		N50/ 290 mm	2, 5 / 8, 12, 16, 14
3.00-3.45	B14		
3.70	D15		
4.00		N16	1, 4 / 4, 4, 3, 5
4.00-4.45	B16		
4.70	D17		
5.00		N13	1, 3 / 4, 3, 3, 3
5.00-5.45	B18		
5.70	D19		
6.00		N12	1, 2 / 3, 3, 3, 3
6.00-6.45	B20		
6.50-7.00	B21		
7.00-7.45	UT22	50 blows	100% Recovery
7.45	D23		
7.70	D24		
8.00		N20	2, 3 / 4, 5, 5, 6
8.00-8.45	D25		
8.70	D26		
9.00-9.45	UT27	70 blows	100% Recovery
9.45	D28		
9.70	D29		
10.00		N50/ 115 mm	24 / 26, 24
10.00-10.45	D30		
10.00-10.40	B31		
10.70	D32		
11.00-11.45	UT33	100 blows	100% Recovery

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Borehole No **BH1**

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started	Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	24/02/21	26/02/21	8.85	E 515674.60 N 170880.38	20.00m

Client Richmond & Wandsworth Council

Method/Plant Used Cable Percussion

Date	Casing	Water	Level (mOD)	Depth (Thickness)	Strata Description	Sample Depth (m)	Type No	Test Result	Field Records
						11.45	D34		
					11.50 ... becoming silty	11.70	D35		
					11.70 ... with occasional dark grey staining	12.00		N26	3, 4 / 5, 6, 7, 8
					12.00 - 12.45 ... with frequent bioturbation	12.00-12.45	D36		
				(12.70)		12.70	D37		
					12.70 ... with rare off-white shell fragments (<2mm)	13.00-13.45	UT38	100 blows	100% Recovery
						13.45	D39		
					13.50 ... with occasional pockets of dark grey silty fine sand (<5mm)	13.70	D40		
					13.70 ... with occasional off-white shell fragments (<3mm)	14.00		N30	3, 5 / 6, 7, 8, 9
					14.00 ... with rare bioturbation	14.00-14.45	D41		
						14.70	D42		
					14.70 ... with 1No pyrite nodule (<4mm)	15.00-15.45	UT43	100 blows	100% Recovery
						15.45	D44		
					15.50 ... becoming very closely fissured	15.70	D45		
					15.70 ... with occasional pockets of light brown silty fine sand (<25mm)	16.00		N38	6, 7 / 7, 9, 10, 12
					16.00 ... becoming very stiff with occasional pockets of grey silty fine sand (<25mm) and bioturbation	16.00-16.45	D46		
						16.70	D47		
						17.00-17.45	UT48	100 blows	100% Recovery
						17.45	D49		
						17.70	D50		
					17.70 ... with rare off-white shell fragments (<2mm)	18.00		N50/ 285 mm	15, 10 / 10, 11, 16, 13
						18.00-18.45	D51		
			-10.15	19.00		19.00	D52		
				(1.00)	Very stiff, dark brown slightly sandy slightly micaceous silty CLAY with rare partings of light grey fine sand, off-white shell fragments (<2mm) and white flecks. (THAMES GROUP: LONDON CLAY FORMATION - A3ii)	19.50-19.95	UT53	100 blows	100% Recovery
25/02/21	6.80	Dry	-11.15	20.00	19.00 ... becoming slightly sandy with rare laminae of light grey fine sand, off-white shell fragments and foraminifera	19.90	D54		
					End of Borehole				

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Borehole No
BH2

Project
Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started / Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	Date Started 22/02/21 Date Completed 24/02/21	8.96	E 515700.52 N 170863.87	20.00m

Client
Richmond & Wandsworth Council

BOREHOLE SUMMARY

Top (m)	Base (m)	Type	Date Started	Date Ended	Crew	Logged By	Barrel Type	Core Bit	Plant Used/ Method	SPT Hammer Reference
0.00	1.20	IP	22/02/2021	22/02/2021	DR	JM			Hand Excavated	
1.20	20.00	CP	22/02/2021	25/02/2021	DR	JM			Dando 175	AR779

WATER STRIKES

Strike at (m)	Rise to (m)	Time to Rise (min)	Casing Depth (m)	Sealed (m)
19.30	19.30	20	8.10	

WATER ADDED

From (m)	To (m)
1.80	6.60

CHISELLING / SLOW DRILLING

From (m)	To (m)	Duration (hr)	Remarks
19.30	19.60	00:30	Claystone

HOLE

Depth (m)	Diameter (mm)
0.00	150
20.00	150

CASING

Depth (m)	Diameter (mm)
0.00	150
8.10	150

ROTARY RECOVERY

From (m)	To (m)	Duration (hr)	Recovery (%)

ROTARY FLUSH DETAIL

From (m)	To (m)	Flush Type	Flush Return (%)	Flush Colour

INSTALLATION DETAILS

Type	Diameter (mm)	Depth of Installation (m)	Top of Response Zone (m)	Bottom of Response Zone (m)	Date of Installation
GMP		6.60	1.00	6.60	24/02/2021

BACKFILL DETAILS

Top (m)	Bottom (m)	Material	Backfill Date	Remarks
0.00	0.30	Concrete	24/02/2021	Flush Cover
0.30	1.00	Bentonite Pellets		
1.00	6.60	Pea Shingle		
6.60	20.00	Bentonite Pellets		

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Borehole No **BH2**

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started	Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	22/02/21	24/02/21	8.96	E 515700.52 N 170863.87	20.00m

Client Richmond & Wandsworth Council

PROGRESS

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Remarks
22/02/21	0.00		Dry	
22/02/21	1.20		Dry	
22/02/21	1.80		Wet	... Water Added
22/02/21	2.50	2.20	1.00	
22/02/21	3.50	3.50	2.50	
22/02/21	4.50	4.50	4.00	
22/02/21	4.95	4.95	4.80	
23/02/21	4.95	4.95	4.30	... Water Added
23/02/21	5.20	5.20	4.00	
23/02/21	6.20	6.20	6.00	
23/02/21	7.50	7.50	6.10	
23/02/21	8.20	7.00	6.50	
23/02/21	9.50	8.10	Dry	
23/02/21	16.95	8.10	Dry	
24/02/21	16.95	8.10	Dry	
24/02/21	19.30	8.10	19.30	... Water Strike
24/02/21	19.50	8.10	Dry	
24/02/21	20.00	8.10	Dry	

SPT DETAILS

Type	Depth (m)	N Value	Blow Count / 75mm	Casing Depth (m)	Water Depth (m)
S	1.50	N14	5, 4 / 3, 3, 3, 5		Dry
C	2.50	N50/0.29	2, 3 / 7, 10, 15, 18	2.20	1.00
C	3.50	N50/0.19	2, 6 / 12, 22, 16	3.50	2.50
C	4.50	N10	1, 2 / 3, 2, 3, 2	4.50	4.00
C	5.50	N12	1, 2 / 3, 3, 3, 3	5.50	4.00
C	6.50	N12	4, 3 / 2, 3, 3, 4	6.50	6.00
S	8.50	N19	2, 3 / 3, 4, 5, 7	7.00	6.50
S	10.50	N24	2, 4 / 5, 6, 6, 7	8.10	Dry
S	12.50	N31	3, 5 / 6, 7, 8, 10	8.10	Dry
S	14.50	N33	3, 5 / 6, 8, 9, 10	8.10	Dry
S	16.50	N36	4, 5 / 7, 8, 10, 11	8.10	Dry
S	18.50	N41	5, 6 / 8, 10, 11, 12	8.10	Dry
C	19.50	N37	22, 3 / 7, 8, 10, 12	8.10	Dry

GENERAL REMARKS

1. Borehole blowing in the gravels.
2. Water seepage encountered at 19.30m depth with no rise.

KEY

SAMPLES
ES - Environmental Sample (Tub, Vial, Jar)
U - 100mm Diameter Undisturbed Sample
UT - 100mm Diameter Thin Wall Undisturbed Sample
U38 - 38mm Diameter Undisturbed Sample
D - Disturbed Sample, B-Bulk Sample, LB- Large Bulk Sample, BLK-Block Sample
C - Core Sample, W-Water Sample, R-Root Sample

AZCL:Assumed Zone of Core Loss

INSTALLATION DETAILS
SPIE - Standpipe Piezometer
SPGW - Groundwater Monitor Standpipe
SPG/GW - Gas / Groundwater Monitor Standpipe
VWP - Vibrating Wire Piezometer
ICM - Inclinometer

HOLE TYPES
IP -Inspection Pit, TP-Trial Pit TT - Trial Trench
CP -Cable Percussion, RC-Rotary Coring, R/S-Rotary/Sonic
DS -Dynamic Sampling, DS/R-Dynamic Sampling /Rotary
DC -Diamond Coring, CP/R-Cable Percussion Rotary follow on

TESTS S/C-SPT / CPT, V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds

Note: All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:46	AGS

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Borehole No BH2

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started / Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	22/02/21 / 24/02/21	8.96	E 515700.52 N 170863.87	20.00m

Client Richmond & Wandsworth Council

Method/Plant Used Cable Percussion

Sheet 1 of 2

Date	Casing	Water	Level (mOD)	Depth (Thickness)	Strata Description
22/02/21		Dry	8.86	0.10	Asphalt. (MADE GROUND)
			8.36	0.60 (0.50)	Light brown slightly clayey sandy GRAVEL with low flint and concrete cobble content. Gravel comprises angular to subrounded fine to coarse flint, brick and concrete fragments. Sand is fine to coarse. (MADE GROUND)
			7.96	1.00	
22/02/21		Dry	6.76	2.20 (1.20)	Soft, greenish grey slightly gravelly slightly sandy silty CLAY with occasional pockets of reddish brown silty fine sand (<25mm) and frequent dark grey flecks. Gravel is subangular to rounded fine to coarse flint. (MADE GROUND) 0.80 ... becoming very silty
22/02/21		Wet			Firm, orangish brown gravelly sandy clayey SILT. Gravel is subangular to subrounded fine to medium flint. Sand is fine to medium. (KEMPTON PARK GRAVEL MEMBER) 1.20 ... with 1No flint cobble
22/02/21	2.20	1.00			
22/02/21	3.50	2.50			Very dense, brown sandy angular to subrounded fine to coarse GRAVEL. Sand is fine to coarse. (KEMPTON PARK GRAVEL MEMBER) 2.50 - 2.95 ... becoming clayey with occasional pockets of orangish brown clay (<25mm) 3.50 ... becoming dense
22/02/21	4.50	4.00		(4.40)	4.50 ... becoming medium dense and very sandy
22/02/21	4.95	4.80			
23/02/21	4.95	4.30			
23/02/21	5.20	4.00			
23/02/21	6.20	6.00	2.36	6.60	6.20 ... with 2No flint cobbles
23/02/21	7.50	6.10			Firm to stiff, dark greyish brown CLAY with rare frequent light grey flecks and occasional dark grey staining. (THAMES GROUP: LONDON CLAY FORMATION - B) 7.00 ... with 1No off-white shell fragment (<4mm)
23/02/21	7.00	6.50			8.00 ... with rare off-white flecks 8.20 ... with rare dark grey staining
23/02/21	8.10	Dry			

SAMPLES & TESTS

Depth (m)	Type No	Test Result	Field Records
0.30	ES1		VOC 9.2ppm
0.30	B2		
0.60	ES3		VOC 6.4ppm
0.60	B4		
0.90-1.00	ES5		VOC 41.6ppm
0.90-1.00	B6		
1.20	ES7		VOC 42ppm
1.20-1.50	B8		
1.20	B9		
1.50		N14	5, 4 / 3, 3, 3, 5
1.50-1.95	D10		
2.00-2.50	ES11		VOC 36.3ppm
2.20	D12		
2.50		N50/ 290 mm	2, 3 / 7, 10, 15, 18
2.50	B13		
3.20	D14		
3.50		N50/ 190 mm	2, 6 / 12, 22, 16
3.50	B15		
4.20	D16		
4.50		N10	1, 2 / 3, 2, 3, 2
4.50	B17		
5.20	D18		
5.50		N12	1, 2 / 3, 3, 3, 3
5.50	B19		
6.20	D20		
6.50		N12	4, 3 / 2, 3, 3, 4
6.50	B21		
7.20	D22		
7.50-7.95	UT23	50 blows	100% Recovery
7.95	D24		
8.20	D25		
8.50		N19	2, 3 / 3, 4, 5, 7
8.50-8.95	D26		
9.20	D27		
9.50-9.95	UT28	80 blows	100% Recovery
9.95	D29		
10.20	D30		
10.50		N24	2, 4 / 5, 6, 6, 7
10.50-10.95	D31		

Instrument/ Backfill

Report ID: CONCEPT-CABLE PERCUSSION BOREHOLE || Project: 203521 ELLERAY HALL & NORTH LANE DEPOT.GPJ || Library: CONCEPT LIBRARY - 2021.GLB || Date: 9 April 2021

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Borehole No BH2

Project: Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started / Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	22/02/21 / 24/02/21	8.96	E 515700.52 N 170863.87	20.00m

Client	Method/Plant Used	Sheet
Richmond & Wandsworth Council	Cable Percussion	2 of 2

Date	Casing	Water	Level (mOD)	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records
						11.20	D32		
					11.20 ... with rare pockets of light grey silt (<15mm) and off-white shell fragments (<3mm)	11.50-11.95	UT33	100 blows	100% Recovery
						11.95	D34		
					12.00 ... with occasional light grey flecks and 1No pyrite nodule (<24mm)	12.20	D35		
					12.20 ... with frequent white flecks	12.50		N31	3, 5 / 6, 7, 8, 10
				(11.90)	12.50 ... with occasional pockets of light grey silt (<6mm)	12.50-12.95	D36		
						13.20	D37		
					13.20 ... with occasional dark grey staining and rare white flecks	13.50-13.95	UT38	100 blows	100% Recovery
						13.95	D39		
					14.00 ... with rare shell fragments (<10mm)	14.20	D40		
					14.20 ... with frequent pockets of light grey silt (<10mm) and white flecks	14.50		N33	3, 5 / 6, 8, 9, 10
					14.50 ... with occasional white flecks	14.50-14.95	D41		
						15.20	D42		
						15.50-15.95	UT43	100 blows	100% Recovery
						15.95	D44		
					16.00 ... with rare white flecks	16.20	D45		
						16.50		N36	4, 5 / 7, 8, 10, 11
						16.50-16.95	D46		
23/02/21	8.10	Dry							
24/02/21	8.10	Dry							
						17.20	D47		
						17.50-17.95	UT48	100 blows	100% Recovery
						17.95	D49		
					18.00 ... with rare pockets of light brown and light grey silty fine sand (<20mm)	18.20	D50		
			-9.54	18.50	18.20 ... with 1No off-white shell fragment (<2mm)	18.50		N41	5, 6 / 8, 10, 11, 12
					Very stiff, dark brown slightly sandy slightly micaceous silty CLAY with occasional partings of light grey silty fine sand, off-white shell fragments (<18mm) and white flecks. (THAMES GROUP: LONDON CLAY FORMATION - A3ii)	18.50-18.95	D51		
						19.20	D52		
24/02/21	8.10	19.30 (1)		(1.50)	19.20 ... with occasional pockets of light and dark grey silty fine sand (<8mm) and rare off-white shell fragments (<4mm)	19.50		N37	22, 3 / 7, 8, 10, 12
24/02/21	8.10	Dry				19.50-20.00	B53		
24/02/21	8.10	Dry	-11.04	20.00	19.30 - 19.60 ... with band of claystone				
					End of Borehole				

Report ID: CONCEPT-CABLE PERCUSSION BOREHOLE || Project: 203521 ELLERAY HALL & NORTH LANE DEPOT.GPJ || Library: CONCEPT LIBRARY - 2021.GLB || Date: 9 April 2021

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref:	AR779
Test Date:	11/06/2020
Report Date:	11/06/2020
File Name:	AR779.spt
Test Operator:	CM

Instrumented Rod Data

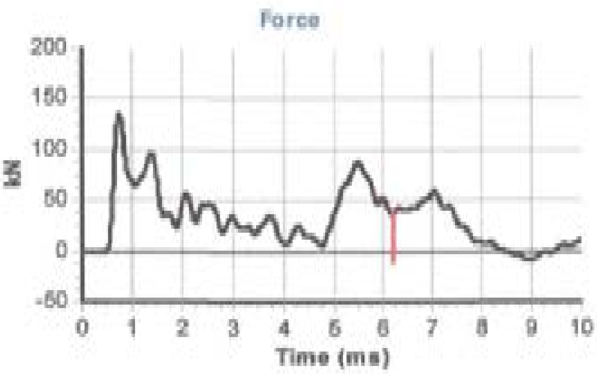
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	7080
Accelerometer No.2:	11609

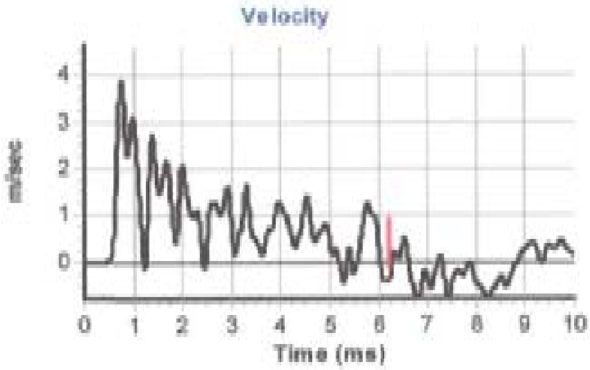
SPT Hammer Information

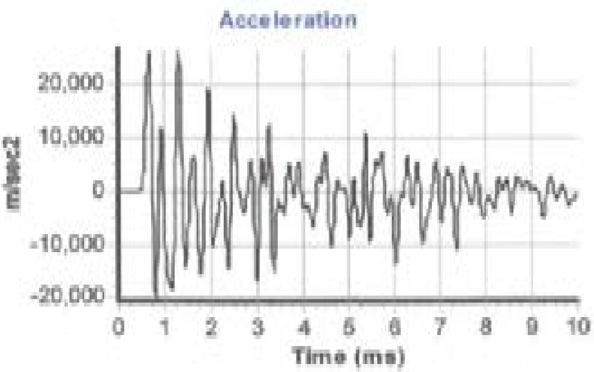
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	10.0

Comments / Location

CONCEPT ENGINEERING/71108







Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	347

Energy Ratio E_r (%): 73

Signed: C.McCLUSKEY
Title: FITTER

The recommended calibration interval is 12 months

9. DYNAMIC SAMPLING BOREHOLE LOGS

CONCEPT
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Borehole No **WS1**

Project				
Elleray Hall & North Lane Depot/East Car Park				
Job No: 20/3521	Date Started: 26/02/21; Date Completed: 26/02/21	Ground Level (mOD): 8.87	Co-Ordinates: E 515675.80 N 170903.02	Final Depth: 2.00m
Client: Richmond & Wandsworth Council			Method/ Plant Used: Dynamic Sampling	Sheet: 1 of 1

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
26/02/21		Dry	8.77		0.10	Asphalt. (MADE GROUND)	0.10-0.20 0.10-0.20	ES1 B2		VOC 10ppm	
			8.57		(0.20) 0.30	Dark grey sandy GRAVEL. Gravel comprises angular to subrounded fine to coarse flint and asphalt fragments. Sand is fine to coarse. (MADE GROUND)	0.30-0.40 0.30	ES3 B4		VOC 10.5ppm	
			8.32		(0.25) 0.55	Dark grey slightly gravelly slightly sandy CLAY with slight hydrocarbon odour and black staining. Gravel comprises angular to subrounded fine to coarse flint, brick and concrete fragments. Sand is fine to coarse. (MADE GROUND)	0.60-0.70 0.60-0.70	ES5 B6		VOC 9.7ppm	
			8.07		(0.25) 0.80	Greenish grey slightly gravelly sandy CLAY with occasional pockets of reddish brown silty fine sand (<25mm) and frequent dark grey staining. Gravel is angular to rounded fine to medium flint. Sand is fine to medium. (ALLUVIUM)	1.00-1.10 1.00-1.10	ES7 B8		VOC 4.8ppm	
26/02/21		Dry	6.97		(1.10) 1.90	Firm, yellowish brown slightly gravelly sandy clayey SILT with frequent pockets of dark grey silty fine to medium sand and occasional pockets of greenish grey silty clay (<25mm). Gravel is subangular to rounded fine to medium flint. (ALLUVIUM)	1.20 1.20-1.65	 D9	N8	2, 2 / 2, 2, 2, 2	
26/02/21	2.00	Dry	6.87		2.00	Medium dense to dense, orangish brown gravelly fine to medium SAND. Gravel is subangular to rounded fine to coarse flint. (KEMPTON PARK GRAVEL MEMBER)	2.00		N50/ 195 mm	9, 16 / 17, 22, 11	
						End of Borehole	2.00			... Borehole aborted at 2.00m depth (see Remarks)	

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	100

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Ø50mm gas and groundwater monitoring pipe installed at 2.00m, slotted between 1.00m and 2.00m depth.
5. Borehole backfilled with pea shingle between 2.00m and 1.00m, and bentonite pellets between 1.00m and and 0.20m depth. Concrete with a stopcock cover installed from 0.20m to ground level.
6. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49

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Borehole No
WS2

Project				
Elleray Hall & North Lane Depot/East Car Park				
Job No 20/3521	**Date Started** 25/02/21 **Date Completed** 25/02/21	**Ground Level (mOD)** 8.52	**Co-Ordinates** E 515656.41 N 170890.57	**Final Depth** 2.00m
Client Richmond & Wandsworth Council			**Method/ Plant Used** Dynamic Sampling	**Sheet** 1 of 1

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
25/02/21		Dry	8.37		0.15	Soft, dark brown silty CLAY with frequent rootlets. (TOPSOIL)	0.00-0.15 0.10	B1 ES2		VOC 0.7ppm	
			7.62		(0.75) 0.90	Dark brown silty gravelly fine to coarse SAND with frequent roots. Gravel comprises subrounded to rounded fine to coarse flint, brick and ceramic fragments. (MADE GROUND) 0.35 ... with rare shell fragments and 1No leather fragment (<100mm)	0.30 0.30 0.60 0.60	ES3 B4 ES5 B6		VOC 0.5ppm VOC 0.4ppm	
25/02/21		Dry	7.04		(0.58) 1.48	Firm, orangish brown mottled light brown gravelly silty CLAY. Gravel comprises angular to subrounded fine to coarse flint and brick fragments. (MADE GROUND) 1.20 ... becoming slightly gravelly and sandy with occasional dark grey staining. Sand is fine to medium	1.00-1.20 1.00-1.20 1.20 1.20	ES7 B8 D9	N16	VOC 0.4ppm 2, 3 / 2, 2, 5, 7	
25/02/21	2.00	Dry	6.52		(0.52) 2.00	Medium dense to dense, oangish brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium flint. (KEMPTON PARK GRAVEL MEMBER) 1.60 - 1.70 ... becoming greyish brown and very gravelly	2.00 2.00		N25/ 100 mm	17, 8 / ... Borehole aborted at 2.00m depth (see Remarks)	
						End of Borehole					

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	100

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Ø50mm gas and groundwater monitoring pipe installed at 2.00m, slotted between 1.00m and 2.00m depth.
5. Borehole backfilled with pea shingle between 2.00m and 1.00m, and bentonite pellets between 1.00m and and 0.20m depth. Concrete with a stopcock cover installed from 0.20m to ground level.
6. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: DH/JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49	AGS

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Borehole No WS3

Project
Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started / Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	Date Started 26/02/21; Date Completed 26/02/21	8.78	E 515675.58 N 170888.52	2.00m

Client	Method/ Plant Used	Sheet
Richmond & Wandsworth Council	Dynamic Sampling	1 of 1

PROGRESS			STRATA				SAMPLES & TESTS			Field Records	Instrument/ Backfill
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result		
26/02/21		Dry	8.68		0.10	Asphalt. (MADE GROUND)					
			8.28		(0.40) 0.50	Dark grey sandy GRAVEL with slight hydrocarbon odour. Gravel comprises angular to subrounded fine to coarse flint, brick and concrete fragments. Sand is fine to coarse. (MADE GROUND)	0.25 0.25	ES1 B2		VOC 12.6ppm	
			7.98		(0.30) 0.80	Dark greyish brown very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. (MADE GROUND)	0.60 0.60	ES3 B4		VOC 11.5ppm	
26/02/21		Dry	7.28		(0.70) 1.50	Stiff, greyish brown slightly gravelly slightly sandy CLAY with frequent pockets of yellowish brown silt (<30mm) and dark grey silty fine sand (<25mm). Gravel is subangular to subrounded fine to medium flint. (ALLUVIUM) 1.00 ... becoming orangish brown and sandy with frequent pockets of greenish grey clay (<30mm)	1.00 1.00 1.10 1.20 1.20-1.65 1.20	ES5 B6 ES7 D8 B9	N30	VOC 13ppm VOC 12.7ppm 1, 3 / 4, 6, 10, 10	
26/02/21	2.00	Dry	6.78		(0.50) 2.00	Medium dense to dense, greyish brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL MEMBER) 1.65 ... becoming yellowish brown 1.85 ... becoming reddish brown	2.00 2.00		N50/ 150 mm	12, 13 / 24, 26 ... Borehole aborted at 2.00m depth (see Remarks)	
						End of Borehole					

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	100

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Borehole backfilled with bentonite pellets upon completion.
5. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49	AGS

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Borehole No
WS4

Project Elleray Hall & North Lane Depot/East Car Park				
Job No 20/3521	**Date Started** 25/02/21 **Date Completed** 25/02/21	**Ground Level (mOD)** 8.74	**Co-Ordinates** E 515667.17 N 170880.60	**Final Depth** 2.00m
Client Richmond & Wandsworth Council			**Method/ Plant Used** Dynamic Sampling	**Sheet** 1 of 1

Date (PROGRESS)	Casing	Water	Level (mOD) (STRATA)	Legend	Depth (Thickness)	Strata Description	Depth (m) (SAMPLES & TESTS)	Type No	Test Result	Field Records	Instrument/ Backfill
25/02/21		Dry	8.64		0.10	Asphalt. (MADE GROUND)	0.10-0.20 0.10-0.20	ES1 B2		VOC 0.8ppm	
			8.24		(0.40) 0.50	Blackish grey sandy GRAVEL with slight hydrocarbon odour. Gravel comprises angular to subangular fine to coarse flint, brick, clinker and asphalt fragments. Sand is fine to coarse. (MADE GROUND) 0.25 ... becoming brown and very sandy	0.30 0.30	ES3 B4		VOC 0.6ppm	
			8.04		(0.20) 0.70	Greyish brown silty gravelly fine to coarse SAND. Gravel comprises subangular to subrounded fine to coarse flint and brick fragments. (MADE GROUND)	0.60 0.60	ES5 B6		VOC 0.5ppm	
25/02/21		Dry	7.40		(0.64) 1.34	Firm, orangish brown mottled light grey slightly gravelly sandy SILT. Gravel comprises angular to subrounded fine to coarse flint and brick fragments. Sand is fine to coarse. (MADE GROUND)	1.00-1.20 1.00-1.20 1.20 1.20-1.65	ES7 B8 D9	 N17/ 225 mm	VOC 0.4ppm 2, 4 / 5, 5, 7	
			6.94		(0.46) 1.80	Medium dense, yellowish brown silty gravelly fine to medium SAND. Gravel is angular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL MEMBER)					
25/02/21	2.00	Dry	6.74		(0.20) 2.00	Medium dense to dense, orangish brown slightly clayey sandy angular to rounded fine to coarse flint GRAVEL. Sand is fine to coarse. (KEMPTON PARK GRAVEL MEMBER)	2.00 2.00		N50/ 150 mm	16, 9 / 25, 25 ... Borehole aborted at 2.00m depth (see Remarks)	
						End of Borehole					

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	100

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Borehole backfilled with bentonite pellets upon completion.
5. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: DH	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49

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Borehole No **WS5**

Project
Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	26/02/21	9.01	E 515678.06 N 170872.74	2.00m
	Date Completed 26/02/21			

Client	Method/ Plant Used	Sheet
Richmond & Wandsworth Council	Dynamic Sampling	1 of 1

Date	Casing	Water	Level (mOD)	Depth (Thickness)	Strata Description	Sample Depth (m)	Type No	Test Result	Field Records
26/02/21		Dry	8.95	0.06	Asphalt. (MADE GROUND)				
			8.81	0.20	Light grey CONCRETE.	0.25	ES1		VOC 115.8ppm
						0.25	B2		
			8.26	0.75 (0.55)	Dark brownish grey sandy GRAVEL with strong hydrocarbon odour. Gravel comprises angular to subrounded fine to coarse flint and concrete fragments. Sand is fine to coarse. (MADE GROUND) 0.20 - 0.22 ... with pockets of black tar substance 0.50 ... becoming greyish brown and clayey. Gravel comprises subangular to subrounded fine to coarse flint, brick and concrete fragments	0.40	ES3		VOC 40.8ppm
						0.40	B4		
						0.70	ES5		VOC 32.6ppm
						0.70	B6		
			7.31	1.70 (0.95)	Orangish brown slightly gravelly sandy CLAY with occasional dark grey staining. Gravel comprises angular to rounded fine to coarse flint and brick fragments. Sand is fine to medium. (MADE GROUND)	1.00	ES7		VOC 20.7ppm
						1.00-1.20	B8		
26/02/21		Dry				1.20		N16	1, 2 / 2, 4, 5, 5
						1.20-1.65	D9		
						1.40-1.60	ES10		VOC 0.3ppm
26/02/21	2.00	Dry	7.01	2.00 (0.30)	Medium dense to dense, yellowish brown slightly silty slightly gravelly fine to medium SAND. Gravel is subangular to rounded fine to medium flint. (KEMPTON PARK GRAVEL MEMBER) 1.78 - 1.85 ... becoming gravelly	2.00		N50/ 135 mm	8, 17 / 23, 27
					End of Borehole	2.00			... Borehole aborted at 2.00m depth (see Remarks)

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	90

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Borehole backfilled with bentonite pellets upon completion.
5. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49

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Borehole No WS6

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started	Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	25/02/21	25/02/21	8.91	E 515719.98 N 170872.86	2.00m

Client	Method/Plant Used	Sheet
Richmond & Wandsworth Council	Dynamic Sampling	1 of 1

Date	Casing	Water	Level (mOD)	Depth (Thickness)	Strata Description	Sample Depth (m)	Type No	Test Result	Field Records
25/02/21		Dry	8.81	0.10	Asphalt. (MADE GROUND)	0.10-0.20 0.10-0.20	ES1 B2		VOC 7.2ppm
			8.56	(0.25) 0.35	Brown sandy GRAVEL with high flint, brick and concrete cobble content. Gravel comprises angular to subrounded fine to coarse flint, brick and concrete fragments. Sand is fine to coarse. (MADE GROUND)	0.30 0.30	ES3 B4		VOC 6.1ppm
			8.11	(0.45) 0.80	Greyish brown slightly gravelly sandy silty CLAY with rare pockets of orangish brown silt (<15mm). Gravel comprises angular to subrounded fine to coarse flint and brick fragments. (MADE GROUND)	0.60 0.60	ES5 B6		VOC 4.1ppm
						0.90-1.00 0.90-1.00	ES7 B8		VOC 9.2ppm
25/02/21		Dry	7.01	(1.10) 1.90	Firm, orangish brown slightly gravelly sandy clayey SILT with frequent dark grey staining. Gravel is angular to subrounded fine to medium flint. (ALLUVIUM) 1.50 ... with occasional pockets of yellowish brown silty fine to medium sand (<25mm)	1.20 1.20 1.20-1.65	 B10 D9	N9	1, 2 / 2, 2, 2, 3
25/02/21	2.00	Dry	6.91	2.00	Very dense to dense, brown clayey sandy subangular to rounded fine to coarse flint GRAVEL. (KEMPTON PARK GRAVEL MEMBER)	2.00		N50/ 245 mm	4, 4 / 11, 14, 18, 7
					End of Borehole	2.00			... Borehole aborted at 2.00m depth (see Remarks)

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	75

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Ø50mm gas and groundwater monitoring pipe installed at 2.00m, slotted between 1.00m and 2.00m depth.
5. Borehole backfilled with pea shingle between 2.00m and 1.00m, and bentonite pellets between 1.00m and and 0.20m depth. Concrete with a stopcock cover installed from 0.20m to ground level.
6. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49

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Borehole No **WS7**

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started	Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	24/02/21	24/02/21	8.98	E 515697.50 N 170866.14	2.00m

Client	Method/Plant Used	Sheet
Richmond & Wandsworth Council	Dynamic Sampling	1 of 1

Date	Casing	Water	Level (mOD)	Depth (Thickness)	Strata Description	Sample Depth (m)	Type No	Test Result	Field Records
24/02/21		Dry	8.88	0.10	Asphalt. (MADE GROUND)	0.10-0.30 0.10-0.30	ES1 B2		VOC 17.8ppm
			8.58	(0.30) 0.40	Dark grey sandy angular to subrounded fine to medium flint GRAVEL. Sand is fine to coarse. (MADE GROUND) 0.20 ... becoming light brown and slightly clayey	0.30 0.30	ES3 B4		VOC 6.5ppm
			8.08	(0.50) 0.90	Greyish brown slightly gravelly slightly sandy clayey SILT with low flint and brick cobble content and occasional roots. Gravel comprises angular to rounded fine to coarse flint, brick and concrete fragments. (MADE GROUND)	0.60 0.60 0.90 0.90	ES5 B6 ES7 B8		VOC 6.1ppm VOC 6.8ppm
24/02/21		Dry	7.23	(0.85) 1.75	Firm, orangish brown mottled greenish grey slightly gravelly sandy clayey SILT with occasional pockets of reddish brown silty fine sand (<25mm), frequent roots and occasional dark grey staining. Gravel is angular to subangular fine to medium flint. (ALLUVIUM) 1.40 ... with occasional pockets of greyish brown and yellowish brown fine sandy clay (<25mm)	1.20 1.20 1.20-1.65 1.40-1.70	 B10 D9 ES11	N10	1, 2 / 2, 2, 3, 3 VOC 7.7ppm
24/02/21	2.00	Dry	6.98	(0.25) 2.00	Very dense, brown slightly silty gravelly fine to medium SAND. Gravel is subangular to rounded fine to medium flint. (KEMPTON PARK GRAVEL MEMBER) 1.80 - 1.90 ... becoming slightly gravelly	2.00 2.00		N50/ 240 mm	7, 8 / 10, 14, 22, 4 ... Borehole aborted at 2.00m depth (see Remarks)
					End of Borehole				

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	100

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Borehole backfilled with bentonite pellets upon completion.
5. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: DH/JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49

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E-mail: si@conceptconsultants.co.uk

Borehole No **WS8**

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started / Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	Date Started 24/02/21 Date Completed 24/02/21	8.94	E 515704.96 N 170856.83	2.00m

Client	Method/Plant Used	Sheet
Richmond & Wandsworth Council	Dynamic Sampling	1 of 1

Date	Casing	Water	Level (mOD)	Depth (Thickness)	Strata Description	Sample Depth (m)	Type No	Test Result	Field Records
24/02/21		Dry	8.84	0.10	Asphalt. (MADE GROUND)	0.10-0.20 0.10-0.20	ES1 B2		VOC 4.9ppm
			8.34	(0.50) 0.60	Dark brown slightly gravelly slightly sandy clayey SILT. Gravel comprises angular to rounded fine to coarse flint, brick and concrete fragments. Sand is fine to medium. (MADE GROUND)	0.30-0.40 0.30-0.40 0.60-0.70 0.60-0.70	ES3 B4 ES5 B6		VOC 5.4ppm VOC 7.9ppm
			7.94	(0.40) 1.00	Greyish brown mottled orangish brown slightly gravelly slightly sandy silty CLAY with frequent dark grey staining. Gravel is angular to subrounded fine to coarse flint. (ALLUVIUM) 0.70 ... becoming orangish brown	0.90-1.00 0.90-1.00	ES7 B8		VOC 7.7ppm
24/02/21		Dry	7.39	(0.55) 1.55	Stiff to very stiff, orangish brown slightly gravelly sandy clayey SILT with occasional pockets of reddish brown silty fine sand (<25mm), frequent dark grey staining and 1No flint cobble. Gravel is subangular to rounded fine to medium flint. (ALLUVIUM)	1.20 1.20-1.30 1.20-1.65	 B10 D9	N34	1, 2 / 2, 12, 10, 10
			7.14	(0.25) 1.80	Dense, brown silty sandy angular to subrounded fine to medium flint GRAVEL. Sand is fine to coarse. (KEMPTON PARK GRAVEL MEMBER)				
24/02/21	2.00	Dry	6.94	(0.20) 2.00	Very dense, orangish brown slightly gravelly silty fine to medium SAND. Gravel is subangular to rounded fine to coarse flint. (KEMPTON PARK GRAVEL MEMBER) 1.95 ... becoming gravelly	2.00 2.00		N50/ 210 mm	9, 13 / 16, 16, 18 ... Borehole aborted at 2.00m depth (see Remarks)
					End of Borehole				

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	95

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Borehole backfilled with bentonite pellets upon completion.
5. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49

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Borehole No **WS9**

Project
Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started / Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	Date Started 24/02/21; Date Completed 24/02/21	9.00	E 515711.76 N 170835.53	2.00m

Client	Method/Plant Used	Sheet
Richmond & Wandsworth Council	Dynamic Sampling	1 of 1

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
24/02/21		Dry	8.90		0.10	Paving slabs (0.04m) over light yellowish brown slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium flint. (MADE GROUND)	0.10 0.10	ES1 B2		VOC 11.6ppm	
			8.35		(0.55) 0.65	Dark brown gravelly sandy silty CLAY. Gravel comprises angular to subrounded fine to coarse flint, brick, concrete and ceramic fragments. (MADE GROUND)	0.40 0.40 0.60 0.60	ES3 B4 ES5 B6		VOC 20.2ppm VOC 27.6ppm	
			8.00		(0.35) 1.00	Dark greyish brown mottled orangish brown slightly gravelly sandy silty CLAY with frequent dark grey staining. Gravel comprises angular to subrounded fine to coarse flint, brick and concrete fragments. Sand is fine to coarse. (MADE GROUND) 0.80 ... becoming orangish brown with frequent pockets of dark grey silt (<30mm)	0.90 0.90	ES7 B8		VOC 19.4ppm	
24/02/21		Dry	7.35		(0.65) 1.65	Orangish brown slightly gravelly sandy clayey SILT with occasional dark grey staining. Gravel is angular to subrounded fine to coarse flint. Sand is fine to medium. (ALLUVIUM) 1.50 ... becoming gravelly	1.20 1.20-1.65 1.40-1.70	 D9 ES10	N18	1, 1 / 1, 3, 7, 7 VOC 4.5ppm	
24/02/21	2.00	Dry	7.00		(0.35) 2.00	Very dense, brown silty sandy angular to subrounded fine to medium flint GRAVEL. Sand is fine to coarse. (KEMPTON PARK GRAVEL MEMBER)	2.00 2.00		N50/ 180 mm	12, 16 / 18, 20, 12 ... Borehole aborted at 2.00m depth (see Remarks)	
						End of Borehole					

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	100

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Borehole backfilled with bentonite pellets upon completion.
5. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49

AGS

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Borehole No WS10

Project Elleray Hall & North Lane Depot/East Car Park				
Job No 20/3521	**Date Started** 24/02/21 **Date Completed** 24/02/21	**Ground Level (mOD)** 9.09	**Co-Ordinates** E 515703.65 N 170828.35	**Final Depth** 2.00m
Client Richmond & Wandsworth Council			**Method/ Plant Used** Dynamic Sampling	**Sheet** 1 of 1

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (*Thickness*)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
24/02/21		Dry	8.99		0.10	Grass over dark brown slightly gravelly clayey fine to medium SAND with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse flint. (MADE GROUND)	0.10-0.20 0.10	ES1 B2		VOC 5.4ppm	
			8.34		(0.65) 0.75	Dark brown gravelly sandy silty CLAY. Gravel comprises angular to subrounded fine to coarse flint, brick, concrete and ceramic fragments. (MADE GROUND) 0.30 ... with 1No glass fragment (<10mm)	0.30 0.30 0.60 0.60 0.90 0.90	ES3 B4 ES5 B6 ES7 B8		VOC 8.4ppm VOC 6.8ppm VOC 6.7ppm	
24/02/21		Dry	7.29		(1.05) 1.80	Firm to stiff, orangish brown slightly gravelly sandy clayey SILT with frequent dark grey staining and occasional roots. Gravel is subangular to subrounded fine to coarse flint. (ALLUVIUM) 1.40 ... with occasional pockets of greyish brown and yellowish brown fine sandy clay (<25mm)	1.20 1.20 1.20-1.65	B10 D9	N15	1, 3 / 2, 2, 3, 8	
24/02/21	2.00	Dry	7.09		(0.20) 2.00	Very dense, brown slightly silty gravelly fine to coarse SAND. Gravel is angular to rounded fine to medium flint. (KEMPTON PARK GRAVEL MEMBER) 1.90 ... becoming slightly gravelly. Sand becoming fine to medium	2.00 2.00		N50/ 165 mm	7, 18 / 21, 22, 7 ... Borehole aborted at 2.00m depth (see Remarks)	
						End of Borehole					

DYNAMIC SAMPLING RECOVERY

From	To	Diameter (mm)	Recovery (%)
1.20	2.00	87	75

GENERAL REMARKS

1. An inspection pit was hand excavated to 1.20m depth prior to boring commencing.
2. Ø110mm casing used from ground level to 2.00m depth.
3. Borehole aborted at 2.00 depth due to refusal.
4. Ø50mm gas and groundwater monitoring pipe installed at 2.00m, slotted between 1.00m and 2.00m depth.
5. Borehole backfilled with pea shingle between 2.00m and 1.00m, and bentonite pellets between 1.00m and and 0.20m depth. Concrete with a stopcock cover installed from 0.20m to ground level.
6. SPT Hammer: 0037

KEY: Drilled By: ES-Environmental Sample (Tub, Vial, Jar), U38-38mm Diameter Undisturbed Sample, U36-36mm Diameter Undisturbed Sample D-Disturbed Sample, B-Bulk Sample, C-Core Sample, W-Water Sample, R-Root Sample AZCL: Assumed Zone of Core Loss
V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe, VOC-Volatile Organic Compounds
All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue: FINAL	Driller: DN	Logger: JM	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:49

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwood Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	0037
Test Date:	12/02/2021
Report Date:	12/02/2021
File Name:	0037.spt
Test Operator:	NPB

Instrumented Rod Data

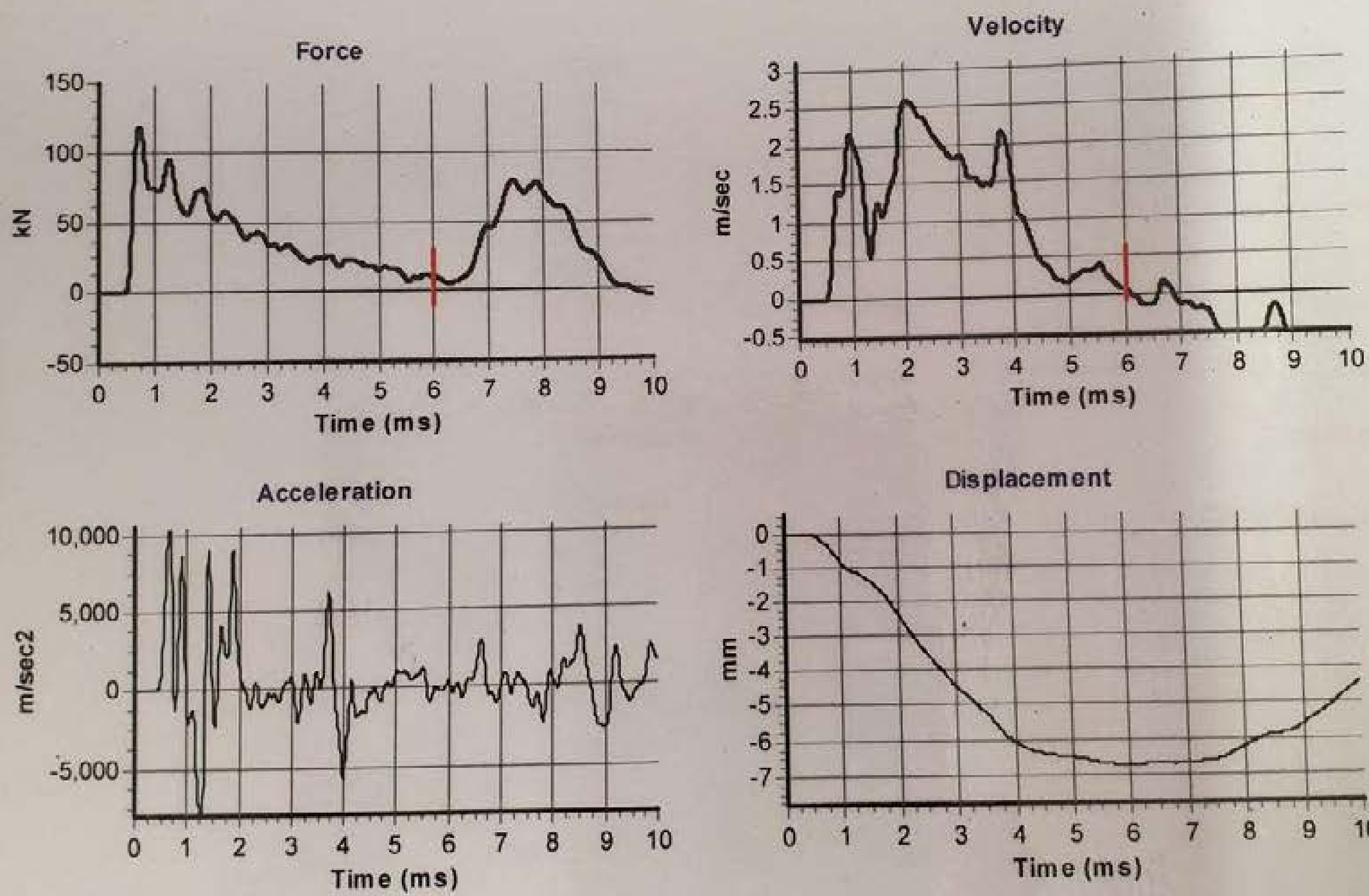
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.3
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	6458
Accelerometer No.2:	9607

SPT Hammer Information

Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	14.5

Comments / Location

CHARLWOODS



Calculations

Area of Rod A (mm2):	944
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	278

Energy Ratio E_r (%): 59

Signed: S Simmonds
Title: Field Operations Tech

The recommended calibration interval is 12 months

10. TRIAL TRENCH LOGS

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Trial Pit No STP1

Project Elleray Hall & North Lane Depot/East Car Park				
Job No 20/3521	**Date Started** 25/02/21 **Date Completed** 03/03/21	**Ground Level (mOD)** 9.00	**Co-Ordinates** E 515682.35 N 170882.26	**Final Depth** 2.60m
Client Richmond & Wandsworth Council			**Method/ Plant Used** Machine Excavated	**Sheet** 1 of 1

Water	Level (mOD)	Legend	Depth (Thickness)	Stata Description	Depth	Type No	Test Result	Field Records
	8.75		(0.25) 0.25	Asphalt (0.03m) over dark brown and dark grey sandy GRAVEL with a moderate hydrocarbon odour. Gravel is angular to subangular fine to coarse flint. Sand is fine to coarse. (MADE GROUND)	0.10 0.15	ES1		VOC 30.3ppm ... Concrete encountered on the NE side of the pit between 0.15m and 0.25m
	8.60		(0.15) 0.40	Greyish brown slightly silty sandy GRAVEL. Gravel comprises angular to subrounded fine to coarse flint, brick and concrete fragments. Sand is fine to coarse. (MADE GROUND)	0.25 0.25	ES2 B3		VOC 1ppm
	8.10		(0.50) 0.90	Brown slightly gravelly clayey silty fine to coarse SAND with occasional pockets of orangish brown clayey silt (<50mm) and shell fragments (<30mm). Gravel comprises angular to subrounded fine to coarse flint, brick, coal, glass, bone and ceramic fragments. (MADE GROUND)	0.70 0.70	ES4 B5		VOC 0.8ppm
	7.60		(0.50) 1.40	Firm, orangish brown mottled greyish brown slightly gravelly slightly sandy silty CLAY with occasional dark brown staining. Gravel comprises subangular to subrounded fine to coarse brick and glass fragments. (MADE GROUND)	1.30	B6		
	7.00		(0.60) 2.00	Yellowish brown slightly silty gravelly fine to coarse SAND. Gravel is subangular to subrounded fin to coarse flint. (KEMPTON PARK GRAVEL MEMBER)	1.60	B7		
	6.40		(0.60) 2.60	Yellowish brown sandy subangular to rounded fine to coarse flint GRAVEL. Sand is fine to coarse. (KEMPTON PARK GRAVEL MEMBER)	2.30	B8		
				End of Trial Pit				

GENERAL REMARKS

1. Weather was cloudy.
2. Pit was dry and unstable.
3. Pit dimensions: 2.50m x 0.35m x 2.60m deep.
4. Ø50mm slottled standpipe was installed to 2.60m depth to facilitate infiltration testing with pea shingle backfill between 2.60m and 1.20m depth. Pipe removed after testing.
5. Pit was backfilled with pea shingle between 2.60m and 1.20m depth and soil arisings between 1.20m and ground level after testing.

Issue: FINAL	Driller: DN	Logger: DH	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:48

CONCEPT
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Trial Pit No STP2

Project Elleray Hall & North Lane Depot/East Car Park

Job No	Date Started / Date Completed	Ground Level (mOD)	Co-Ordinates	Final Depth
20/3521	25/02/21 / 02/03/21	8.66	E 515664.87 N 170888.10	2.50m

Client	Method/Plant Used	Sheet
Richmond & Wandsworth Council	Machine Excavated	1 of 1

Water	Level (mOD)	Depth (Thickness)	Stata Description	Depth	Type No	Test Result	Field Records
	8.56	0.10	Brown sandy silty CLAY with frequent rootlets. (TOPSOIL)	0.00			... Asphalt encounted on the Eastern side of the pit between GL and 0.10m
	8.36	(0.20) 0.30	Dark brown and dark grey sandy GRAVEL with frequent rootlets and slight hydrocarbon odour. Gravel comprises angular to subrounded fine to coarse flint, brick and asphalt fragments. Sand is fine to coarse. (MADE GROUND) 0.20 ... becoming orangish brown	0.10 0.10	ES1 B2		VOC 1.5ppm
	8.06	(0.30) 0.60	Dark grey slightly gravelly sandy silty fine to coarse SAND with frequent orange and black staining. Gravel comprises angular to rounded fine to coarse flint and brick fragments. (MADE GROUND)	0.40 0.40	ES3 B4		VOC 2ppm
	7.66	(0.40) 1.00	Orangish brown clayey sandy GRAVEL with occasional roots. Gravel comprises subangular to subrounded fine to coarse flint, brick, glass and ceramic pipe fragments. Sand is fine to coarse. (MADE GROUND)	0.70 0.70 0.70	 ES5 B6		VOC 0.8ppm ... 2No Ø150-200mm clay pipes infilled with clay and roots encountered running diagonally at 0.70m depth
	6.86	(0.80) 1.80	Firm, orangish brown mottled light grey slightly gravelly sandy clayey SILT. Gravel is subangular to rounded fine to coarse flint. Sand is fine to coarse. (ALLUVIUM)	1.20	B7		
	6.16	(0.70) 2.50	Brownish orange sandy subangular to rounded fine to coarse flint GRAVEL. Sand is fine to coarse. (KEMPTON PARK GRAVEL MEMBER)	1.80 2.00 2.50	 B8 B9		... Pit collapsing at 1.80m depth
			End of Trial Pit				

GENERAL REMARKS

1. Weather was cloudy.
2. Pit was dry and unstable.
3. Pit dimensions: 2.50m x 0.35m x 2.50m deep.
4. Ø50mm slottled standpipe was installed to 2.50m depth to facilitate infiltration testing with pea shingle backfill between 2.50m and 1.40m depth. Pipe removed after testing.
5. Pit was backfilled with pea shingle between 2.50m and 1.40m depth and soil arisings between 1.40m and ground level after testing.

Issue: FINAL	Driller: DN	Logger: DH	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:48

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Trial Pit No STP3

Project Elleray Hall & North Lane Depot/East Car Park				
Job No 20/3521	**Date Started** 25/02/21 **Date Completed** 03/03/21	**Ground Level (mOD)** 8.93	**Co-Ordinates** E 515700.13 N 170858.01	**Final Depth** 2.70m
Client Richmond & Wandsworth Council			**Method/ Plant Used** Machine Excavated	**Sheet** 1 of 1

Water	Level (mOD)	Legend	Depth (Thickness)	Stata Description	Depth	Type No	Test Result	Field Records
			(0.50)	Asphalt (0.08m) over dark brown and dark grey silty gravelly fine to coarse SAND with rare shell fragments (<2mm). Gravel comprises angular to subrounded fine to coarse flint, brick, glass and ceramic fragments. (MADE GROUND)	0.20 0.20	ES1 B2		VOC 0.6ppm
	8.43		0.50		0.50 0.50	ES3 B4		VOC 0.5ppm
			(0.50)	Soft to firm, dark brown slightly gravelly slighty sandy silty CLAY with occasional pockets of brown fine to medium sand (<40mm). Gravel comprises angular to subrounded fine to coarse flint and brick fragments. (MADE GROUND)				
	7.93		1.00		1.00-1.10 1.00-1.10	ES5 B6		VOC 0.6ppm
			(1.20)	Yellowish brown slightly gravelly silty fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. (KEMPTON PARK GRAVEL MEMBER)				
				1.50 ... with occasional pockets of light grey sandy clayey silt (<300mm)	1.50	B7		
				2.00 ... becoming slightly silty and gravelly	2.00	B8		
	6.73		2.20					
			(0.50)	Yellowish brown very sandy subangular to rounded fine to coarse flint GRAVEL. Sand is fine to coarse. (KEMPTON PARK GRAVEL MEMBER)	2.50	B9		
	6.23		2.70					
				End of Trial Pit				

GENERAL REMARKS

1. Weather was cloudy.
2. Pit was dry and unstable.
3. Pit dimensions: 2.30m x 0.35m x 2.70m deep.
4. Ø50mm slottled standpipe was installed to 2.70m depth to facilitate infiltration testing with pea shingle backfill between 2.70m and 1.20m and gravelly sand arisings from 1.20m to 0.80m depth. Pipe removed after testing.
5. Pit was backfilled with pea shingle between 2.70m and 1.20m depth and soil arisings between 0.80m and ground level after testing.

Issue: FINAL	Driller: DN	Logger: DH	CHD: AN	APRV: OS	Log Print Date & Time: 09/04/2021 12:48

11. DYNAMIC CONE PENETROMETER (DCP) RESULTS

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.001	Surface Type:	Thin bituminous seal
Direction:	WS1	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	150	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	240	0.00	26	1	26	419	13.00
2	1	1	255	15.00	27	1	27	436	17.00
3	1	2	264	9.00	28	1	28	463	27.00
4	1	3	273	9.00	29	1	29	495	32.00
5	1	4	279	6.00	30	1	30	539	44.00
6	1	5	285	6.00	31	1	31	579	40.00
7	1	6	294	9.00	32	1	32	610	31.00
8	1	7	302	8.00	33	1	33	645	35.00
9	1	8	308	6.00	34	1	34	685	40.00
10	1	9	311	3.00	35	1	35	730	45.00
11	1	10	318	7.00	36	1	36	770	40.00
12	1	11	323	5.00	37	1	37	810	40.00
13	1	12	328	5.00	38	0	37	20	--
14	1	13	330	2.00	39	1	38	70	50.00
15	1	14	333	3.00	40	1	39	109	39.00
16	1	15	338	5.00	41	1	40	142	33.00
17	1	16	343	5.00	42	1	41	173	31.00
18	1	17	347	4.00	43	1	42	201	28.00
19	1	18	355	8.00	44	1	43	230	29.00
20	1	19	361	6.00	45	1	44	261	31.00
21	1	20	369	8.00	46	1	45	289	28.00
22	1	21	376	7.00	47	1	46	321	32.00
23	1	22	381	5.00	48	1	47	352	31.00
24	2	24	396	7.50	49	1	48	381	29.00
25	1	25	406	10.00	50	1	49	405	24.00
51	1	50	428	23.00					
52	1	51	449	21.00					
53	1	52	465	16.00					
54	1	53	484	19.00					
55	1	54	502	18.00					
56	1	55	520	18.00					
57	1	56	536	16.00					
58	1	57	551	15.00					
59	1	58	571	20.00					
60	1	59	595	24.00					
61	1	60	620	25.00					
62	1	61	645	25.00					
63	1	62	669	24.00					
64	1	63	690	21.00					
65	1	64	720	30.00					
66	1	65	746	26.00					
67	1	66	774	28.00					
68	1	67	797	23.00					
69	1	68	816	19.00					
70	1	69	835	19.00					
71	1	70	851	16.00					
72	1	71	867	16.00					
73	1	72	883	16.00					
74	1	73	983	100.00					

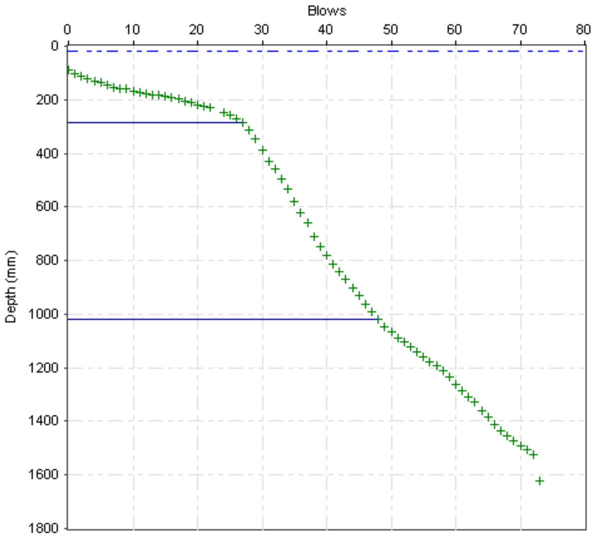
Point 38 Extension Rod Added

DCP Layer Strength Analysis Report

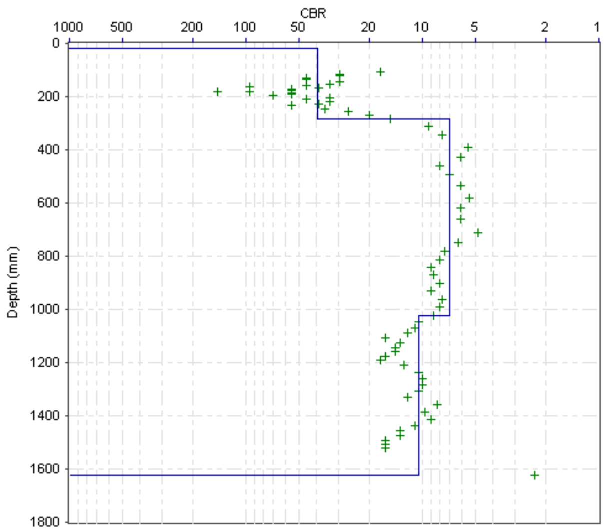
Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.001	Surface Type:	Thin bituminous seal
Direction:	WS1	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	150	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

Layer Boundaries: Chainage 0.001



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	6.92	39	266	286
2	35.00	7	735	1021
3	24.08	10	602	1623

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by ....

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.002	Surface Type:	Thin bituminous seal
Direction:	WS2	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	0	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

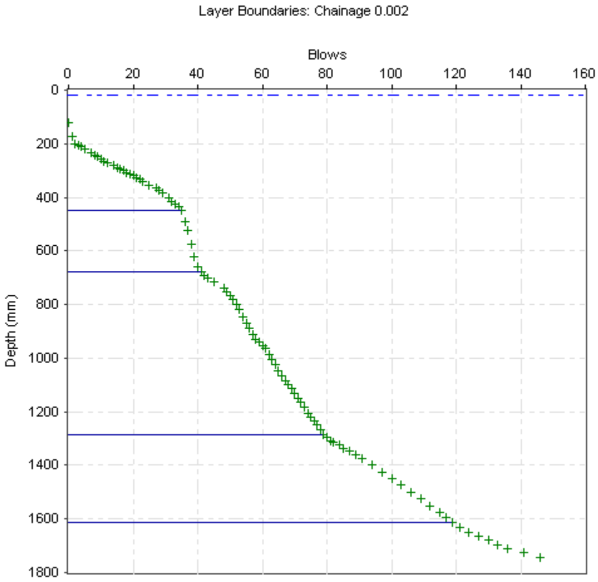
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	120	0.00	26	1	29	385	10.00
2	1	1	175	55.00	27	2	31	400	7.50
3	1	2	200	25.00	28	1	32	415	15.00
4	1	3	205	5.00	29	1	33	425	10.00
5	1	4	210	5.00	30	1	34	435	10.00
6	1	5	220	10.00	31	1	35	450	15.00
7	2	7	235	7.50	32	1	36	490	40.00
8	1	8	245	10.00	33	1	37	525	35.00
9	1	9	250	5.00	34	1	38	575	50.00
10	1	10	255	5.00	35	1	39	620	45.00
11	1	11	265	10.00	36	1	40	660	40.00
12	1	12	270	5.00	37	1	41	680	20.00
13	2	14	280	5.00	38	1	42	690	10.00
14	1	15	290	10.00	39	1	43	700	10.00
15	1	16	295	5.00	40	2	45	715	7.50
16	1	17	300	5.00	41	3	48	740	8.33
17	1	18	310	10.00	42	1	49	755	15.00
18	1	19	315	5.00	43	1	50	765	10.00
19	1	20	320	5.00	44	1	51	780	15.00
20	1	21	325	5.00	45	1	52	800	20.00
21	1	22	330	5.00	46	1	53	820	20.00
22	1	23	340	10.00	47	1	54	845	25.00
23	2	25	355	7.50	48	1	55	870	25.00
24	2	27	365	5.00	49	0	55	65	--
25	1	28	375	10.00	50	1	56	85	20.00
51	1	57	105	20.00	76	1	82	510	5.00
52	1	58	125	20.00	77	2	84	520	5.00
53	1	59	135	10.00	78	1	85	530	10.00
54	1	60	150	15.00	79	2	87	540	5.00
55	1	61	160	10.00	80	2	89	555	7.50
56	1	62	180	20.00	81	2	91	570	7.50
57	1	63	200	20.00	82	3	94	595	8.33
58	1	64	220	20.00	83	3	97	620	8.33
59	1	65	240	20.00	84	3	100	645	8.33
60	1	66	260	20.00	85	3	103	670	8.33
61	1	67	280	20.00	86	3	106	695	8.33
62	1	68	295	15.00	87	3	109	720	8.33
63	1	69	310	15.00	88	3	112	745	8.33
64	1	70	325	15.00	89	3	115	770	8.33
65	1	71	345	20.00	90	2	117	790	10.00
66	1	72	360	15.00	91	2	119	810	10.00
67	1	73	380	20.00	92	2	121	825	7.50
68	1	74	400	20.00	93	3	124	845	6.67
69	1	75	415	15.00	94	3	127	860	5.00
70	1	76	430	15.00	95	3	130	875	5.00
71	1	77	445	15.00	96	3	133	890	5.00
72	1	78	460	15.00	97	3	136	905	5.00
73	1	79	480	20.00	98	5	141	920	3.00
74	1	80	490	10.00	99	5	146	940	4.00
75	1	81	505	15.00					

Point 49 Extension Rod Added

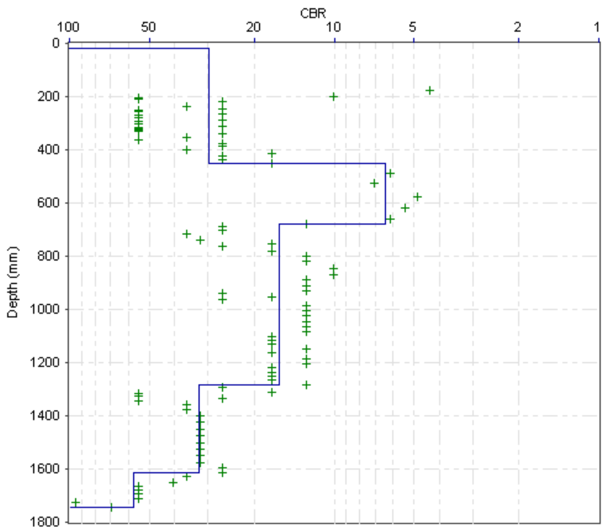
DCP Layer Strength Analysis Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.002	Surface Type:	Thin bituminous seal
Direction:	WS2	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	0	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	8.95	30	430	450
2	38.33	6	230	680
3	15.92	16	605	1285
4	8.25	32	330	1615
5	4.81	57	130	1745

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by ....

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.003	Surface Type:	Thin bituminous seal
Direction:	WS3	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	200	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	200	0.00	26	1	38	130	25.00
2	7	7	210	1.43	27	1	39	150	20.00
3	3	10	220	3.33	28	1	40	175	25.00
4	3	13	234	4.67	29	1	41	196	21.00
5	3	16	245	3.67	30	1	42	210	14.00
6	2	18	251	3.00	31	1	43	221	11.00
7	2	20	262	5.50	32	1	44	229	8.00
8	1	21	275	13.00	33	1	45	237	8.00
9	1	22	291	16.00	34	1	46	244	7.00
10	1	23	340	49.00	35	2	48	249	2.50
11	1	24	376	36.00	36	1	49	253	4.00
12	1	25	400	24.00	37	1	50	257	4.00
13	1	26	453	53.00	38	1	51	265	8.00
14	1	27	512	59.00	39	1	52	272	7.00
15	1	28	569	57.00	40	1	53	280	8.00
16	1	29	625	56.00	41	1	54	287	7.00
17	1	30	675	50.00	42	1	55	287	0.00
18	1	31	705	30.00	43	1	56	292	5.00
19	1	32	740	35.00	44	1	57	300	8.00
20	1	33	783	43.00	45	1	58	309	9.00
21	1	34	830	47.00	46	1	59	316	7.00
22	1	35	865	35.00	47	1	60	322	6.00
23	0	35	20	--	48	1	61	326	4.00
24	1	36	85	65.00	49	1	62	329	3.00
25	1	37	105	20.00	50	1	63	332	3.00
51	1	64	336	4.00	76	2	125	575	6.00
52	1	65	340	4.00	77	1	126	580	5.00
53	1	66	344	4.00	78	2	128	590	5.00
54	2	68	349	2.50	79	3	131	600	3.33
55	3	71	360	3.67	80	2	133	615	7.50
56	3	74	370	3.33	81	2	135	625	5.00
57	2	76	380	5.00	82	1	136	635	10.00
58	3	79	390	3.33	83	2	138	647	6.00
59	3	82	401	3.67	84	1	139	655	8.00
60	2	84	411	5.00	85	1	140	665	10.00
61	2	86	419	4.00	86	1	141	675	10.00
62	3	89	429	3.33	87	1	142	685	10.00
63	3	92	440	3.67	88	2	144	700	7.50
64	3	95	450	3.33	89	1	145	709	9.00
65	3	98	460	3.33	90	1	146	715	6.00
66	3	101	470	3.33	91	2	148	755	20.00
67	3	104	481	3.67					
68	3	107	490	3.00					
69	3	110	500	3.33					
70	2	112	510	5.00					
71	2	114	519	4.50					
72	3	117	531	4.00					
73	2	119	542	5.50					
74	2	121	552	5.00					
75	2	123	563	5.50					

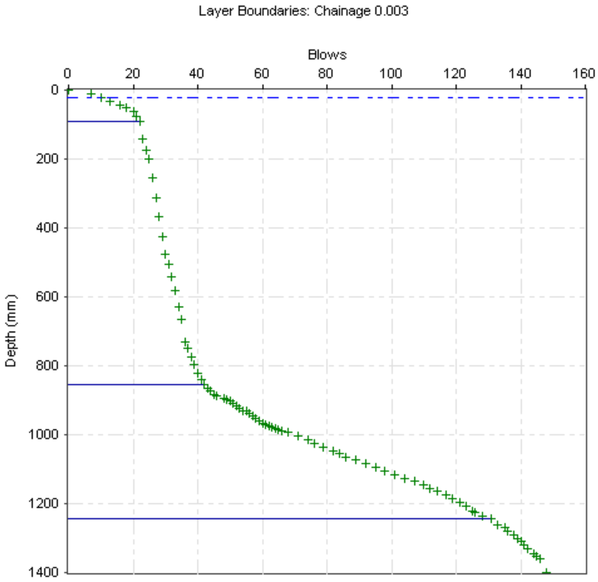
Remarks: Start at 260mm
Point 23 Extension Rod Added

UK DCP V3.1

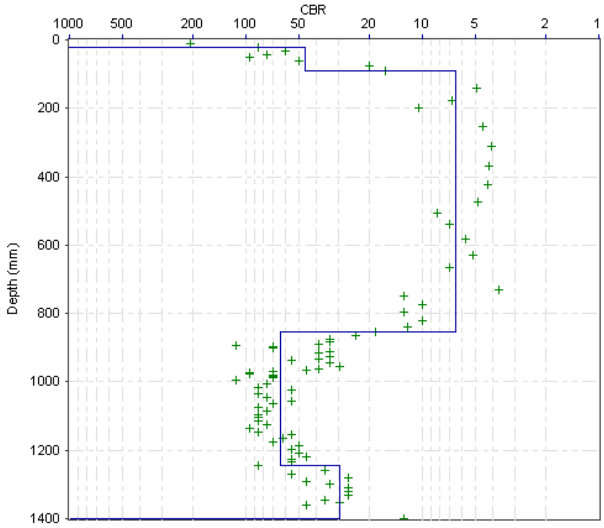
DCP Layer Strength Analysis Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.003	Surface Type:	Thin bituminous seal
Direction:	WS3	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	200	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	5.92	46	71	91
2	38.20	6	764	855
3	4.38	63	390	1245
4	9.12	29	155	1400

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by ....

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.004	Surface Type:	Thin bituminous seal
Direction:	WS4	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	180	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	260	0.00	26	1	105	670	20.00
2	1	1	270	10.00	27	1	106	695	25.00
3	1	2	285	15.00	28	1	107	720	25.00
4	2	4	300	7.50	29	1	108	765	45.00
5	2	6	315	7.50	30	1	109	825	60.00
6	3	9	330	5.00	31	0	109	30	--
7	5	14	350	4.00	32	1	110	90	60.00
8	5	19	360	2.00	33	1	111	145	55.00
9	5	24	375	3.00	34	1	112	195	50.00
10	5	29	390	3.00	35	1	113	245	50.00
11	5	34	405	3.00	36	1	114	290	45.00
12	5	39	420	3.00	37	1	115	320	30.00
13	5	44	440	4.00	38	1	116	355	35.00
14	5	49	455	3.00	39	1	117	385	30.00
15	5	54	475	4.00	40	1	118	405	20.00
16	5	59	490	3.00	41	1	119	425	20.00
17	5	64	505	3.00	42	1	120	440	15.00
18	10	74	520	1.50	43	1	121	460	20.00
19	5	79	535	3.00	44	1	122	475	15.00
20	5	84	550	3.00	45	1	123	490	15.00
21	5	89	565	3.00	46	2	125	510	10.00
22	10	99	590	2.50	47	3	128	535	8.33
23	2	101	610	10.00	48	2	130	555	10.00
24	2	103	635	12.50	49	3	133	580	8.33
25	1	104	650	15.00	50	3	136	595	5.00
51	3	139	615	6.67					
52	3	142	615	0.00					
53	3	145	635	6.67					
54	5	150	660	5.00					
55	5	155	690	6.00					
56	5	160	715	5.00					
57	3	163	735	6.67					
58	5	168	760	5.00					
59	5	173	785	5.00					
60	3	176	805	6.67					
61	4	180	830	6.25					
62	3	183	850	6.67					
63	2	185	870	10.00					

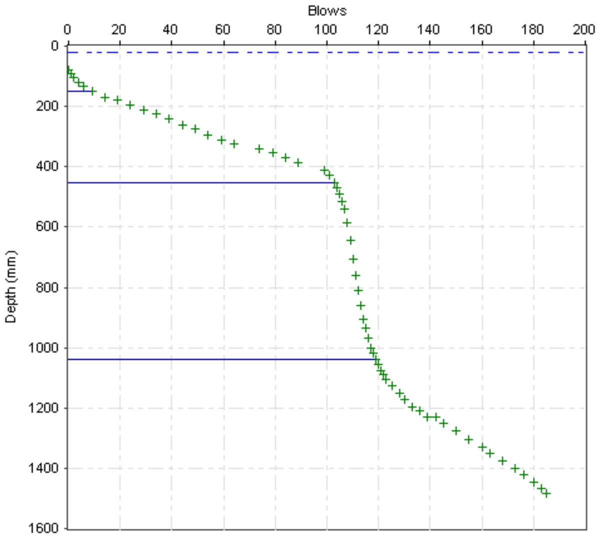
Point 31 Extension Rod Added

DCP Layer Strength Analysis Report

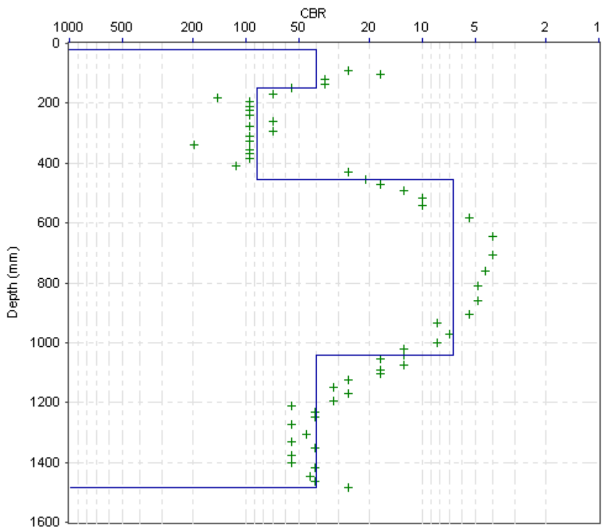
Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.004	Surface Type:	Thin bituminous seal
Direction:	WS4	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	180	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

Layer Boundaries: Chainage 0.004



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	6.82	40	130	150
2	3.24	87	305	455
3	36.56	7	585	1040
4	6.74	40	445	1485

CBR Relationship:

TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by ....

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.005	Surface Type:	Thin bituminous seal
Direction:	WS5	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	200	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	310	0.00	26	2	97	790	15.00
2	1	1	335	25.00	27	1	98	810	20.00
3	1	2	345	10.00	28	1	99	835	25.00
4	3	5	355	3.33	29	1	100	870	35.00
5	3	8	365	3.33	30	0	100	65	--
6	5	13	380	3.00	31	1	101	100	35.00
7	5	18	390	2.00	32	1	102	135	35.00
8	5	23	405	3.00	33	1	103	165	30.00
9	5	28	415	2.00	34	1	104	195	30.00
10	5	33	430	3.00	35	1	105	225	30.00
11	5	38	450	4.00	36	1	106	250	25.00
12	5	43	475	5.00	37	1	107	275	25.00
13	3	46	490	5.00	38	1	108	305	30.00
14	3	49	510	6.67	39	1	109	330	25.00
15	5	54	525	3.00	40	1	110	360	30.00
16	10	64	545	2.00	41	1	111	390	30.00
17	5	69	560	3.00	42	1	112	415	25.00
18	3	72	585	8.33	43	1	113	445	30.00
19	5	77	610	5.00	44	1	114	470	25.00
20	3	80	645	11.67	45	1	115	500	30.00
21	3	83	665	6.67	46	1	116	530	30.00
22	3	86	685	6.67	47	1	117	560	30.00
23	3	89	705	6.67	48	1	118	580	20.00
24	3	92	730	8.33	49	1	119	605	25.00
25	3	95	760	10.00	50	1	120	625	20.00
51	1	121	650	25.00	76	5	164	1065	3.00
52	1	122	675	25.00	77	5	169	1085	4.00
53	1	123	700	25.00	78	5	174	1100	3.00
54	1	124	720	20.00	79	5	179	1120	4.00
55	1	125	735	15.00	80	5	184	1135	3.00
56	1	126	750	15.00					
57	1	127	770	20.00					
58	1	128	780	10.00					
59	1	129	795	15.00					
60	1	130	810	15.00					
61	1	131	830	20.00					
62	1	132	845	15.00					
63	1	133	860	15.00					
64	1	134	875	15.00					
65	1	135	895	20.00					
66	1	136	905	10.00					
67	1	137	915	10.00					
68	1	138	925	10.00					
69	1	139	950	25.00					
70	1	140	970	20.00					
71	3	143	985	5.00					
72	3	146	1000	5.00					
73	3	149	1015	5.00					
74	5	154	1035	4.00					
75	5	159	1050	3.00					

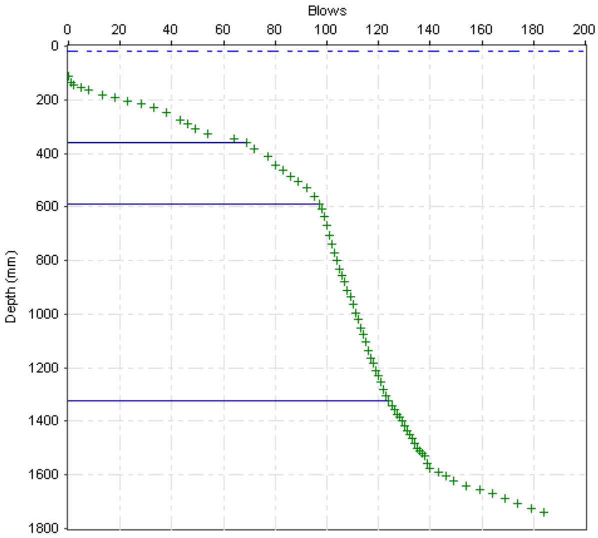
Remarks: Start at 220mm
Point 30 Extension Rod Added

DCP Layer Strength Analysis Report

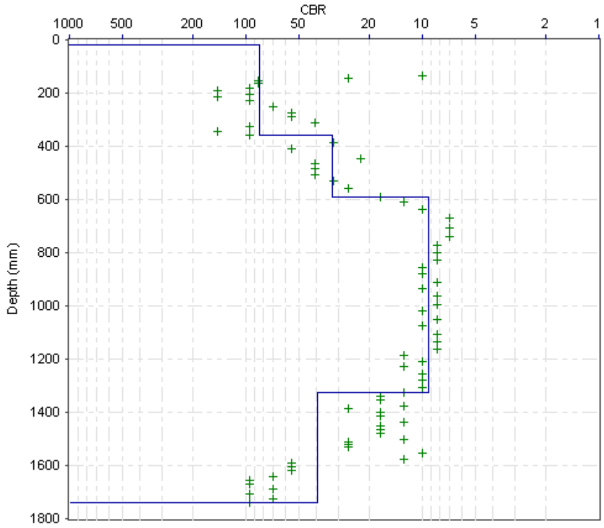
Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.005	Surface Type:	Thin bituminous seal
Direction:	WS5	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	200	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

Layer Boundaries: Chainage 0.005



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	3.37	84	340	360
2	8.21	33	230	590
3	27.22	9	735	1325
4	6.92	39	415	1740

CBR Relationship:

TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by ....

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.006	Surface Type:	Thin bituminous seal
Direction:	WS6	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	160	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

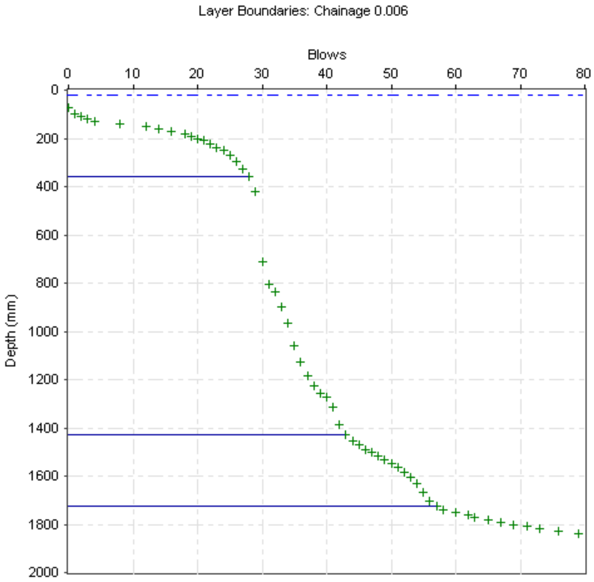
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	235	0.00	26	1	33	275	65.00
2	1	1	260	25.00	27	1	34	340	65.00
3	1	2	270	10.00	28	1	35	435	95.00
4	1	3	280	10.00	29	1	36	500	65.00
5	1	4	290	10.00	30	1	37	560	60.00
6	4	8	300	2.50	31	1	38	600	40.00
7	4	12	310	2.50	32	1	39	630	30.00
8	2	14	320	5.00	33	1	40	650	20.00
9	2	16	330	5.00	34	1	41	690	40.00
10	2	18	340	5.00	35	1	42	760	70.00
11	1	19	350	10.00	36	1	43	805	45.00
12	1	20	360	10.00	37	1	44	830	25.00
13	1	21	370	10.00	38	1	45	845	15.00
14	1	22	385	15.00	39	1	46	865	20.00
15	1	23	400	15.00	40	1	47	875	10.00
16	1	24	410	10.00	41	1	48	890	15.00
17	1	25	430	20.00	42	1	49	910	20.00
18	1	26	455	25.00	43	1	50	925	15.00
19	1	27	485	30.00	44	1	51	940	15.00
20	1	28	520	35.00	45	1	52	960	20.00
21	1	29	580	60.00	46	1	53	980	20.00
22	1	30	870	290.00	47	1	54	1005	25.00
23	0	30	85	--	48	1	55	1040	35.00
24	1	31	180	95.00	49	1	56	1080	40.00
25	1	32	210	30.00	50	1	57	1100	20.00
51	1	58	1115	15.00					
52	2	60	1125	5.00					
53	2	62	1135	5.00					
54	1	63	1145	10.00					
55	2	65	1155	5.00					
56	2	67	1165	5.00					
57	2	69	1175	5.00					
58	2	71	1185	5.00					
59	2	73	1195	5.00					
60	3	76	1205	3.33					
61	3	79	1215	3.33					

Point 23 Extension Rod Added

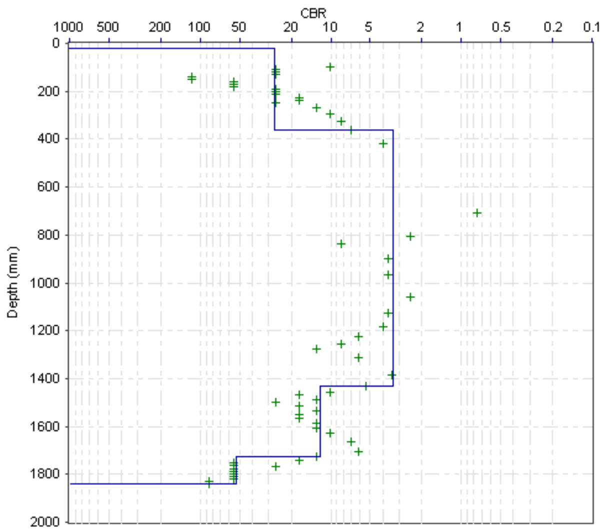
DCP Layer Strength Analysis Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.006	Surface Type:	Thin bituminous seal
Direction:	WS6	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	160	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	9.74	27	340	360
2	71.33	3	1070	1430
3	21.07	12	295	1725
4	5.23	53	115	1840

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by ....

UK DCP V3.1

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.007	Surface Type:	Thin bituminous seal
Direction:	WS7	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	200	Thickness (mm):	
Test Date:	02/03/2021	Strength Coeff.:	

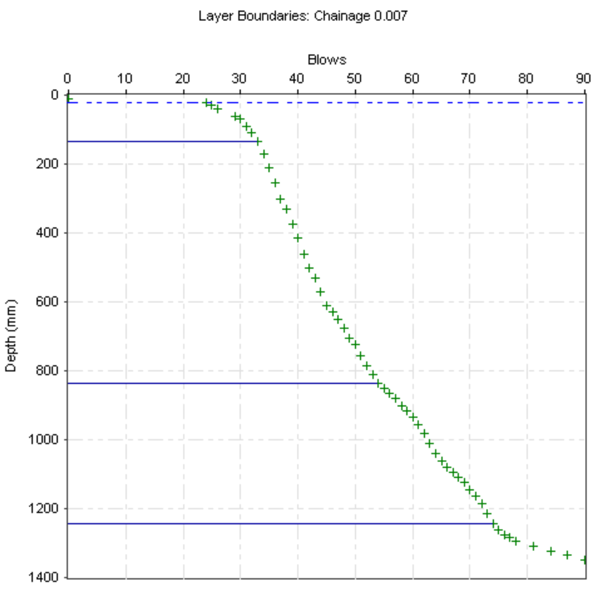
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	210	0.00	26	1	49	110	30.00
2	24	24	220	0.42	27	1	50	130	20.00
3	1	25	230	10.00	28	1	51	160	30.00
4	1	26	240	10.00	29	1	52	190	30.00
5	3	29	260	6.67	30	1	53	215	25.00
6	1	30	270	10.00	31	1	54	240	25.00
7	1	31	290	20.00	32	1	55	255	15.00
8	1	32	310	20.00	33	1	56	270	15.00
9	1	33	335	25.00	34	1	57	285	15.00
10	1	34	370	35.00	35	1	58	305	20.00
11	1	35	410	40.00	36	1	59	320	15.00
12	1	36	455	45.00	37	1	60	340	20.00
13	1	37	500	45.00	38	1	61	360	20.00
14	1	38	530	30.00	39	1	62	385	25.00
15	1	39	575	45.00	40	1	63	415	30.00
16	1	40	615	40.00	41	1	64	445	30.00
17	1	41	660	45.00	42	1	65	465	20.00
18	1	42	700	40.00	43	1	66	485	20.00
19	1	43	730	30.00	44	1	67	500	15.00
20	1	44	770	40.00	45	1	68	515	15.00
21	1	45	810	40.00	46	1	69	530	15.00
22	0	45	15	--	47	1	70	550	20.00
23	1	46	35	20.00	48	1	71	570	20.00
24	1	47	55	20.00	49	1	72	590	20.00
25	1	48	80	25.00	50	1	73	620	30.00
51	1	74	650	30.00					
52	1	75	665	15.00					
53	1	76	680	15.00					
54	1	77	690	10.00					
55	1	78	700	10.00					
56	3	81	715	5.00					
57	3	84	730	5.00					
58	3	87	740	3.33					
59	3	90	755	5.00					

Remarks: Start at 310mm
Point 22 Extension Rod Added

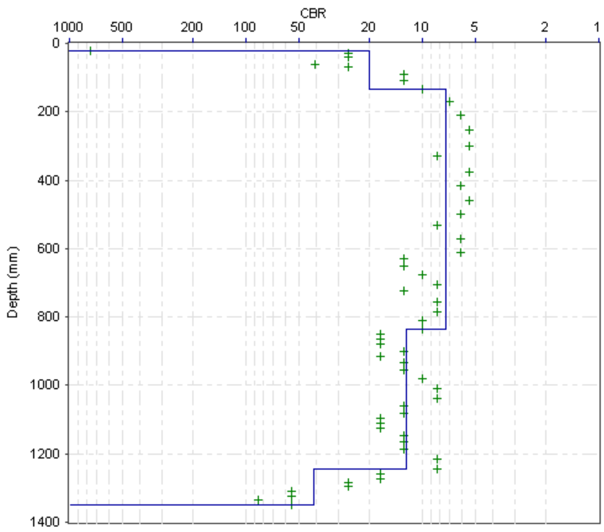
DCP Layer Strength Analysis Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.007	Surface Type:	Thin bituminous seal
Direction:	WS7	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	200	Thickness (mm):	
Test Date:	02/03/2021	Strength Coeff.:	



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	13.13	20	115	135
2	33.33	7	700	835
3	20.50	12	410	1245
4	6.56	41	105	1350

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by ....

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.008	Surface Type:	Thin bituminous seal
Direction:	WS8	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	145	Thickness (mm):	
Test Date:	01/03/2021	Strength Coeff.:	

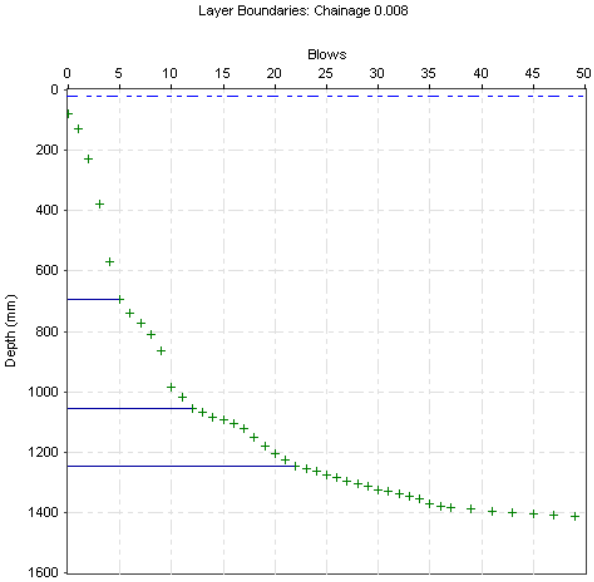
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	225	0.00	26	1	24	285	10.00
2	1	1	275	50.00	27	1	25	295	10.00
3	1	2	375	100.00	28	1	26	305	10.00
4	1	3	525	150.00	29	1	27	315	10.00
5	1	4	715	190.00	30	1	28	325	10.00
6	1	5	840	125.00	31	1	29	335	10.00
7	1	6	885	45.00	32	1	30	345	10.00
8	1	7	920	35.00	33	1	31	350	5.00
9	1	8	955	35.00	34	1	32	360	10.00
10	1	9	1010	55.00	35	1	33	365	5.00
11	1	10	1130	120.00	36	1	34	375	10.00
12	1	11	1165	35.00	37	1	35	390	15.00
13	0	11	40	--	38	1	36	400	10.00
14	1	12	75	35.00	39	1	37	405	5.00
15	1	13	90	15.00	40	2	39	410	2.50
16	1	14	105	15.00	41	2	41	415	2.50
17	1	15	115	10.00	42	2	43	420	2.50
18	1	16	125	10.00	43	2	45	425	2.50
19	1	17	140	15.00	44	2	47	430	2.50
20	1	18	170	30.00	45	2	49	435	2.50
21	1	19	200	30.00					
22	1	20	225	25.00					
23	1	21	245	20.00					
24	1	22	265	20.00					
25	1	23	275	10.00					

Point 13 Extension Rod Added

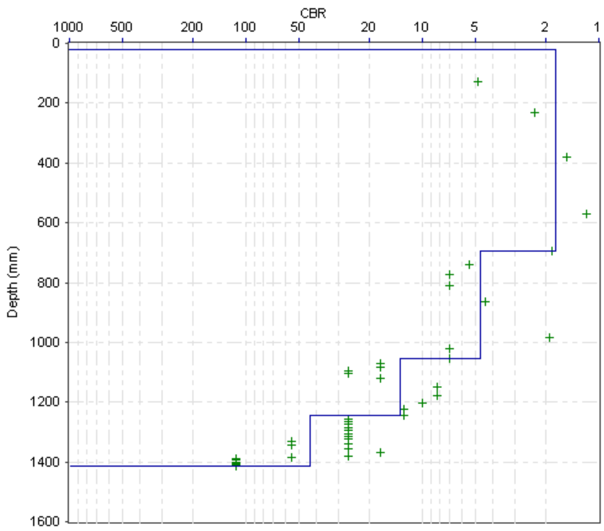
DCP Layer Strength Analysis Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.008	Surface Type:	Thin bituminous seal
Direction:	WS8	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	145	Thickness (mm):	
Test Date:	01/03/2021	Strength Coeff.:	



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	129.35	2	675	695
2	51.43	5	360	1055
3	19.00	13	190	1245
4	6.30	43	170	1415

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by ....

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.009	Surface Type:	Thin bituminous seal
Direction:	WS9	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	150	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	150	0.00	26	1	24	100	5.00
2	1	1	190	40.00	27	2	26	113	6.50
3	1	2	340	150.00	28	2	28	129	8.00
4	1	3	505	165.00	29	2	30	142	6.50
5	1	4	850	345.00	30	2	32	156	7.00
6	1	5	990	140.00	31	1	33	165	9.00
7	1	6	1065	75.00	32	1	34	175	10.00
8	1	7	1142	77.00	33	1	35	185	10.00
9	1	8	1175	33.00	34	1	36	195	10.00
10	1	9	1205	30.00	35	2	38	205	5.00
11	1	10	1250	45.00	36	2	40	215	5.00
12	1	11	1275	25.00					
13	1	12	1290	15.00					
14	1	13	1305	15.00					
15	1	14	1315	10.00					
16	1	15	1330	15.00					
17	1	16	1340	10.00					
18	1	17	1350	10.00					
19	1	18	1370	20.00					
20	1	19	1390	20.00					
21	0	19	40	--					
22	1	20	55	15.00					
23	1	21	70	15.00					
24	1	22	85	15.00					
25	1	23	95	10.00					

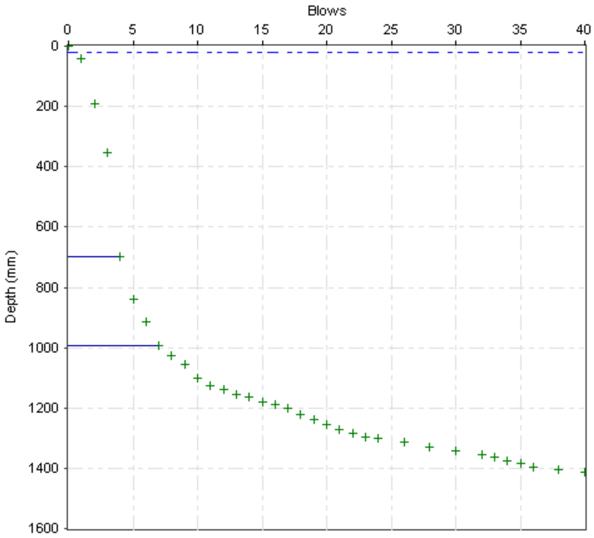
Point 21 Extension Rod Added

DCP Layer Strength Analysis Report

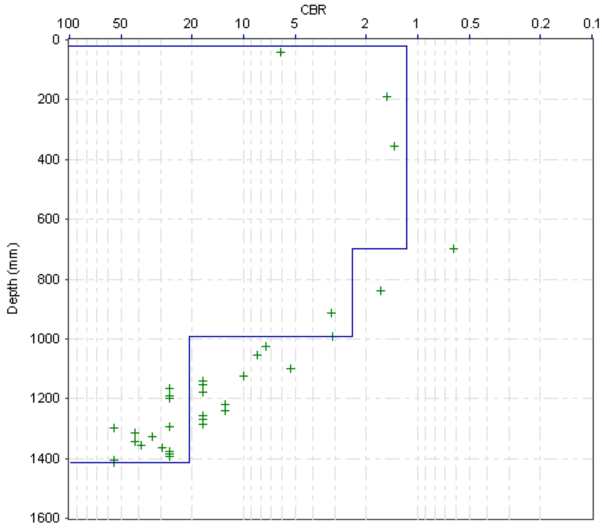
Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.009	Surface Type:	Thin bituminous seal
Direction:	WS9	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	150	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

Layer Boundaries: Chainage 0.009



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	194.29	1	680	700
2	97.33	2	292	992
3	12.82	20	423	1415

CBR Relationship:
TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by ....

Penetration Data Report

Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.010	Surface Type:	Thin bituminous seal
Direction:	WS10	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	0	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	100	0.00	26	1	24	830	20.00
2	1	1	207	107.00	27	1	25	850	20.00
3	1	2	265	58.00	28	1	26	875	25.00
4	1	3	372	107.00	29	1	27	910	35.00
5	1	4	456	84.00					
6	1	5	541	85.00					
7	1	6	610	69.00					
8	1	7	655	45.00					
9	1	8	715	60.00					
10	1	9	786	71.00					
11	1	10	910	124.00					
12	0	10	110	--					
13	1	11	380	270.00					
14	1	12	465	85.00					
15	1	13	525	60.00					
16	1	14	600	75.00					
17	1	15	645	45.00					
18	1	16	676	31.00					
19	1	17	699	23.00					
20	1	18	718	19.00					
21	1	19	740	22.00					
22	1	20	755	15.00					
23	1	21	775	20.00					
24	1	22	795	20.00					
25	1	23	810	15.00					

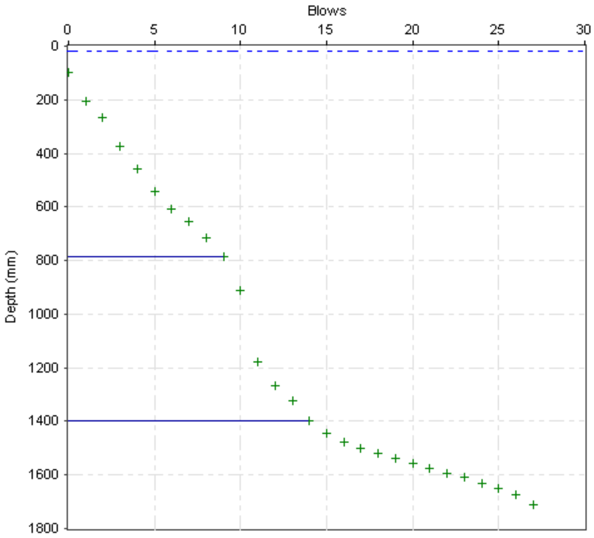
Point 12 Extension Rod Added

DCP Layer Strength Analysis Report

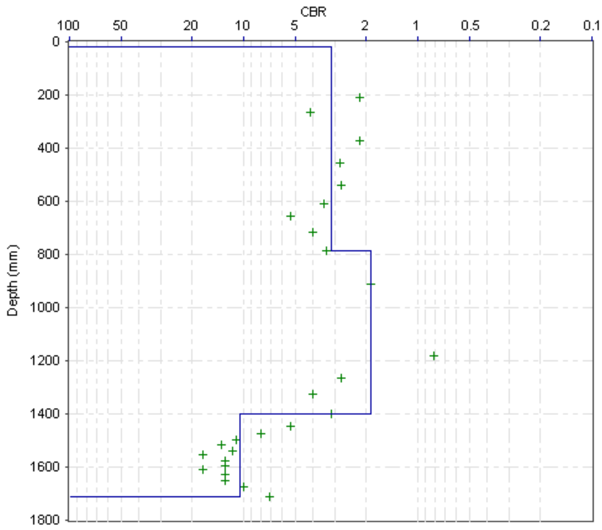
Project Name: 203521 - Elleray Hall & North Lane Depot-East Car Park

Chainage (km):	0.010	Surface Type:	Thin bituminous seal
Direction:	WS10	Thickness (mm):	20
Location/Offset:	Carriageway	Strength Coeff.:	0.20
Cone Angle:	60 degrees	Base Type:	
Zero Error (mm):	0	Thickness (mm):	
Test Date:	24/02/2021	Strength Coeff.:	

Layer Boundaries: Chainage 0.010



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	75.57	3	766	786
2	122.80	2	614	1400
3	23.85	11	310	1710

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by ....

12. SOAKAWAY TEST RESULTS

Unit 8 Warple Mews, Warple Way, London W3 0RF
Tel: 0208 811 2880, Fax: 0208 811 2881
Email: si@conceptconsultants.co.uk

CONCEPT SITE INVESTIGATIONS

Site Name:	**Elleray Hall & North Lane Depot/East Car Park**
Job No.:	**20/3521**
Date:	**26/02/2021**

Soakaway Design

BRE Digest 365 (September 1991 incl. revisions, 2003, 2007 and 2016)

Trial Pit No.:	**STP1**	
Date Excavated:	25/02/2021	
Date Backfilled:	03/03/2021	
Pit Dimensions:	Length (m)	2.50
	Width (m)	0.35
	Depth (m)	2.60
Level:		

Soil Infiltration Rate:

$$f = \frac{V_{p\,75-25}}{a_{p\,50} * t_{p\,75-25}}$$

	Test 1		Test 2		Test 3	
Effective depth	1.81	m	1.77	m	1.70	m
V_{p} *75-25*	0.523	m^3	0.511	m^3	0.491	m^3
$a_p 50$	6.034	m^2	5.920	m^2	5.370	m^2
t_{p} *75-25*	10.90	min	17.03	min	19.72	min
Result (*f*)	**1.32E-04**	**m/sec**	**8.45E-05**	**m/sec**	**7.73E-05**	**m/sec**

REMARKS:

Weather:	Cloudy
Installation Construction:	50mm pipe installed to base of pit, with pipe protruding 0.30m above ground level. D Pit backfield with pea shingle to 1.20m depth
Notes:	It is assumed that voids in gravel are 33% of total volume

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

Date: **26/02/2021** **Test No.: 1**

Standing Water Level (m) Dry

Date	Time (h:mm:ss)	Minutes	Depth to Water (mbgl)	Depth to Water (mOD)
26/02/2021	0:00:00	0.00	0.79	
26/02/2021	0:00:30	0.50	0.87	
26/02/2021	0:01:00	1.00	0.95	
26/02/2021	0:01:30	1.50	1.03	
26/02/2021	0:02:00	2.00	1.11	
26/02/2021	0:02:30	2.50	1.25	
26/02/2021	0:03:00	3.00	1.39	
26/02/2021	0:03:30	3.50	1.50	
26/02/2021	0:04:00	4.00	1.59	
26/02/2021	0:04:30	4.50	1.67	
26/02/2021	0:05:00	5.00	1.74	
26/02/2021	0:06:00	6.00	1.85	
26/02/2021	0:07:00	7.00	1.94	
26/02/2021	0:09:00	9.00	2.04	
26/02/2021	0:10:00	10.00	2.08	
26/02/2021	0:15:00	15.00	2.18	
26/02/2021	0:20:00	20.00	2.27	
26/02/2021	0:25:00	25.00	2.33	
26/02/2021	0:30:00	30.00	2.38	
26/02/2021	0:35:00	35.00	2.43	
26/02/2021	0:40:00	40.00	2.46	
26/02/2021	0:45:00	45.00	2.48	
26/02/2021	0:50:00	50.00	2.51	
26/02/2021	0:55:00	55.00	2.53	
26/02/2021	1:00:00	60.00	2.55	

REMARKS:
1) All measurements taken from he top of standpipe at 0.30m above ground level.
2) Pit filled with water above top of gravel.

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

Date: **26/02/2021** **Test No.: 2**

Standing Water Level (m) Dry

Date	Time (h:mm:ss)	Minutes	Depth to Water (mbgl)	Depth to Water (mOD)
26/02/2021	0:00:00	0.00	0.83	
26/02/2021	0:00:30	0.50	0.91	
26/02/2021	0:01:00	1.00	0.98	
26/02/2021	0:01:30	1.50	1.04	
26/02/2021	0:02:00	2.00	1.09	
26/02/2021	0:02:30	2.50	1.20	
26/02/2021	0:03:00	3.00	1.31	
26/02/2021	0:03:30	3.50	1.40	
26/02/2021	0:04:00	4.00	1.47	
26/02/2021	0:04:30	4.50	1.54	
26/02/2021	0:05:00	5.00	1.59	
26/02/2021	0:06:00	6.00	1.67	
26/02/2021	0:07:00	7.00	1.74	
26/02/2021	0:09:00	9.00	1.83	
26/02/2021	0:10:00	10.00	1.88	
26/02/2021	0:15:00	15.00	2.07	
26/02/2021	0:20:00	20.00	2.16	
26/02/2021	0:25:00	25.00	2.23	
26/02/2021	0:30:00	30.00	2.29	
26/02/2021	0:35:00	35.00	2.34	
26/02/2021	0:40:00	40.00	2.38	
26/02/2021	0:45:00	45.00	2.42	
26/02/2021	0:50:00	50.00	2.45	
26/02/2021	0:55:00	55.00	2.48	
26/02/2021	1:00:00	60.00	2.50	

REMARKS:
1) All measurements taken from the top of standpipe at 0.30m above ground level.
2) Pit filled with water above top of gravel.

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

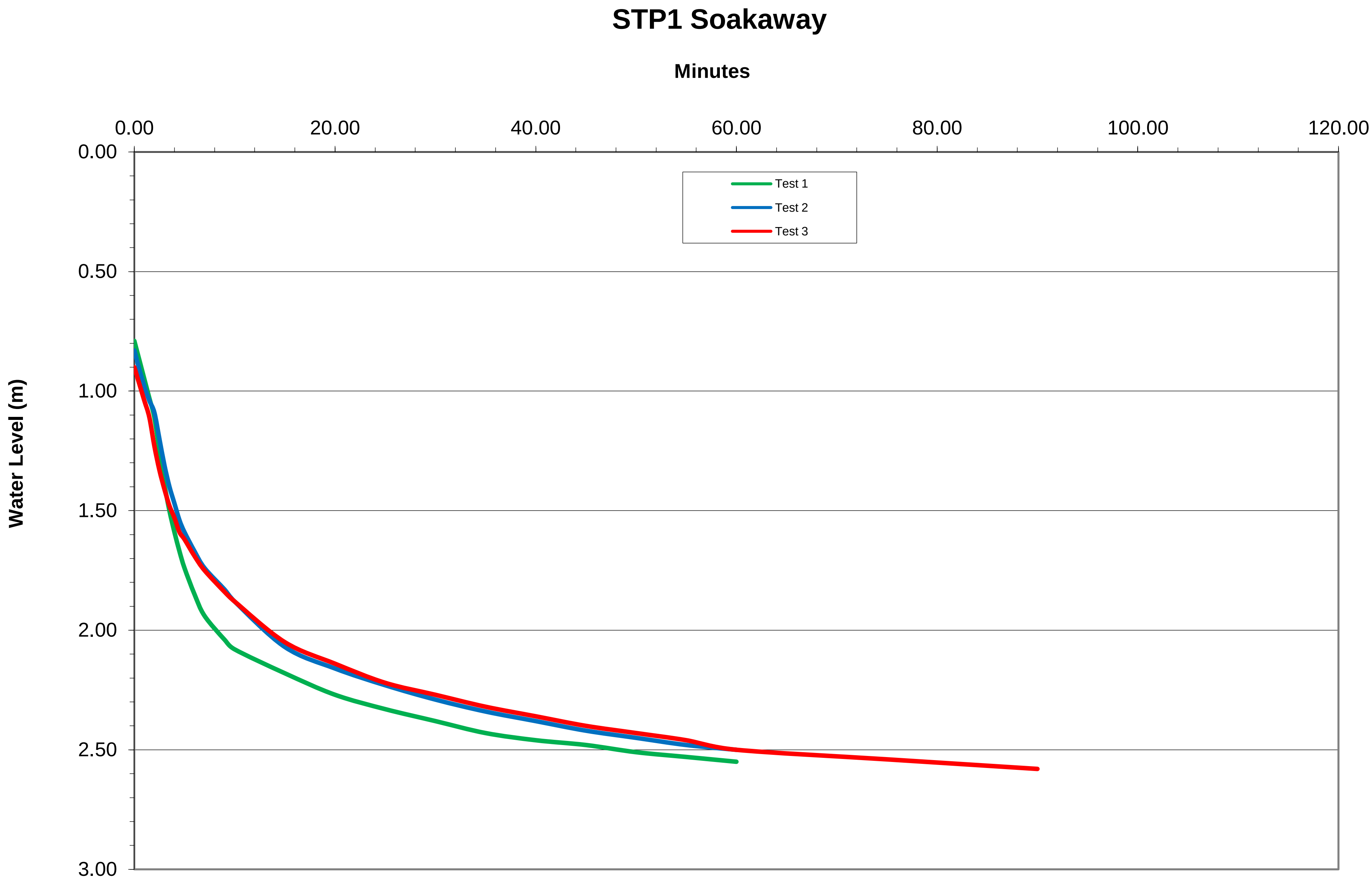
Date: **26/02/2021** **Test No.: 3**

Standing Water Level (m) Dry

Date	Time (h:mm:ss)	Minutes	Depth to Water (mbgl)	Depth to Water (mOD)
26/02/2021	0:00:00	0.00	0.90	
26/02/2021	0:00:30	0.50	0.97	
26/02/2021	0:01:00	1.00	1.04	
26/02/2021	0:01:30	1.50	1.11	
26/02/2021	0:02:00	2.00	1.23	
26/02/2021	0:02:30	2.50	1.33	
26/02/2021	0:03:00	3.00	1.41	
26/02/2021	0:03:30	3.50	1.48	
26/02/2021	0:04:00	4.00	1.53	
26/02/2021	0:04:30	4.50	1.59	
26/02/2021	0:05:00	5.00	1.62	
26/02/2021	0:06:00	6.00	1.69	
26/02/2021	0:07:00	7.00	1.75	
26/02/2021	0:09:00	9.00	1.84	
26/02/2021	0:10:00	10.00	1.88	
26/02/2021	0:15:00	15.00	2.05	
26/02/2021	0:20:00	20.00	2.14	
26/02/2021	0:25:00	25.00	2.22	
26/02/2021	0:30:00	30.00	2.27	
26/02/2021	0:35:00	35.00	2.32	
26/02/2021	0:40:00	40.00	2.36	
26/02/2021	0:45:00	45.00	2.40	
26/02/2021	0:50:00	50.00	2.43	
26/02/2021	0:55:00	55.00	2.46	
26/02/2021	1:00:00	60.00	2.50	
26/02/2021	1:15:00	75.00	2.54	
26/02/2021	1:30:00	90.00	2.58	

REMARKS:
1) All measurements taken from the top of standpipe at 0.30m above ground level.

CONCEPT SITE INVESTIGATIONS



Unit 8 Warple Mews, Warple Way, London W3 0RF
Tel: 0208 811 2880, Fax: 0208 811 2881
Email: si@conceptconsultants.co.uk

CONCEPT SITE INVESTIGATIONS

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

Date: **26/02/2021**

Soakaway Design

BRE Digest 365 (September 1991 incl. revisions, 2003, 2007 and 2016)

Trial Pit No.: **STP2**

Date Excavated: 25/02/2021

Date Backfilled: 02/03/2021

Pit Dimensions:

Length (m)	2.50
Width (m)	0.35
Depth (m)	2.60

Level:

Soil Infiltration Rate:

$$f = \frac{V_{p\,75-25}}{a_{p\,50} * t_{p\,75-25}}$$

	Test 1		Test 2	
Effective depth	0.83	m	0.62	m
V_{p} *75-25*	0.240	m^3	0.179	m^3
a_p50	4.352	m^2	3.953	m^2
t_{p} *75-25*	137.04	min	106.50	min
Result (*f*)	**6.70E-06**	**m/sec**	**7.09E-06**	**m/sec**

REMARKS:

Weather: Cloudy

Installation Construction: 50mm pipe installed to base of pit, with pipe protruding 0.40m above ground level. Pit backfield with pea shingle to 1.20m depth

Notes: Soakaway did not reach 75% of effective storage depth.
Infiltration rate calculated for the fall of water level from 75% to 25% of actual maximium water depth achieved in the test. Gravel assumed to occupy 66% of volume.

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

Date: **26/02/2021** **Test No.: 1**

Standing Water Level (m) Dry

Date	Time (h:mm:ss)	Minutes	Depth to Water (mbgl)	Depth to Water (mOD)
26/02/2021	0:00:00	0.00	1.38	
26/02/2021	0:00:30	0.50	1.39	
26/02/2021	0:01:00	1.00	1.39	
26/02/2021	0:01:30	1.50	1.40	
26/02/2021	0:02:00	2.00	1.41	
26/02/2021	0:02:30	2.50	1.42	
26/02/2021	0:03:00	3.00	1.43	
26/02/2021	0:03:30	3.50	1.43	
26/02/2021	0:04:00	4.00	1.44	
26/02/2021	0:04:30	4.50	1.44	
26/02/2021	0:05:00	5.00	1.45	
26/02/2021	0:06:00	6.00	1.46	
26/02/2021	0:07:00	7.00	1.47	
26/02/2021	0:08:00	8.00	1.48	
26/02/2021	0:09:00	9.00	1.49	
26/02/2021	0:10:00	10.00	1.50	
26/02/2021	0:15:00	15.00	1.53	
26/02/2021	0:20:00	20.00	1.56	
26/02/2021	0:25:00	25.00	1.59	
26/02/2021	0:30:00	30.00	1.61	
26/02/2021	0:40:00	40.00	1.64	
26/02/2021	0:50:00	50.00	1.69	
26/02/2021	1:00:00	60.00	1.72	
26/02/2021	1:15:00	75.00	1.75	
26/02/2021	1:30:00	90.00	1.79	
26/02/2021	1:45:00	105.00	1.85	
26/02/2021	2:00:00	120.00	1.91	
26/02/2021	2:30:00	150.00	2.00	
26/02/2021	3:30:00	210.00	2.11	
26/02/2021	5:10:00	310.00	2.21	

REMARKS:
1) All measurements taken from the top of standpipe at 0.40m above ground level.
2) Water level filled the hole to approximately 0.40m above pea shingle.
3) Test 2 started on the 26/02/2021 and completed on the 01/03/2021. Results recorded by diver. Base of diver at 2.83m below the top of standpipe.

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

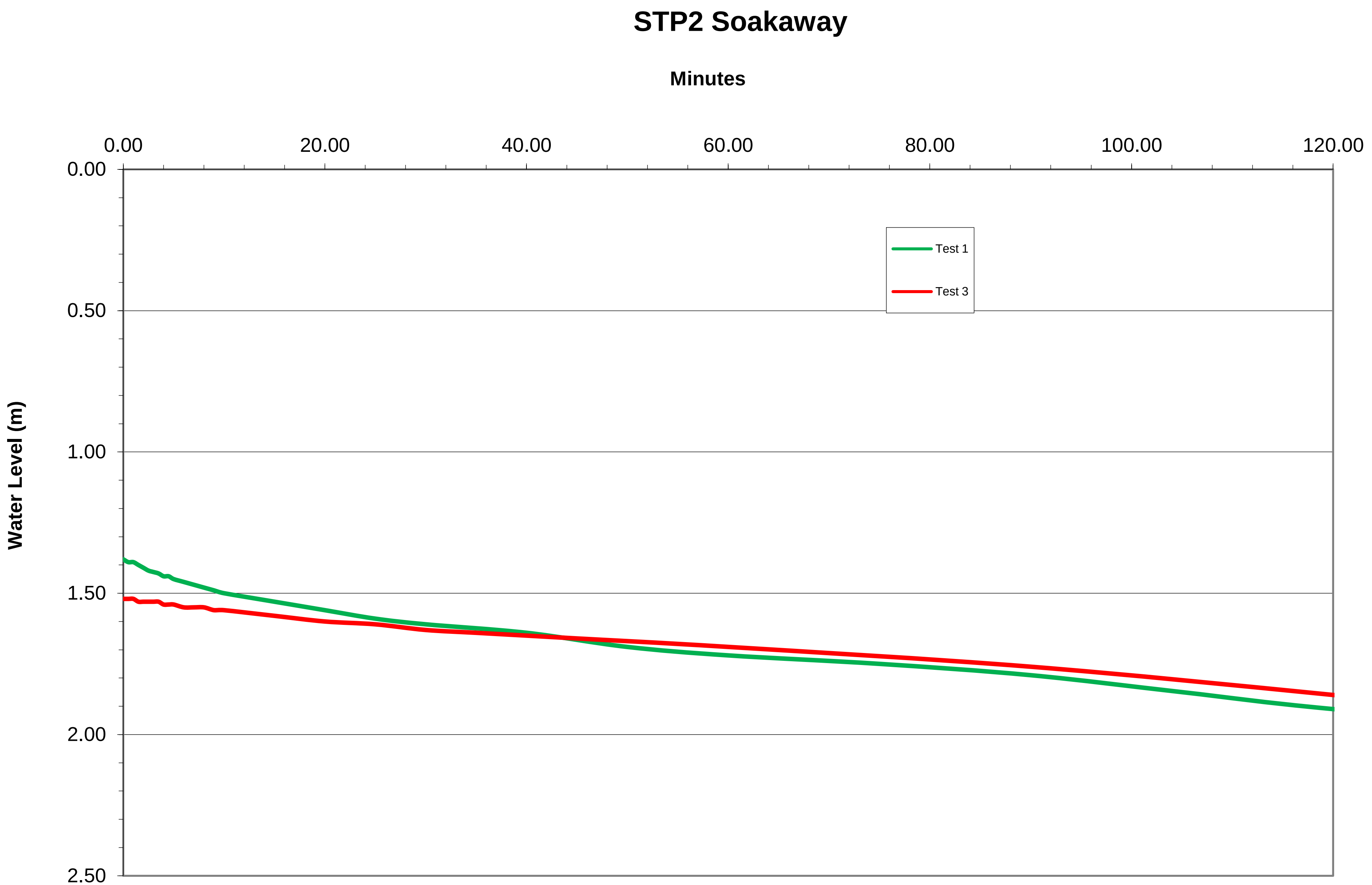
Date: **26/02/2021** **Test No.: 3**

Standing Water Level (m) Dry

Date	Time (h:mm:ss)	Minutes	Depth to Water (mbgl)	Depth to Water (mOD)
26/02/2021	0:00:00	0.00	1.52	
26/02/2021	0:00:30	0.50	1.52	
26/02/2021	0:01:00	1.00	1.52	
26/02/2021	0:01:30	1.50	1.53	
26/02/2021	0:02:00	2.00	1.53	
26/02/2021	0:02:30	2.50	1.53	
26/02/2021	0:03:00	3.00	1.53	
26/02/2021	0:03:30	3.50	1.53	
26/02/2021	0:04:00	4.00	1.54	
26/02/2021	0:04:30	4.50	1.54	
26/02/2021	0:05:00	5.00	1.54	
26/02/2021	0:06:00	6.00	1.55	
26/02/2021	0:07:00	7.00	1.55	
26/02/2021	0:08:00	8.00	1.55	
26/02/2021	0:09:00	9.00	1.56	
26/02/2021	0:10:00	10.00	1.56	
26/02/2021	0:15:00	15.00	1.58	
26/02/2021	0:20:00	20.00	1.60	
26/02/2021	0:25:00	25.00	1.61	
26/02/2021	0:30:00	30.00	1.63	
26/02/2021	0:35:00	35.00	1.64	
26/02/2021	0:40:00	40.00	1.65	
26/02/2021	0:45:00	45.00	1.66	
26/02/2021	1:00:00	60.00	1.69	
26/02/2021	1:30:00	90.00	1.76	
26/02/2021	2:00:00	120.00	1.86	
26/02/2021	2:30:00	150.00	1.97	
26/02/2021	3:00:00	180.00	2.02	
26/02/2021	3:30:00	210.00	2.07	
26/02/2021	4:00:00	240.00	2.10	
26/02/2021	4:30:00	270.00	2.14	

REMARKS:
1) All measurements taken from the top of standpipe at 0.40m above ground level.

CONCEPT SITE INVESTIGATIONS



CONCEPT SITE INVESTIGATIONS

CONCEPT
Unit 8 Warple Mews, Warple Way, London W3 0RF
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Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

Date: **26/02/2021**

Soakaway Design

BRE Digest 365 (September 1991 incl. revisions, 2003, 2007 and 2016)

Trial Pit No.: **STP3**

Date Excavated: 25/02/2021

Date Backfilled: 03/03/2021

Pit Dimensions:

	Length (m)	2.30
	Width (m)	0.35
	Depth (m)	2.70

Level:

Soil Infiltration Rate:

$$f = \frac{V_{p75-25}}{a_{p50} * t_{p75-25}}$$

	Test 1		Test 2		Test 3	
Effective depth	1.44	m	1.47	m	1.16	m
V_{p} 75-25	0.383	m^3	0.391	m^3	0.308	m^3
a_p50	4.621	m^2	4.701	m^2	3.879	m^2
t_{p} 75-25	25.83	min	31.29	min	15.83	min
Result (f)	**5.34E-05**	**m/sec**	**4.42E-05**	**m/sec**	**8.36E-05**	**m/sec**

REMARKS:

Weather: Cloudy

Installation Construction: 50mm pipe installed to base of pit, with pipe protruding 0.35m above ground level. Pit backfield with pea shingle to 1.20m depth

Notes: Volume of water in the hole reduced by 66% to account for gravel.

CONCEPT SITE INVESTIGATIONS

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

Date: **26/02/2021** **Test No.: 1**

Standing Water Level (m) Dry

Date	Time (h:mm:ss)	Minutes	Depth to Water (mbgl)	Depth to Water (mOD)
26/02/2021	0:00:00	0.00	1.26	
26/02/2021	0:00:30	0.50	1.32	
26/02/2021	0:01:00	1.00	1.39	
26/02/2021	0:01:30	1.50	1.44	
26/02/2021	0:02:00	2.00	1.48	
26/02/2021	0:02:30	2.50	1.51	
26/02/2021	0:03:00	3.00	1.55	
26/02/2021	0:03:30	3.50	1.58	
26/02/2021	0:04:00	4.00	1.61	
26/02/2021	0:04:30	4.50	1.64	
26/02/2021	0:05:00	5.00	1.67	
26/02/2021	0:05:30	5.50	1.70	
26/02/2021	0:06:00	6.00	1.72	
26/02/2021	0:06:30	6.50	1.75	
26/02/2021	0:07:00	7.00	1.77	
26/02/2021	0:07:30	7.50	1.80	
26/02/2021	0:08:00	8.00	1.82	
26/02/2021	0:08:30	8.50	1.84	
26/02/2021	0:09:00	9.00	1.86	
26/02/2021	0:09:30	9.50	1.88	
26/02/2021	0:10:00	10.00	1.90	
26/02/2021	0:11:00	11.00	1.94	
26/02/2021	0:12:00	12.00	1.98	
26/02/2021	0:13:00	13.00	2.01	
26/02/2021	0:14:00	14.00	2.05	
26/02/2021	0:15:00	15.00	2.08	
26/02/2021	0:16:00	16.00	2.10	
26/02/2021	0:17:00	17.00	2.13	
26/02/2021	0:18:00	18.00	2.15	
26/02/2021	0:19:00	19.00	2.17	
26/02/2021	0:20:00	20.00	2.19	
26/02/2021	0:22:00	22.00	2.23	
26/02/2021	0:24:00	24.00	2.26	
26/02/2021	0:26:00	26.00	2.29	
26/02/2021	0:28:00	28.00	2.32	
26/02/2021	0:30:00	30.00	2.34	
26/02/2021	0:35:00	35.00	2.39	
26/02/2021	0:40:00	40.00	2.43	
26/02/2021	0:45:00	45.00	2.45	
26/02/2021	0:50:00	50.00	2.47	

REMARKS:
1) All measurements taken from the top of standpipe at 0.35m above ground level.
2) Water level filled to the top of pea shingle at approximately 1.20m.

CONCEPT SITE INVESTIGATIONS

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

Date: **26/02/2021** **Test No.: 2**

Standing Water Level (m) Dry

Date	Time (h:mm:ss)	Minutes	Depth to Water (mbgl)	Depth to Water (mOD)
26/02/2021	0:00:00	0.00	1.23	
26/02/2021	0:00:30	0.50	1.28	
26/02/2021	0:01:00	1.00	1.34	
26/02/2021	0:01:30	1.50	1.39	
26/02/2021	0:02:00	2.00	1.44	
26/02/2021	0:02:30	2.50	1.47	
26/02/2021	0:03:00	3.00	1.50	
26/02/2021	0:03:30	3.50	1.52	
26/02/2021	0:04:00	4.00	1.55	
26/02/2021	0:04:30	4.50	1.57	
26/02/2021	0:05:00	5.00	1.60	
26/02/2021	0:05:30	5.50	1.62	
26/02/2021	0:06:00	6.00	1.64	
26/02/2021	0:06:30	6.50	1.66	
26/02/2021	0:07:00	7.00	1.68	
26/02/2021	0:07:30	7.50	1.70	
26/02/2021	0:08:00	8.00	1.72	
26/02/2021	0:08:30	8.50	1.75	
26/02/2021	0:09:00	9.00	1.77	
26/02/2021	0:09:30	9.50	1.78	
26/02/2021	0:10:00	10.00	1.80	
26/02/2021	0:11:00	11.00	1.84	
26/02/2021	0:12:00	12.00	1.87	
26/02/2021	0:13:00	13.00	1.90	
26/02/2021	0:14:00	14.00	1.93	
26/02/2021	0:15:00	15.00	1.96	
26/02/2021	0:16:00	16.00	1.96	
26/02/2021	0:17:00	17.00	2.02	
26/02/2021	0:18:00	18.00	2.05	
26/02/2021	0:19:00	19.00	2.07	
26/02/2021	0:20:00	20.00	2.10	
26/02/2021	0:22:00	22.00	2.14	
26/02/2021	0:24:00	24.00	2.18	
26/02/2021	0:26:00	26.00	2.22	
26/02/2021	0:28:00	28.00	2.24	
26/02/2021	0:30:00	30.00	2.26	
26/02/2021	0:35:00	35.00	2.32	
26/02/2021	0:40:00	40.00	2.37	
26/02/2021	0:45:00	45.00	2.40	
26/02/2021	0:50:00	50.00	2.43	

REMARKS:
1) All measurements taken from the top of standpipe at 0.35m above ground level.
2) Water level filled to the top of pea shingle at approximately 1.20m.

Site Name: **Elleray Hall & North Lane Depot/East Car Park**

Job No.: **20/3521**

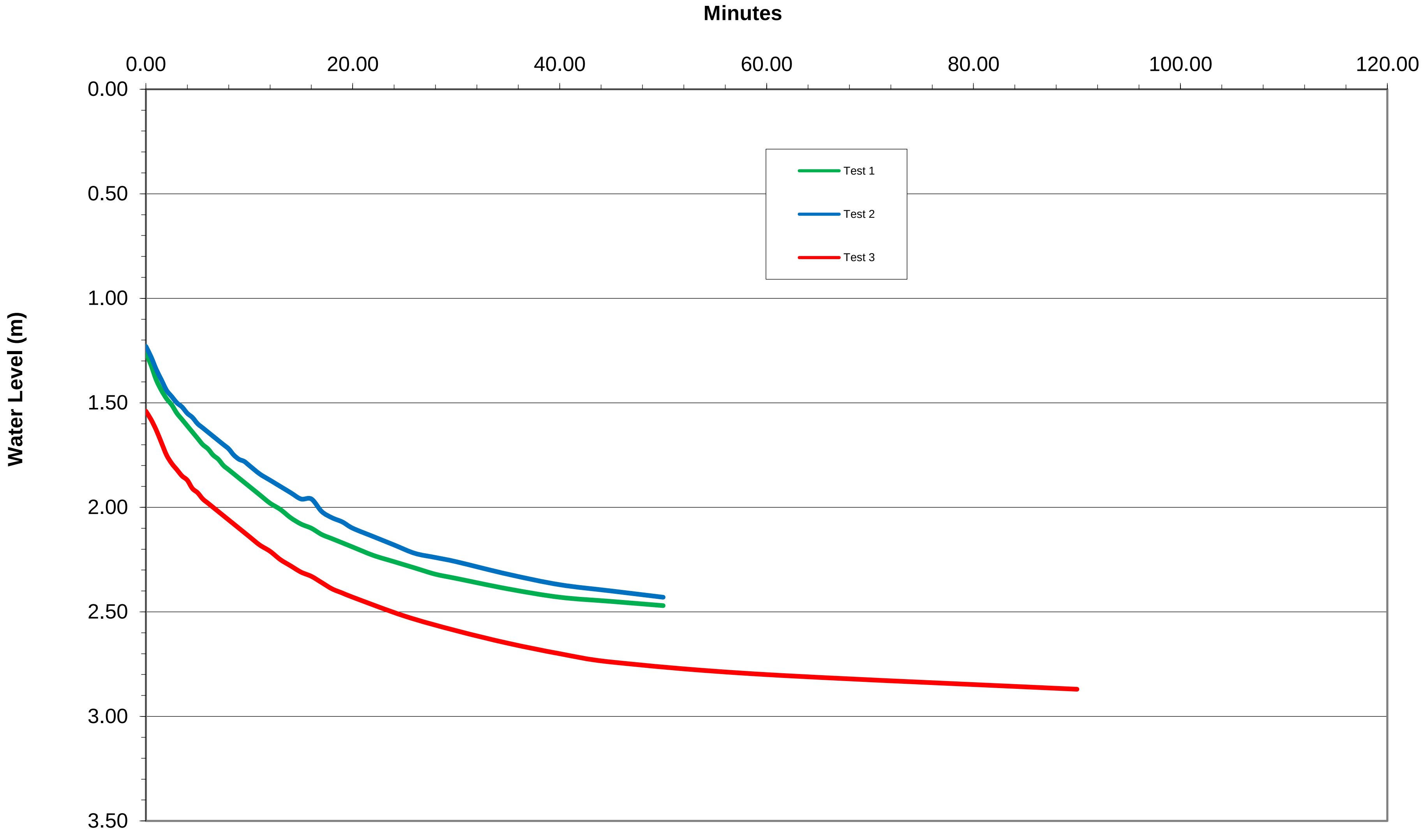
Date: **01/03/2021** **Test No.: 3**

Standing Water Level (m) Dry

Date	Time (h:mm:ss)	Minutes	Depth to Water (mbgl)	Depth to Water (mOD)
26/02/2021	0:00:00	0.00	1.54	
26/02/2021	0:00:30	0.50	1.58	
26/02/2021	0:01:00	1.00	1.63	
26/02/2021	0:01:30	1.50	1.69	
26/02/2021	0:02:00	2.00	1.75	
26/02/2021	0:02:30	2.50	1.79	
26/02/2021	0:03:00	3.00	1.82	
26/02/2021	0:03:30	3.50	1.85	
26/02/2021	0:04:00	4.00	1.87	
26/02/2021	0:04:30	4.50	1.91	
26/02/2021	0:05:00	5.00	1.93	
26/02/2021	0:05:30	5.50	1.96	
26/02/2021	0:06:00	6.00	1.98	
26/02/2021	0:06:30	6.50	2.00	
26/02/2021	0:07:00	7.00	2.02	
26/02/2021	0:07:30	7.50	2.04	
26/02/2021	0:08:00	8.00	2.06	
26/02/2021	0:08:30	8.50	2.08	
26/02/2021	0:09:00	9.00	2.10	
26/02/2021	0:09:30	9.50	2.12	
26/02/2021	0:10:00	10.00	2.14	
26/02/2021	0:11:00	11.00	2.18	
26/02/2021	0:12:00	12.00	2.21	
26/02/2021	0:13:00	13.00	2.25	
26/02/2021	0:14:00	14.00	2.28	
26/02/2021	0:15:00	15.00	2.31	
26/02/2021	0:16:00	16.00	2.33	
26/02/2021	0:17:00	17.00	2.36	
26/02/2021	0:18:00	18.00	2.39	
26/02/2021	0:19:00	19.00	2.41	
26/02/2021	0:20:00	20.00	2.43	
26/02/2021	0:25:00	25.00	2.52	
26/02/2021	0:30:00	30.00	2.59	
26/02/2021	0:35:00	35.00	2.65	
26/02/2021	0:40:00	40.00	2.70	
26/02/2021	0:45:00	45.00	2.74	
26/02/2021	1:00:00	60.00	2.80	
26/02/2021	1:30:00	90.00	2.87	

REMARKS:
1) All measurements taken from below top of standpipe at 0.35m above ground level.

STP3 Soakaway



13. INSTRUMENTATION MONITORING RESULTS

Borehole	Depth of Installation (mbgl)	Date of Installation	Type	Top (mbgl)	Bottom (mbgl)	Date & Time	Water Level (mbgl)	Water Level (mOD)	Remarks
BH1	6.30	26/02/2021	GMP	1.00	6.30	25/02/2021	4.00	4.85	
	6.30	26/02/2021	GMP	1.00	6.30	03/03/2021	4.05	4.80	
	6.30	26/02/2021	GMP	1.00	6.30	10/03/2021 09:35:00	No Access		Car parked
	6.30	26/02/2021	GMP	1.00	6.30	17/03/2021 09:32:00	4.06	4.79	
	6.30	26/02/2021	GMP	1.00	6.30	24/03/2021 10:10:00	No Access		Car parked
	6.30	26/02/2021	GMP	1.00	6.30	09/06/2021 12:27:00	4.15	4.70	
BH2	6.60	24/02/2021	GMP	1.00	6.60	23/02/2021	4.30	4.66	
	6.60	24/02/2021	GMP	1.00	6.60	03/03/2021	4.14	4.82	
	6.60	24/02/2021	GMP	1.00	6.60	10/03/2021 08:30:00	4.15	4.81	
	6.60	24/02/2021	GMP	1.00	6.60	17/03/2021 10:16:00	4.15	4.81	
	6.60	24/02/2021	GMP	1.00	6.60	24/03/2021 10:00:00	4.16	4.80	
	6.60	24/02/2021	GMP	1.00	6.60	09/06/2021 14:32:00	4.24	4.72	
WS1	2.00	26/02/2021	GMP	1.00	2.00	03/03/2021	Dry		
	2.00	26/02/2021	GMP	1.00	2.00	10/03/2021 09:40:00	Dry		
	2.00	26/02/2021	GMP	1.00	2.00	17/03/2021 09:38:00	Dry		
	2.00	26/02/2021	GMP	1.00	2.00	24/03/2021 10:20:00	Dry		
	2.00	26/02/2021	GMP	1.00	2.00	09/06/2021 13:20:00	Dry		
WS2	2.00	25/02/2021	GMP	1.00	2.00	03/03/2021	Dry		
	2.00	25/02/2021	GMP	1.00	2.00	10/03/2021 09:55:00	Dry		
	2.00	25/02/2021	GMP	1.00	2.00	17/03/2021 10:00:00	Dry		
	2.00	25/02/2021	GMP	1.00	2.00	24/03/2021 10:15:00	Dry		
	2.00	25/02/2021	GMP	1.00	2.00	09/06/2021 13:45:00	Dry		
WS6	2.00	25/02/2021	GMP	1.00	2.00	03/03/2021	Dry		
	2.00	25/02/2021	GMP	1.00	2.00	10/03/2021 09:00:00	Dry		
	2.00	25/02/2021	GMP	1.00	2.00	17/03/2021 10:20:00	Dry		
	2.00	25/02/2021	GMP	1.00	2.00	24/03/2021 09:50:00	Dry		
	2.00	25/02/2021	GMP	1.00	2.00	09/06/2021 14:20:00	Dry		
WS10	2.00	24/02/2021	GMP	1.00	2.00	03/03/2021	Dry		
	2.00	24/02/2021	GMP	1.00	2.00	10/03/2021 09:25:00	Dry		
	2.00	24/02/2021	GMP	1.00	2.00	17/03/2021 10:38:00	Dry		
	2.00	24/02/2021	GMP	1.00	2.00	24/03/2021 09:40:00	Dry		
	2.00	24/02/2021	GMP	1.00	2.00	09/06/2021 14:05:00	Dry		

KEY
GMP - Gas monitoring point
GWMP - Groundwater monitoring point
SPIE - Standpipe piezometer
EPIE - Electronic Piezometer
SP - Standpipe

CONCEPT
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W3 0RF
Telephone: 020 8811 2880_Fax: 020 8811 2881
E-mail: si@conceptconsultants.co.uk

AGS

GROUNDWATER MONITORING

Job No: 20/3521

Project: Elleray Hall & North Lane Depot/East Car Park

Client: Richmond & Wandsworth Council

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JM+JI	
Date:	10/03/2021	**Job Number:**	20/3521	**Time:**	08:10

METEOROLOGICAL AND SITE INFORMATION									
State of ground:		Dry		Moist		Wet			**Delete As Required**
Wind:		Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None		Slight		Cloudy		Overcast	Basement Level
Precipitation		None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:					Temperature (°)				

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		

BH (No.)	BH1	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
					0							**No access**
Depth to GW: (m)					15							
					30							
					45							
					60							
					75							
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK							
					15							
					30							
					45							
					60							
					75							
					90							
					105							
					120							

KEY

aP: Atmospheric Pressure NR: Not Recorded

dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JM+JI	
Date:	10/03/2021	**Job Number:**	20/3521	**Time:**	08:10

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:		Calm		Light	X	Moderate		Strong	Ground Level
Cloud cover:		None		Slight	X	Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1010				Temperature (°)	7			

INSTRUMENTATION USED

Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	BH2	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1010	0.0	0.0	**0**	0.0	0.0	0.2	19.2	0.0	0.0	
Depth to GW: (m)	4.15				**15**	0.0	0.0	0.4	19.9	0.0	0.0	
					30	0.0	0.0	0.4	19.6	0.0	0.0	
					45	0.0	0.0	0.4	19.5	0.0	0.0	
					60	0.0	0.0	0.4	19.5	0.0	0.0	
					75	0.0	0.0	0.4	19.5	0.0	0.0	Constant readings
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	0.4						
					15	0.3						
					30	0.2						
					45	0.2						
					60	0.1						
					75	0.1						
					90	0.1						
					105							
					120							

KEY
aP: Atmospheric Pressure NR: Not Recorded
dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JM+JI
Date:	10/03/2021	**Job Number:**	20/3521	**Time:**	09:30

METEOROLOGICAL AND SITE INFORMATION									
State of ground:		Dry	X	Moist		Wet			**Delete As Required**
Wind:		Calm	X	Light		Moderate		Strong	Ground Level
Cloud cover:		None		Slight		Cloudy	X	Overcast	
Precipitation		None	X	Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1009				Temperature (°)	7			

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS1	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1009	0.0	0.0	**0**	0.0	0.0	0.5	18.8	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	0.8	18.9	0.0	0.0	
					30	0.0	0.0	0.9	18.3	0.0	0.0	
					45	0.0	0.0	0.9	18.2	0.0	0.0	
					60	0.0	0.0	0.9	18.2	0.0	0.0	
					75	0.0	0.0	0.9	18.2	0.0	0.0	Constant readings
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK							
					15	0.6						
					30	0.5						
					45	0.5						
					60	0.4						
					75	0.4						
					90	0.4						
					105							
					120							

KEY
aP: Atmospheric Pressure
dP: Differential Pressure
NR: Not Recorded

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS						
Location:	Elleray Hall			**Engineer:**	JM+JI	
Date:	10/03/2021	**Job Number:**	20/3521		**Time:**	09:45

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:		Calm	X	Light		Moderate		Strong	Ground Level
Cloud cover:	X	None		Slight		Cloudy		Overcast	
Precipitation		None	X	Slight		Moderate		Heavy	
Barometric pressure (mb) Before:					Temperature (°)	7			

INSTRUMENTATION USED

Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS2	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1009	0.0	0.0	**0**	0.0	0.0	0.8	8.5	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	4.5	16.2	0.0	0.0	
					30	0.0	0.0	4.6	15.1	0.0	0.0	
					45	0.0	0.0	4.7	14.9	0.0	0.0	
					60	0.0	0.0	4.7	14.8	0.0	0.0	
					75	0.0	0.0	4.7	14.8	0.0	0.0	
					90	0.0	0.0	4.7	14.7	0.0	0.0	
					105	0.0	0.0	4.7	14.7	0.0	0.0	
					120	0.0	0.0	4.7	14.7	0.0	0.0	Constant readings
					135							
					150							
						PID(ppm)						
					PEAK	0.4						
					15	0.2						
					30	0.2						
					45	0.2						
					60	0.2						
					75							
					90							
					105							
					120							

KEY

aP: Atmospheric Pressure NR: Not Recorded

dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

C•NCEPT

Gas Monitoring Results

JOB DETAILS						
Location:	Elleray Hall			**Engineer:**	JM+JI	
Date:	10/03/2021	**Job Number:**	20/3521	**Time:**	09:00	

METEOROLOGICAL AND SITE INFORMATION									
State of ground:		Dry	X	Moist		Wet			**Delete As Required**
Wind:		Calm	X	Light		Moderate		Strong	Ground Level
Cloud cover:		None		Slight		Cloudy	X	Overcast	
Precipitation		None	X	Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1010				Temperature (°)	7			

INSTRUMENTATION USED				
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;			Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		X	

BH (No.)	WS6	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1010	0.0	0.0	**0**	0.0	0.0	0.3	19.2	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	0.0	19.9	0.0	0.0	
					30	0.0	0.0	0.0	19.7	0.0	0.0	
					45	0.0	0.0	0.0	19.6	0.0	0.0	
					60	0.0	0.0	0.0	19.5	0.0	0.0	
					75	0.0	0.0	0.0	19.5	0.0	0.0	
					90	0.0	0.0	0.0	19.5	0.0	0.0	Constant readings
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	2.0						
					15	1.3						
					30	1.1						
					45	1.0						
					60	1.8						
					75	1.9						
					90	2.0						
					105	2.0						
					120	2.0						

KEY
aP: Atmospheric Pressure NR: Not Recorded
dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

Gas Monitoring Results

JOB DETAILS						
Location:	Elleray Hall		**Engineer:**	JM+JI		
Date:	10/03/2021	**Job Number:**	20/3521	**Time:**	09:15	

METEOROLOGICAL AND SITE INFORMATION									
State of ground:		Dry	X	Moist		Wet			**Delete As Required**
Wind:		Calm	X	Light		Moderate		Strong	Ground Level
Cloud cover:		None		Slight		Cloudy	X	Overcast	
Precipitation		None	X	Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1010				Temperature (°)	7			

INSTRUMENTATION USED				
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;			Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		X	

BH (No.)	WS10	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1010	0.0	0.0	**0**	0.0	0.0	0.0	19.2	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	0.5	19.3	0.0	0.0	
					30	0.0	0.0	0.5	18.6	0.0	0.0	
					45	0.0	0.0	0.5	18.5	0.0	0.0	
					60	0.0	0.0	0.5	18.5	0.0	0.0	
					75	0.0	0.0	0.5	18.4	0.0	0.0	
					90	0.0	0.0	0.5	18.4	0.0	0.0	
					105	0.0	0.0	0.5	18.4	0.0	0.0	Constant readings
					120							
					135							
					150							
						PID(ppm)						
					PEAK	0.9						
					15	0.9						
					30	0.9						
					45	0.9						
					60	0.9						
					75	0.9						
					90	0.9						
					105	0.9						
					120	0.9						

KEY

aP: Atmospheric Pressure NR: Not Recorded

dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS						
Location:	Elleray Hall			**Engineer:**	JM+JI	
Date:	17/03/2021	**Job Number:**	20/3521	**Time:**	09:25	

METEOROLOGICAL AND SITE INFORMATION										
State of ground:	X	Dry		Moist		Wet				**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong		Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast		
Precipitation	X	None		Slight		Moderate		Heavy		
Barometric pressure (mb) Before:	1032				Temperature (°)	8				

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	BH1	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1032	0.0	0.0	**0**	0.0	0.0	0.6	18.7	0.0	0.0	
Depth to GW: (m)	4.06				**15**	0.0	0.0	4.1	15.5	0.0	0.0	
					30	0.0	0.0	4.3	14.0	0.0	0.0	
					45	0.0	0.0	4.4	13.6	0.0	0.0	
					60	0.0	0.0	4.4	13.5	0.0	0.0	
					75	0.0	0.0	4.5	13.4	0.0	0.0	
					90	0.0	0.0	4.5	13.3	0.0	0.0	
					105	0.0	0.0	4.5	13.2	0.0	0.0	
					120	0.0	0.0	4.5	13.2	0.0	0.0	
					135	0.0	0.0	4.6	13.1	0.0	0.0	
					150	0.0	0.0	4.6	13.0	0.0	0.0	Constant readings
						PID(ppm)						
					PEAK							
					15	1.0						
					30	1.1						
					45	1.1						
					60	1.1						
					75	1.1						
					90	1.1						
					105	1.1						
					120	1.1						

KEY
aP: Atmospheric Pressure   NR: Not Recorded   Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.
dP: Differential Pressure

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JM+JI	
Date:	17/03/2021	**Job Number:**	20/3521	**Time:**	10:08

METEOROLOGICAL AND SITE INFORMATION									
State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1032					Temperature (°)	8		

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	BH2	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1032	0.0	0.0	**0**	0.0	0.0	4.1	17.1	0.0	0.0	
Depth to GW: (m)	4.15				**15**	0.0	0.0	0.7	18.2	0.0	0.0	
					30	0.0	0.0	0.6	19.0	0.0	0.0	
					45	0.0	0.0	0.6	19.1	0.0	0.0	
					60	0.0	0.0	0.6	19.1	0.0	0.0	
					75	0.0	0.0	0.6	19.1	0.0	0.0	Constant readings
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	0.4						
					15	0.3						
					30	0.3						
					45	0.2						
					60	0.2						
					75	0.2						
					90	0.2						
					105							
					120							

KEY
aP: Atmospheric Pressure
dP: Differential Pressure
NR: Not Recorded

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JM+JI	
Date:	17/03/2021	**Job Number:**	20/3521	**Time:**	10:30

METEOROLOGICAL AND SITE INFORMATION										
State of ground:	X	Dry		Moist		Wet				**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong		Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast		
Precipitation	X	None		Slight		Moderate		Heavy		
Barometric pressure (mb) Before:	1033					Temperature (°)	8			

INSTRUMENTATION USED				
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		X	Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;			

BH (No.)	WS1	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1033	0.0	0.0	**0**	0.0	0.0	0.1	19.8	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	1.2	17.7	0.0	0.0	
					30	0.0	0.0	1.3	17.2	0.0	0.0	
					45	0.0	0.0	1.4	17.2	0.0	0.0	
					60	0.0	0.0	1.4	17.0	0.0	0.0	
					75	0.0	0.0	1.4	16.9	0.0	0.0	
					90	0.0	0.0	1.4	17.1	0.0	0.0	
					105	0.0	0.0	1.4	17.1	0.0	0.0	
					120	0.0	0.0	1.4	17.1	0.0	0.0	Constant readings
					135							
					150							
						PID(ppm)						
					PEAK							
					15	0.4						
					30	0.5						
					45	0.5						
					60	0.5						
					75	0.5						
					90	0.5						
					105	0.5						
					120	0.5						

KEY
aP: Atmospheric Pressure — NR: Not Recorded
dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JM+JI	
Date:	17/03/2021	**Job Number:**	20/3521	**Time:**	09:50

METEOROLOGICAL AND SITE INFORMATION									
State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast	
Precipitation	X			Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1033				Temperature (°)	8			

INSTRUMENTATION USED				
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		X	Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;			

BH (No.)	WS2	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1033	0.0	0.0	**0**	0.0	0.0	1.3	18.4	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	5.4	14.7	0.0	0.0	
					30	0.0	0.0	5.7	14.4	0.0	0.0	
					45	0.0	0.0	5.8	14.4	0.0	0.0	
					60	0.0	0.0	5.8	14.4	0.0	0.0	
					75	0.0	0.0	5.8	14.1	0.0	0.0	
					90	0.0	0.0	5.8	14.1	0.0	0.0	
					105	0.0	0.0	5.8	14.2	0.0	0.0	
					120	0.0	0.0	5.8	14.3	0.0	0.0	
					135	0.0	0.0	5.8	14.3	0.0	0.0	
					150	0.0	0.0	5.8	14.3	0.0	0.0	Constant readings
						PID(ppm)						
					PEAK	1.0						
					15	1.0						
					30	0.4						
					45	0.3						
					60	0.3						
					75	0.3						
					90							
					105							
					120							

KEY

aP: Atmospheric Pressure   NR: Not Recorded   Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

dP: Differential Pressure

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JM+JI	
Date:	17/03/2021	**Job Number:**	20/3521	**Time:**	10:10

METEOROLOGICAL AND SITE INFORMATION										
State of ground:	X	Dry		Moist		Wet				**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong		Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast		
Precipitation	X	None		Slight		Moderate		Heavy		
Barometric pressure (mb) Before:	1033					Temperature (°)	8			

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		

BH (No.)	WS6	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1033	0.0	0.0	**0**	0.0	0.0	5.3	17.0	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	0.2	19.3	0.0	0.0	
					30	0.0	0.0	0.1	19.9	0.0	0.0	
					45	0.0	0.0	0.1	19.9	0.0	0.0	
					60	0.0	0.0	0.0	20.0	0.0	0.0	
					75	0.0	0.0	0.0	20.2	0.0	0.0	
					90	0.0	0.0	0.0	20.2	0.0	0.0	
					105	0.0	0.0	0.0	20.2	0.0	0.0	Constant readings
					120							
					135							
					150							
						PID(ppm)						
					PEAK	1.3						
					15	1.0						
					30	1.1						
					45	1.2						
					60	1.2						
					75	1.2						
					90	1.3						
					105	1.3						
					120	1.3						

KEY

aP: Atmospheric Pressure NR: Not Recorded

dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JM+JI	
Date:	17/03/2021	**Job Number:** 20/3521		**Time:**	10:30

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None		Slight	X	Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1032				Temperature (°)	8			

INSTRUMENTATION USED

Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS10	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1032	0.0	0.0	**0**	0.0	0.0	0.7	19.7	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	0.6	19.2	0.0	0.0	
					30	0.0	0.0	0.6	19.1	0.0	0.0	
					45	0.0	0.0	0.6	19.1	0.0	0.0	
					60	0.0	0.0	0.6	19.1	0.0	0.0	Constant readings
					75							
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	1.7						
					15	0.6						
					30	0.6						
					45	0.6						
					60	0.6						
					75	0.6						
					90	0.6						
					105							
					120							

KEY
aP: Atmospheric Pressure NR: Not Recorded
dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JI & JM
Date:	24/03/2021	**Job Number:**	20/3521	**Time:**	10:20

METEOROLOGICAL AND SITE INFORMATION									
State of ground:		Dry		Moist		Wet			**Delete As Required**
Wind:		Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None		Slight		Cloudy		Overcast	
Precipitation		None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:					Temperature (°)				

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		

BH (No.)	BH1	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
					0							No Access
Depth to GW: (m)					15							
					30							
					45							
					60							
					75							
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK							
					15							
					30							
					45							
					60							
					75							
					90							
					105							
					120							

KEY

aP: Atmospheric Pressure	NR: Not Recorded	Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

dP: Differential Pressure

C•NCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JI & JM	
Date:	24/03/2021	**Job Number:**	20/3521	**Time:**	10:00

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1020				Temperature (°)	10			

INSTRUMENTATION USED

Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	BH2	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1020	0.0	0.0	**0**	0.0	0.0	0.0	19.2	0.0	0.0	
Depth to GW: (m)	4.16				**15**	0.0	0.0	0.9	19.2	0.0	0.0	
					30	0.0	0.0	0.9	18.7	0.0	0.0	
					45	0.0	0.0	0.9	18.6	0.0	0.0	
					60	0.0	0.0	0.9	18.6	0.0	0.0	
					75	0.0	0.0	0.9	18.6	0.0	0.0	Constant readings
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	0.3						
					15	0.2						
					30	0.2						
					45	0.2						
					60	0.2						
					75							
					90							
					105							
					120							

KEY
aP: Atmospheric Pressure NR: Not Recorded
dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JI & JM
Date:	24/03/2021	**Job Number:**	20/3521	**Time:**	10:15

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1020					Temperature (°)	10		

INSTRUMENTATION USED

			Tick Instrument used
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS1	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1020	-1.0	-0.3	**0**	0.0	0.0	5.2	15.6	0.0	0.0	
Depth to GW: (m)	DRY		0.0	0.0	**15**	0.0	0.0	1.0	17.2	0.0	0.0	
			0.0	0.0	**30**	0.0	0.0	0.9	17.6	0.0	0.0	
					45	0.0	0.0	0.8	17.9	0.0	0.0	
					60	0.0	0.0	0.8	18.0	0.0	0.0	
					75	0.0	0.0	0.7	18.1	0.0	0.0	
					90	0.0	0.0	0.8	18.0	0.0	0.0	
					105	0.0	0.0	0.8	18.0	0.0	0.0	
					120	0.0	0.0	0.8	18.0	0.0	0.0	Constant readings
					135							
					150							
						PID(ppm)						
					PEAK	0.6						
					15	0.2						
					30	0.2						
					45	0.2						
					60	0.2						
					75							
					90							
					105							
					120							

KEY
aP: Atmospheric Pressure NR: Not Recorded
dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JI & JM	
Date:	24/03/2021	**Job Number:**	20/3521	**Time:**	10:05

METEOROLOGICAL AND SITE INFORMATION									
State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1020					Temperature (°)	10		

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS2	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1020	0.0	0.0	**0**	0.0	0.0	0.0	19.9	0.0	0.0	
Depth to GW: (m)	DRY				**15**	0.0	0.0	4.8	16.6	0.0	0.0	
					30	0.0	0.0	5.6	14.8	0.0	0.0	
					45	0.0	0.0	5.7	14.5	0.0	0.0	
					60	0.0	0.0	5.7	14.4	0.0	0.0	
					75	0.0	0.0	5.7	14.4	0.0	0.0	
					90	0.0	0.0	5.7	14.3	0.0	0.0	
					105	0.0	0.0	5.7	14.3	0.0	0.0	
					120	0.0	0.0	5.7	14.3	0.0	0.0	Constant readings
					135							
					150							
						PID(ppm)						
					PEAK	0.5						
					15	0.2						
					30	0.2						
					45	0.2						
					60	0.2						
					75							
					90							
					105							
					120							

KEY

aP: Atmospheric Pressure — NR: Not Recorded

dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JI & JM
Date:	24/03/2021	**Job Number:**	20/3521	**Time:**	09:45

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1020				Temperature (°)	10			

INSTRUMENTATION USED

Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS6	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1020	0.0	0.0	**0**	0.0	0.0	0.8	18.8	0.0	0.0	
Depth to GW: (m)	DRY				**15**	0.0	0.0	0.0	19.7	0.0	0.0	
					30	0.0	0.0	0.0	19.6	0.0	0.0	
					45	0.0	0.0	0.0	19.6	0.0	0.0	
					60	0.0	0.0	0.0	19.6	0.0	0.0	
					75	0.0	0.0	0.0	19.6	0.0	0.0	Constant readings
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	0.9						
					15	0.8						
					30	0.9						
					45	0.9						
					60	0.9						
					75							
					90							
					105							
					120							

KEY
aP: Atmospheric Pressure NR: Not Recorded
dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JI & JM
Date:	24/03/2021	**Job Number:**	20/3521	**Time:**	09:30

METEOROLOGICAL AND SITE INFORMATION									
State of ground:		Dry	X	Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:		None	X	Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1020				Temperature (°)	10			

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS10	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1020	0.0	0.0	**0**	0.0	0.0	0.4	19.1	0.0	0.0	
Depth to GW: (m)	DRY				**15**	0.0	0.0	0.8	19.3	0.0	0.0	
					30	0.0	0.0	0.8	18.9	0.0	0.0	
					45	0.0	0.0	0.8	18.8	0.0	0.0	
					60	0.0	0.0	0.8	18.8	0.0	0.0	
					75	0.0	0.0	0.8	18.7	0.0	0.0	
					90	0.0	0.0	0.8	18.7	0.0	0.0	
					105	0.0	0.0	0.8	18.7	0.0	0.0	Constant readings
					120							
					135							
					150							
						PID(ppm)						
					PEAK	0.7						
					15	0.5						
					30	0.5						
					45	0.4						
					60	0.4						
					75	0.4						
					90							
					105							
					120							

KEY

aP: Atmospheric Pressure NR: Not Recorded

dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JI
Date:	09/06/2021	**Job Number:**	20/3521	**Time:**	12:18

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:	X	None		Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1024				Temperature (°)	23			

INSTRUMENTATION USED

Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	BH1	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1024	0.0	0.0	**0**	0.0	0.0	0.0	19.3	0.0	0.0	
Depth to GW: (m)	4.15				**15**	0.0	0.0	0.0	19.5	0.0	0.0	
					30	0.0	0.0	0.0	19.6	0.0	0.0	
					45	0.0	0.0	0.0	19.6	0.0	0.0	
					60	0.0	0.0	0.0	19.6	0.0	0.0	
					75	0.0	0.0	0.0	19.6	0.0	0.0	Constant readings
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	1.7						
					15	0.5						
					30	0.1						
					45	0.0						
					60	0.0						
					75							
					90							
					105							
					120							

KEY
aP: Atmospheric Pressure NR: Not Recorded Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.
dP: Differential Pressure

CONCEPT

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JI
Date:	09/06/2021	**Job Number:**	20/3521	**Time:**	14:25

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:	X	None		Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1018					Temperature (°)	24		

INSTRUMENTATION USED

Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	BH2	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1018	0.0	0.0	**0**	0.0	0.0	0.0	20.1	0.0	0.0	
Depth to GW: (m)	4.24				**15**	0.0	0.0	0.0	20.1	0.0	0.0	
					30	0.0	0.0	0.0	20.1	0.0	0.0	
					45	0.0	0.0	0.0	20.1	0.0	0.0	
					60	0.0	0.0	0.0	20.1	0.0	0.0	Constant readings
					75							
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	2.7						
					15	0.8						
					30	0.6						
					45	0.6						
					60	0.6						
					75							
					90							
					105							
					120							

KEY
aP: Atmospheric Pressure
dP: Differential Pressure
NR: Not Recorded

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JI
Date:	09/06/2021	**Job Number:**	20/3521	**Time:**	13:08

METEOROLOGICAL AND SITE INFORMATION										
State of ground:	X	Dry		Moist		Wet				**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong		Ground Level
Cloud cover:	X	None		Slight		Cloudy		Overcast		
Precipitation	X	None		Slight		Moderate		Heavy		
Barometric pressure (mb) Before:	1026				Temperature (°)	24				

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS1	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1026	0.0	0.0	**0**	0.0	0.0	0.0	19.0	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	0.0	19.6	0.0	0.0	
					30	0.0	0.0	0.0	19.8	0.0	0.0	
					45	0.0	0.0	0.0	19.8	0.0	0.0	
					60	0.0	0.0	0.0	19.8	0.0	0.0	
					75	0.0	0.0	0.0	19.8	0.0	0.0	Constant readings
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	4.3						
					15	1.5						
					30	1.3						
					45	1.2						
					60	1.2						
					75	1.2						
					90							
					105							
					120							

KEY
aP: Atmospheric Pressure NR: Not Recorded Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.
dP: Differential Pressure

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall		**Engineer:**	JI	
Date:	09/06/2021	**Job Number:**	20/3521	**Time:**	13:35

METEOROLOGICAL AND SITE INFORMATION									
State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:	X	None		Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1020				Temperature (°)	24			

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS2	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1021	1.0	0.1	**0**	0.0	0.0	0.0	19.6	0.0	0.0	
Depth to GW: (m)	Dry		0.0	0.0	**15**	0.0	0.0	0.0	19.7	0.0	0.0	
					30	0.0	0.0	0.0	19.8	0.0	0.0	
					45	0.0	0.0	0.0	19.8	0.0	0.0	
					60	0.0	0.0	0.0	19.7	0.0	0.0	
					75	0.0	0.0	0.0	19.7	0.0	0.0	
					90	0.0	0.0	0.0	19.7	0.0	0.0	Constant readings
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	2.8						
					15	0.6						
					30	0.6						
					45	0.5						
					60	0.5						
					75	0.5						
					90							
					105							
					120							

KEY
aP: Atmospheric Pressure NR: Not Recorded
dP: Differential Pressure

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

Gas Monitoring Results

JOB DETAILS					
Location:	Elleray Hall			**Engineer:**	JI
Date:	09/06/2021	**Job Number:**	20/3521	**Time:**	14:10

METEOROLOGICAL AND SITE INFORMATION										
State of ground:	X	Dry		Moist		Wet				**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong		Ground Level
Cloud cover:	X	None		Slight		Cloudy		Overcast		
Precipitation	X	None		Slight		Moderate		Heavy		
Barometric pressure (mb) Before:	1020				Temperature (°)	24				

INSTRUMENTATION USED			
Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;		Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X	

BH (No.)	WS6	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1020	0.0	0.0	**0**	0.0	0.0	0.0	20.1	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	0.0	20.1	0.0	0.0	
					30	0.0	0.0	0.0	20.1	0.0	0.0	
					45	0.0	0.0	0.0	20.1	0.0	0.0	
					60	0.0	0.0	0.0	20.1	0.0	0.0	Constant readings
					75							
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	4.6						
					15	1.3						
					30	1.3						
					45	1.3						
					60	1.3						
					75							
					90							
					105							
					120							

KEY
aP: Atmospheric Pressure
dP: Differential Pressure
NR: Not Recorded

Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.

CONCEPT

Gas Monitoring Results

JOB DETAILS						
Location:	Elleray Hall			**Engineer:**	JI	
Date:	09/06/2021	**Job Number:**	20/3521	**Time:**	13:55	

METEOROLOGICAL AND SITE INFORMATION

State of ground:	X	Dry		Moist		Wet			**Delete As Required**
Wind:	X	Calm		Light		Moderate		Strong	Ground Level
Cloud cover:	X	None		Slight		Cloudy		Overcast	
Precipitation	X	None		Slight		Moderate		Heavy	
Barometric pressure (mb) Before:	1021				Temperature (°)	24			

INSTRUMENTATION USED

Gas concentration:	#1 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;			Tick Instrument used
	#2 Gas Data GFM 436, Accuracy: CH4 ±0.3% (0 to 5%), ±3.0% (at 30%), ±3.0% (at 100%); CO2 ±0.3% (0 to 5%), ±3.0% (at 40%); O2 ±0.2%;	X		

BH (No.)	WS10	aP After (mb)	dp (Pa)	Flow rate (l/h)	Time (s)	CH_4 (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S(ppm)	CO (ppm)	Comments
		1021	0.0	0.0	**0**	0.0	0.0	0.0	20.0	0.0	0.0	
Depth to GW: (m)	Dry				**15**	0.0	0.0	0.0	20.1	0.0	0.0	
					30	0.0	0.0	0.0	20.2	0.0	0.0	
					45	0.0	0.0	0.0	20.2	0.0	0.0	
					60	0.0	0.0	0.0	20.2	0.0	0.0	
					75	0.0	0.0	0.0	20.2	0.0	0.0	Constant readings
					90							
					105							
					120							
					135							
					150							
						PID(ppm)						
					PEAK	3.9						
					15	0.6						
					30	0.4						
					45	0.3						
					60	0.3						
					75	0.2						
					90	0.2						
					105	0.2						
					120							

KEY
aP: Atmospheric Pressure   NR: Not Recorded   Note: Where 0.0 is shown on the results indicates value lower than the detection limit of the instrument.
dP: Differential Pressure

GROUNDWATER - IN SITU ANALYSIS & SAMPLING

Site:	**Elleray Hall**
Job No.:	**20/3521**
Date:	**09/06/2021**
Technician:	**JI**
Sampling method:	*Low Flow (peristaltic)*

BH No.	Base of well (mbgl)	Top of slotted (mbgl)	Depth to GW (mbgl)
BH1	6.30	1.00	4.15

Purge Volume (L)	Time	Temp (°C)	DO (mg/L)	SPC (mS/cm)	pH	pH (mV)	Redox Potential (mV)	Sample Detail (Colour/Odour/ Turbidity)
1.0	12:35	20.4	6.50	0.79	7.23	-42.8	175.9	Clear
2.0	12:39	19.9	6.55	0.79	7.25	-43.4	178.1	Clear
3.0	12:42	19.8	6.57	0.79	7.27	-44.6	176.4	Clear
4.0	12:45	19.8	6.56	0.79	7.25	-43.7	173.3	Clear

CONCEPT

GROUNDWATER - IN SITU ANALYSIS & SAMPLING

Site:	**Elleray Hall**
Job No.:	**20/3521**
Date:	**17/03/2021**
Technician:	**JI + JM**
Sampling method:	*Low Flow (peristaltic)*

BH No.	Base of well (mbgl)	Top of slotted (mbgl)	Depth to GW (mbgl)
BH2	6.60	1.00	4.15

Purge Volume (L)	Time	Temp (°C)	DO (mg/L)	SPC (mS/cm)	pH	pH (mV)	Redox Potential (mV)	Sample Detail (Colour/Odour/ Turbidity)
1.0	10:31	12.0	5.66	0.95	7.03	-21.0	192.5	Slightly brown
2.0	10:33	12.0	5.58	0.95	7.01	-19.6	194.1	Slightly brown
3.5	10:36	12.0	5.48	0.95	6.98	-18.4	196.9	Slightly brown
4.5	10:39	12.0	5.48	0.95	6.97	-17.9	198.4	Slightly brown

TEST DATE AND CONDITIONS		
Date	11/08/2020	
Atmospheric Pressure	997	mB
Ambient Temperature	21.6	°C
Environics Serial No.	5089	

GFM436 Final Inspection & Calibration Check Certificate

GAS DATA LTD
Unit 4, Fairfield Court
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LJ
Tel 02476303311 Fax 02476307711

Customer	Concept Site Investigations
Certificate Number	121930
Order Number	326344

Serial Number	13240
Software Version	G436-00.0027/0010

Recalibration DUE Date
11/08/21

Instrument Checks					
Keyboard	✓		Display Contrast	✓	
Pump Flow In	400	Accept > 200 cc/min	Pump Flow @ -200mB	250	Accept > 200 cc/min
Clock Set / Running	✓		Labels Fitted	✓	

Gas Checks						
	CH_4		CO_2		O_2	
	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value %	Instrument Gas Readings %	True Gas Value %
Sensor	59.8	60	40	40	20.9	20.9
	Accept ±3.0		Accept ±3.0		Accept ±0.5	
	4.9	5	5	5	6	6
	Accept ±0.3		Accept ±0.3		Accept ±0.3	
Zero Reading 100% N2	0	0	0	0	0	0
	Accept ±0.0		Accept ±0.0		Accept ±0.1	

Optional Gas Checks						
Applied Gas & Range		Concentration Tested @ (ppm)	Instrument Readings *(ppm)*			
Gas Type	Range *(ppm)*		Zero Reading		Instrument Gas Reading	
H2S	5000	1500	0	Accept ±0.0	1500	Accept ±5.0
CO	2000	1000	0	Accept ±0.0	1000	Accept ±5.0
Hexane	2.0%	2.0%	0	Accept ±0.0	1.99	Accept ±10.0

Cross Gas Effects									
Applied Gas *(ppm)*		Instrument Readings *(ppm)*							
Gas Type	Concentration	Toxic 1:	H2S	Toxic 2:	CO	Toxic 3:	HEX		
H2S	*1500*	1500		0		0			
CO	*1000*	40		1000		0			
Hexane	*2.0%*	0		0		1.99			

Pressure Checks			
Atmospheric Pressure [AP] *(mB)*			
Current Atmospheric Pressure (mB)		Instrument Atmospheric Pressure Reading (mB)	
AP Open Ports		997	*Accept ±2.0*
AP Port (Internal)	*+800 mB*	800	*Accept ±5.0*
	+1200mb	1200	*Accept ±5.0*

Flow Checks					
Borehole Flow			Differential Pressure		
Applied Reading *(l/h)*	Instrument Reading *(l/h)*		Applied Pressure *(Pa)*	Instrument Reading *(Pa)*	
-30	-30.1	*Accept ±3.0*	-328	-330	*Accept ±50*
-3	-3	*Accept ±1.0*	-15	-15	*Accept ±6.0*
0	0	*Accept ±0.0*	0	0	*Accept ±0.5*
3	3	*Accept ±0.5*	16	16	*Accept ±3.0*
30	30	*Accept ±3.0*	328	328	*Accept ±50*
60	60	*Accept ±6.0*	971	968	*Accept ±130*
90	90.7	*Accept ±9.0*	1894	1933	*Accept ±250*

Temperature Checks		
Calibration Temperature	Instrument Temperature Reading °C	
Applied Temperature °C		
-10	-10	*Accept ±2.0*
0	0	*Accept ±1.0*
30	30	*Accept ±1.0*
60	60	*Accept ±1.0*
100	100	*Accept ±1.0*

Technician:	Date Tested:
Jack Rutland	*12/08/2020*

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.

Gas Data Ltd is certified to BS EN ISO9001:2015. Certificate NQA 8374. Valid until 21/03/2022

TEST DATE AND CONDITIONS	
Date	03/03/21
Atmospheric Pressure	1013mB
Ambient Temp	24.7°C
Environics Serial No.	2518

GAS DATA LTD
Pegasus House
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LB
Tel 02476303311 Fax 02476307711

GFM436-3 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

INSTRUMENT DETAILS	
Serial No	Customer
12224	Concept Site Investigations

INSTRUMENT CHECKS			
Keyboard	✓	Pump Flow	500cc/min
Display Contrast	✓	Pump Flow @ -200mB	300cc/min
Clock Set / Running	✓	S/W Version	G436.0027/0011
Labels Fitted	✓	Recalibration Date	03/03/22

GAS CHECKS							
Calibration Gas		Instrument Gas Channels Read					
Gas Type	Applied Conc.	CH4 (%)	tol. (% vol.)	CO2 (%)	tol. (% vol.)	O2 (%)	tol. (% vol.)
N2	100%	0.0	0.0	0.0	0.0	0.0	+/-0.1
CH4	5%	4.9	+/-0.3	0.0	0.0	0.0	+/-0.1
	60%	59.7	+/-3.0	0.0	0.0	0.0	+/-0.1
CO2	5%	0.0	0.0	5.0	+/-0.3	0.0	+/-0.1
	40%	0.0	0.0	40.2	+/-3.0	0.0	+/-0.1
O2	20.9%	0.0	0.0	0.1	+0.1	20.8	+/-0.5

OPTIONAL GAS CHECKS								
Calibration Gas		Instrument Gas Channels Read						
Gas Type	Applied Conc.	Label	H2S	CO			Hexane	tol. (% vol.)
		Range	5000ppm	2000ppm			2.00%	
N2	100%		0	0			0	0.0
H2S	1500ppm		1500	0				+/- 5.0
CO	1000ppm		70	998				+/- 5.0
Hexane	2.00%						1.966	+/- 10.0

PRESSURE CHECKS							
Calibration Pressure		Instrument Pressure Channels Read					
Pressure @	Applied Pressure	Atmospheric [Ap] (mB)	tol. (mB)				
All Ports	Current Atmospheric	1012	+/-2.0				
Ap Port (Internal)	+800mB(a)	802	+/-5.0				
	+1200mB(a)	1197	+/-5.0				

TEST DATE AND CONDITIONS	
Date	03/03/21
Atmospheric Pressure	1013mB
Ambient Temp	24.7°C
Environics Serial No.	2518

GAS DATA LTD
Pegasus House
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LB
Tel 02476303311 Fax 02476307711

GFM436-3 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

FLOW CHECKS					
Calibration Flow		Instrument Flow Channels Read			
Applied Flow (l/hour)	Applied Pressure (Pa)	Flow [Flow] (l/hour)	tol. (l/hour)	Differential Pressure [Dp] (Pa)	tol. (Pa)
-30.0	-305	-28.6	+/-3.0	-319	+/-50
-3.0	-10	-2.7	+/-1.0	-10	+/-6
0.0	0	0.0	0.0	0	0.0
+3.0	9	3.1	+/-0.5	11	+/-3
+30.0	283	29.7	+/-3.0	287	+/-50
+60.0	840	60.1	+/-6.0	847	+/-130
+90.0	1642	90.1	+/-9.0	1676	+/-250

TEMPERATURE CHECK		
Calibration Temperature	Instrument Temperature Channel Read	
Applied Equivalent Temperature (°C)	Temperature [Temp] (°C)	tol. (°C)
-10.0	-10.5	+/- 2.0
0.0	0.0	+/- 1.0
30.0	30.0	+/- 1.0
60.0	60.0	+/- 1.0
100.0	99.5	+/- 1.0

Notes:

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.

Gas Data Ltd is certified to BS EN ISO9001:2015. Certificate NQA 8374. Valid until 22/03/2019

shawcity LIMITED
LIFE-SAVING SOLUTIONS

CERTIFICATE OF CALIBRATION
Phocheck Tiger

CALIBRATION CERTIFICATE NO:

ISSUED BY:	SHAWCITY LIMITED
DATE:	09.09.20
APPROVED SIGNATORY:	Mjordison
NAME:	Matt Jordison
CUSTOMER:	Concept Engineering Consultants
INSTRUMENT:	Tiger
SERIAL NUMBER:	T-107908
CALIBRATION METHOD:	CM03
AMBIENT CONDITIONS:	20°C ± 2°C and 50% (± 20%) RH

Prior to calibration the instrument was allowed to stabilise in the laboratory for at least 30 minutes.
The instrument was calibrated by exposing the sensor to known values of gas concentrations.
All gases were sampled through the complete probe and in line filter, where applicable.
The reference value is that generated by the certified source and the indicated value is that measured by the instrument.

CALIBRATION RESULTS

GAS	LOT No	REF. VALUE	INDICATED VALUE
Isobutylene	WO241578-1	100 ppm	100 ppm
Isobutylene	WO229476-2	1000 ppm	1000 ppm

COMMENTS:
The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of $k=2$.
This provides a level of confidence of uncertainty of approximately 95%.
The uncertainty of measurement is ±2 %
The results indicate that the instrument conforms to the applicable parts of the published specification.

Tel: 01793 780622
www.shawcity.co.uk
Instrument House, 91-92 Shrivenham Hundred Business Park
Watchfield, Oxfordshire, SN6 8TY
Fax: 01793 784466
service@shawcity.co.uk

14. GEOTECHNICAL LABORATORY TEST RESULTS

CONCEPT SITE INVESTIGATIONS

Site Name:	Elleray Hall & North Lane Depot/East Car Park	**Job No.:**	20/3521
Client:	Richmond & Wandsworth Council	**Date Reported:**	08/04/2021

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits by 4 Point Cone Method

Borehole No.	Sample Type	Sample No.	Depth m	Description	Natural Moisture Content %	Passing 425 μm sieve %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
BH1	B	6	0.60	Dark brown gravelly very clayey SAND. Gravel comprises fine to coarse flint and concrete	24	61	30	18	12	
BH1	B	10	1.20	Brown clayey silty gravelly SAND. Gravel is fine to coarse flint	10	62	30	19	11	
BH1	D	24	7.70	Greyish brown slightly micaceous silty CLAY	27	100	68	26	42	
BH1	UT	53	19.50	Very stiff, extremely closely fissured dark brown slightly sandy slightly micaceous silty CLAY with rare partings (<1mm) of silty sand and white flecks		100	69	25	44	

BS 1377: Part 2: Clause 4.3 & 4.4: 1990 Determination of the liquid limit by the cone penetrometer method

BS 1377: Part 2: Clause 5: 1990 Determination of the plastic limit and plasticity index

BS 1377: Part 2: Clause 3.2: 1990 Determination of the moisture content by the oven drying method

4503

Remarks: The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced :	29/03/2021	Checked / Approved by:	LG
Date - sample testing completed :	06/04/2021	Date Approved:	08/04/2021
Approved Signatories:	L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)		

CONCEPT
Unit D, Herald Way, Coventry CV3 2RQ
Tel: 02477087673
Email:coventrylab@conceptconsultants.co.uk

CONCEPT SITE INVESTIGATIONS

Site Name:	Elleray Hall & North Lane Depot/East Car Park	**Job No.:**	20/3521
Client:	Richmond & Wandsworth Council	**Date Reported:**	08/04/2021

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits by 4 Point Cone Method

Borehole No.	Sample Type	Sample No.	Depth m	Description	Natural Moisture Content %	Passing 425 µm sieve %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
BH2	B	6	0.90	Orangish brown sandy slightly gravelly silty CLAY. Gravel is fine to medium flint	18	85	24	12	12	
BH2	D	10	1.50	Orangish brown slightly gravelly slightly sandy SILT. Gravel is fine and medium flint	16	83	25	15	10	
BH2	D	24	7.95	Greysih brown slightly micaceous silty CLAY	27	100	72	26	46	
BH2	D	40	14.20	Greyish brown slightly micaceous silty CLAY	25	100	77	28	49	
BH2	D	52	19.20	Dark brown slightly micaceous silty CLAY with rare pockets of grey silty sand	24	100	73	26	47	

BS 1377: Part 2: Clause 4.3 & 4.4: 1990 Determination of the liquid limit by the cone penetrometer method

BS 1377: Part 2: Clause 5: 1990 Determination of the plastic limit and plasticity index

BS 1377: Part 2: Clause 3.2: 1990 Determination of the moisture content by the oven drying method

4503

Remarks: The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced :	29/03/2021	Checked / Approved by:	LG
Date - sample testing completed :	06/04/2021	Date Approved:	08/04/2021
Approved Signatories:	L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)		

CONCEPT
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Tel: 02477087673
Email:coventrylab@conceptconsultants.co.uk

CONCEPT SITE INVESTIGATIONS

Site Name:	Elleray Hall & North Lane Depot/East Car Park	**Job No.:**	20/3521
Client:	Richmond & Wandsworth Council	**Date Reported:**	08/04/2021

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits by 4 Point Cone Method

Borehole No.	Sample Type	Sample No.	Depth m	Description	Natural Moisture Content %	Passing 425 μm sieve %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
STP1	B	5	0.70	Dark brown clayey silty slightly gravelly SAND. Gravel comprises fine to medium flint and brick fragments	17	68	23	12	11	
STP2	B	7	1.20	Orangish brown mottled brownish grey slightly gravelly sandy silty CLAY. Gravel is fine to medium flint	20	80	36	20	16	
STP3	B	7	1.50	Yellowish brown very sandy slightly gravelly silty CLAY. Gravel is fine to coarse flint	13	77	34	14	20	
WS1	D	9	1.20	Yellowish brown slightly sandy slightly gravelly clayey SILT. Gravel comprises fine to medium flint	19	58	40	29	11	
WS2	B	8	1.00	Orangish brown slightly sandy slightly gravelly silty CLAY. Gravel comprises fine to coarse flint, brick and concrete fragments	13	60	32	17	15	
WS3	B	6	1.00	Greyish brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium flint	22	75	28	20	8	
WS5	B	8	1.00	Orangish brown slightly sandy slightly gravelly silty CLAY .Gravel is fine to medium flint	21	46	30	19	11	
WS6	D	9	1.20	Orangish brown sandy slightly gravelly silty CLAY. Gravel is fine to medium flint	14	61	39	15	24	

BS 1377: Part 2: Clause 4.3 & 4.4: 1990 Determination of the liquid limit by the cone penetrometer method

BS 1377: Part 2: Clause 5: 1990 Determination of the plastic limit and plasticity index

BS 1377: Part 2: Clause 3.2: 1990 Determination of the moisture content by the oven drying method

4503

Remarks: The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced :	31/03/2021	Checked / Approved by:	LG
Date - sample testing completed :	06/04/2021	Date Approved:	08/04/2021
Approved Signatories:	L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)		

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Unit D, Herald Way, Coventry CV3 2RQ
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Email:coventrylab@conceptconsultants.co.uk

CONCEPT SITE INVESTIGATIONS

Site Name:	Elleray Hall & North Lane Depot/East Car Park	**Job No.:**	20/3521
Client:	Richmond & Wandsworth Council	**Date Reported:**	08/04/2021

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits by 4 Point Cone Method

Borehole No.	Sample Type	Sample No.	Depth m	Description	Natural Moisture Content %	Passing 425 μm sieve %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
WS8	B	4	0.30	Dark brown slightly sandy gravelly silty CLAY. Gravel comprises fine to coarse flint, brick and concrete fragments	21	45	28	16	12	
WS9	B	4	0.40	Dark brown slightly sandy gravelly silty CLAY. Gravel comprises fine to medium flint, brick and concrete fragments	20	44	38	26	12	
WS10	D	9	1.20	Orangish brown sandy slightly gravelly silty CLAY. Gravel is fine to coarse flint	13	70	27	16	11	

BS 1377: Part 2: Clause 4.3 & 4.4: 1990 Determination of the liquid limit by the cone penetrometer method

BS 1377: Part 2: Clause 5: 1990 Determination of the plastic limit and plasticity index

BS 1377: Part 2: Clause 3.2: 1990 Determination of the moisture content by the oven drying method

4503

Remarks: The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced :	31/03/2021	Checked / Approved by:	LG
Date - sample testing completed :	06/04/2021	Date Approved:	08/04/2021
Approved Signatories:	L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)		

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CONCEPT SITE INVESTIGATIONS

PARTICLE SIZE DISTRIBUTION

TEST REPORT

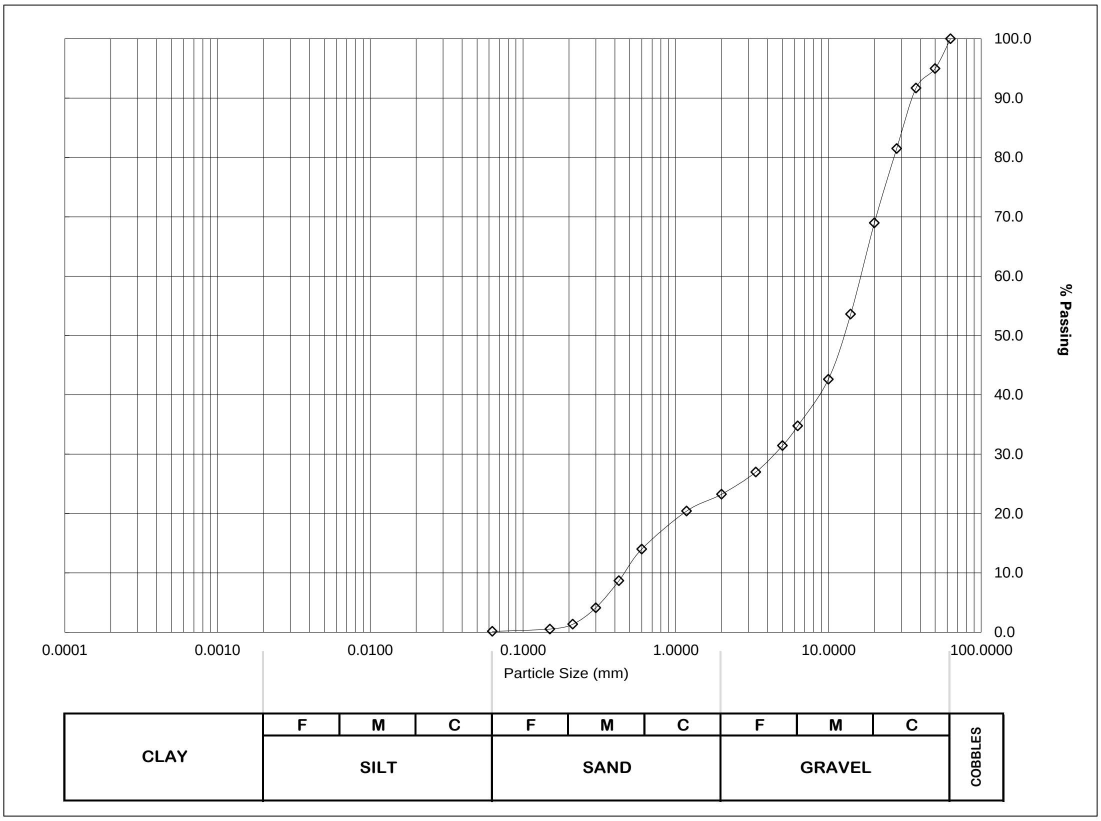
Site Name:	**Elleray Hall & North Lane Depot/East Car Park**							**Job Number:**	**20/3521**
Client:	**Richmond & Wandsworth Council**							**Date Reported:**	**08/04/2021**
Borehole No:	**BH1**	**Sample Type/No.**	**B**	**16**	**Top Depth:**	**4.00 m**	**Bottom Depth:**	**4.45**	**m**

Soil Description:

Brown very sandy fine to coarse flint GRAVEL

BS Test Sieves	
Size (mm)	% Passing
75.000	100
63.000	100
50.000	95
37.500	92
28.000	82
20.000	69
14.000	54
10.000	43
6.300	35
5.000	31
3.350	27
2.000	23
1.180	20
0.600	14
0.425	9
0.300	4
0.212	1
0.150	1
0.063	0

Sedimentation (*if applicable)	
Size (mm)	% Passing
0.020	
0.006	
0.002	



Method/type:	Dry Sieving

BS 1377: Part 2: Clause 9.3: 1990 Determination of particle size distribution - dry sieving method.

Particle Proportions %	
Cobbles	
Gravel	76.7
Sand	23.1
Silt and Clay	0.1

4503

Remarks:

The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced :	31/03/2021	Checked / Approved by:	LG
Date - sample testing completed :	01/04/2021	Date Approved:	08/04/2021

Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)

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CONCEPT SITE INVESTIGATIONS

PARTICLE SIZE DISTRIBUTION

TEST REPORT

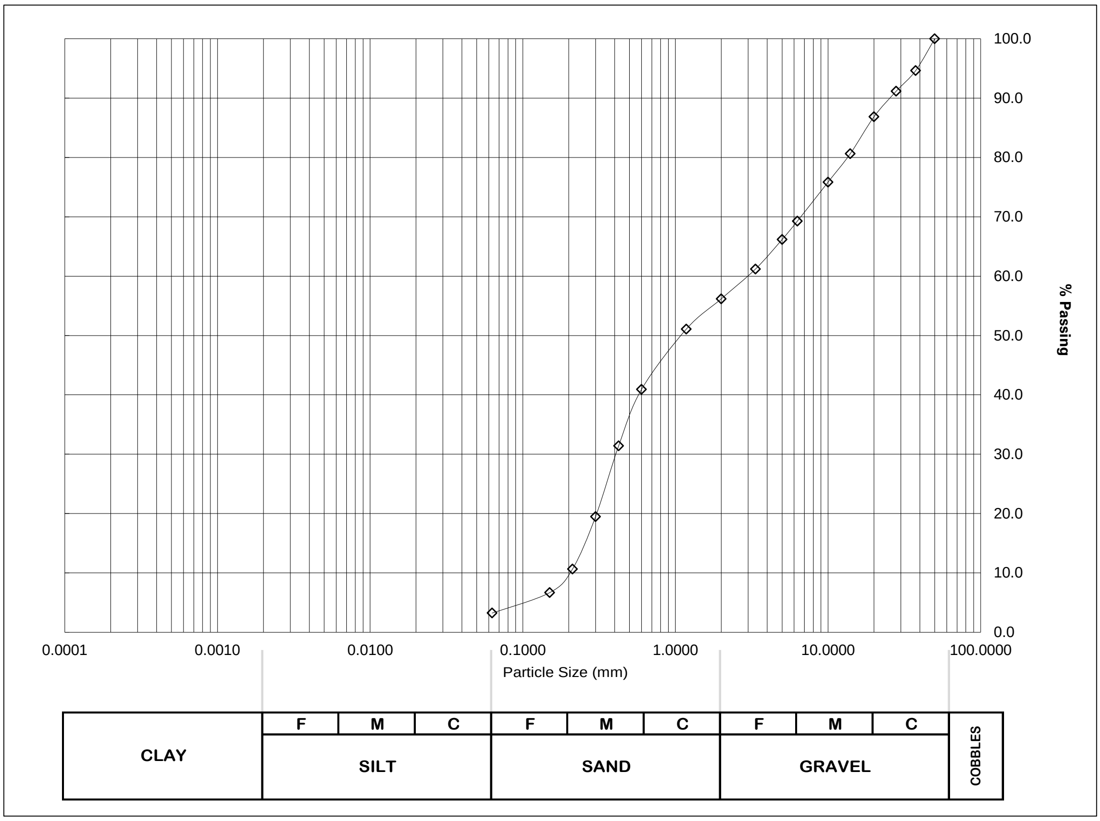
Site Name:	**Elleray Hall & North Lane Depot/East Car Park**					**Job Number:**	**20/3521**
Client:	**Richmond & Wandsworth Council**					**Date Reported:**	**08/04/2021**
Borehole No:	**BH2**	**Sample Type/No.**	**B**	**13**	**Top Depth: 2.50 m**	**Bottom Depth:**	**m**

Soil Description:

Brown slightly clayey very gravelly SAND. Gravel is fine to coarse flint

BS Test Sieves	
Size (mm)	% Passing
75.000	100
63.000	100
50.000	100
37.500	95
28.000	91
20.000	87
14.000	81
10.000	76
6.300	69
5.000	66
3.350	61
2.000	56
1.180	51
0.600	41
0.425	31
0.300	19
0.212	11
0.150	7
0.063	3

Sedimentation (*if applicable)	
Size (mm)	% Passing
0.020	
0.006	
0.002	



Method/type:	Wet Sieving

BS 1377: Part 2: Clause 9.2: 1990 Determination of particle size distribution - wet sieving method.

Particle Proportions %	
Cobbles	
Gravel	43.8
Sand	53.0
Silt and Clay	3.2

4503

Remarks:

The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced :	31/03/2021	Checked / Approved by:	LG
Date - sample testing completed :	01/04/2021	Date Approved:	08/04/2021

Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)

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CONCEPT SITE INVESTIGATIONS

PARTICLE SIZE DISTRIBUTION

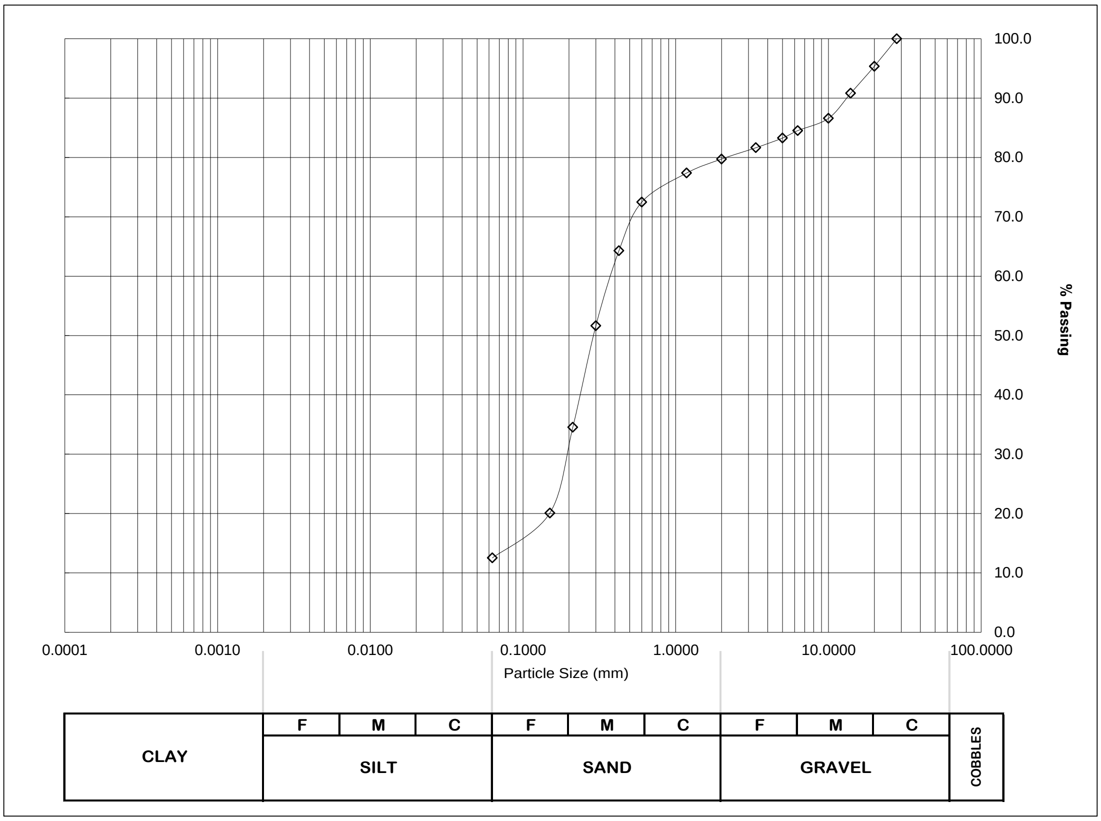
TEST REPORT

Site Name:	**Elleray Hall & North Lane Depot/East Car Park**						**Job Number:**	**20/3521**
Client:	**Richmond & Wandsworth Council**						**Date Reported:**	**08/04/2021**
Borehole No:	**STP1**	**Sample Type/No.**	**B**	**7**	**Top Depth:**	**1.60 m**	**Bottom Depth:**	**m**

Soil Description:

Orangish brown very gravelly silty SAND with occasional pockets of sandy clay. Gravel comprises fine to coarse flint and sandstone

BS Test Sieves	
Size (mm)	% Passing
75.000	100
63.000	100
50.000	100
37.500	100
28.000	100
20.000	95
14.000	91
10.000	87
6.300	85
5.000	83
3.350	82
2.000	80
1.180	77
0.600	72
0.425	64
0.300	52
0.212	35
0.150	20
0.063	13



Sedimentation (*if applicable)	
Size (mm)	% Passing
0.020	
0.006	
0.002	

Method/type:	Wet Sieving

BS 1377: Part 2: Clause 9.2: 1990 Determination of particle size distribution - wet sieving method.

Particle Proportions %	
Cobbles	
Gravel	20.3
Sand	67.2
Silt and Clay	12.5

4503

Remarks:

The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced :	01/04/2021	Checked / Approved by:	LG
Date - sample testing completed :	07/04/2021	Date Approved:	08/04/2021

Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)

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CONCEPT SITE INVESTIGATIONS

PARTICLE SIZE DISTRIBUTION

TEST REPORT

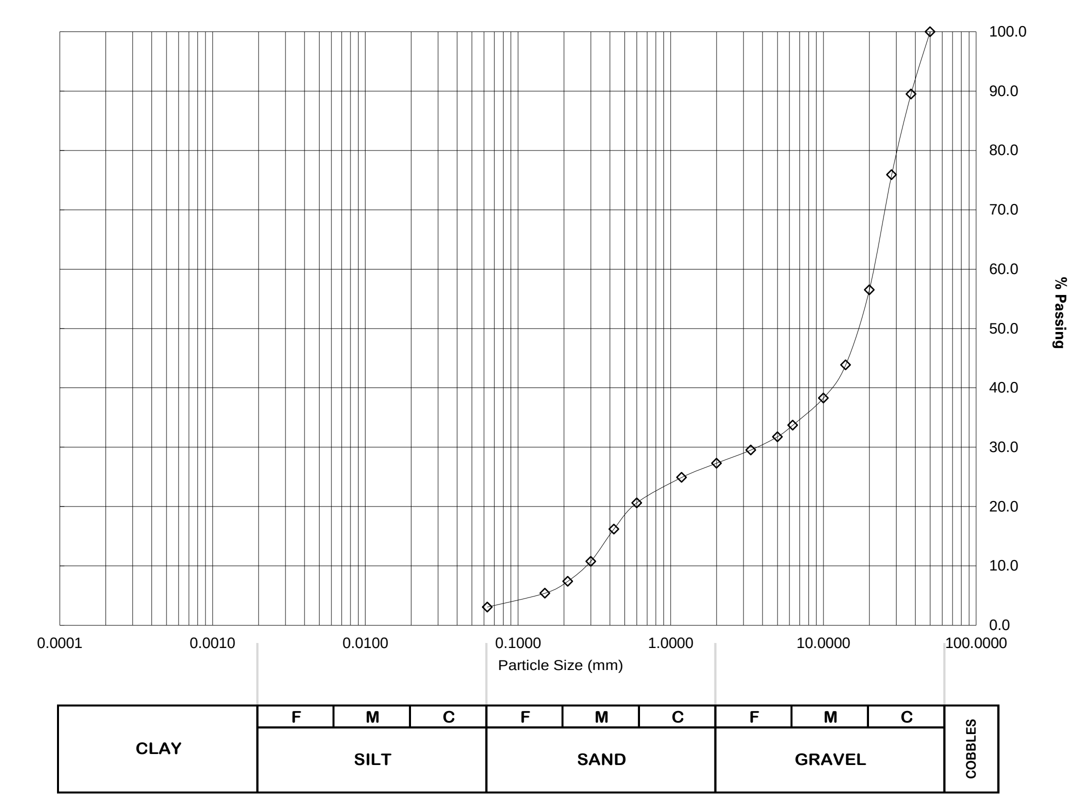
Site Name:	**Elleray Hall & North Lane Depot/East Car Park**					**Job Number:**	**20/3521**
Client:	**Richmond & Wandsworth Council**					**Date Reported:**	**08/04/2021**
Borehole No:	**STP3**	**Sample Type/No.**	**B**	**9**	**Top Depth:** **2.50 m**	**Bottom Depth:**	**m**

Soil Description:

Orangish brown slightly clayey very sandy fine to coarse flint GRAVEL

BS Test Sieves	
Size (mm)	% Passing
75.000	100
63.000	100
50.000	100
37.500	90
28.000	76
20.000	56
14.000	44
10.000	38
6.300	34
5.000	32
3.350	30
2.000	27
1.180	25
0.600	21
0.425	16
0.300	11
0.212	7
0.150	5
0.063	3

Sedimentation (*if applicable)	
Size (mm)	% Passing
0.020	
0.006	
0.002	



Method/type:	Wet Sieving	BS 1377: Part 2: Clause 9.2: 1990 Determination of particle size distribution - wet sieving method.

Particle Proportions %	
Cobbles	
Gravel	72.7
Sand	24.2
Silt and Clay	3.1

4503

Remarks:

The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced :	01/04/2021	Checked / Approved by:	LG
Date - sample testing completed :	07/04/2021	Date Approved:	08/04/2021

Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)

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UKAS TESTING 2183

eurofins | Chemtest

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Email: info@chemtest.com

Final Report

Report No.:	21-08106-1		
Initial Date of Issue:	19-Mar-2021		
Client	Concept Consultants		
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ		
Contact(s):	Kasia Mazerant Lab		
Project	20/3521		
Quotation No.:	Q21-22809	**Date Received:**	15-Mar-2021
Order No.:	L2462	**Date Instructed:**	15-Mar-2021
No. of Samples:	10		
Turnaround (Wkdays):	5	**Results Due:**	19-Mar-2021
Date Approved:	19-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521

Client: Concept Consultants				**Chemtest Job No.:**	21-08106	21-08106	21-08106	21-08106	21-08106	21-08106	21-08106	21-08106	21-08106
Quotation No.: Q21-22809				**Chemtest Sample ID.:**	1159838	1159839	1159840	1159841	1159842	1159843	1159844	1159845	1159846
				Client Sample ID.:	17	28	41	53	9	14	23	30	46
				Sample Location:	BH1	BH1	BH1	BH1	BH2	BH2	BH2	BH2	BH2
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	4.70	9.45	14.00	19.50	1.20	3.20	7.50	10.20	16.50
				Bottom Depth (m):			14.45	19.95			7.95		16.95
				Date Sampled:	10-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021	10-Mar-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Moisture	N	2030	%	0.020	13	18	18	18	14	10	23	22	18
pH	U	2010		4.0	9.0	8.8	8.7	8.8	8.7	9.0	8.7	8.7	8.9
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	0.038	0.076	0.11	< 0.010	< 0.010	0.038	0.088	0.052

Results - Soil

Project: 20/3521

Client: Concept Consultants	**Chemtest Job No.:**				21-08106
Quotation No.: Q21-22809	**Chemtest Sample ID.:**				1159847
	Client Sample ID.:				53
	Sample Location:				BH2
	Sample Type:				SOIL
	Top Depth (m):				19.50
	Bottom Depth (m):				20.00
	Date Sampled:				10-Mar-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	18
pH	U	2010		4.0	8.8
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.26

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING 2183

Amended Report

Report No.:	21-08014-2		
Initial Date of Issue:	19-Mar-2021	**Date of Re-Issue:**	30-Mar-2021
Client	Concept Consultants		
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ		
Contact(s):	Kasia Mazerant Lab Lynn Griffin		
Project	20/3521		
Quotation No.:	Q21-22809	**Date Received:**	15-Mar-2021
Order No.:	L2463	**Date Instructed:**	15-Mar-2021
No. of Samples:	6		
Turnaround (Wkdays):	5	**Results Due:**	19-Mar-2021
Date Approved:	19-Mar-2021		

Approved By:

Details:

Results - Soil

Project: 20/3521

Client: Concept Consultants				**Chemtest Job No.:**	21-08014	21-08014	21-08014	21-08014	21-08014	21-08014
Quotation No.: Q21-22809				**Chemtest Sample ID.:**	1159289	1159290	1159291	1159292	1159293	1159294
				Client Sample ID.:	7	7	8	8	6	8
				Sample Location:	STP1	STP2	STP2	WS1	WS3	WS10
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.60	1.20	2.0	1.00	1.00	0.90
				Bottom Depth (m):				1.10		
				Date Sampled:	11-Mar-2021	11-Mar-2021	11-Mar-2021	11-Mar-2021	11-Mar-2021	11-Mar-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Moisture	N	2030	%	0.020	15	22	14	18	18	17
pH	U	2010		4.0	8.5	8.4	8.8	8.3	8.4	7.6
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.025	< 0.010	< 0.010	< 0.010	0.034	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

CONCEPT SITE INVESTIGATIONS	Summary Test Report - Undrained Triaxial Compression (Single-Stage) BS 1377 : Part 7: 1990 Clause 8	Date Reported:	08/04/2021
		Job No.:	20/3521

Site Location: Elleray Hall & North Lane Depot/East Car Park **Client:** Richmond & Wandsworth Council

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH1	UT	22	7.00	Very stiff, very closely fissured greyish brown slightly micaceous silty CLAY	140	9.0	1.99	1.55	28	180	90	Brittle with slight plastic deformation
BH1	UT	33	11.00	Very stiff, very closely fissured greyish brown slightly micaceous silty CLAY with rare white flecks	220	6.8	1.99	1.55	29	211	106	Brittle
BH1	UT	43	15.00	Very stiff, extremely closely fissuredgreyish brown slightly micaceous silty CLAY	300	2.8	1.98	1.53	29	234	117	Brittle
BH1	UT	53	19.50	Very stiff, extremely closely fissured dark brown slightly sandy slightly micaceous silty CLAY with rare partings (<1mm) of silty sand and white flecks	390	3.5	2.05	1.65	24	645	323	Brittle

Remarks: The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced:	29/03/2021	Checked/Approved by:	LG
Date - sample testing completed:	31/03/2021	Date Approved:	08/04/2021

Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)

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4503

CONCEPT SITE INVESTIGATIONS	**Summary Test Report - Undrained Triaxial Compression (Single-Stage)** BS 1377 : Part 7: 1990 Clause 8	**Date Reported:**	08/04/2021
		Job No.:	20/3521

Site Location: Elleray Hall & North Lane Depot/East Car Park **Client:** Richmond & Wandsworth Council

BH No.	**Sample Type**	**Sample No**	**Depth top (m)**	**Description**	**Cell pressure** kN/m2	**Strain at failure** %	**Bulk Density** Mg/m3	**Dry Density** Mg/m3	**NMC** %	**Max Dev. Stress** kPa	**Shear Strength** kPa	**Mode of failure/Comments**
BH2	UT	28	9.50	Very stiff, extremely closely fissured greyish brown slightly micaceous silty CLAY	190	7.7	1.99	1.54	29	214	107	Brittle
BH2	UT	33	11.50	Very stiff, very closely fissured greyish brown slightly micaceous silty CLAY and rare pockets of shell fragments	230	5.3	1.99	1.57	27	316	158	Brittle
BH2	UT	43	15.50	Very stiff, very closely fissured dark greyish brown slightly micaceous silty CLAY	310	2.9	2.01	1.57	27	280	140	Brittle
BH2	UT	48	17.50	Very stiff, very closely fissured dark greyish brown slightly micaceous silty CLAY with rare pockets of grey silty sand	360	2.6	2.04	1.64	25	407	204	Brittle

Remarks: The results reported relate only to the items tested or sampled.

Date - samples received:	09/03/2021		
Date - sample testing commenced:	29/03/2021	Checked/Approved by:	LG
Date - sample testing completed:	31/03/2021	Date Approved:	08/04/2021

Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)

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AGS

UKAS TESTING 4503

15. CHEMICAL LABORATORY TEST RESULTS

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Email: info@chemtest.com

Final Report

Report No.:	21-05672-1		
Initial Date of Issue:	08-Mar-2021		
Client	Concept Consultants		
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ		
Contact(s):	Ana Gonzalez Chris Hustler Kasia Mazerant		
Project	20/3521 Elleray Hall		
Quotation No.:	Q21-23032	**Date Received:**	24-Feb-2021
Order No.:	CL2727	**Date Instructed:**	01-Mar-2021
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	05-Mar-2021
Date Approved:	08-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants	**Chemtest Job No.:**				21-05672	21-05672
Quotation No.: Q21-23032	**Chemtest Sample ID.:**				1147935	1147936
	Sample Location:				WS1	WS1
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.30	0.60
	Bottom Depth (m):					0.70
	Date Sampled:				22-Feb-2021	22-Feb-2021
	Asbestos Lab:				COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	
Asbestos Identification	U	2192		N/A	No Asbestos Detected	
ACM Detection Stage	U	2192		N/A	-	
Moisture	N	2030	%	0.020	13	13
Soil Colour	N	2040		N/A	Black	Black
Other Material	N	2040		N/A	Stones	Stones
Soil Texture	N	2040		N/A	Clay	Clay
pH	M	2010		4.0	8.4	8.3
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.7	1.8
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.060	0.060
Cyanide (Total)	M	2300	mg/kg	0.50	0.90	8.4
Sulphate (Total)	M	2430	%	0.010	0.29	0.35
Arsenic	M	2450	mg/kg	1.0	24	23
Cadmium	M	2450	mg/kg	0.10	0.36	0.38
Chromium	M	2450	mg/kg	1.0	22	28
Copper	M	2450	mg/kg	0.50	56	92
Mercury	M	2450	mg/kg	0.10	0.64	0.62
Nickel	M	2450	mg/kg	0.50	22	24
Lead	M	2450	mg/kg	0.50	300	370
Selenium	M	2450	mg/kg	0.20	0.26	0.34
Zinc	M	2450	mg/kg	0.50	160	430
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	19	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	25	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	41	4.5
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	130	17
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	51	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	270	22
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	21	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	180	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	870	27

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants	**Chemtest Job No.:**				21-05672	21-05672
Quotation No.: Q21-23032	**Chemtest Sample ID.:**				1147935	1147936
	Sample Location:				WS1	WS1
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.30	0.60
	Bottom Depth (m):					0.70
	Date Sampled:				22-Feb-2021	22-Feb-2021
	Asbestos Lab:				COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	2600	97
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	300	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	4000	120
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	4200	150
Naphthalene	M	2700	mg/kg	0.10	2.5	0.41
Acenaphthylene	M	2700	mg/kg	0.10	17	1.0
Acenaphthene	M	2700	mg/kg	0.10	11	0.83
Fluorene	M	2700	mg/kg	0.10	28	1.9
Phenanthrene	M	2700	mg/kg	0.10	170	9.9
Anthracene	M	2700	mg/kg	0.10	55	3.1
Fluoranthene	M	2700	mg/kg	0.10	200	13
Pyrene	M	2700	mg/kg	0.10	190	12
Benzo[a]anthracene	M	2700	mg/kg	0.10	92	5.6
Chrysene	M	2700	mg/kg	0.10	79	5.1
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	96	6.4
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	38	2.9
Benzo[a]pyrene	M	2700	mg/kg	0.10	83	5.5
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	64	3.5
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	14	1.1
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	51	2.9
Total Of 16 PAH's	M	2700	mg/kg	2.0	1200	75
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20	< 20	< 20
Chloroethane	U	2760	µg/kg	2.0	< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethene	M	2760	mg/kg	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0	< 5.0
Trichloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0	< 1.0
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05672	21-05672
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1147935	1147936
				Sample Location:	WS1	WS1
				Sample Type:	SOIL	SOIL
				Top Depth (m):	0.30	0.60
				Bottom Depth (m):		0.70
				Date Sampled:	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Trichloroethene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10	< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1.0	< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50	< 50
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0	< 2.0

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05672	21-05672
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1147935	1147936
				Sample Location:	WS1	WS1
				Sample Type:	SOIL	SOIL
				Top Depth (m):	0.30	0.60
				Bottom Depth (m):		0.70
				Date Sampled:	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0
Total Phenols	M	2920	mg/kg	0.30	0.48	< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-05674-1
Initial Date of Issue:	05-Mar-2021
Client	Concept Consultants
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ
Contact(s):	Ana Gonzalez Chris Hustler Kasia Mazerant
Project	20/3521 Elleray Road

Quotation No.:	Q21-23032	**Date Received:**	24-Feb-2021
Order No.:	CL2727	**Date Instructed:**	01-Mar-2021
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	05-Mar-2021
Date Approved:	05-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521 Elleray Road

Client: Concept Consultants				**Chemtest Job No.:**	21-05674	21-05674
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1147940	1147942
				Sample Location:	WS2	WS2
				Sample Type:	SOIL	SOIL
				Top Depth (m):	0.30	1.00
				Bottom Depth (m):		1.20
				Date Sampled:	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-
Moisture	N	2030	%	0.020	14	13
Soil Colour	N	2040		N/A	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand
pH	M	2010		4.0	8.4	8.5
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.1	0.83
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.011	0.035
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50
Sulphate (Total)	M	2430	%	0.010	0.11	0.042
Arsenic	M	2450	mg/kg	1.0	30	22
Cadmium	M	2450	mg/kg	0.10	< 0.10	< 0.10
Chromium	M	2450	mg/kg	1.0	25	25
Copper	M	2450	mg/kg	0.50	2000	53
Mercury	M	2450	mg/kg	0.10	1.7	0.26
Nickel	M	2450	mg/kg	0.50	31	25
Lead	M	2450	mg/kg	0.50	1200	130
Selenium	M	2450	mg/kg	0.20	0.37	0.28
Zinc	M	2450	mg/kg	0.50	800	84
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20		0.53
TPH >C6-C8	N	2670	mg/kg	1.0	< 1.0	< 1.0
TPH >C8-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0
TPH >C10-C12	N	2670	mg/kg	1.0	< 1.0	< 1.0
TPH >C12-C16	N	2670	mg/kg	1.0	< 1.0	12
TPH >C16-C21	N	2670	mg/kg	1.0	15	24
TPH >C21-C25	N	2670	mg/kg	1.0	22	14
TPH >C25-C35	N	2670	mg/kg	1.0	17	14
TPH >C35-C40	N	2670	mg/kg	1.0	< 1.0	< 1.0
Total TPH >C6-C40	M	2670	mg/kg	10	54	63
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	3.5	2.8

Results - Soil

Project: 20/3521 Elleray Road

Client: Concept Consultants				**Chemtest Job No.:**	21-05674	21-05674
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1147940	1147942
				Sample Location:	WS2	WS2
				Sample Type:	SOIL	SOIL
				Top Depth (m):	0.30	1.00
				Bottom Depth (m):		1.20
				Date Sampled:	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Anthracene	M	2700	mg/kg	0.10	1.1	1.2
Fluoranthene	M	2700	mg/kg	0.10	11	6.7
Pyrene	M	2700	mg/kg	0.10	10	5.4
Benzo[a]anthracene	M	2700	mg/kg	0.10	6.9	3.9
Chrysene	M	2700	mg/kg	0.10	5.7	3.1
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	9.0	4.2
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	3.6	1.9
Benzo[a]pyrene	M	2700	mg/kg	0.10	6.9	3.1
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	5.3	2.1
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	1.5	0.59
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	4.2	1.7
Total Of 16 PAH's	M	2700	mg/kg	2.0	69	37
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
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LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
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Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
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If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-05677-1
Initial Date of Issue:	05-Mar-2021
Client	Concept Consultants
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ
Contact(s):	Ana Gonzalez Chris Hustler Kasia Mazerant
Project	20/3521 Elleray Hall

Quotation No.:	Q21-23032	**Date Received:**	24-Feb-2021
Order No.:	CL2727	**Date Instructed:**	01-Mar-2021
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	05-Mar-2021
Date Approved:	05-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05677	21-05677	21-05677
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1147952	1147953	1147955
				Sample Location:	BH1	BH1	BH1
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.25	0.40	1.00
				Bottom Depth (m):			1.20
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A	-		-
Asbestos Identification	U	2192		N/A	No Asbestos Detected		No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-		-
Moisture	N	2030	%	0.020	2.8	2.5	13
Soil Colour	N	2040		N/A	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand
pH	M	2010		4.0	9.3	9.3	7.2
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.70	0.75	0.86
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.066	0.052	0.12
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	M	2430	%	0.010	0.28	0.10	0.043
Arsenic	M	2450	mg/kg	1.0	19	18	11
Cadmium	M	2450	mg/kg	0.10	0.10	< 0.10	< 0.10
Chromium	M	2450	mg/kg	1.0	25	22	17
Copper	M	2450	mg/kg	0.50	60	30	16
Mercury	M	2450	mg/kg	0.10	0.36	3.2	0.15
Nickel	M	2450	mg/kg	0.50	24	21	13
Lead	M	2450	mg/kg	0.50	1200	130	58
Selenium	M	2450	mg/kg	0.20	0.21	0.23	0.25
Zinc	M	2450	mg/kg	0.50	89	62	35
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20	4.8		
TPH >C6-C8	N	2670	mg/kg	1.0		< 1.0	< 1.0
TPH >C8-C10	N	2670	mg/kg	1.0		6.7	< 1.0
TPH >C10-C12	N	2670	mg/kg	1.0		10	< 1.0
TPH >C12-C16	N	2670	mg/kg	1.0		200	6.2
TPH >C16-C21	N	2670	mg/kg	1.0		1200	11
TPH >C21-C25	N	2670	mg/kg	1.0		520	9.3
TPH >C25-C35	N	2670	mg/kg	1.0		1000	7.4
TPH >C35-C40	N	2670	mg/kg	1.0		230	< 1.0
Total TPH >C6-C40	M	2670	mg/kg	10		3200	34
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0		
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0		
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0		
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	13		
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	14		

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants	**Chemtest Job No.:**				21-05677	21-05677	21-05677
Quotation No.: Q21-23032	**Chemtest Sample ID.:**				1147952	1147953	1147955
	Sample Location:				BH1	BH1	BH1
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.25	0.40	1.00
	Bottom Depth (m):						1.20
	Date Sampled:				22-Feb-2021	22-Feb-2021	22-Feb-2021
	Asbestos Lab:				COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	28		
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	150		
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	49		
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	250		
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0		
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0		
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	81		
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	38		
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	270		
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	1500		
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	3700		
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	350		
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	5900		
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	6100		
Naphthalene	M	2700	mg/kg	0.10	20	26	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	65	66	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	12	12	< 0.10
Fluorene	M	2700	mg/kg	0.10	75	83	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	560	710	< 0.10
Anthracene	M	2700	mg/kg	0.10	150	160	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	660	760	< 0.10
Pyrene	M	2700	mg/kg	0.10	560	620	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	300	31	< 0.10
Chrysene	M	2700	mg/kg	0.10	240	230	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	320	340	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	130	140	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	260	270	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	190	180	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	45	47	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	160	160	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	3700	3800	< 2.0
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0		
Chloromethane	M	2760	µg/kg	1.0	< 1.0		
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0		
Bromomethane	M	2760	µg/kg	20	< 20		
Chloroethane	U	2760	µg/kg	2.0	< 2.0		
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0		
1,1-Dichloroethene	M	2760	mg/kg	1.0	< 1.0		

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05677	21-05677	21-05677
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1147952	1147953	1147955
				Sample Location:	BH1	BH1	BH1
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.25	0.40	1.00
				Bottom Depth (m):			1.20
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0	< 1.0		
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0		
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0		
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0		
Trichloromethane	M	2760	µg/kg	1.0	< 1.0		
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0		
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0		
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0		
Benzene	M	2760	µg/kg	1.0	< 1.0		
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0		
Trichloroethene	N	2760	µg/kg	1.0	< 1.0		
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0		
Dibromomethane	M	2760	µg/kg	1.0	< 1.0		
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0		
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10		
Toluene	M	2760	µg/kg	1.0	< 1.0		
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10		
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10		
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0		
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0		
Dibromochloromethane	U	2760	µg/kg	10	< 10		
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0		
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0		
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0		
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0		
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0		
o-Xylene	M	2760	µg/kg	1.0	< 1.0		
Styrene	M	2760	µg/kg	1.0	< 1.0		
Tribromomethane	U	2760	µg/kg	1.0	< 1.0		
Isopropylbenzene	M	2760	µg/kg	1.0	< 1.0		
Bromobenzene	M	2760	µg/kg	1.0	< 1.0		
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50		
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0		
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0		
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0		
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0		
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0		
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0		

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05677	21-05677	21-05677
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1147952	1147953	1147955
				Sample Location:	BH1	BH1	BH1
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.25	0.40	1.00
				Bottom Depth (m):			1.20
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0		
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0		
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0		
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0		
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0		
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0		
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50		
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0		
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0		
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0		
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0		
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

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Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

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If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-05752-1
Initial Date of Issue:	05-Mar-2021
Client	Concept Consultants
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ
Contact(s):	Ana Gonzalez Chris Hustler Kasia Mazerant
Project	20/3521 Elleray Hall

Quotation No.:	Q21-23032	**Date Received:**	24-Feb-2021
Order No.:	CL2727	**Date Instructed:**	01-Mar-2021
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	05-Mar-2021
Date Approved:	05-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05752	21-05752	21-05752
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148288	1148289	1148292
				Sample Location:	WS5	WS5	WS3
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.25	0.40	1.00
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A		-	
Asbestos Identification	U	2192		N/A		No Asbestos Detected	
ACM Detection Stage	U	2192		N/A		-	
Asbestos by Gravimetry	U	2192	%	0.001		-	
Total Asbestos	U	2192	%	0.001		-	
Moisture	N	2030	%	0.020	3.6	9.2	16
Soil Colour	N	2040		N/A	Black	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	None
Soil Texture	N	2040		N/A	Chalk	Clay	Clay
pH	M	2010		4.0	8.9		
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	< 0.40		
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.010		
Cyanide (Total)	M	2300	mg/kg	0.50	4.7		
Sulphate (Total)	M	2430	%	0.010	0.11		
Arsenic	M	2450	mg/kg	1.0	11		
Cadmium	M	2450	mg/kg	0.10	0.25		
Chromium	M	2450	mg/kg	1.0	3.5		
Copper	M	2450	mg/kg	0.50	8.4		
Mercury	M	2450	mg/kg	0.10	0.15		
Nickel	M	2450	mg/kg	0.50	3.7		
Lead	M	2450	mg/kg	0.50	50		
Selenium	M	2450	mg/kg	0.20	0.28		
Zinc	M	2450	mg/kg	0.50	33		
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	72	43	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	120	15	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	450	11	6.5
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	570	14	6.9
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	1100	62	29
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	460	13	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	2700	160	42
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	280	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	5200	16	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	9900	41	6.1

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05752	21-05752	21-05752
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148288	1148289	1148292
				Sample Location:	WS5	WS5	WS3
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.25	0.40	1.00
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	19000	170	38
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	27000	620	160
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	2800	48	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	64000	900	210
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	67000	1100	250
Naphthalene	M	2700	mg/kg	0.10	370	18	7.0
Acenaphthylene	M	2700	mg/kg	0.10	58	7.5	1.4
Acenaphthene	M	2700	mg/kg	0.10	59	4.8	1.6
Fluorene	M	2700	mg/kg	0.10	150	15	3.3
Phenanthrene	M	2700	mg/kg	0.10	580	71	14
Anthracene	M	2700	mg/kg	0.10	140	19	3.5
Fluoranthene	M	2700	mg/kg	0.10	380	61	10
Pyrene	M	2700	mg/kg	0.10	340	56	9.4
Benzo[a]anthracene	M	2700	mg/kg	0.10	140	27	4.0
Chrysene	M	2700	mg/kg	0.10	120	25	3.8
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	130	28	4.3
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	56	12	2.1
Benzo[a]pyrene	M	2700	mg/kg	0.10	120	23	3.5
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	83	15	3.8
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	20	4.3	0.98
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	69	11	2.2
Total Of 16 PAH's	M	2700	mg/kg	2.0	2800	400	74
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20	< 20	< 20	< 20
Chloroethane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	M	2760	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Benzene	M	2760	µg/kg	1.0	510	< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05752	21-05752	21-05752
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148288	1148289	1148292
				Sample Location:	WS5	WS5	WS3
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.25	0.40	1.00
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Trichloroethene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10	< 10
Toluene	M	2760	µg/kg	1.0	2200	4.5	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10	< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10	< 10	< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0	160	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	2200	5.8	< 1.0
o-Xylene	M	2760	µg/kg	1.0	1200	3.4	< 1.0
Styrene	M	2760	µg/kg	1.0	730	< 1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0	14	< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50	< 50	< 50
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	180	1.8	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	1100	4.4	< 1.0
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05752	21-05752	21-05752
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148288	1148289	1148292
				Sample Location:	WS5	WS5	WS3
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.25	0.40	1.00
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Total Phenols	M	2920	mg/kg	0.30	170	< 0.30	< 0.30

Results - Single Stage WAC

Project: 20/3521 Elleray Hall

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-05752						
Chemtest Sample ID:	1148288						
Sample Ref:							
Sample ID:							
Sample Location:	WS5						
Top Depth(m):	0.25						
Bottom Depth(m):							
Sampling Date:	22-Feb-2021				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	M	%	6.3	3	5	6
Loss On Ignition	2610	M	%	9.7	--	--	10
Total BTEX	2760	M	mg/kg	6.3	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg	67000	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	2800	100	--	--
pH	2010	M		8.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0060	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0009	0.0092	0.5	2	25
Barium	1455	U	0.013	0.13	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	0.04	1	5
Chromium	1455	U	0.0039	0.039	0.5	10	70
Copper	1455	U	0.0018	0.018	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0007	0.0070	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0017	0.017	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.005	0.051	4	50	200
Chloride	1220	U	5.9	59	800	15000	25000
Fluoride	1220	U	0.27	2.7	10	150	500
Sulphate	1220	U	7.2	72	1000	20000	50000
Total Dissolved Solids	1020	N	290	2900	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.2	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	3.6

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection

Test Methods

SOP	Title	Parameters included	Method summary
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-05756-1		
Initial Date of Issue:	05-Mar-2021		
Client	Concept Consultants		
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ		
Contact(s):	Ana Gonzalez Chris Hustler Kasia Mazerant		
Project	20/3521 Elleray Hall		
Quotation No.:	Q21-23032	**Date Received:**	24-Feb-2021
Order No.:	CL2727	**Date Instructed:**	01-Mar-2021
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	05-Mar-2021
Date Approved:	05-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05756	21-05756	21-05756
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148308	1148310	1148311
				Sample Location:	BH2	BH2	BH2
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.3	0.9	1.2
				Bottom Depth (m):		1.0	
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A	-	-	
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	
ACM Detection Stage	U	2192		N/A	-	-	
Moisture	N	2030	%	0.020	11	14	13
Soil Colour	N	2040		N/A	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Clay	Clay
pH	M	2010		4.0	8.6	8.3	
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.58	0.64	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	0.019	
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	
Sulphate (Total)	M	2430	%	0.010	0.084	0.052	
Arsenic	M	2450	mg/kg	1.0	39	9.9	
Cadmium	M	2450	mg/kg	0.10	1.0	< 0.10	
Chromium	M	2450	mg/kg	1.0	17	17	
Copper	M	2450	mg/kg	0.50	61	11	
Mercury	M	2450	mg/kg	0.10	0.88	< 0.10	
Nickel	M	2450	mg/kg	0.50	18	9.6	
Lead	M	2450	mg/kg	0.50	620	41	
Selenium	M	2450	mg/kg	0.20	< 0.20	0.26	
Zinc	M	2450	mg/kg	0.50	230	72	
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	
Total Organic Carbon	M	2625	%	0.20	1.4		
TPH >C6-C8	N	2670	mg/kg	1.0	< 1.0		
TPH >C8-C10	N	2670	mg/kg	1.0	< 1.0		
TPH >C10-C12	N	2670	mg/kg	1.0	< 1.0		
TPH >C12-C16	N	2670	mg/kg	1.0	< 1.0		
TPH >C16-C21	N	2670	mg/kg	1.0	4.7		
TPH >C21-C25	N	2670	mg/kg	1.0	7.5		
TPH >C25-C35	N	2670	mg/kg	1.0	7.0		
TPH >C35-C40	N	2670	mg/kg	1.0	< 1.0		
Total TPH >C6-C40	M	2670	mg/kg	10	19		
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0		< 1.0	< 1.0

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05756	21-05756	21-05756
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148308	1148310	1148311
				Sample Location:	BH2	BH2	BH2
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.3	0.9	1.2
				Bottom Depth (m):		1.0	
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		< 10	< 10
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	1.9	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	0.45	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	5.2	0.34	0.42
Pyrene	M	2700	mg/kg	0.10	4.8	0.34	0.43
Benzo[a]anthracene	M	2700	mg/kg	0.10	2.8	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	2.8	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	4.1	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	1.6	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	2.9	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	2.4	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.56	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	2.1	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	32	< 2.0	< 2.0
Dichlorodifluoromethane	U	2760	µg/kg	1.0		< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0		< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20		< 20	< 20
Chloroethane	U	2760	µg/kg	2.0		< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,1-Dichloroethene	M	2760	mg/kg	1.0		< 1.0	< 1.0

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05756	21-05756	21-05756
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148308	1148310	1148311
				Sample Location:	BH2	BH2	BH2
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.3	0.9	1.2
				Bottom Depth (m):		1.0	
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0		< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5.0		< 5.0	< 5.0
Trichloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0		< 1.0	< 1.0
Benzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0		< 2.0	< 2.0
Trichloroethene	N	2760	µg/kg	1.0		< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0		< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0		< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10		< 10	< 10
Toluene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10		< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10		< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0		< 2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10		< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0		< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0		< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0		< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1.0		< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50		< 50	< 50
N-Propylbenzene	U	2760	µg/kg	1.0		< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1.0		< 1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0		< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05756	21-05756	21-05756
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148308	1148310	1148311
				Sample Location:	BH2	BH2	BH2
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.3	0.9	1.2
				Bottom Depth (m):		1.0	
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Sec-Butylbenzene	U	2760	µg/kg	1.0		< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0		< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0		< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50		< 50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0		< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0		< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0		< 1.0	< 1.0
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30

Results - Single Stage WAC

Project: 20/3521 Elleray Hall

Chemtest Job No:	21-05756				Landfill Waste Acceptance Criteria Limits		
Chemtest Sample ID:	1148309						
Sample Ref:					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:							
Sample Location:	BH2						
Top Depth(m):	0.6						
Bottom Depth(m):							
Sampling Date:	22-Feb-2021						
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	M	%	1.3	3	5	6
Loss On Ignition	2610	M	%	3.6	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg	25	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	30	100	--	--
pH	2010	M		8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.017	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0042	0.042	0.5	2	25
Barium	1455	U	0.010	0.10	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0018	0.018	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.026	0.26	0.5	10	30
Nickel	1455	U	0.0007	0.0065	0.4	10	40
Lead	1455	U	0.0032	0.032	0.5	10	50
Antimony	1455	U	0.014	0.14	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.006	0.064	4	50	200
Chloride	1220	U	7.5	75	800	15000	25000
Fluoride	1220	U	1.2	12	10	150	500
Sulphate	1220	U	63	630	1000	20000	50000
Total Dissolved Solids	1020	N	120	1200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	22	220	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	17

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection

Test Methods

SOP	Title	Parameters included	Method summary
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-05764-1		
Initial Date of Issue:	05-Mar-2021		
Client	Concept Consultants		
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ		
Contact(s):	Ana Gonzalez Chris Hustler Kasia Mazerant		
Project	20/3521 Elleray Hall		
Quotation No.:	Q21-23032	**Date Received:**	24-Feb-2021
Order No.:	CL2727	**Date Instructed:**	01-Mar-2021
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	05-Mar-2021
Date Approved:	05-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05764	21-05764	21-05764	21-05764
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148334	1148335	1148336	1148338
				Sample Location:	WS4	WS4	WS4	WS3
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.1	0.3	0.6	0.25
				Bottom Depth (m):	0.2			
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
ACM Type	U	2192		N/A		-		-
Asbestos Identification	U	2192		N/A		No Asbestos Detected		No Asbestos Detected
ACM Detection Stage	U	2192		N/A		-		-
Moisture	N	2030	%	0.020	8.5	8.7	13	3.9
Soil Colour	N	2040		N/A	Brown		Brown	Brown
Other Material	N	2040		N/A	Stones		None	Stones
Soil Texture	N	2040		N/A	Sand		Sand	Sand
pH	M	2010		4.0	8.9		8.8	8.8
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.64		1.1	1.1
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.013		< 0.010	0.070
Cyanide (Total)	M	2300	mg/kg	0.50	3.1		2.1	12
Sulphate (Total)	M	2430	%	0.010	0.18		0.050	0.40
Arsenic	M	2450	mg/kg	1.0	24		11	30
Cadmium	M	2450	mg/kg	0.10	0.15		< 0.10	0.33
Chromium	M	2450	mg/kg	1.0	27		17	24
Copper	M	2450	mg/kg	0.50	40		21	88
Mercury	M	2450	mg/kg	0.10	0.69		< 0.10	0.32
Nickel	M	2450	mg/kg	0.50	26		16	36
Lead	M	2450	mg/kg	0.50	290		50	250
Selenium	M	2450	mg/kg	0.20	0.27		0.28	0.34
Zinc	M	2450	mg/kg	0.50	81		47	140
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20		3.7		
TPH >C6-C8	N	2670	mg/kg	1.0			< 1.0	
TPH >C8-C10	N	2670	mg/kg	1.0			< 1.0	
TPH >C10-C12	N	2670	mg/kg	1.0			< 1.0	
TPH >C12-C16	N	2670	mg/kg	1.0			< 1.0	
TPH >C16-C21	N	2670	mg/kg	1.0			13	
TPH >C21-C25	N	2670	mg/kg	1.0			26	
TPH >C25-C35	N	2670	mg/kg	1.0			18	
TPH >C35-C40	N	2670	mg/kg	1.0			1.7	
Total TPH >C6-C40	M	2670	mg/kg	10			60	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0			< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0			< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0			55
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0			26
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0			44

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05764	21-05764	21-05764	21-05764
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148334	1148335	1148336	1148338
				Sample Location:	WS4	WS4	WS4	WS3
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.1	0.3	0.6	0.25
				Bottom Depth (m):	0.2			
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	20			82
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	86			320
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0			180
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	110			710
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0			< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0			< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0			15
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	18			63
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	120			530
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	580			2900
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	1500			8800
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	190			1100
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	2400			13000
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	2500			14000
Naphthalene	M	2700	mg/kg	0.10	2.4		0.21	24
Acenaphthylene	M	2700	mg/kg	0.10	9.0		0.75	2.6
Acenaphthene	M	2700	mg/kg	0.10	2.8		0.30	24
Fluorene	M	2700	mg/kg	0.10	8.6		0.65	100
Phenanthrene	M	2700	mg/kg	0.10	61		5.9	610
Anthracene	M	2700	mg/kg	0.10	17		1.5	200
Fluoranthene	M	2700	mg/kg	0.10	96		5.2	760
Pyrene	M	2700	mg/kg	0.10	90		4.8	680
Benzo[a]anthracene	M	2700	mg/kg	0.10	45		1.9	360
Chrysene	M	2700	mg/kg	0.10	37		1.6	270
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	66		1.4	380
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	26		1.0	160
Benzo[a]pyrene	M	2700	mg/kg	0.10	54		2.2	340
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	40		1.5	220
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	11		0.63	59
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	34		1.1	200
Total Of 16 PAH's	M	2700	mg/kg	2.0	600		31	4400
Dichlorodifluoromethane	U	2760	µg/kg	1.0	< 1.0			< 1.0
Chloromethane	M	2760	µg/kg	1.0	< 1.0			< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0			< 1.0
Bromomethane	M	2760	µg/kg	20	< 20			< 20
Chloroethane	U	2760	µg/kg	2.0	< 2.0			< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0			< 1.0
1,1-Dichloroethene	M	2760	mg/kg	1.0	< 1.0			< 1.0

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05764	21-05764	21-05764	21-05764
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148334	1148335	1148336	1148338
				Sample Location:	WS4	WS4	WS4	WS3
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.1	0.3	0.6	0.25
				Bottom Depth (m):	0.2			
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0	< 1.0			< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0			< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0			< 1.0
Bromochloromethane	U	2760	µg/kg	5.0	< 5.0			< 5.0
Trichloromethane	M	2760	µg/kg	1.0	< 1.0			< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0			< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0			< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1.0	< 1.0			< 1.0
Benzene	M	2760	µg/kg	1.0	< 1.0			2.4
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0			< 2.0
Trichloroethene	N	2760	µg/kg	1.0	< 1.0			< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0			< 1.0
Dibromomethane	M	2760	µg/kg	1.0	< 1.0			< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0			< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10			< 10
Toluene	M	2760	µg/kg	1.0	< 1.0			1.5
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10			< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10			< 10
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0			< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2.0	< 2.0			< 2.0
Dibromochloromethane	U	2760	µg/kg	10	< 10			< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0			< 5.0
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0			< 2.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0			< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0			1.1
Styrene	M	2760	µg/kg	1.0	< 1.0			< 1.0
Tribromomethane	U	2760	µg/kg	1.0	< 1.0			< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0
Bromobenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50			< 50
N-Propylbenzene	U	2760	µg/kg	1.0	< 1.0			< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0			< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0			2.0
4-Chlorotoluene	U	2760	µg/kg	1.0	< 1.0			< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1.0	< 1.0			< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0			6.5

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05764	21-05764	21-05764	21-05764
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148334	1148335	1148336	1148338
				Sample Location:	WS4	WS4	WS4	WS3
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.1	0.3	0.6	0.25
				Bottom Depth (m):	0.2			
				Date Sampled:	22-Feb-2021	22-Feb-2021	22-Feb-2021	22-Feb-2021
				Asbestos Lab:		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Sec-Butylbenzene	U	2760	µg/kg	1.0	< 1.0			< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1.0	< 1.0			< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0
N-Butylbenzene	U	2760	µg/kg	1.0	< 1.0			< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50			< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1.0	< 1.0			< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	< 2.0			< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0			< 1.0
Total Phenols	M	2920	mg/kg	0.30	< 0.30		< 0.30	0.85

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-05789-1		
Initial Date of Issue:	11-Mar-2021		
Client	Concept Consultants		
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ		
Contact(s):	Ana Gonzalez Kasia Mazerant		
Project	20/3521 Elleray Hall		
Quotation No.:	Q21-23032	**Date Received:**	25-Feb-2021
Order No.:	CL2732	**Date Instructed:**	05-Mar-2021
No. of Samples:	6		
Turnaround (Wkdays):	5	**Results Due:**	11-Mar-2021
Date Approved:	11-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants	**Chemtest Job No.:**				21-05789	21-05789	21-05789	21-05789	21-05789	21-05789
Quotation No.: Q21-23032	**Chemtest Sample ID.:**				1148464	1148469	1148473	1148474	1148478	1148481
	Sample Location:				WS6	WS7	WS8	WS8	WS9	WS10
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.10	0.30	0.30	0.60	0.60	0.30
	Bottom Depth (m):				0.20	0.30	0.40	0.70	0.60	0.30
	Date Sampled:				23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY			COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
ACM Type	U	2192		N/A	-	-	-			-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected			No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-			-
Moisture	N	2030	%	0.020	9.5	12		18	18	18
Soil Colour	N	2040		N/A	Brown	Brown		Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones		None	None	Stones
Soil Texture	N	2040		N/A	Sand	Sand		Clay	Clay	Sand
pH	M	2010		4.0	9.6	8.5		7.8	7.8	7.7
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.63	0.90		0.68	0.63	0.64
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.13	0.048		< 0.010	< 0.010	0.017
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50		< 0.50	< 0.50	0.50
Sulphate (Total)	M	2430	%	0.010	0.19	0.12		0.035	0.026	0.12
Arsenic	M	2450	mg/kg	1.0	19	31		15	13	23
Cadmium	M	2450	mg/kg	0.10	0.22	0.87		0.13	0.11	0.80
Chromium	M	2450	mg/kg	1.0	12	14		15	17	23
Copper	M	2450	mg/kg	0.50	14	79		41	25	89
Mercury	M	2450	mg/kg	0.10	< 0.10	0.61		0.90	0.40	1.1
Nickel	M	2450	mg/kg	0.50	13	15		15	15	23
Lead	M	2450	mg/kg	0.50	33	430		170	130	500
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20		0.36	0.33	0.67
Zinc	M	2450	mg/kg	0.50	61	190		69	68	430
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50
TPH >C6-C8	N	2670	mg/kg	1.0	< 1.0	< 1.0		< 1.0		< 1.0
TPH >C8-C10	N	2670	mg/kg	1.0	1.2	< 1.0		1.4		< 1.0
TPH >C10-C12	N	2670	mg/kg	1.0	18	< 1.0		20		< 1.0
TPH >C12-C16	N	2670	mg/kg	1.0	49	< 1.0		52		4.7
TPH >C16-C21	N	2670	mg/kg	1.0	29	< 1.0		25		25
TPH >C21-C25	N	2670	mg/kg	1.0	120	< 1.0		110		100
TPH >C25-C35	N	2670	mg/kg	1.0	3300	< 1.0		37		51
TPH >C35-C40	N	2670	mg/kg	1.0	1900	< 1.0		< 1.0		< 1.0
Total TPH >C6-C40	M	2670	mg/kg	10	5500	< 10		240		180
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0					< 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0					< 1.0	
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0					< 1.0	
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0					< 1.0	
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0					< 1.0	
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0					< 1.0	

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05789	21-05789	21-05789	21-05789	21-05789	21-05789
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148464	1148469	1148473	1148474	1148478	1148481
				Sample Location:	WS6	WS7	WS8	WS8	WS9	WS10
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.10	0.30	0.30	0.60	0.60	0.30
				Bottom Depth (m):	0.20	0.30	0.40	0.70	0.60	0.30
				Date Sampled:	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY			COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0					< 1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0					< 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0					< 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0					< 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0					< 1.0	
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0					< 1.0	
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0					< 1.0	
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0					< 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0					< 1.0	
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0					< 1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0					< 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0					< 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0					< 10	
Naphthalene	M	2700	mg/kg	0.10	< 0.10	0.63		< 0.10	< 0.10	0.43
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	0.80		< 0.10	< 0.10	0.81
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	0.11		< 0.10	< 0.10	0.14
Fluorene	M	2700	mg/kg	0.10	< 0.10	0.43		< 0.10	< 0.10	0.23
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	3.4		0.86	0.54	3.0
Anthracene	M	2700	mg/kg	0.10	< 0.10	0.70		0.16	0.13	0.74
Fluoranthene	M	2700	mg/kg	0.10	0.35	10		1.2	1.2	7.7
Pyrene	M	2700	mg/kg	0.10	0.42	9.4		1.2	1.2	7.5
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	4.5		0.49	0.69	4.2
Chrysene	M	2700	mg/kg	0.10	< 0.10	4.3		0.64	0.72	4.2
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	7.1		< 0.10	0.54	6.2
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	2.8		< 0.10	0.35	2.9
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	5.5		< 0.10	0.77	4.7
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	3.9		< 0.10	0.66	3.4
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	0.97		< 0.10	0.34	1.1
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	4.2		< 0.10	0.58	2.8
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	59		4.6	7.7	50
Dichlorodifluoromethane	U	2760	µg/kg	1.0					< 1.0	
Chloromethane	M	2760	µg/kg	1.0					< 1.0	
Vinyl Chloride	M	2760	µg/kg	1.0					< 1.0	
Bromomethane	M	2760	µg/kg	20					< 20	
Chloroethane	U	2760	µg/kg	2.0					< 2.0	
Trichlorofluoromethane	M	2760	µg/kg	1.0					< 1.0	
1,1-Dichloroethene	M	2760	mg/kg	1.0					< 1.0	
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0					< 1.0	

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05789	21-05789	21-05789	21-05789	21-05789	21-05789
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148464	1148469	1148473	1148474	1148478	1148481
				Sample Location:	WS6	WS7	WS8	WS8	WS9	WS10
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.10	0.30	0.30	0.60	0.60	0.30
				Bottom Depth (m):	0.20	0.30	0.40	0.70	0.60	0.30
				Date Sampled:	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY			COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
1,1-Dichloroethane	M	2760	µg/kg	1.0					< 1.0	
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0					< 1.0	
Bromochloromethane	U	2760	µg/kg	5.0					< 5.0	
Trichloromethane	M	2760	µg/kg	1.0					< 1.0	
1,1,1-Trichloroethane	M	2760	µg/kg	1.0					< 1.0	
Tetrachloromethane	M	2760	µg/kg	1.0					< 1.0	
1,1-Dichloropropene	U	2760	µg/kg	1.0					< 1.0	
Benzene	M	2760	µg/kg	1.0					< 1.0	
1,2-Dichloroethane	M	2760	µg/kg	2.0					< 2.0	
Trichloroethene	N	2760	µg/kg	1.0					< 1.0	
1,2-Dichloropropane	M	2760	µg/kg	1.0					< 1.0	
Dibromomethane	M	2760	µg/kg	1.0					< 1.0	
Bromodichloromethane	M	2760	µg/kg	5.0					< 5.0	
cis-1,3-Dichloropropene	N	2760	µg/kg	10					< 10	
Toluene	M	2760	µg/kg	1.0					< 1.0	
Trans-1,3-Dichloropropene	N	2760	µg/kg	10					< 10	
1,1,2-Trichloroethane	M	2760	µg/kg	10					< 10	
Tetrachloroethene	M	2760	µg/kg	1.0					< 1.0	
1,3-Dichloropropane	U	2760	µg/kg	2.0					< 2.0	
Dibromochloromethane	U	2760	µg/kg	10					< 10	
1,2-Dibromoethane	M	2760	µg/kg	5.0					< 5.0	
Chlorobenzene	M	2760	µg/kg	1.0					< 1.0	
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0					< 2.0	
Ethylbenzene	M	2760	µg/kg	1.0					< 1.0	
m & p-Xylene	M	2760	µg/kg	1.0					< 1.0	
o-Xylene	M	2760	µg/kg	1.0					< 1.0	
Styrene	M	2760	µg/kg	1.0					< 1.0	
Tribromomethane	U	2760	µg/kg	1.0					< 1.0	
Isopropylbenzene	M	2760	µg/kg	1.0					< 1.0	
Bromobenzene	M	2760	µg/kg	1.0					< 1.0	
1,2,3-Trichloropropane	N	2760	µg/kg	50					< 50	
N-Propylbenzene	U	2760	µg/kg	1.0					< 1.0	
2-Chlorotoluene	M	2760	µg/kg	1.0					< 1.0	
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0					< 1.0	
4-Chlorotoluene	U	2760	µg/kg	1.0					< 1.0	
Tert-Butylbenzene	U	2760	µg/kg	1.0					< 1.0	
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0					< 1.0	
Sec-Butylbenzene	U	2760	µg/kg	1.0					< 1.0	

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-05789	21-05789	21-05789	21-05789	21-05789	21-05789
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1148464	1148469	1148473	1148474	1148478	1148481
				Sample Location:	WS6	WS7	WS8	WS8	WS9	WS10
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.10	0.30	0.30	0.60	0.60	0.30
				Bottom Depth (m):	0.20	0.30	0.40	0.70	0.60	0.30
				Date Sampled:	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021	23-Feb-2021
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY			COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
1,3-Dichlorobenzene	M	2760	µg/kg	1.0					< 1.0	
4-Isopropyltoluene	U	2760	µg/kg	1.0					< 1.0	
1,4-Dichlorobenzene	M	2760	µg/kg	1.0					< 1.0	
N-Butylbenzene	U	2760	µg/kg	1.0					< 1.0	
1,2-Dichlorobenzene	M	2760	µg/kg	1.0					< 1.0	
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50					< 50	
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0					< 1.0	
Hexachlorobutadiene	U	2760	µg/kg	1.0					< 1.0	
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0					< 2.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0					< 1.0	
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-06275-1
Initial Date of Issue:	11-Mar-2021
Client	Concept Consultants
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ
Contact(s):	Ana Gonzalez Chris Hustler Kasia Mazerant
Project	20/3521 Elleray Hall

Quotation No.:	Q21-23032	**Date Received:**	01-Mar-2021
Order No.:	CL2732	**Date Instructed:**	05-Mar-2021
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	11-Mar-2021
Date Approved:	11-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-06275	21-06275	21-06275	21-06275
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1151026	1151028	1151029	1151032
				Sample Location:	STP3	STP1	STP1	STP2
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.10	0.25	0.40
				Bottom Depth (m):	0.50	0.10	0.25	0.40
				Date Sampled:	25-Feb-2021	25-Feb-2021	25-Feb-2021	25-Feb-2021
				Asbestos Lab:	COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
ACM Type	U	2192		N/A	-		-	
Asbestos Identification	U	2192		N/A	No Asbestos Detected		No Asbestos Detected	
ACM Detection Stage	U	2192		N/A	-		-	
Moisture	N	2030	%	0.020	15	7.8		11
Soil Colour	N	2040		N/A	Brown	Brown		Brown
Other Material	N	2040		N/A	Stones	Stones		Stones
Soil Texture	N	2040		N/A	Sand	Sand		Sand
pH	M	2010		4.0	8.0	9.0		8.8
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.65	0.74		0.53
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	0.37		0.064
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	0.60		< 0.50
Sulphate (Total)	M	2430	%	0.010	0.020	1.1		0.13
Arsenic	M	2450	mg/kg	1.0	11	26		11
Cadmium	M	2450	mg/kg	0.10	< 0.10	3.2		0.19
Chromium	M	2450	mg/kg	1.0	14	38		15
Copper	M	2450	mg/kg	0.50	15	170		25
Mercury	M	2450	mg/kg	0.10	0.17	5.3		0.39
Nickel	M	2450	mg/kg	0.50	11	35		16
Lead	M	2450	mg/kg	0.50	52	770		100
Selenium	M	2450	mg/kg	0.20	0.26	0.31		< 0.20
Zinc	M	2450	mg/kg	0.50	32	470		59
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50		< 0.50
TPH >C6-C8	N	2670	mg/kg	1.0	< 1.0			< 1.0
TPH >C8-C10	N	2670	mg/kg	1.0	< 1.0			< 1.0
TPH >C10-C12	N	2670	mg/kg	1.0	< 1.0			18
TPH >C12-C16	N	2670	mg/kg	1.0	< 1.0			33
TPH >C16-C21	N	2670	mg/kg	1.0	< 1.0			70
TPH >C21-C25	N	2670	mg/kg	1.0	< 1.0			150
TPH >C25-C35	N	2670	mg/kg	1.0	< 1.0			160
TPH >C35-C40	N	2670	mg/kg	1.0	< 1.0			32
Total TPH >C6-C40	M	2670	mg/kg	10	< 10			460
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		< 1.0		
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		< 1.0		
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0		< 1.0		
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0		25		
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0		22		
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0		51		

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-06275	21-06275	21-06275	21-06275
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1151026	1151028	1151029	1151032
				Sample Location:	STP3	STP1	STP1	STP2
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.10	0.25	0.40
				Bottom Depth (m):	0.50	0.10	0.25	0.40
				Date Sampled:	25-Feb-2021	25-Feb-2021	25-Feb-2021	25-Feb-2021
				Asbestos Lab:	COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0		370		
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		60		
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		520		
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0		
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0		
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0		21		
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0		36		
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0		69		
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		220		
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0		2100		
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		410		
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		2800		
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		3400		
Naphthalene	M	2700	mg/kg	0.10	< 0.10	3.3		1.9
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	6.6		2.4
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	5.4		4.9
Fluorene	M	2700	mg/kg	0.10	< 0.10	11		7.5
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	63		54
Anthracene	M	2700	mg/kg	0.10	< 0.10	23		15
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	130		67
Pyrene	M	2700	mg/kg	0.10	< 0.10	120		62
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	58		30
Chrysene	M	2700	mg/kg	0.10	< 0.10	57		28
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	78		36
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	31		15
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	62		31
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	42		< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	11		< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	35		< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	740		350
Dichlorodifluoromethane	U	2760	µg/kg	1.0		< 1.0		
Chloromethane	M	2760	µg/kg	1.0		< 1.0		
Vinyl Chloride	M	2760	µg/kg	1.0		< 1.0		
Bromomethane	M	2760	µg/kg	20		< 20		
Chloroethane	U	2760	µg/kg	2.0		< 2.0		
Trichlorofluoromethane	M	2760	µg/kg	1.0		< 1.0		
1,1-Dichloroethene	M	2760	mg/kg	1.0		< 1.0		
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0		< 1.0		

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-06275	21-06275	21-06275	21-06275
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1151026	1151028	1151029	1151032
				Sample Location:	STP3	STP1	STP1	STP2
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.10	0.25	0.40
				Bottom Depth (m):	0.50	0.10	0.25	0.40
				Date Sampled:	25-Feb-2021	25-Feb-2021	25-Feb-2021	25-Feb-2021
				Asbestos Lab:	COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
1,1-Dichloroethane	M	2760	µg/kg	1.0		< 1.0		
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0		< 1.0		
Bromochloromethane	U	2760	µg/kg	5.0		< 5.0		
Trichloromethane	M	2760	µg/kg	1.0		< 1.0		
1,1,1-Trichloroethane	M	2760	µg/kg	1.0		< 1.0		
Tetrachloromethane	M	2760	µg/kg	1.0		< 1.0		
1,1-Dichloropropene	U	2760	µg/kg	1.0		< 1.0		
Benzene	M	2760	µg/kg	1.0		< 1.0		
1,2-Dichloroethane	M	2760	µg/kg	2.0		< 2.0		
Trichloroethene	N	2760	µg/kg	1.0		< 1.0		
1,2-Dichloropropane	M	2760	µg/kg	1.0		< 1.0		
Dibromomethane	M	2760	µg/kg	1.0		< 1.0		
Bromodichloromethane	M	2760	µg/kg	5.0		< 5.0		
cis-1,3-Dichloropropene	N	2760	µg/kg	10		< 10		
Toluene	M	2760	µg/kg	1.0		< 1.0		
Trans-1,3-Dichloropropene	N	2760	µg/kg	10		< 10		
1,1,2-Trichloroethane	M	2760	µg/kg	10		< 10		
Tetrachloroethene	M	2760	µg/kg	1.0		< 1.0		
1,3-Dichloropropane	U	2760	µg/kg	2.0		< 2.0		
Dibromochloromethane	U	2760	µg/kg	10		< 10		
1,2-Dibromoethane	M	2760	µg/kg	5.0		< 5.0		
Chlorobenzene	M	2760	µg/kg	1.0		< 1.0		
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0		< 2.0		
Ethylbenzene	M	2760	µg/kg	1.0		< 1.0		
m & p-Xylene	M	2760	µg/kg	1.0		< 1.0		
o-Xylene	M	2760	µg/kg	1.0		< 1.0		
Styrene	M	2760	µg/kg	1.0		< 1.0		
Tribromomethane	U	2760	µg/kg	1.0		< 1.0		
Isopropylbenzene	M	2760	µg/kg	1.0		< 1.0		
Bromobenzene	M	2760	µg/kg	1.0		< 1.0		
1,2,3-Trichloropropane	N	2760	µg/kg	50		< 50		
N-Propylbenzene	U	2760	µg/kg	1.0		< 1.0		
2-Chlorotoluene	M	2760	µg/kg	1.0		< 1.0		
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0		< 1.0		
4-Chlorotoluene	U	2760	µg/kg	1.0		< 1.0		
Tert-Butylbenzene	U	2760	µg/kg	1.0		< 1.0		
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0		< 1.0		
Sec-Butylbenzene	U	2760	µg/kg	1.0		< 1.0		

Results - Soil

Project: 20/3521 Elleray Hall

Client: Concept Consultants				**Chemtest Job No.:**	21-06275	21-06275	21-06275	21-06275
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1151026	1151028	1151029	1151032
				Sample Location:	STP3	STP1	STP1	STP2
				Sample Type:	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.10	0.25	0.40
				Bottom Depth (m):	0.50	0.10	0.25	0.40
				Date Sampled:	25-Feb-2021	25-Feb-2021	25-Feb-2021	25-Feb-2021
				Asbestos Lab:	COVENTRY		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
1,3-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0		
4-Isopropyltoluene	U	2760	µg/kg	1.0		< 1.0		
1,4-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0		
N-Butylbenzene	U	2760	µg/kg	1.0		< 1.0		
1,2-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0		
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50		< 50		
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0		< 1.0		
Hexachlorobutadiene	U	2760	µg/kg	1.0		< 1.0		
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0		< 2.0		
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0		< 1.0		
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30		< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

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U	UKAS accredited
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N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-08859-1		
Initial Date of Issue:	25-Mar-2021		
Client	Concept Consultants		
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ		
Contact(s):	Ana Gonzalez Kasia Mazerant		
Project	20/3521 Elieray Hall & North Lake Depot		
Quotation No.:	Q21-23032	**Date Received:**	19-Mar-2021
Order No.:	CL2776	**Date Instructed:**	19-Mar-2021
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	26-Mar-2021
Date Approved:	25-Mar-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Water

Project: 20/3521 Elieray Hall & North Lake Depot

Client: Concept Consultants				**Chemtest Job No.:**	21-08859
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1163651
				Sample Location:	BH2
				Sample Type:	WATER
				Date Sampled:	17-Mar-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	8.2
Sulphate	U	1220	mg/l	1.0	89
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.57
Boron (Dissolved)	U	1455	µg/l	10.0	110
Cadmium (Dissolved)	U	1455	µg/l	0.12	< 0.12
Chromium (Dissolved)	U	1455	µg/l	0.50	6.9
Copper (Dissolved)	U	1455	µg/l	0.50	1.5
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05
Nickel (Dissolved)	U	1455	µg/l	0.50	1.0
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	1.2
Zinc (Dissolved)	U	1455	µg/l	3.0	4.0
Chromium (Hexavalent)	U	1490	µg/l	20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10
Naphthalene	U	1700	µg/l	0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10

Results - Water

Project: 20/3521 Elieray Hall & North Lake Depot

Client: Concept Consultants			**Chemtest Job No.:**		21-08859
Quotation No.: Q21-23032			**Chemtest Sample ID.:**		1163651
			Sample Location:		BH2
			Sample Type:		WATER
			Date Sampled:		17-Mar-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10
Bromodichloromethane	U	1760	µg/l	5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0

Results - Water

Project: 20/3521 Elieray Hall & North Lake Depot

Client: Concept Consultants			**Chemtest Job No.:**		21-08859
Quotation No.: Q21-23032			**Chemtest Sample ID.:**		1163651
			Sample Location:		BH2
			Sample Type:		WATER
			Date Sampled:		17-Mar-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
m & p-Xylene	U	1760	µg/l	1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0
Total Phenols	U	1920	mg/l	0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

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Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

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customerservices@chemtest.com

UKAS TESTING 2183

Eurofins Chemtest

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-19966-1		
Initial Date of Issue:	18-Jun-2021		
Client	Concept Consultants		
Client Address:	Unit D, Herald Way Binley Industrial Estate Coventry CV3 2RQ		
Contact(s):	Ana Gonzalez Kasia Mazerant		
Project	20/3521 Elleray Hall & North Lane Depot		
Quotation No.:	Q21-23032	**Date Received:**	11-Jun-2021
Order No.:	CL2904	**Date Instructed:**	11-Jun-2021
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	17-Jun-2021
Date Approved:	18-Jun-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Water

Project: 20/3521 Elleray Hall & North Lane Depot

Client: Concept Consultants				**Chemtest Job No.:**	21-19966
Quotation No.: Q21-23032				**Chemtest Sample ID.:**	1219867
Order No.: CL2904				Client Sample Ref.:	1A
				Sample Location:	BH1
				Sample Type:	WATER
				Date Sampled:	09-Jun-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	8.3
Sulphate	U	1220	mg/l	1.0	110
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.57
Boron (Dissolved)	U	1455	µg/l	10.0	84
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	7.0
Copper (Dissolved)	U	1455	µg/l	0.50	1.5
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05
Nickel (Dissolved)	U	1455	µg/l	0.50	0.59
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	1.4
Zinc (Dissolved)	U	1455	µg/l	2.5	< 2.5
Chromium (Hexavalent)	U	1490	µg/l	20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10
Naphthalene	U	1700	µg/l	0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10

Results - Water

Project: 20/3521 Elleray Hall & North Lane Depot

Client: Concept Consultants			**Chemtest Job No.:**		21-19966
Quotation No.: Q21-23032			**Chemtest Sample ID.:**		1219867
Order No.: CL2904			Client Sample Ref.:		1A
			Sample Location:		BH1
			Sample Type:		WATER
			Date Sampled:		09-Jun-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Pyrene	U	1700	µg/l	0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10
Bromodichloromethane	U	1760	µg/l	5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0

Results - Water

Project: 20/3521 Elleray Hall & North Lane Depot

Client: Concept Consultants			Chemtest Job No.:		21-19966
Quotation No.: Q21-23032			Chemtest Sample ID.:		1219867
Order No.: CL2904			Client Sample Ref.:		1A
			Sample Location:		BH1
			Sample Type:		WATER
			Date Sampled:		09-Jun-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0
Total Phenols	U	1920	mg/l	0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

16. PHOTOGRAPHS

Project No	20/3521	Hole ID	WS1
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	001 & 002
Client	Richmond & Wandsworth Council	Date	February 2021

CONCEPT

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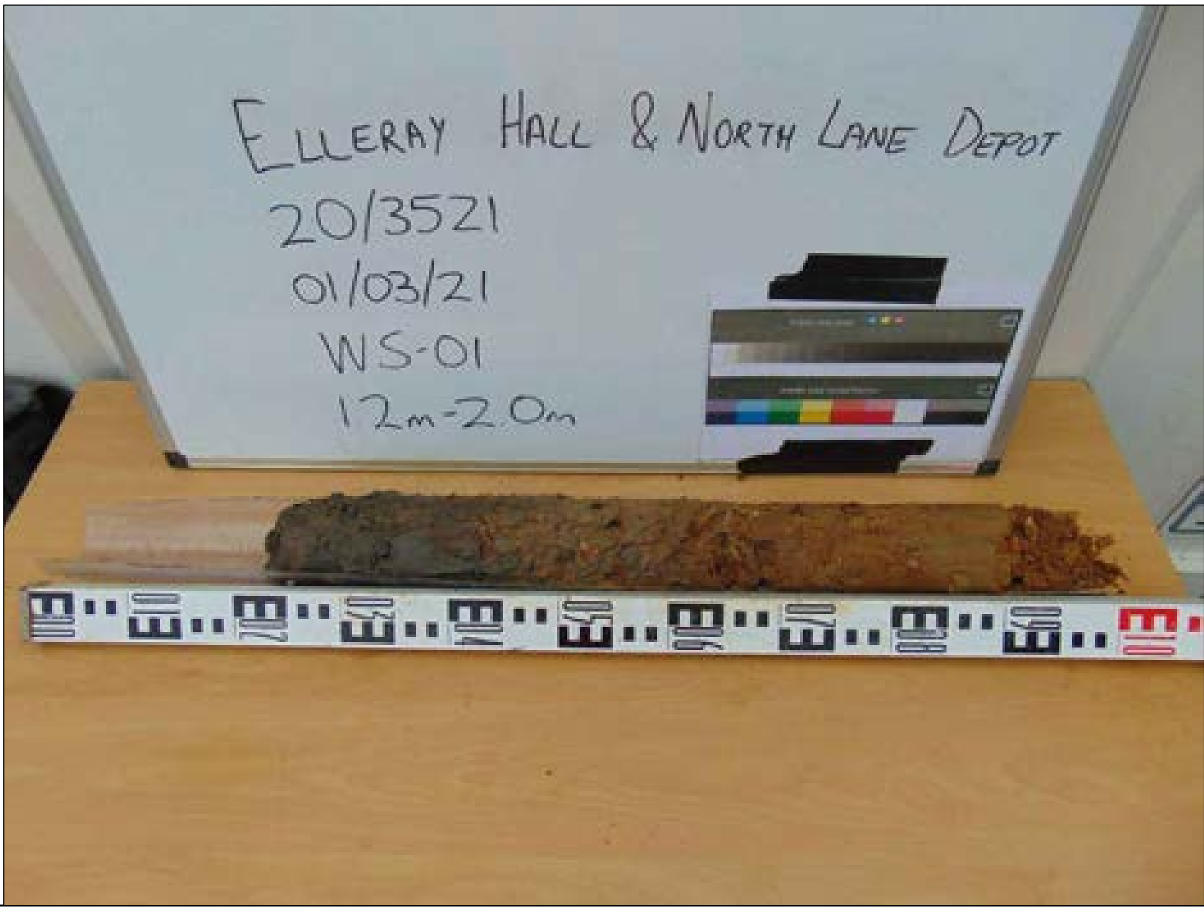

Photograph No 001

Photograph No 002

Project No	20/3521	Hole ID	WS2
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	003 & 004
Client	Richmond & Wandsworth Council	Date	February 2021

CONCEPT
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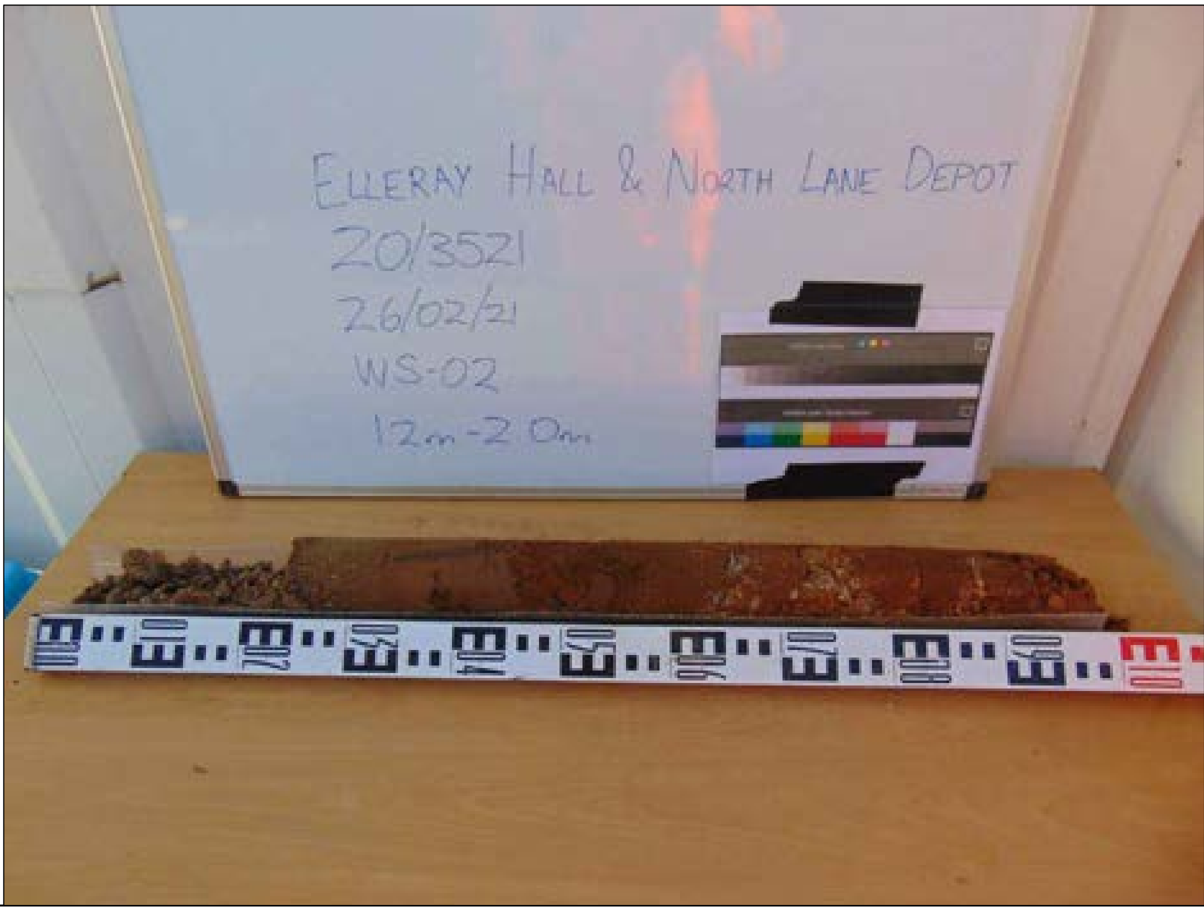

Photograph No 003

Photograph No 004

Project No	20/3521	Hole ID	WS3
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	005 & 006
Client	Richmond & Wandsworth Council	Date	February 2021

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Photograph No 005

Photograph No 006

Project No	20/3521	Hole ID	WS4
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	007 & 008
Client	Richmond & Wandsworth Council	Date	February 2021

CONCEPT
HEAD OFFICE: Unit 8 Warple Mews Warple Way London W3 0RF si@conceptconsultants.co.uk +44(0) 20 8811 2880
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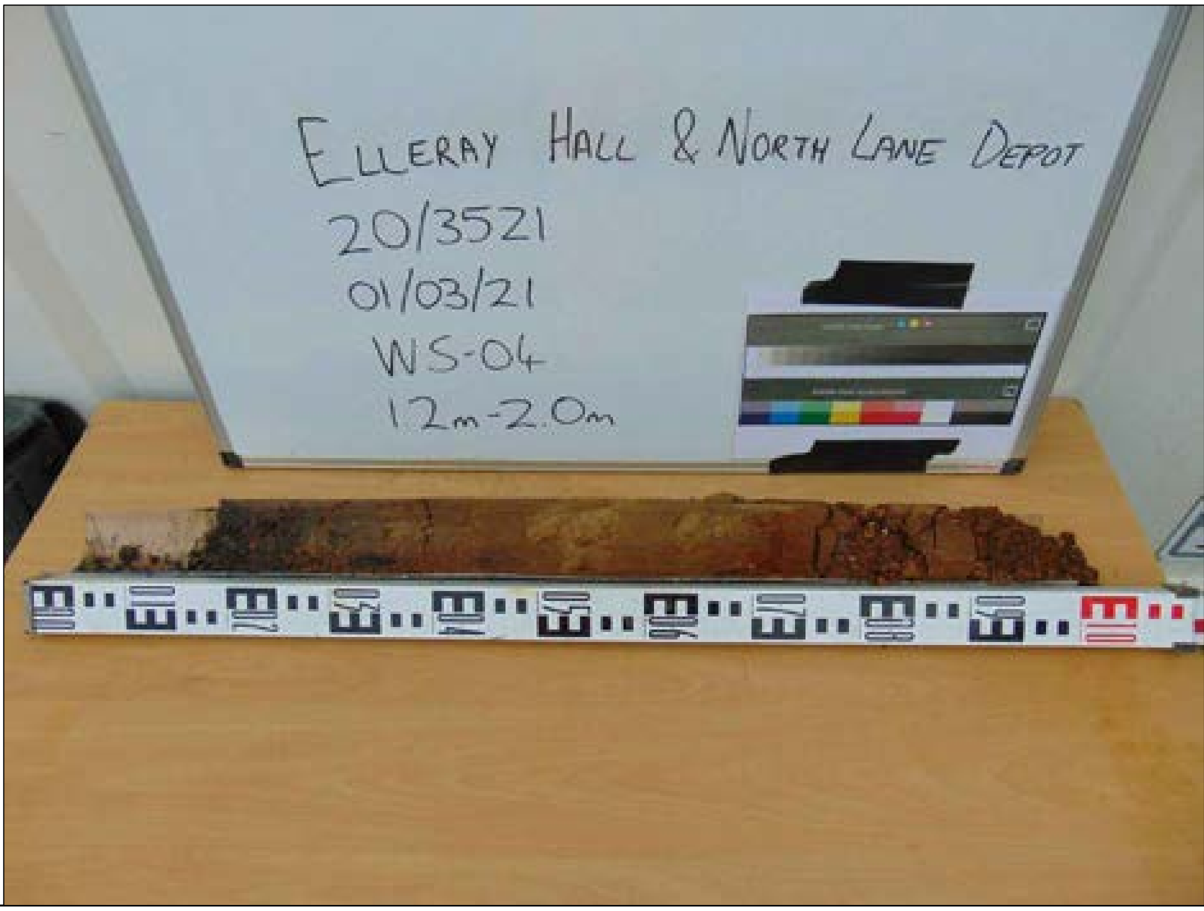

Photograph No 007

Photograph No 008

Project No	20/3521	Hole ID	WS5
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	009 & 010
Client	Richmond & Wandsworth Council	Date	February 2021

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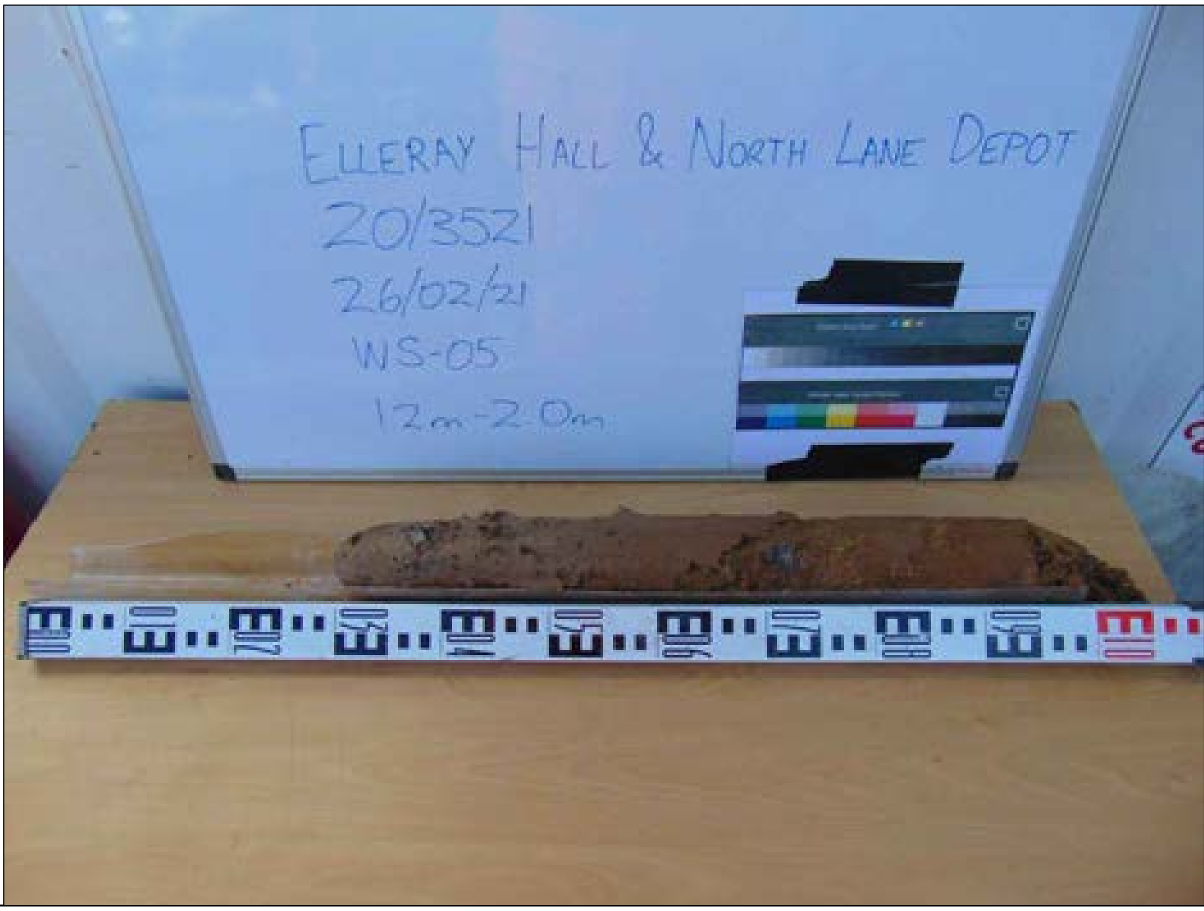

Photograph No 009

Photograph No 010

Project No	20/3521	Hole ID	WS6
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	011 & 012
Client	Richmond & Wandsworth Council	Date	February 2021

CONCEPT

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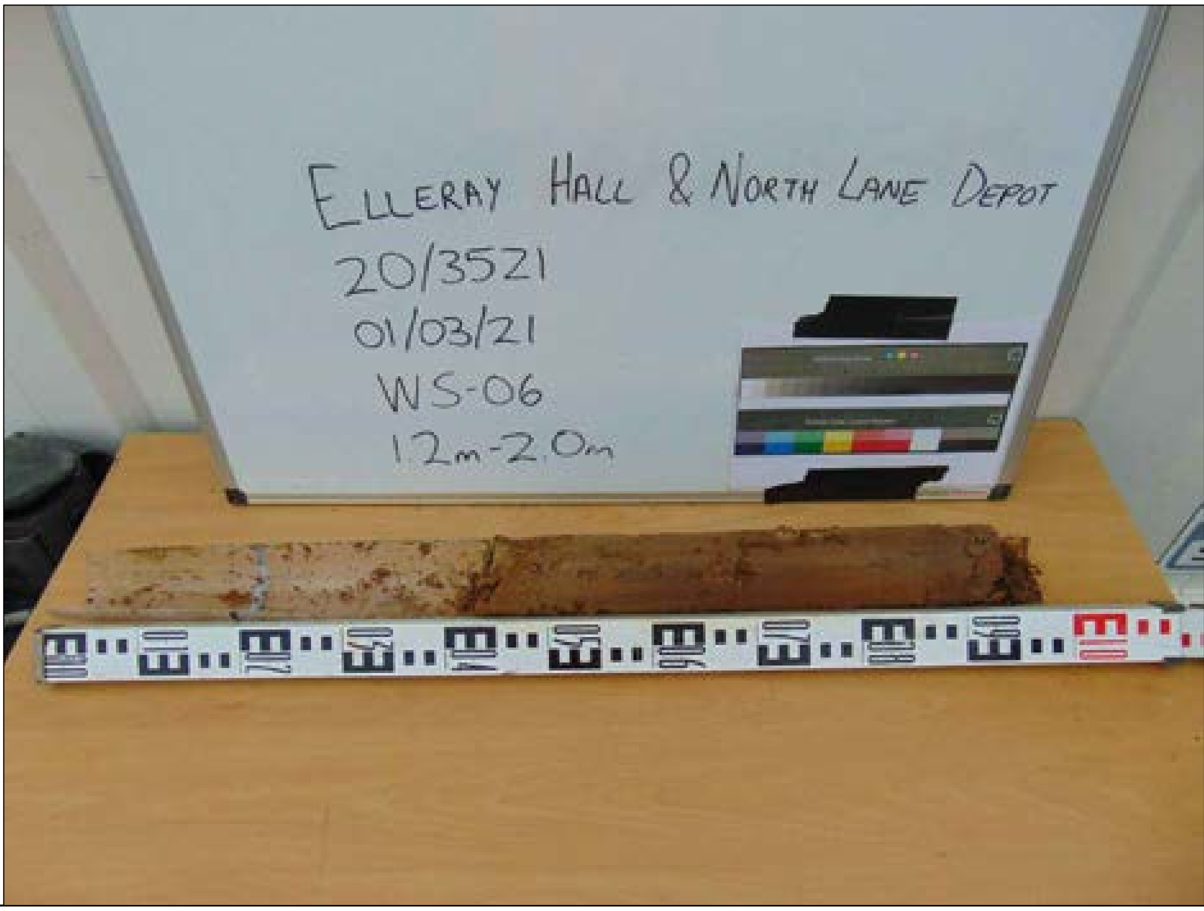

Photograph No 011

Photograph No 012

Project No	20/3521	Hole ID	WS7
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	013 & 014
Client	Richmond & Wandsworth Council	Date	February 2021

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Photograph No 013

Photograph No 014

Project No	20/3521	Hole ID	WS8
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	015 & 016
Client	Richmond & Wandsworth Council	Date	February 2021

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Photograph No 015

Photograph No 016

Project No	20/3521	Hole ID	WS9
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	017 & 018
Client	Richmond & Wandsworth Council	Date	February 2021

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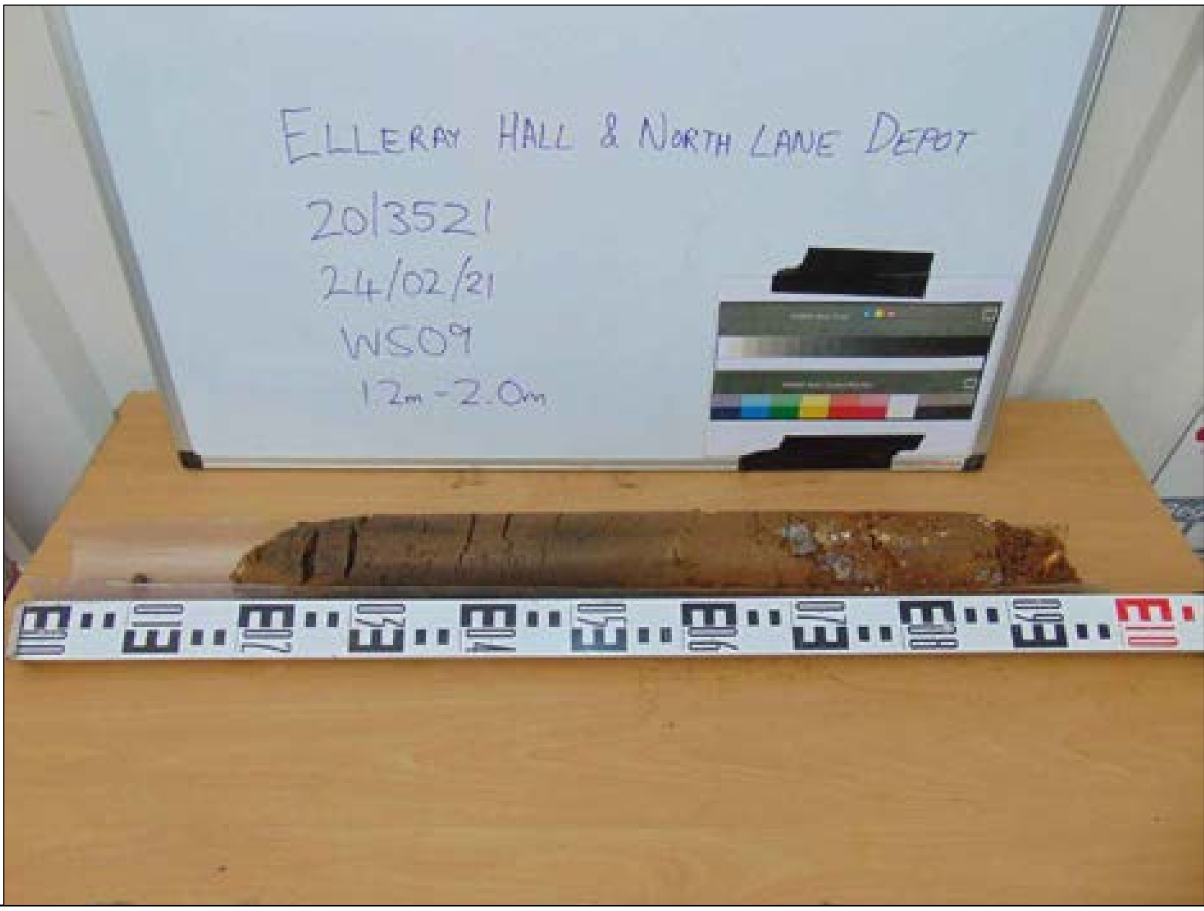

Photograph No 017

Photograph No 018

Project No	20/3521	Hole ID	WS10
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	019 & 020
Client	Richmond & Wandsworth Council	Date	February 2021

HEAD OFFICE: Unit 8 Warple Mews, Warple Way, London W3 0RF, si@conceptconsultants.co.uk, +44(0) 20 8811 2880
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Photograph No 019

Photograph No 020

Project No	20/3521	Hole ID	STP1
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	021 & 022
Client	Richmond & Wandsworth Council	Date	25/02/2021

CONCEPT

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Photograph No 021

Photograph No 022

Project No	20/3521	Hole ID	STP1
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	023 & 024
Client	Richmond & Wandsworth Council	Date	25/02/2021

Photograph No 023

Photograph No 024

Project No	20/3521	Hole ID	STP2
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	025 & 026
Client	Richmond & Wandsworth Council	Date	25/02/2021

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Photograph No 025

Photograph No 026

Project No	20/3521	Hole ID	STP2
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	027 & 028
Client	Richmond & Wandsworth Council	Date	25/02/2021

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Photograph No 027

Photograph No 028

Project No	20/3521	Hole ID	STP2
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	029 & 030
Client	Richmond & Wandsworth Council	Date	25/02/2021

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Photograph No 029

Photograph No 030

Project No	20/3521	Hole ID	STP3
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	031 & 032
Client	Richmond & Wandsworth Council	Date	25/02/2021

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Photograph No 031

Photograph No 032

Project No	20/3521	Hole ID	STP3
Project Name	Elleray Hall & North Lane Depot/East Car Park	Photograph No	033 & 034
Client	Richmond & Wandsworth Council	Date	25/02/2021

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LABORATORY: 47-49 Brunel Road, Old Oak Common, Acton London W3 7XR, lab@conceptconsultants.co.uk, +44(0) 20 8740 1553
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Photograph No 033

Photograph No 034

APPENDIX A: Unexploded Ordnance Risk Assessment

JOMAS ENGINEERING ENVIRONMENTAL

WE LISTEN, WE PLAN, WE DELIVER

Geotechnical Engineering and Environmental Services across the UK.

DETAILED UNEXPLODED ORDNANCE (UXO) RISK ASSESSMENT

FOR THE SITE AT

Elleray Hall & North Lane Depot, Teddington TW11
And
East Car Park, Teddington TW11

This report has been produced by Primely on behalf of JOMAS

JOMAS ASSOCIATES LTD
6-9 The Square, Stockley Park, Uxbridge, UB11 1FW
www.jomasassociates.com 0843-289-2187 info@jomasassociates.com

EXECUTIVE SUMMARY

Site location and general description

Primely Ltd has been commissioned by *JOMAS ASSOCIATES Ltd* to carry out a detailed Unexploded Ordnance (UXO) Risk Assessment for the development projects at North lane depot East car park, Teddington TW11 0HG and Elleray Hall, Elleray Road, Teddington TW11 0HG. The sites are centred approximately on National Grid Reference TQ 15689 70909.

The site is bounded on all sides by private homes, with North Lane on its West and Middle Lane centred between the two plots as seen in figure 2.1.

The site is currently occupied by commercial buildings in part and associated with hard-standing tarmacked ground.

TW11 0HG is currently in Coronavirus (Covid-19) England Tier 5 (Stay at home)
Data from NHSX, correct as of 16th January 2021

Scope of proposed works

It is understood that a series of site investigation works are planned across the site area.

Risk assessment

Primely Ltd has assessed that there is a **LOW** risk of items of unexploded German aerial delivered. Other types of munitions also constitute a **LOW** risk**.**

- The site is located within the London Borough of Richmond upon Thames, historic county of Middlesex, which sustained a low-density bombing campaign during the Blitz.
- Official records show that 59 high explosive (HE) bombs were dropped in Teddington throughout the war.
- November 1940 saw the borough sustain its highest casualties. 74 people were killed.
- On the night of November 29,130 bombs and between 3,000 and 5,000 incendiary devices rained down on Twickenham and Teddington, destroying 150 houses and damaging more than 6,000 others.

- The National Physical Laboratory had been designated a special target by the Luftwaffe, as it was here the engineer and aeronautical designer Barnes Wallis was developing the 'Bouncing Bomb', later to be used by the RAF in the famous Dambusters raid of May 1943. The raid destroyed Germany's Mohne and Eder dams.
- There was an American army base in Bushy Park (600m south west of the site).
- Teddington Film Studios, one of the few British studios (2km southeast), received a direct hit from a V1 on the evening of July 5, 1944.
- By the end of the war, 143 civilians had been killed in air raids, 500 houses had been destroyed, and another 32,000 residences had sustained damage.

Recommended risk mitigation measures

To support the proposed works, Primely Ltd suggests the following risk mitigation measures:

- No further action. However, re-active measures should be employed such as a UXO “Toolbox” brief, a UXO ‘Emergency Management Plan’ and/or an “on-call” service.

Primely Ltd can supply the above services.

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Acronyms and abbreviations

AAA Anti-Aircraft Artillery
AP Armour Piercing
AP Anti-Personnel
ARP Air Raid Precaution (Wardens)
BD Bombing Density
BGL Below Ground Level
BGS British Geological Survey (UK)
BH Borehole
BPD Bomb Penetration Depth
CDM Construction (Design and Management) Regulations 2015 (UK)
CIRIA Construction Industry Research and Information Association
CPT Cone Penetrometer Test
EOC Explosive Ordnance Clearance
EOD Explosive Ordnance Disposal
ERP Emergency Response Plan
ERW Explosive Remnants of War
FFE Free From Explosives
GI Ground Investigation
GPS Global Positioning System
HE High Explosive
HSE Health and Safety Executive
HSWA Health and Safety at Work Act 1974
IB Incendiary Bomb
JSEODOC Joint Services Explosive Ordnance Disposal Operations Centre (UK)
LE Low Explosive
LM Luftmine (Germany)
HSWA Health and Safety at Work Act 1974
IB Incendiary Bomb
JSEODOC Joint Services Explosive Ordnance Disposal Operations Centre (UK)
LE Low Explosive
LM Luftmine (Germany)
LSA Land Service Ammunition MOD Ministry of Defence (UK)
NEQ Net Explosive Quantity
RAF Royal Air Force
RN Royal Navy
ROF Royal Ordnance Factory
SAA Small Arms Ammunition
SAP Semi-Armour-Piercing
RAF Royal Air Force
SI Site Investigation
SIP Self-Igniting Phosphorous
UXB Unexploded Bomb
UXO Unexploded Ordnance
V1 Vengeance Weapon 1 - Flying bombs
V2 Vengeance Weapon 2 - Flying bombs
WAAF Women Auxiliary Air Force
ROF Small Arms Ammunition
SI Site Investigation

INTRODUCTION

Primely Ltd has been commissioned by *JOMAS ASSOCIATES* to carry out a detailed Unexploded Ordnance (UXO) Risk Assessment for the development projects at North Lane Depot East car par and Elleray Hall, Elleray Road, Teddington TW11 0HG*, United Kingdom*. The desk study provides a detailed assessment of the location with regards to the risks of encountering items of unexploded ordnance and the consequences of that encounter.

This report documents the findings of the study carried out for the assessment of the potential risk from deep buried unexploded High Explosive (HE) bombs and munitions constituents at the site, and make suitable recommendations to mitigate the risk to a level that is as low as reasonable and practicable (ALARP).

Reasonable efforts have been exerted to ensure that significant and sufficient available historical information has been accessed and checked. The evidence assessed has been, where possible, included in the report to enable *JOMAS* and its representatives to understand the basis of the risk assessment.

Primely Ltd cannot be held responsible for inaccuracies, gaps in the available historical information, or for any changes to the assessed level of risk or risk mitigation measures based on documentation or other information that may have become available or discovered later than the date of this study.

The exact location of ordnances, their nature, as well as their quantities is ambiguous to say the least with absolute exactitude because wartime records are difficult to verify. However, our study leans on the accumulation and careful analysis of a multitude of accessible evidence.

There are several sources of information through which investigations for UXO hazards can be collected; these include the national archives, MoD archives, local historical sources, historical mapping, as well as available aerial photography. Information was considered only if it reasonably correlated with the site.

1. METHODOLOGY

1.1 Method objectives

This report follows the guidelines outlined in CIRIA Report C681, '*Unexploded Ordnance (UXO): A Guide for the Construction Industry'* which represents best practice and has been endorsed by the HSE. The report recommends appropriate site and work-specific risk mitigation measures to reduce the risk from explosive ordnance during the envisaged works to a level that is as low as reasonably practicable (ALARP).

The ALARP principle is a key factor in efficiency and effectiveness in reducing UXO risks. Any additional mitigation that delivers low benefits but consumes disproportionate time, money, and effort, is dimmed unnecessary. It is important to note that the principle is not trying to reduce the risk to zero, but to find the balance of reducing the cost of a risk significantly without compromising safety. The assessment of UXO risk is a measure of probability of encountering a deep buried unexploded ordnance and the consequence of that encounter. If risks of an UXO were identified, the methods of mitigation recommended in this report are considered reasonably and sufficiently robust to reduce them to ALARP.

Primely Ltd has been supporting the UK construction industry with UXO Risk Management measures and can support JOMAS ASSOCIATES through the whole risk management process. We offer the complete UXO risk management process from the preliminary and detailed desk study through to on-site support.

1.2 Sources of Information

Reasonable effort has been made to ensure that relevant evidence was consulted and presented to produce a thorough and comprehensible report. To achieve this, the following records and archives material, held in the public domain, have been accessed:

- Primely Ltd in-house data base.
- The National Archives, Kew.
- Historical mapping datasets.
- British Geological Survey
- Historic England National Monuments Record.
- Available material from 33 Engineer Regiment (EOD) Archive.
- Open sources such as published books and verified online resources.

2. SITE DETAILS AND DESCRIPTION

2.1 Site location and Description

The investigation is for the sites located at North lane depot East car park and Elleray Hall, Elleray Road, Teddington TW11 0HG, United Kingdom. The site is centred approximately on National Grid Reference TQ 15689 70909.

The site is bounded on all sides by private homes, with North Lane on its West and Middle Lane centred between the two plots as seen in figure 2.1 below.

The site is currently occupied by commercial buildings in part and associated with hard-standing tarmacked ground.

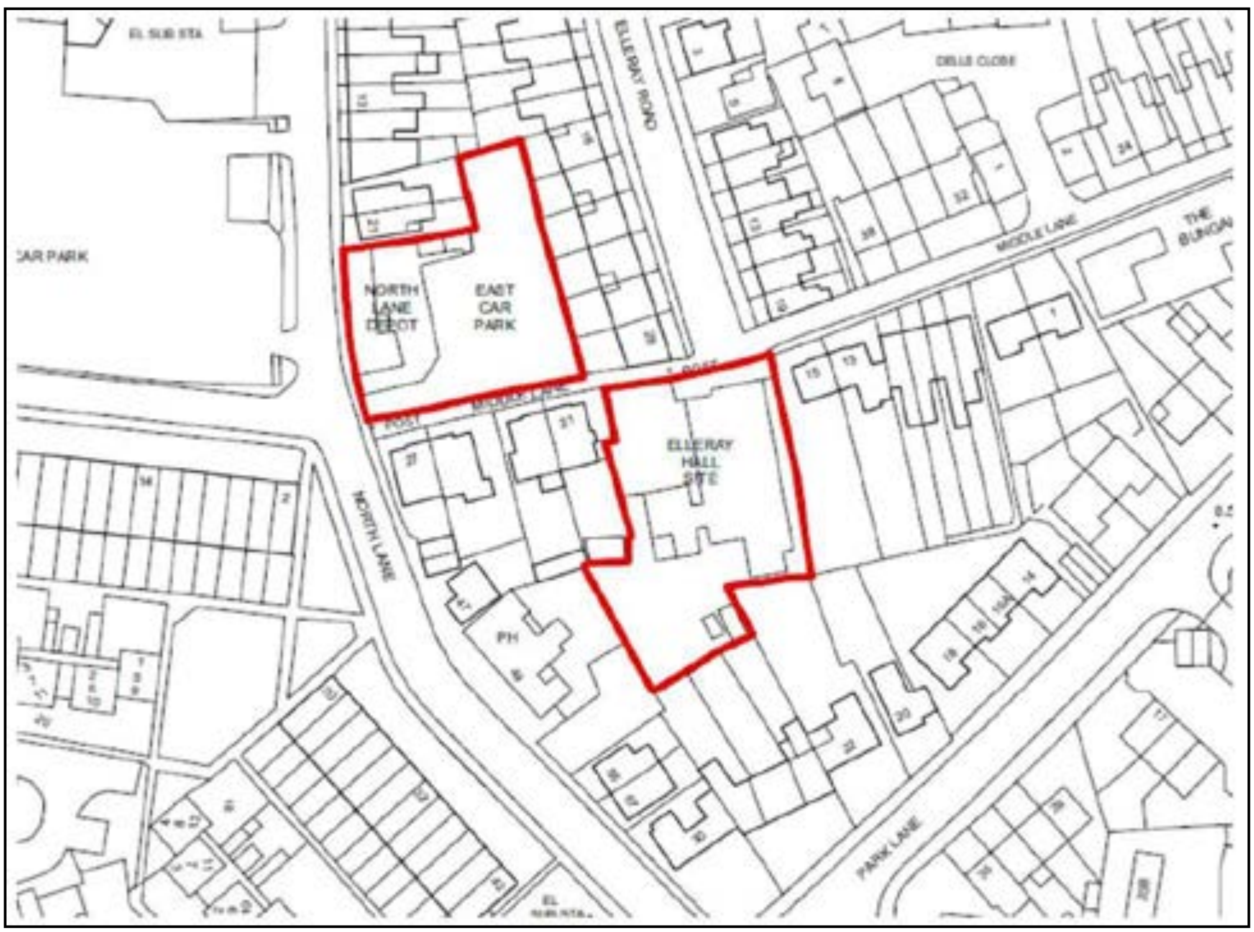

Figure 2.1: Description of the site location

2.2 Proposed Scheme of work

It is understood that a series of site investigation works are planned across the site area.

2.3 Ground Conditions - Geology

It should be noted that the maximum depth that a bomb could reach may vary across a site and will be largely dependent on the specific underlying geological strata and its density.

2.4 Historical Ground Investigation Data

The British Geological Survey Geology of Britain web map services provides access to the geographic locations and logs of historical borehole investigations and well installations located nearby, to the north and east of the site (See figure 2.4 below).

Figure 2.4: Historical borehole records (Source: BGS Web Service)

Table 2.4.1 below displays the strata succession encountered in the boreholes (See appendix for full log). No boreholes were found closer to the site.

Table 2.4.1: LITTLE QUEENS ROAD TWICKENHAM

Name: LITTLE QUEENS ROAD TWICKENHAM **Reference:** TQ17SE19 **Length (m):** 9.600000 **Easting**: 515500 **Northing:** 170800		
Geological section	**Thickness**	**Depth**
Topsoil	0.2m	0.6
Made ground	5.9m	6.1m
Gravel	0.3m	6.4m
Brown clay	0.3m	6.7m
Blue clay	3m	9.77m

Table 2.4.2: GOVERNMENT CHEMIST LAB NPPL 11

Name: GOVERNMENT CHEMIST LAB NPPL 11 **Reference:** TQ17SE64/K **Length (m):** 10.000000 **Easting:** 515470 **Northing:** 170750		
Geological section	**Thickness**	**Depth**
Made ground	5.9m	1.0m
Gravel	0.3m	1.8m
Weathered London clay	0.3m	7.8m
London clay	3m	8m

3. HISTORICAL DATASETS

3.1 General

The following section presents information identified relating to the site of military value of various types. The focus of this report concerns German aerial delivered weapons dropped during WWI and WWII.

The Great War started in Belgium and France along the Western Front in 1914 but by the beginning of 1915 it had moved closer to home. During the first great war, London was targeted and bombed by Zeppelin Airships. An estimated 250 tons of ordnance were dropped upon the city, most of which fell on the City of London. The first Zeppelin raid over London came on the 31st May 1915 and the increasing threat of attack saw the establishment of a ring of defensive airfields around the city.

The country received a much-needed respite from bombing in June 1941, when Luftwaffe squadrons were ordered to concentrate on the war against Russia. The resumption of Hitler's bombing of England, a period known as The Little Blitz, did not occur until the spring of 1944, when raids were launched from Luftwaffe bases in occupied France.

WWI bombs were generally smaller in sizes and were dropped from a lower altitude which resulted in a limited penetration in depth of these ordnances. This report has placed a greater emphasis on WWII bombs as they can be found significantly deeper than the WWI ordnances.

3.2 Site History

The sites are situated in Teddington, in the London Borough of Richmond upon Thames. It is also in the historic county of Middlesex.

In 1800 the population of Teddington was under 700, in 100 houses. The number of houses had probably doubled by the 1860s, but the population was still only just over 1000. In 1861 the Manor of Teddington, which consisted of nearly half the parish, was sold for the development of desirable villas. To assist this development the railway arrived in 1863.

There were no buildings in Broad Street in 1800 although there were houses in Middle Lane backing on to Broad Street and in Park Lane, including the alms houses, built in 1739 and demolished in about 1950. Elleray Villa was built by 1820 on the corner of North Lane with an entrance in Broad Street. The house was demolished in about 1890 and the site crossed by Elleray Road. There was a house round the corner in Stanley Road in 1800. It is thought that this was the house called Maud Cottage, later called The Hollies or the Old Hollies. The house was demolished in 1965 to make way for the redevelopment of the land between Somerset Road and Walpole Road.

Built in 1911, Elleray Hall's initial purpose was to act as a parish hall. It wasn't until 1950's Teddington's Old Peoples' Welfare Committee (T.O.P.W.C.) began utilising the hall for distributing off-ration sweets to its local elderly community. T.O.P.W.C. had been formed in 1946 with the aim of aiding the elderly with fuel and food. Seventy-two years on, T.O.P.W.C. has become Elleray Community Association but its objective of combating isolation in the neighbourhood continues.

At the end of October 1940, concerns ran high when a bomb landed on the apron of Teddington Weir. The breach caused by the bomb's detonation created a reduction in the depth of water at Teddington Reach (1.6 km east of the site) by six feet, making navigation impossible except at high tides. Those dwelling on Trowlock Island were marooned temporarily. Full navigation of the Reach would not be restored for seven weeks.

In the months that followed, the aerial bombardment grew heavier. November 1940 saw the borough sustain its highest casualties. 74 people were killed, the majority in a devastating attack which took place on the night of November 29. 130 bombs and between 3,000 and 5,000 incendiary devices rained down on Twickenham and Teddington, destroying 150 houses and damaging more than 6,000 others. The worst damage was sustained just 130m north of the depot, at Church Road.
Mrs Lilian Dring, a Teddington resident, wrote: *"Most of Teddington became a raging inferno. Duty rotas were abandoned and every available warden was on duty most of the night. The Baltic Timber Yard, Stanley Road* (which is just over 300m north west of the site) *and the Baptist Church went up in mountains of flame which almost met over our heads as we patrolled Walpole Road."*

Another tragedy occurred the same night. Bombs intended to pulverize the National Physical Laboratory at Teddington exploded over a public air raid shelter in the laboratory's grounds, killing eight residents of Walpole Crescent. The NPL (circa 500m Northwest of the sites of interest) had been designated a special target by the Luftwaffe, as it was here the engineer and aeronautical designer Barnes Wallis was developing the 'Bouncing Bomb', later to be used by the RAF in the famous Dambusters raid of May 1943. The raid destroyed Germany's Mohne and Eder dams.

During the 'Little Blitz', as far as residents of the borough were concerned, the worst of these raids occurred on February 25, 1944, when 45 bombs were dropped in an effort to destroy both the National Physical Laboratory and an American army base in Bushy Park (600m south west of the site). The Luftwaffe missed their targets. Three bombs fell in Fulwell Golf Course (1.2km north) and 28 landed in Hampton and Hampton Hill (1.6km northwest).

Teddington Film Studios, one of the few British studios (2km southeast) to remain in operation during World War II, received a direct hit from a V1 on the evening of July 5, 1944. The bomb completely gutted the main studio and took the life of 'Doc' Salomon, the studio's American production manager. This effectively put an end to Teddington Studio's valiant efforts to produce morale-boosting films throughout the war. Understandably, the psychological impact these missiles had on the local population was devastating. An even greater threat was posed by the sophisticated, longer-range V2 rockets. Unlike the V1, which could be seen and heard from a distance, the V2 was silent and there was no warning of its arrival: it simply dropped to the ground and exploded violently on impact. The only V2 to land in the area, at the rear of Fairfax Road, 1.3km southeast, left a crater 40 feet wide and 8 feet deep. Fear of this new menace from the skies led to the evacuation of 7,000 women and children from the borough in July 1944.

By the end of the war, 143 civilians had been killed in air raids, 500 houses had been destroyed, and another 32,000 residences had sustained damage.

3.2.1 Second World War Bombing Statistics

The following table summarises the quantity of German bombs (excluding 1kg incendiaries and antipersonnel bombs) falling on the borough of Richmond upon Thames between 1940 and 1945.

Table 3.2.1 Ordnance Statistic within the borough[1]

Record of German Ordnance Dropped on Teddington		
Area Acreage		**N/A**
Weapons	High Explosive Bombs (all types)	59
	Parachute Mines	-
	Oil Bombs	-
	Phosphorus Bombs	-
	Fire Pot	-
	Pilotless Aircraft (V-1) incidents	-
	Long Range Rockets (V-2) incidents	-
Total		
Items per 1000 acres		N/A

[1] **Source**: Home Office Statistics

This table does not include UXO found during or after WWII.

1kg incendiary and anti-personnel bombs were frequently considered too numerous to be recorded and their locations to be registered. They were, consequently, considered to have been dropped ubiquitously across the area. Although the risk relating to Incendiary bombs is lesser than that relating to larger HE bombs, they are still lethal as they were designed to inflict damage and injury. The risk of harm should not be dismissed.

3.3 Ordnance Survey Historical Maps

Historical maps were obtained for this report and are presented in Annex F (historical maps). These maps provide an indication of the composition of the site pre and post- WWII. See below for a summary of the site history on various mapping editions.

Table 3.3 – Ordnance Survey Historical Maps Description

Pre WW1		
Date	**Scale**	**Description**
1896	1:2,500	The site is bounded by Broad street to the north, Park Lane to the south, North Lane to the west and Elleray road to the east. It is set in rural Teddington and contains two buildings that are not clearly defined.
1915	1:2,500	During WW1, there were developments adjacent to the site with the emergence of a row of terraced houses facing Elleray road and a Hall at the bottom of the site. The area itself illustrates a progress in development.

Pre WW2		
Date	**Scale**	**Description**
1920	1:2,500	After WW1, there has been minimal changes to the area.
1934	1:10,560	In the period before WW2, very little or no changes have taken place from the previous map edition. Memorial Hospital has been built west of the area, on a site that previously used to be a Nursery.

Post WW2		
Date	**Scale**	**Description**
1959	1:2,500	The site is unchanged with only the Hall being converted into Works building. The area itself is more urbanised with more building's, particularly in the open spaces south and east of the site.
1963-1979	1:2,500	No changes on the site. Nursery and allotment areas towards the south-west have been developed with more housing.
1991	1:2,500	Changes have taken place on the site with a car park built on the north and a Day Centre at the south. Buildings west of the site, adjacent to North Lane have also been replaced by a big car park.
1975	1:10,000	No discernable changes have taken place.
1987	1:10,000	No discernable changes have taken place.

3.4 Aerial Bombing

The focus of research is centered on German air-delivered ordnance dropped during WW1. However, other forms of explosive contamination will be considered. It is assessed that the risk of encountering WW1 bombs is low as they were dropped from a lower altitude and were generally smaller in sizes, resulting in a much lower penetration depth.

As for the site of interest in **figure 3.4.1** below show the concentric red lines that portray a high bombing density on and around the site area. This indicates that there has been a significant tonnage of bombs dropped in the area. This may be due to the high number of military target present in the area.

3.5 Sources of Potential Unexploded Ordnance

During WWI and WWII, many towns and cities across the UK were subjected to bombing which often resulted in extensive damage to town centres, docks, railways, industrial areas, and other infrastructures. Part of the destruction could be associated with the poor accuracy of the technology and the nature of bombing techniques.

The bombing records were gathered by the police, Air Raid Precaution (ARP) wardens, and military personnel. The records were maintained locally and/or by regions, in the form of written records, maps (depicting strikes' locations and damage to structures). Records were detailed and typically made through direct observations, or by post-raid surveys. As the immediate priority was to assist casualties and minimise damage, loss or incompletion of some records were inevitable.

UXO found at diverse sites in the UK originates from three principal sources;

1. During escape of Luftwaffe aircrafts from an aerial attack, they would drop some or all their load resulting in bombs being found in unexpected locations. This is commonly referred to as tip and run. The CIRIA publication C681 suggests that approximately 10 per cent of all munitions deployed failed to function as designed. Thus, many remained buried and can present a potential risk especially to workers undertaking construction and civil engineering groundwork.
2. During transportation of aggregate containing munitions from a contaminated area to an area that was previously free of UXO.
3. Poor precision during targeting (due to high altitude night bombing and/or poor visibility) resulted in bombs landing off target, but within the surrounding area. British decoy sites were constructed to deliberately cause incorrect targeting, often built in remote and uninhabited areas.

3.5.1 Allied as source of UXO

As the pressure mounted during WWII, the government requisitioned considerable areas of land for defence, where the armed forces would carry out training, construction of airfields and facilities for munitions production and storage. It has been estimated that at least 20 per cent of the UK's land has been used for military training at some point.

Thousands of tons of the munitions used during the war were used for the Allied Forces weapon testing, and military training. Therefore, allied UXO contamination derived from legacy munitions from military training, deliberate or accidental dumping (AXO), and ordnance that directly resulted from war fighting activities are known as Explosive Remnants of War.

There is no supporting evidence that the site had been used for military purpose or even to store resources. The closest legitimate target was the training ground at Mill green.

3.5.2 German as source of UXO

Where a bomb fails to detonate upon penetration of the ground, it leaves behind an entry hole that is not always apparent, and some were unreported, leaving the buried bomb being unrecorded. Aerial bombing of London witnessed a wide range of German bombs.

3.6 WWII German aerial Ordnance Type Description High Explosive (HE) Bombs

3.6.1 German SC50 and SC250

The SC series of High Explosive Bombs were thin cased bombs used for general demolition. In this series, most bombs were between 50kg to 500kg, with larger bombs of up to 1,800kg **(see Annex A)**. Their fill of high explosive made up half their weight. The SC50 was made of a 'one piece drawn steel body'. The SD series were bombs made with a thicker case and a lower charge weight and were generally used against hardened targets (See table 3.6.1 below).

Table 3.6.1: Range of German bomb series

Weight in Kg	Weight in lb	Series
50kg	112lb	S.C. or S.D.
250kg	550lb	S.C. or S.D.
500kg	1,000lb	S.C. or S.D.
1000kg	2,400 lb	S.C. (Herman)
1,000kg	2,400 lb	S.D. (Esau)
1,400kg	3,200 lb	S.D. (Fritz)
1,800kg	4,000 lb	S.C. (Satan)

3.6.2 1Kg Incendiary Bomb SD2 'Butterfly' Bomb (Armed status)

The 1 kg B1E incendiary bomb **(see annex B)** consisted of a cylinder of magnesium alloy, with an incendiary filling of thermite with three steel fins. These bombs were ignited by a small percussion charge, fired upon impact. Explosive heads were later incorporated into the IB. Whilst Incendiary Bombs may have fallen within the Study Site, they were considered ubiquitous and record keeping of those were sometimes discarded if they were under 1kg.

3.6.3 The Butterfly Bomb (or Sprengbombe Dickwandig 2 kg or SD2)

These were a German 2-kilogram antipersonnel sub munition used by the Luftwaffe, made of a thin cylindrical metal outer shell which hinged open when the bomblets were deployed **(see annex B).** The design was very distinctive and easy to recognise as it had the appearance of a large butterfly. SD2 bomblets were dropped in large numbers from containers holding between 6 and 108 sub munitions. These broke open in air and scattered the sub-munitions.

3.6.4 V1s and V2s

The final phase of bombing began at the end of 1944 when the first V2 rocket exploded in addition to IBs and HE bomb strikes. The fear of the V1 flying bombs and V2 rockets was tangible. These unmanned bombs were caused when London targets were overshot. The V type rockets were thin-skinned, unmanned, and less accurate weapons **(see annex C)**. There was no advance warning for a rocket which travelled faster than the speed of sound, reaching its target four minutes after launch. Enormously destructive, they caused huge craters and flattened whole rows of houses. Across London thousands of homeless people needed rehousing.

3.7 Consequences of interaction

A friction impact from intrusive machineries could provoke a shock-sensitive fuse explosive. The effects of chemical breakdown of the explosive fill and the general degradation over time can cause explosive compounds to crystallise and extrude out from the main body of the bomb. It may only require a limited amount of energy to initiate the extruded explosive around the fuse pocket which could detonate the main charge.

Upon detonation, factors that may be affected may vary depending on the site-specific conditions but can be summarised as:

- People – site workers, local residents and general public.
- Plant and equipment – construction plant on site.
- Services – subsurface gas, electricity, telecommunications.
- Structures – not only visible damage to above ground buildings, but potentially damage to foundations and the weakening of support structures.

The depth that an unexploded bomb will penetrate depends on several factors including:

- Size and shape of bomb
- Height of release
- Velocity and angle of bomb
- Nature of the ground cover
- The Geology.

Unexploded ordnance does not spontaneously explode as military HE. It is generally reasonably stable and requires significant energy for detonation to occur. In the case of a German UXB, discovered within the construction site, there are other potential initiation mechanisms such as a significant impact e.g. from piling machinery or large and violent mechanical excavation, onto the main body of the weapon (unless the fuse is struck).

Most German bomb and mine fuses were electric and were highly engineered compared to their British equivalents. A small proportion of German WWII bombs employed clockwork fuses. It is probable that clockwork or mechanical fuse mechanisms would have corroded since WWII and this will generally prevent them from functioning.

4. REQUIREMENT FOR UXO RISK ASSESSMENT

4.1 Background

There is currently no formal obligation for construction or development projects to undertake a UXO risk assessment in the UK and there is no specific legislation enforcing this on the management for the mitigation of UXO risk. However, the CDM legislation outlined below makes noticeably clear that those responsible for intrusive works should undertake a comprehensive and robust assessment of the potential risks to employees and implement mitigation measures to address any hazards identified.

4.2 CDM Regulations 2015

The Construction (Design and Management) Regulations 2015 defines the responsibilities of parties involved in the construction of temporary or permanent structures. The CDM 2015 establishes a duty of care extending from clients, principle coordinators, designers, and contractors to those working on, or affected by, a project. Those responsible for construction projects may therefore be accountable for the personal or proprietary loss of third parties if correct health and safety procedure has not been applied. The CDM 2015 does not specifically reference UXO. The risk presented by such items is both within the scope and purpose of the legislation. It is therefore implied that there is an obligation on parties to:

- Provide or obtain an appropriate assessment of potential UXO risks at the site.
- Emplace appropriate risk mitigation measures if necessary.
- Supply all parties with relevant risk information.
- Prepare a suitably robust emergency response plan.

4.3 Other legislations

The 1974 Health and Safety at Work Act dictates that all employers have a responsibility under this Act and the Management of Health and Safety at Work Regulations 1999, to ensure the health and safety of their employees and third parties, so far as is reasonably practicable. In the event of a casualty resulting from the failure of an employer or client to address the risks relating to UXO, the organisation may be criminally liable under the Corporate Manslaughter and Corporate Homicide Act 2007.

5. DATA ANALYSIS

The sites are situated in Teddington, in the London Borough of Richmond upon Thames. It is also in the historic county of Middlesex. The borough received a low bombing campaign during the war.

There were no buildings in Broad Street (150m northeast of the site) in 1800 although there were houses in Middle Lane backing on to Broad Street and in Park Lane, including the alms houses, built in 1739 and demolished in about 1950. Elleray Villa was built by 1820. The house was demolished in about 1890 and the site crossed by Elleray Road.
Built in 1911, Elleray Hall's initial purpose was to act as a parish hall.
At the end of October 1940, a bomb landed on the apron of Teddington Weir. The breach caused by the bomb's detonation created a reduction in the depth of water at Teddington Reach (1.6 km east of the site) by six feet, making navigation impossible.
November 1940 saw the borough sustain its highest casualties. 74 people were killed, the majority in a devastating attack which took place on the night of November 29. 130 bombs and between 3,000 and 5,000 incendiary devices rained down on Twickenham and Teddington, destroying 150 houses and damaging more than 6,000 others. The worst damage was sustained just 130m north of the depot, at Church Road.

Another tragedy occurred the same night. Bombs intended to pulverize the National Physical Laboratory at Teddington exploded over a public air raid shelter in the laboratory's grounds, killing eight residents of Walpole Crescent. The NPL (circa 500m Northwest of the sites of interest) had been designated a special target by the Luftwaffe, as it was here the engineer and aeronautical designer Barnes Wallis was developing the 'Bouncing Bomb', later to be used by the RAF in the famous Dambusters raid of May 1943. The raid destroyed Germany's Mohne and Eder dams.

There was an American army base in Bushy Park (600m south west of the site), which was hit by 45 bombs On February 25, 1944.

The National Physical Laboratory was an official Luftwaffe target, which it missed their targets. Three bombs fell in Fulwell Golf Course (1.2km north) and 28 landed in Hampton and Hampton Hill (1.6km northwest).

Teddington Film Studios, one of the few British studios (2km southeast) to remain in operation during World War II, received a direct hit from a V1 on the evening of July 5, 1944. By the end of the war, 143 civilians had been killed in air raids, 500 houses had been destroyed, and another 32,000 residences had sustained damage.

6. RISK ASSESSMENT

There is a **low** risk of encountering German air delivered HE bombs. British AAA projectiles and Incendiary bombs pose a **low** threat.

6.1 Maximum Bomb Penetration Depth

A key consideration when assessing the likelihood of finding a high explosive bomb is the depth at which they may be found. The penetration is dependent upon the:

- **Nature** of the ground;
- **Weight** of the ordnance;
- **Type** of ordnance.

6.1.1 The J-Curve Effect

When an air-delivered bomb penetrates the ground after it is dropped from height, it is slowed by its passage through underlying soils, its trajectory curves towards the surface with a final horizontal offset from the point of entry**.** This is typically a distance of about one third of the bomb’s penetration depth but can be up to 15m. This underground trajectory is known as a **J curve (See Annex E)** and is the reason why bombs can be found under basements that were constructed before WW2.

Research during WW2 suggested that a 1000kg bomb dropped in clay could theoretically penetrate a vertical depth of 25m and 8m horizontally. It should be noted that the maximum **actual** depth of penetration observed in the research for a 1000kg bomb was 12.5m. Contemporary bomb disposal guidance indicated that only 1% of bombs (of 50kg or heavier) penetrated more than 9m.

6.1.2 WWII UXB Penetration Studies

During WWII, the Ministry of Home Security undertook a major study on actual bomb penetration depths, carrying out statistical analysis on the measured depths of 1,328 bombs as reported by Bomb Disposal. Conclusions were made as to the likely average and maximum depths of penetration of different sized bombs in different geological strata.
For example, the largest common German bomb (500kg) had a likely concluded penetration depth of 6m in sand or gravel but 11m in clay. The maximum observed depth for a 500kg bomb was 11.4m and for a 1000kg bomb 12.8m. Theoretical calculations suggested that significantly greater penetration depths were probable.

6.1.3 Site Specific Bomb Penetration Considerations

Although it is possible that the Luftwaffe deployed bombs in the area, their deployment was infrequent, and to use such larger (or the largest) bombs for BPD calculations were not justifiable on either technical or risk management grounds. WWII German bombs have a greater penetration depth when compared to IBs and AAA projectiles, which are unlikely to be encountered at depths greater than 1m. Given the development of the Site after WWII, the presence of Unexploded Ordnance is significantly reduced, unless a cross contamination has taken place.

6.2 Risk Pathway

Given the types of UXO that might be present on Site, all types of aggressive intrusive engineering activities (i.e. excavations and piling) may generate a significant risk pathway. Whilst not all UXO encountered aggressively will initiate upon contact, such a discovery could lead to serious impact on the project especially in terms of critical injury to personnel, damage to equipment and project delay.

6.4 Risk Rating Calculation

This Semi-Quantitative Risk Assessment assesses and rates the risks posed by the most probable threat items when conducting many different activities on the site. Risk Rating is determined by calculating the probability of encountering UXO and the consequences of initiating it.

Table 6.4.1 – UXO Risk Calculation

UXO RISK CALCULATIONS TABLE – ALL AREAS				
Activities	**Threat item**	**Probability (SH X EM=P)**	**Consequence (DXPSR=C)**	**Risk rating (PXC=RR)**
Trial Pits (Within existing foundations)	HE Bombs	1x1=1	2x3=6	1x6=6
	AAA projectiles	1x1=1	3x2=6	1x6=6
	IBs	1x1=1	2x3=6	1x6=6
Boreholes (Within existing foundations)	HE Bombs	1x2=2	2x2=4	2x4=8
	AAA projectiles	1x1=1	2x2=4	1x4=4
	IBs	1x1=1	2x2=4	1x4=4
Piling (Within existing foundations)	HE Bombs	1x3=3	3x1=3	3x3=4
	AAA Projectiles	1x1=1	3x2=6	1x6=6
	IBs	1x1=1	2x2=4	1x4=12

SH: Site History
EM: Engineering Methodology
P: Probability
D: Depth

C: Consequence
PSR: Proximity to Sensitive Receptors
RR: Risk Rating

Key

Low	Medium	High	Very High

Probability Calculation

The potential that an item of UXO would detonate, if encountered, relies on a number of variable factors. There are no empirical means of accurately and reasonably calculating the probability of an UXO detonation during intrusive site activities. During the semi quantitative risk assessment process, SH and IM are scored from 1 to 3 with 1 = Low, 2 = Medium and 3 = High. Probability is therefore scored 1 to 9.

Table 6.4.2 – Risk Rating - Probability and Consequence

		Probability					
		1	2	3	4	6	9
Consequence	1	1	2	3	4	6	9
	2	2	4	6	8	12	18
	3	3	6	9	12	18	27
	4	4	8	12	16	24	36
	6	6	12	18	24	36	54
	9	9	18	27	36	54	81

Table 6.4.3 – Risk Scoring Categories

Risk Rating (P x C)	Risk Rating (P x C)	Risk Tolerability	Action Required
1-9	Low	Partly Tolerable	Re-active measures should be employed such as a UXO “Toolbox” brief, a UXO ‘Emergency Management Plan’ and/or an “on-call” service.
12-18	Low-Medium	Less Tolerable	
24-27	Medium-High	intolerable	Pro-active measures should be employed such as EOD Engineer Site Supervision and Magnetometer Surveys.
36-81	High	Highly Intolerable	

In utilising table 6.4.3 above, Primely Ltd can assess the risk tolerability and devise a suitable level of risk mitigation to meet the ALARP principle.

7 RECOMMENDED RISK MITIGATION MEASURES

For the works carried out at North Lane depot East car park, Teddington TW11 0HG and Elleray Hall, Elleray Road, Teddington TW11 0HG, United Kingdom, Primely Ltd estimates that there is a LOW risk of deep buried UXO and recommends:

No further action. However, re-active measures should be employed such as a UXO "Toolbox" brief, a UXO 'Emergency Management Plan' and/or an "on-call" service. A Site Management documentation detailing the actions to undertake in the event of a suspected or real UXO discovery should be held on-site to guide, which can be supplied by Primely Ltd.

This desktop assessment is based upon analysis of historical evidence along with other data readily available. Every reasonable effort has been made to locate and present significant and pertinent information.

Primely Ltd cannot be held accountable for any changes to the assessed risk level or risk mitigation measures, based on documentation or other data that may come to light later than the date of this study or which was not available to Primely Ltd during the production of this report.

The accuracy of WWII era records sometimes proves difficult to verify. Therefore, conclusions as to the exact location and nature of a UXO risk can rarely be quantified and are to a degree subjective. To counter this, a range of sources have been consulted and analysed. Wartime records show that the quality and nature of record keeping varied between boroughs; while some local authorities maintained records with a methodical approach, others considered a more vague, dispersed, and narrow in scope. Many other records were damaged or destroyed in subsequent bombing raids. Furthermore, records of attacks on military or strategic targets were often maintained separately from the general records and those have not always survived.

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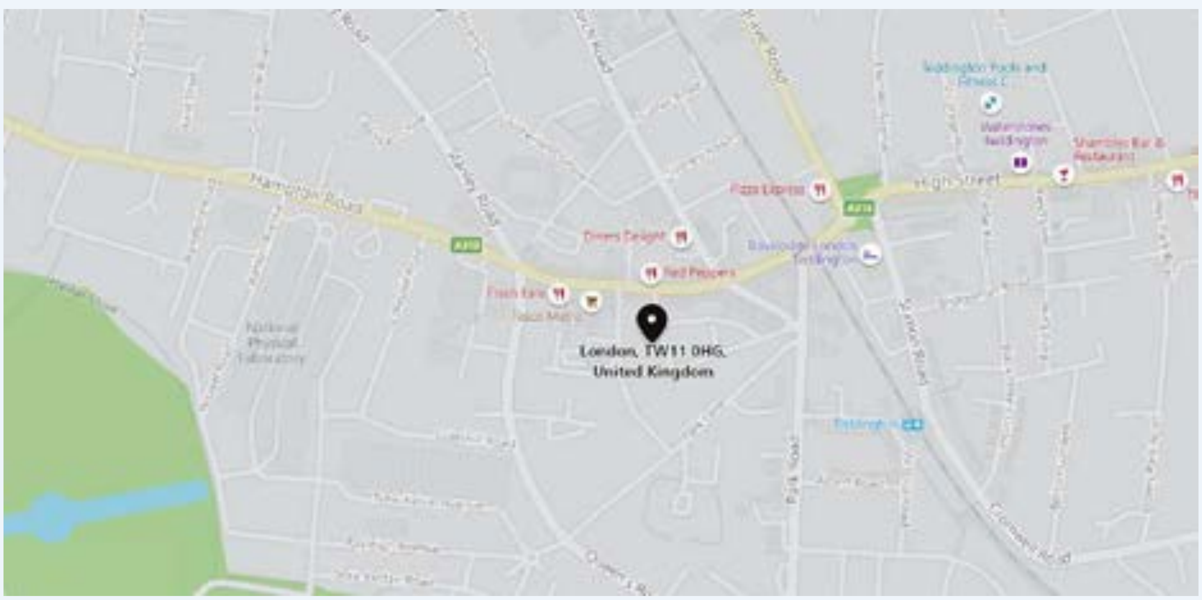
APPENDICES

Appendix A Site Location



Appendix B Historical Borehole scans

SITE INVESTIGATION REPORT No.41413

LOCATION

PROPOSED DEVELOPMENT.
THE CAUSEWAY.
TEDDINGTON.
MIDDLESEX

TQ17SE 181

FOR

PETTITT & MOORE.
CONSULTING ENGINEERS
64, COLDHARBOUR LANE,
HAYES,
MIDDLESEX.

JANUARY 1979

TQ17SE 181

MAY GURNEY (TECHNICAL SERVICES) Ltd., NORWICH 1583 7099

LOCATION: The Causeway, Teddington, Middlesex.

JOB No. 41413 **BORE HOLE No.** 1 Sheet 1

COMMENCED: 16.12.78 **COMPLETED:** 16.12.78 **DIAMETER:** 150mm

GROUND WATER struck at ....m. below ground level. Standing at 3.20 m. below ground level

DESCRIPTION	LEGEND	DEPTH METRES	O.D. LEVEL	SAMPLE/ TEST	DEPTH METRES	REMARKS
GROUND LEVEL		0.00		J_1	0.20	
Dark grey-brown, clay, sand, gravel, glass etc – FILL.		0.60		B_1	0.20–0.60	
				J_2	0.70	
VERY DENSE, brown, clayey, fine to coarse SAND and GRAVEL.		1.20		B_2	0.70–1.20	
				SPT	1.00	N=67
				SPT	1.50	65 BLOWS FOR 225mm

DESCRIPTION	LEGEND	DEPTH METRES	O.D. LEVEL	SAMPLE/TEST	DEPTH METRES	REMARKS
DENSE, brown, fine to coarse SAND and fine to coarse GRAVEL.				B_3	1.20-3.00	
				B_4	3.00-4.00	
				SPT	3.00	N=31
FIRM, brown, silty, CLAY		4.00		J_3	4.10	
		4.40		J_4	4.40	
FIRM to STIFF, grey-brown, fissured, silty CLAY				U_1	4.50	20 BLOWS
				J_5	4.95	
				J_6	5.00	
100mm layer of clay stone at 5.00M				U_2	6.00	30 BLOWS
				J_7	6.50	
				B_5	8.00	
CONTINUED		9.00				

WATER ADDED TO ASSIST BORING

KEY: B = Bulk sample; J = Jar sample; U = 100mm undisturbed sample.
W = Water sample; S.P.T. = Standard Penetration Test.
N = Number of blows per 300mm penetration in S.P.T.
H.V. = Hand Vane Test; C = Undrained shear strength.

MAY GURNEY (TECHNICAL SERVICES) Ltd., NORWICH

LOCATION: The Causeway, Teddington, Middlesex.

JOB No. 41413 **BORE HOLE No.** 1 Sheet 2

COMMENCED: 16.12.78 **COMPLETED:** 16.12.78 **DIAMETER:** 150mm

GROUND WATER struck at..........m. below ground level. Standing at 3.20 m. below ground level

DESCRIPTION	LEGEND	DEPTH METRES	O.D. LEVEL	SAMPLE/TEST	DEPTH METRES	REMARKS
CONTINUED		9.00				
FIRM to STIFF, grey-brown, fissured, silty CLAY				U_3	9.50	38 BLOWS
				J_8	10.00	
END OF BOREHOLE		10.00				

WATER ADDED TO ASSIST BORING

KEY : B = Bulk sample; J = Jar sample; U = 100mm undisturbed sample.
W = Water sample; S.P.T. = Standard Penetration Test.
N = Number of blows per 300mm penetration in S.P.T.
H.V. = Hand Vane Test; C = Undrained shear strength.

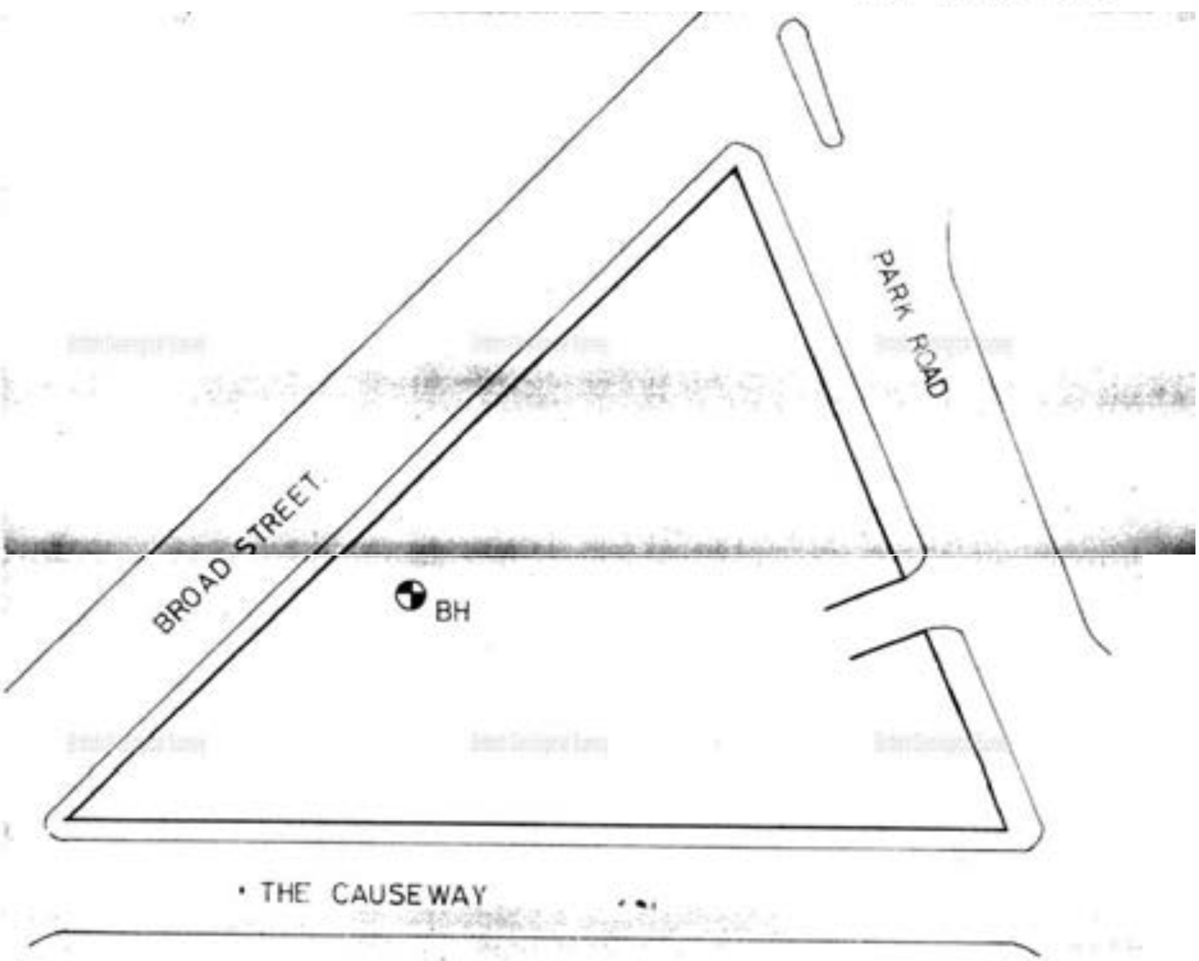
TQ17SE 181

MAY, GURNEY (TECHNICAL SERVICES) LTD.

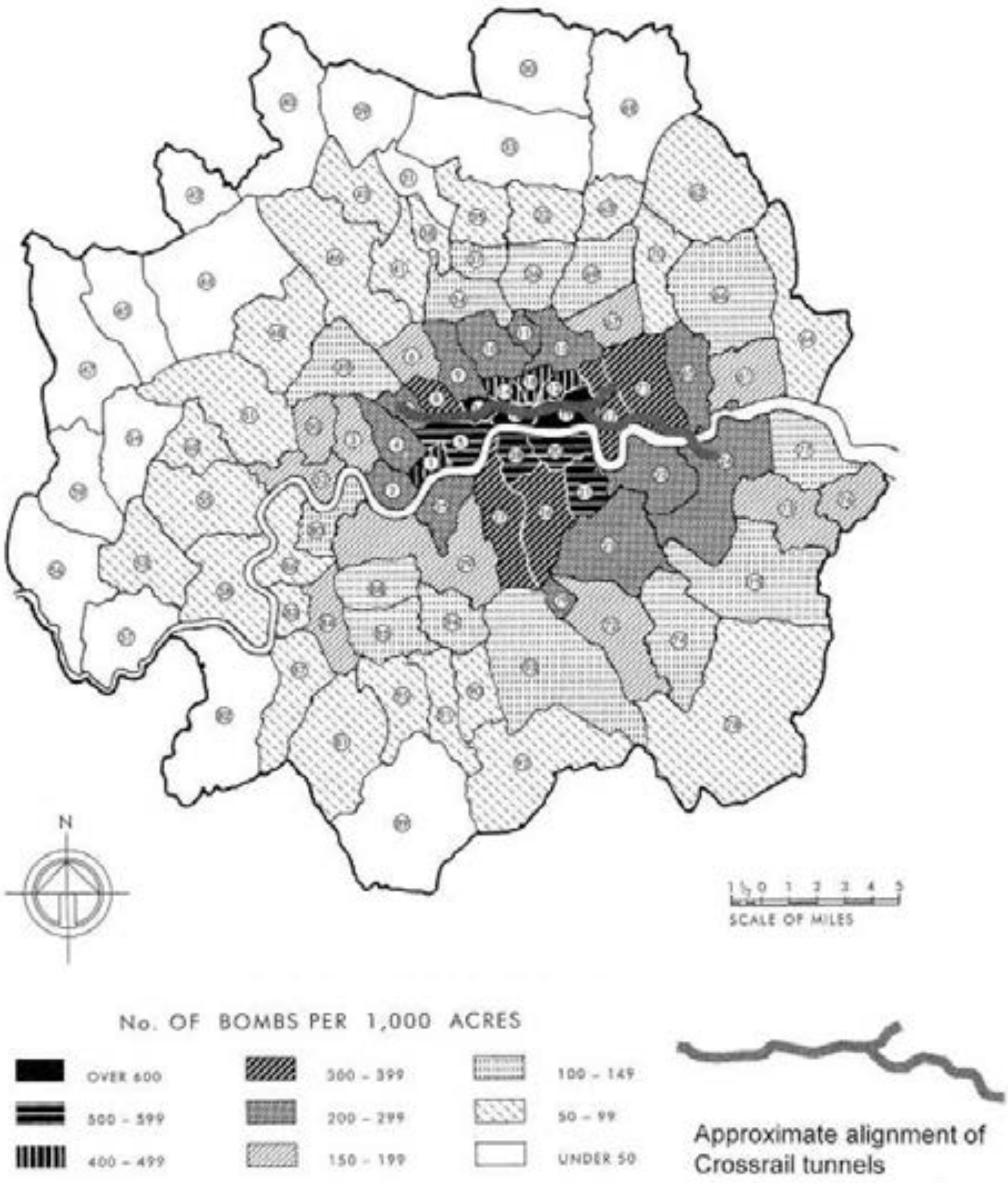
Site plan showing borehole position.

scale 1:500

ref: 41413/SP1



Appendix C London bombing census Map



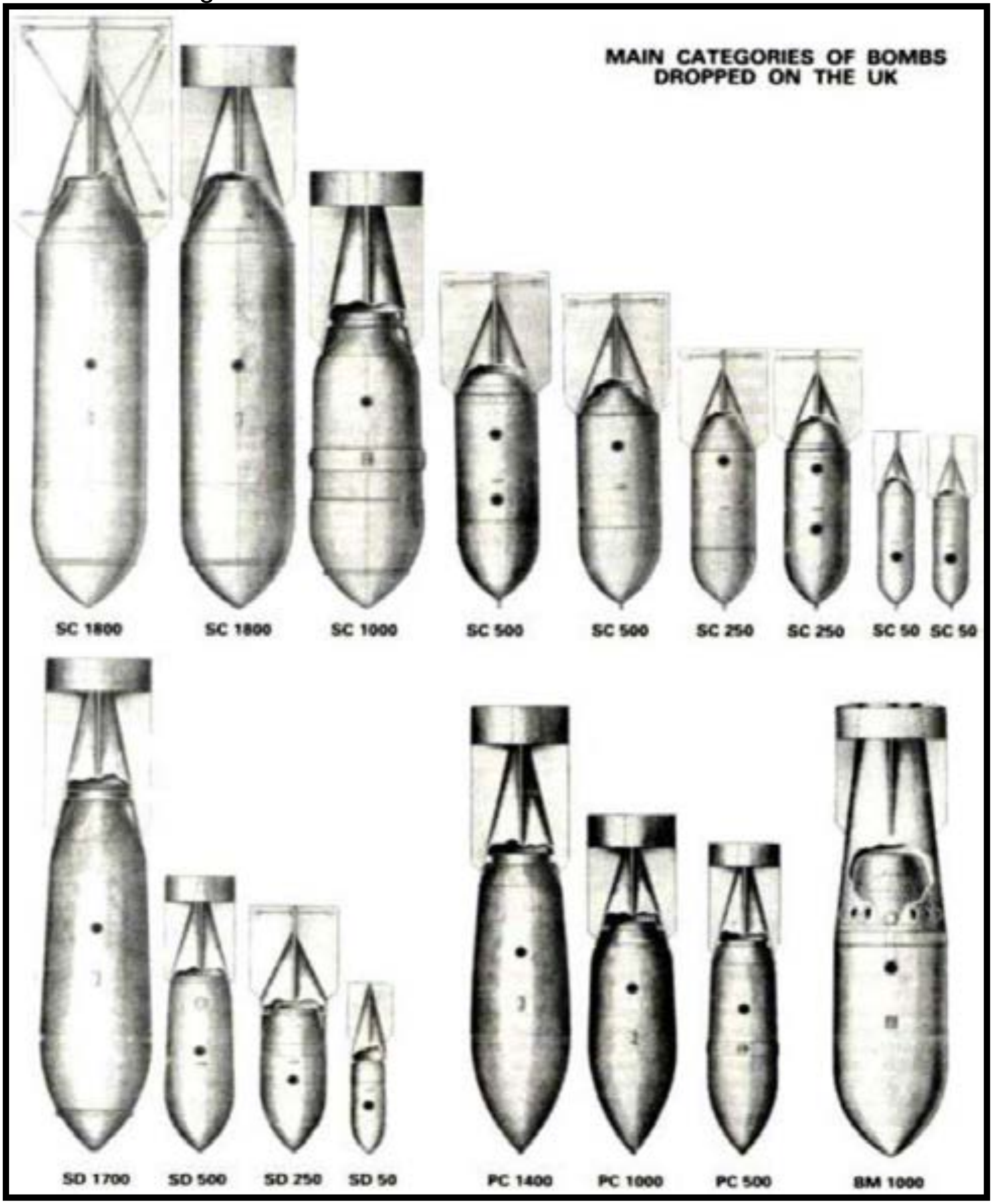
Appendix D Bomb Damage Maps

Bombsight free public resource - bomb location map
No map available

LCC Bomb Damage Maps
No map available.

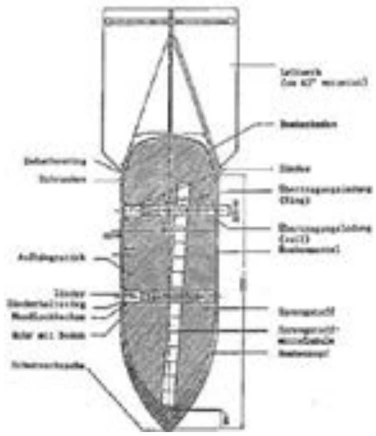
ANNEXES

ANNEX A – German Bombs Series and Main categories of bombs dropped on the UK during WWII



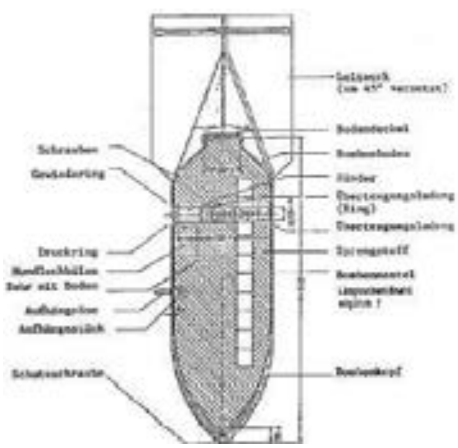
ANNEX B Most used Bombs

SC500 HE Bomb



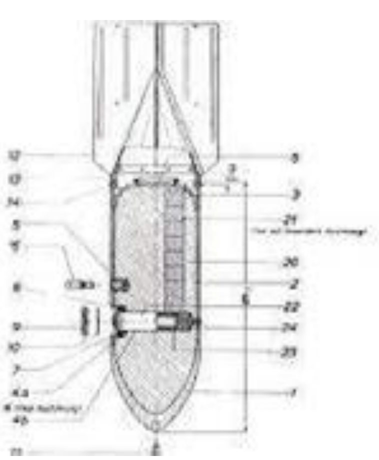
Variants	K, L2, J
Mass	500 kg (1,100 lb)
Length	2.03 m (6 ft 8 in)
Diameter	457 mm (18 in)
Fill	Amatol; TNT; Trialent
Fill weight	220 kg (490 lb)

SC250 HE Bomb



Weight	250 kg (550 lb)
Length	164 cm (65 in) (overall) 120 cm (47 in) (body)
Diameter	37 cm (15 in)
Filling	Amatol (60%) / TNT (40%) or TNT with a variety of additives including wax, woodmeal, aluminum powder, naphthalene and ammonium nitrate
Filling weight	250 kg (550 lb)
Length	164 cm (65 in) (overall) 120 cm (47 in) (body)

SC50 HE Bomb



Overall Length	46.1 inches (1,171 mm)
Body Length	30.0 inches (762 mm)
Body Diameter	7.9 inches (201 mm)
Tail Width	16.1 inches (409 mm)
Filling Weight	24.4 kilograms (54 lb)
Total Weight	55 kilograms (121 lb)
Charge/Weight Ratio	45.75%
Explosive Filling	Cast TNT, Amatol or Trialen
Bomb Type	High Explosive

Incendiary Bomb


Bomb weight	1kg
Construction	Electron case with steel nose cap
Length	350mm
Body diameter	30mm
Fill	650g (1.7 lb) Thermite
Fuse	impact

used extensively in WW II and often in a conjunction with HE bombs.

SD-2 Butterfly bomb

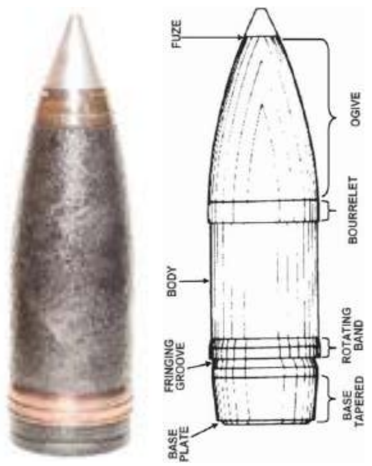

Weight	2Kg
Length	200mm
Body diameter	80mm
explosive	Fp 60/40
NEQ	0.225Kg (0.496lb)
Fuse	Mechanical Clockwork/ Mechanical time or B1/B2 Harassment

German 2 kg anti-personnel submunition used by the Luftwaffe during ww2. They were packed into containers holding between 6 and 108 submunitions.

Parachute Mine (Luftmine B / LMB)

Bomb Weight	987.017kg (2176lb)
ExplosiveWeight	125-130kg (276-287lb)
Fuze Type	Impact/ Time delay / hydrostatic pressure fuze
Bomb Dimensions	1640 x 512mm (64.57 x 20.16in)
Body Diameter	368mm (14.5in)
Remarks	Parachute Mines were normally carried by HE115 (Naval operations), HE 111 and JU 88 aircraft types. Deployed a parachute when dropped in order to control its descent.

ANNEX C British Anti Aircrafts Ammuntions

3.7” British Anti Aircraft Artillery Projectile (AAA)		
	**Body**	forward centring bands and a wider driving band. Square-based Brass cartridge shell with tapered nose
	Dimensions	94mm x 360mm (3.7 x 14.7”)
	Weight	12.7kg (28lb)
	Fuze	Mechanical time fuze
	Composition	Cast steel
	Explosive	Amatol, TNT or RDX/TNT. MK6 had

40mm Bofor’s Projectile		
	**Weight**	1.96lb (0.86kg)
	Explosive Weight	300g (0.6lb)
	Fuze Type	Proximity and Mechanical Time Fuze
	Rate of Fire	120 rounds per minute Projectile
	Dimensions	40mm x 310mm (1.6in x 12.2in)
	Ceiling	23,000ft (7000m)

ANNEX D – Vengeance weapons

Annex D1 The V1 Flying Bomb

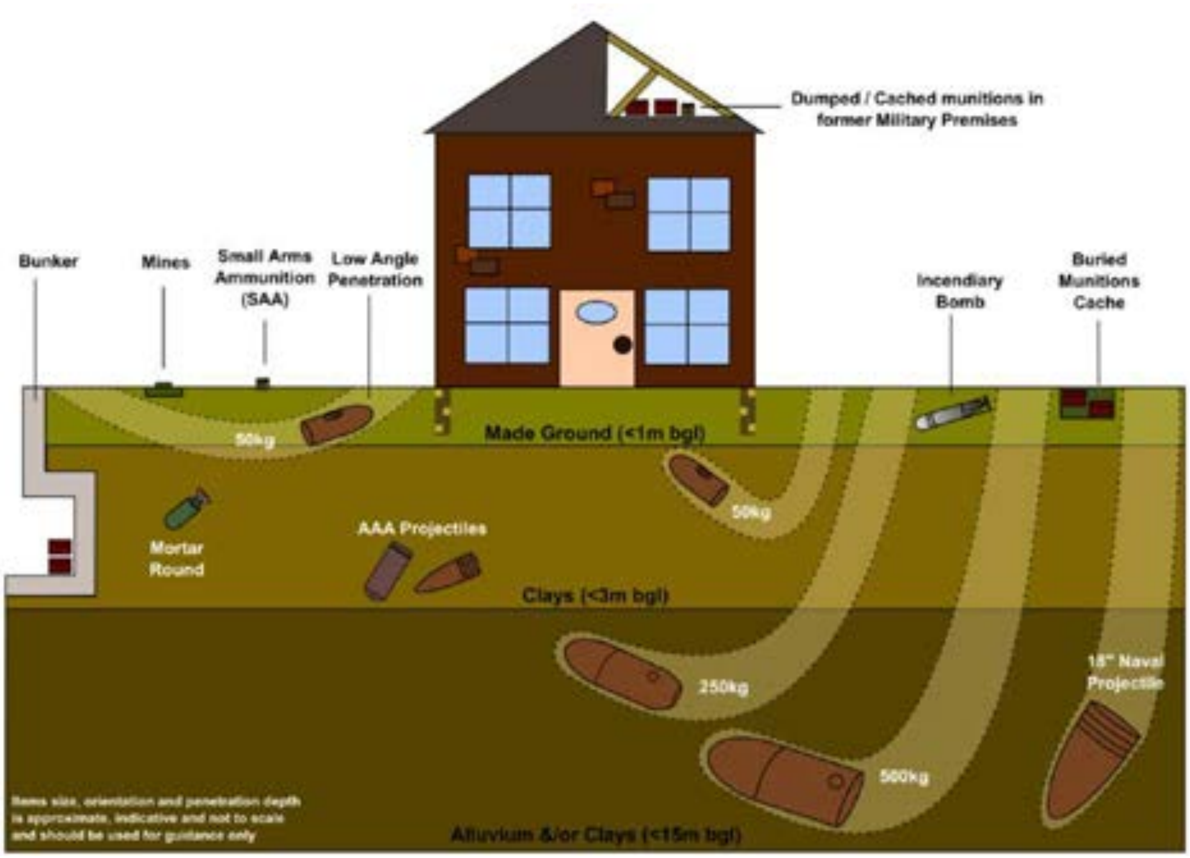
The V1 Flying bomb was the world's first cruise missile, they were also known as Doodle bugs or Vengeance weapon. The V1 was an unmanned plane that delivered a ton of high explosive. Between June 1944 and March 1945, 2419 of them exploded in London. The V1 was capable of inflicting huge damage to buildings, homes, and personnel. In the inner London suburbs where terrace houses were packed together, sometimes up to 20 houses would totally collapse, just at one hit. The blast area of a V1 extended across a radius of 400 -600 yards in each direction. https://youtu.be/ro4ApX7EhJw

Annex D2 The V2 Rocket

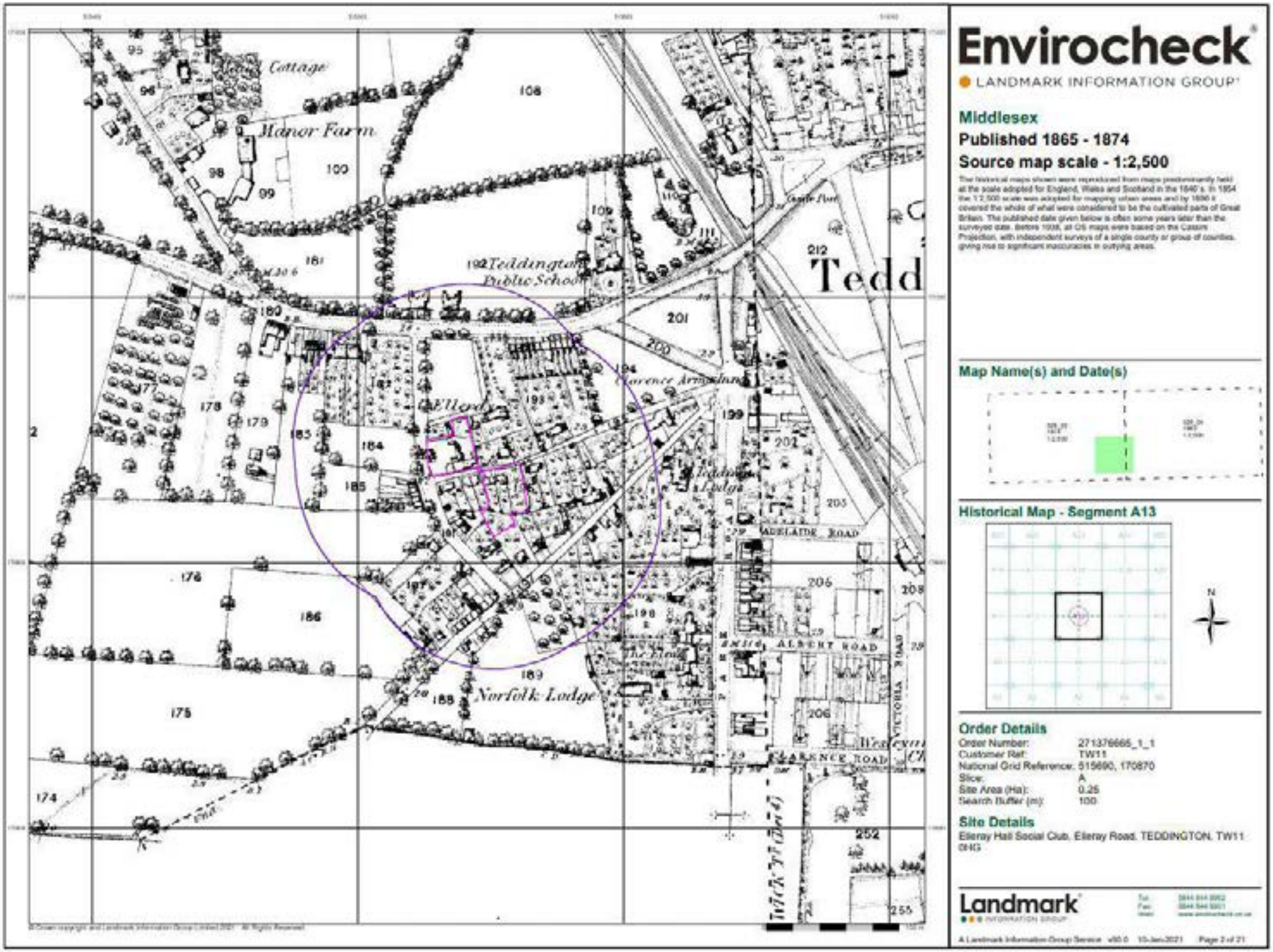
https://rarehistoricalphotos.com/v2-rocket-in-pictures/

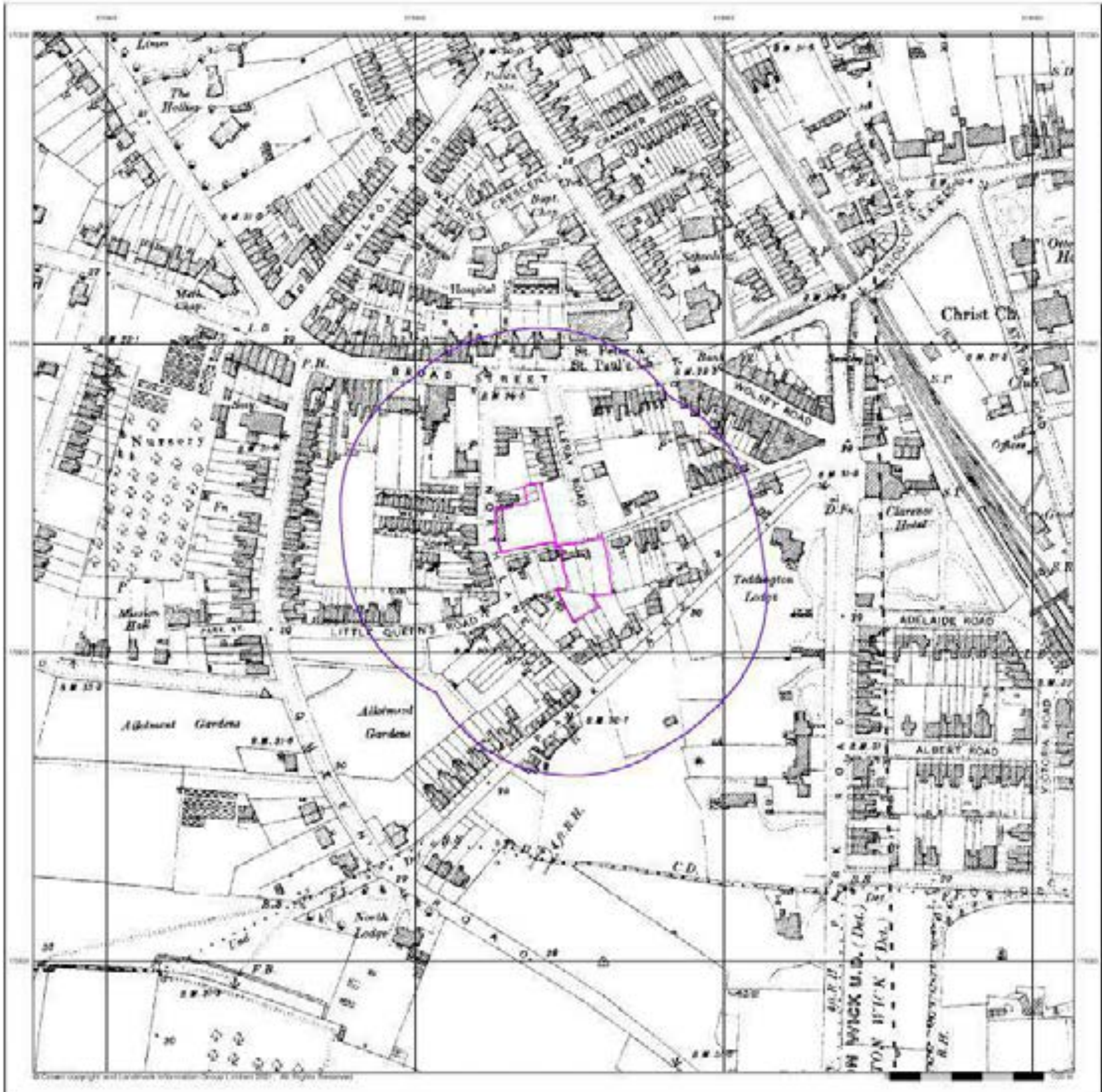
In addition to type and weight designations, HE bombs sometimes carried a suffix to indicate the type of fuse or zünder employed, i.e, mV = *"mit Verzögerung"* (with short delay action) and LZZ = *"LangZeitZünder"* (long time delay). Thus, for example, the designation SC250 LZZ identified a general purpose, high explosive bomb, weighing 250kg and fitted with a long delay fuse. The thin-cased general purpose was called the "*sprengbombe cylindrich*" (SC. Used for blast effect, they had a relatively high charge ratio of 55%. Used primarily for general demolition, something like 80% of German high explosive bombs dropped on the UK were of the SC type.

ANNEX E The J – Curve



ANNEX F: Historical Maps





Envirocheck

LANDMARK INFORMATION GROUP

London

Published 1896

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

Historical Map - Segment A13

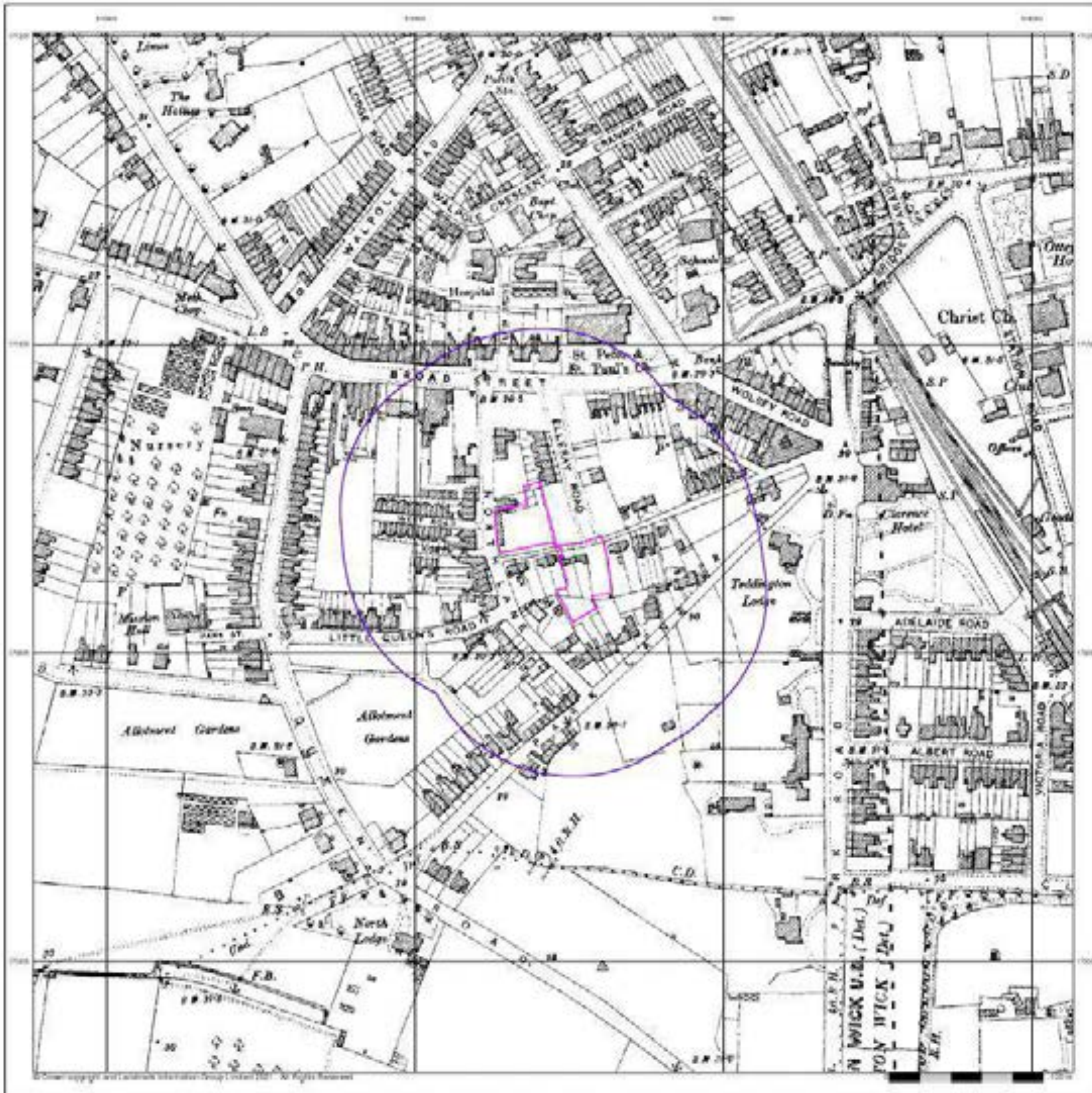
Order Details

Order Number: 271376965_1_1
Customer Ref: TW11
National Grid Reference: 515690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

Landmark INFORMATION GROUP



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LANDMARK INFORMATION GROUP®

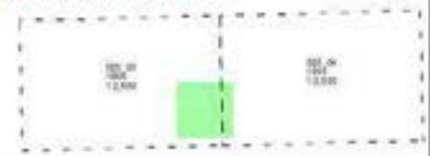
Middlesex

Published 1896

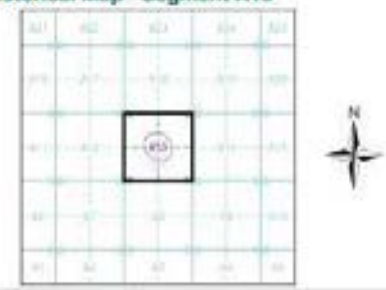
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 271376905_1_1
Customer Ref: TW11
National Grid Reference: 515690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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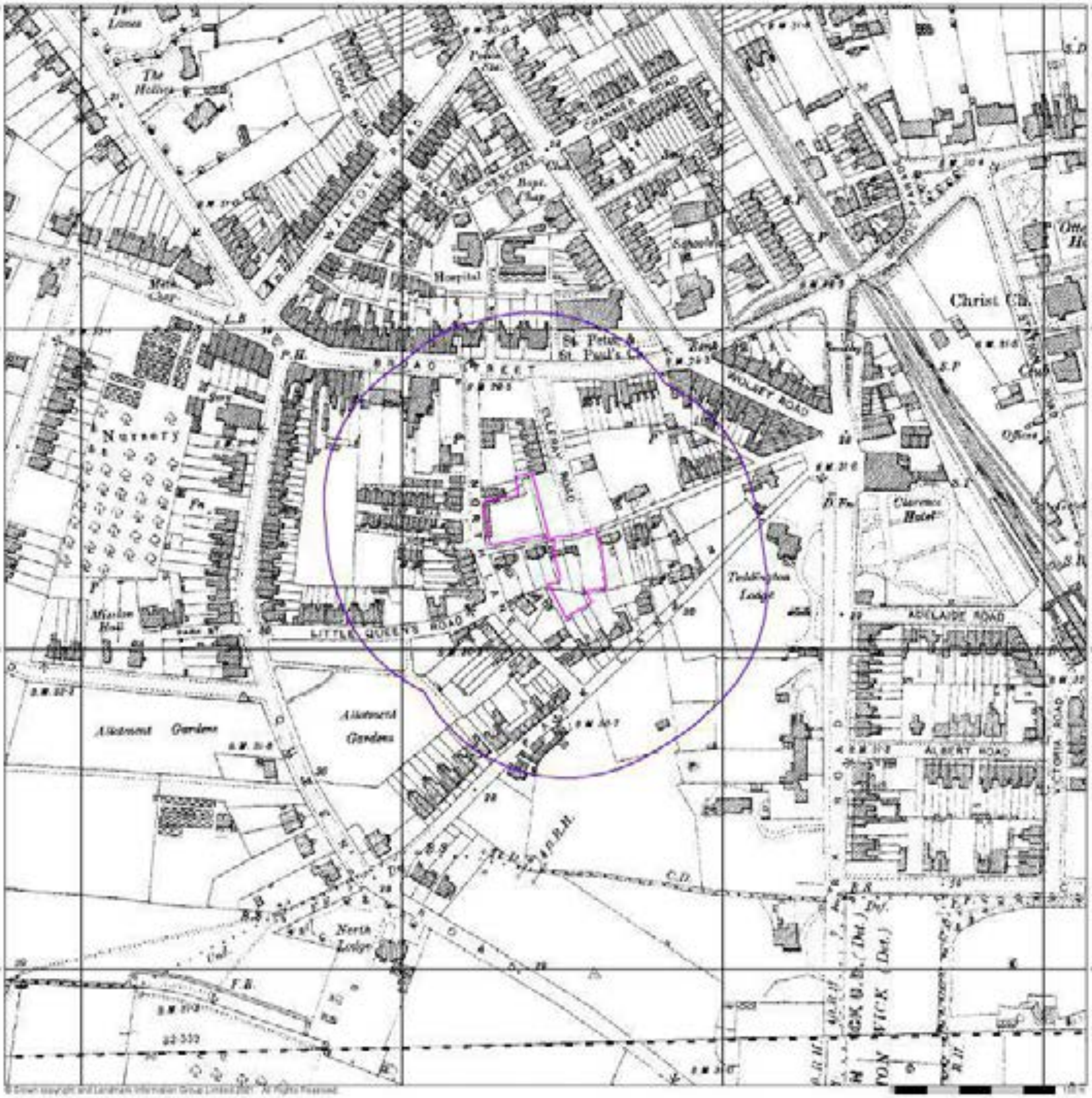

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LANDMARK INFORMATION GROUP

Surrey

Published 1898

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

Historical Map - Segment A13

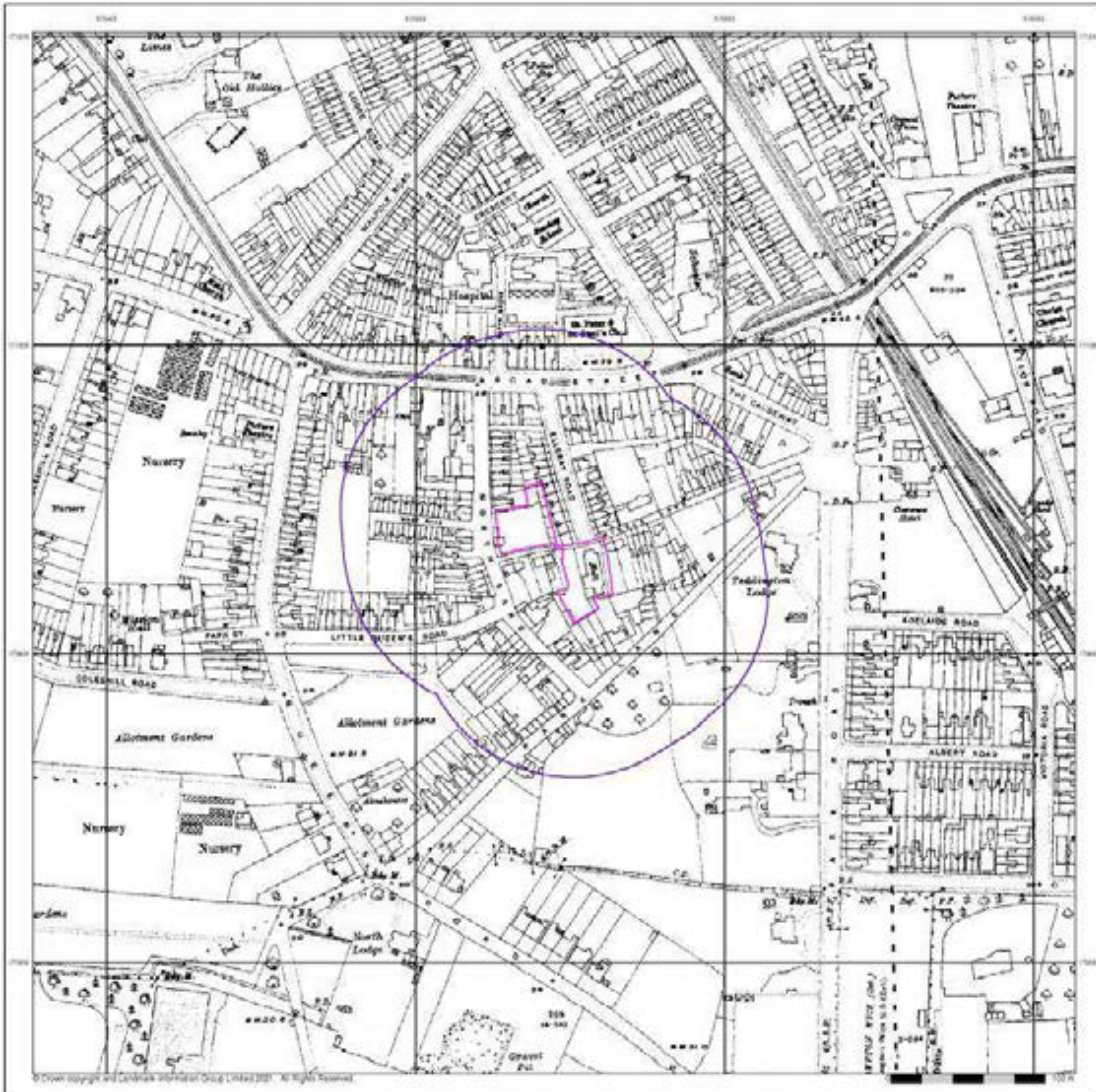
Order Details

Order Number: 271376665_1_1
Customer Ref: TW11
National Grid Reference: 516690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

Landmark



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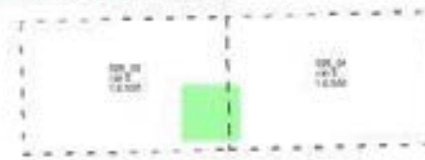
Middlesex

Published 1915

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



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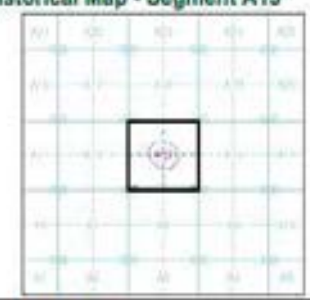

Order Details

Order Number:	271376665_1_1
Customer Ref:	TW11
National Grid Reference:	515690, 170870
Slice:	A
Site Area (Ha):	0.25
Search Buffer (m):	100

Site Details

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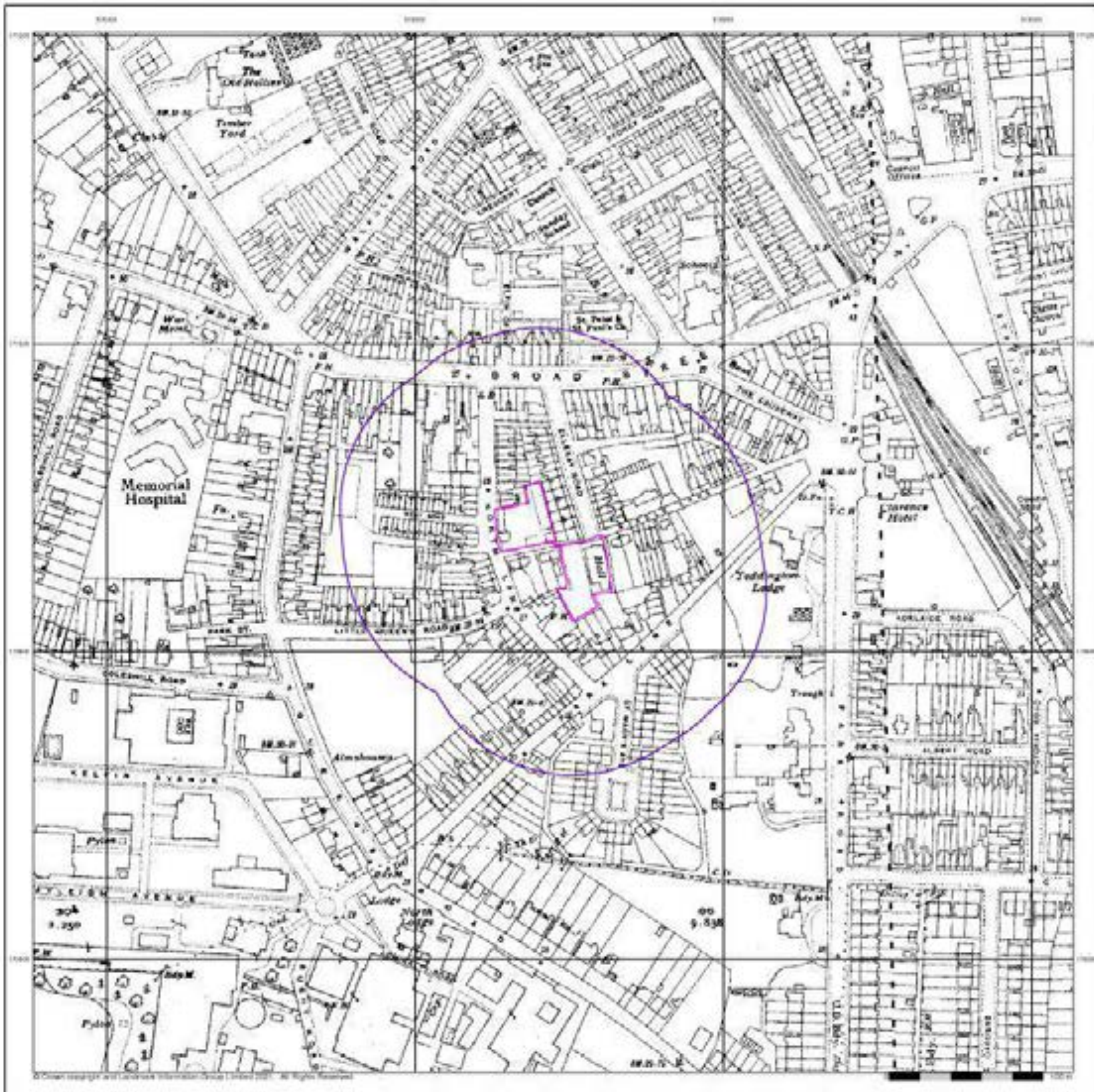
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP

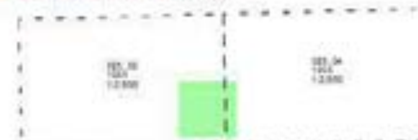
Middlesex

Published 1934

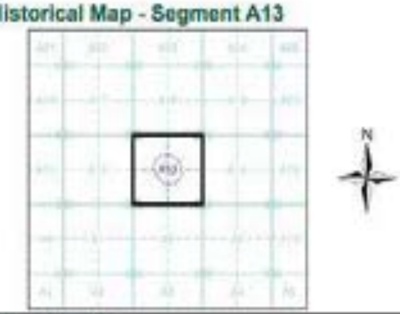
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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Customer Ref: TW11
National Grid Reference: 515690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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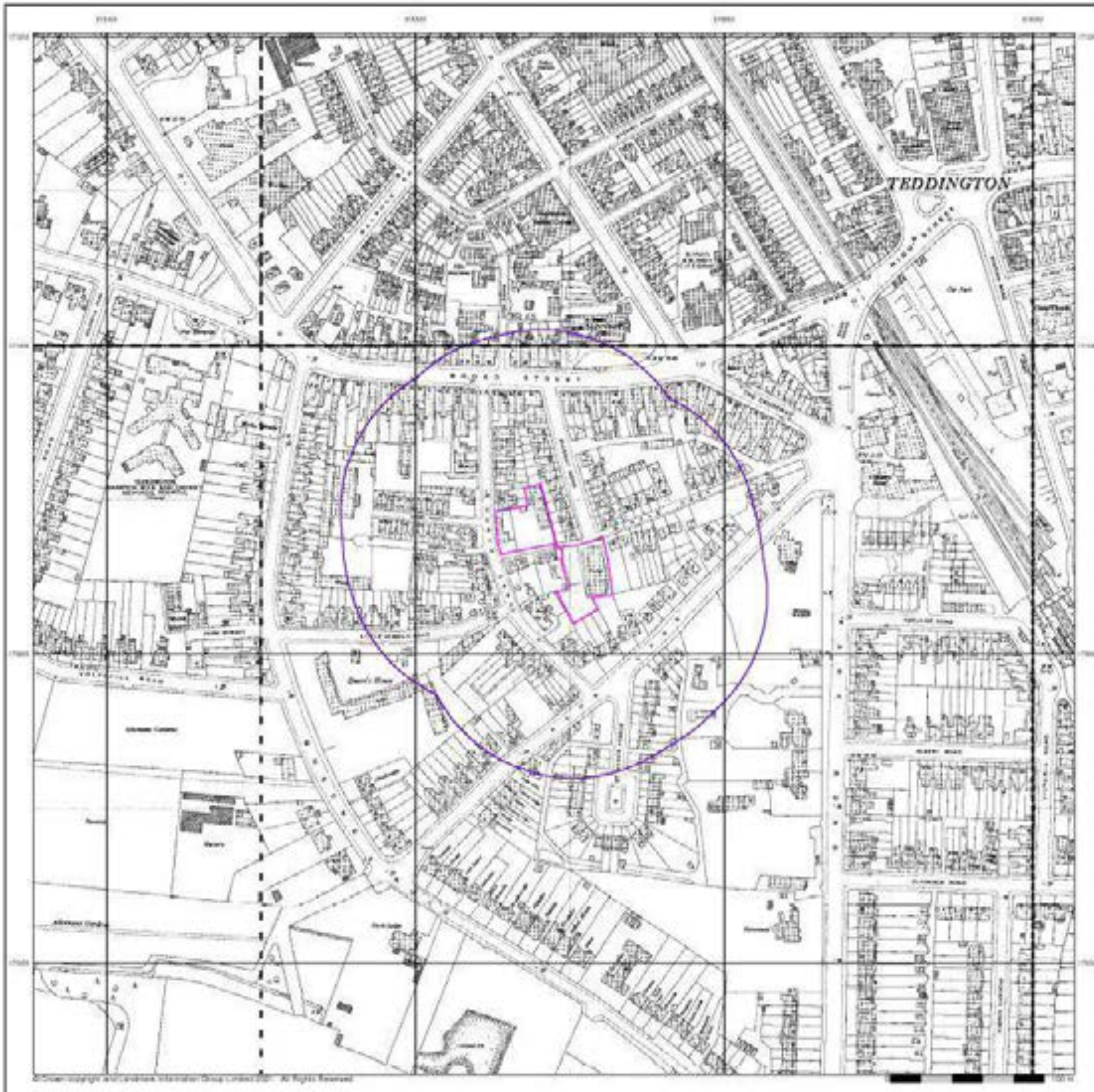

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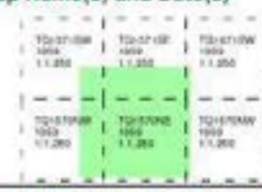
Ordnance Survey Plan

Published 1959

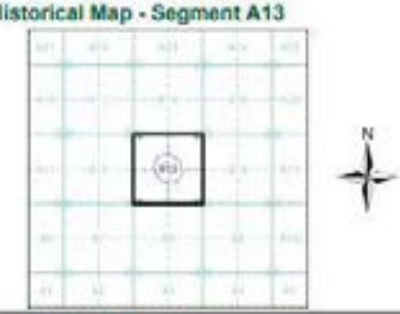
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 271376665_1_1
Customer Ref: TW11
National Grid Reference: 515690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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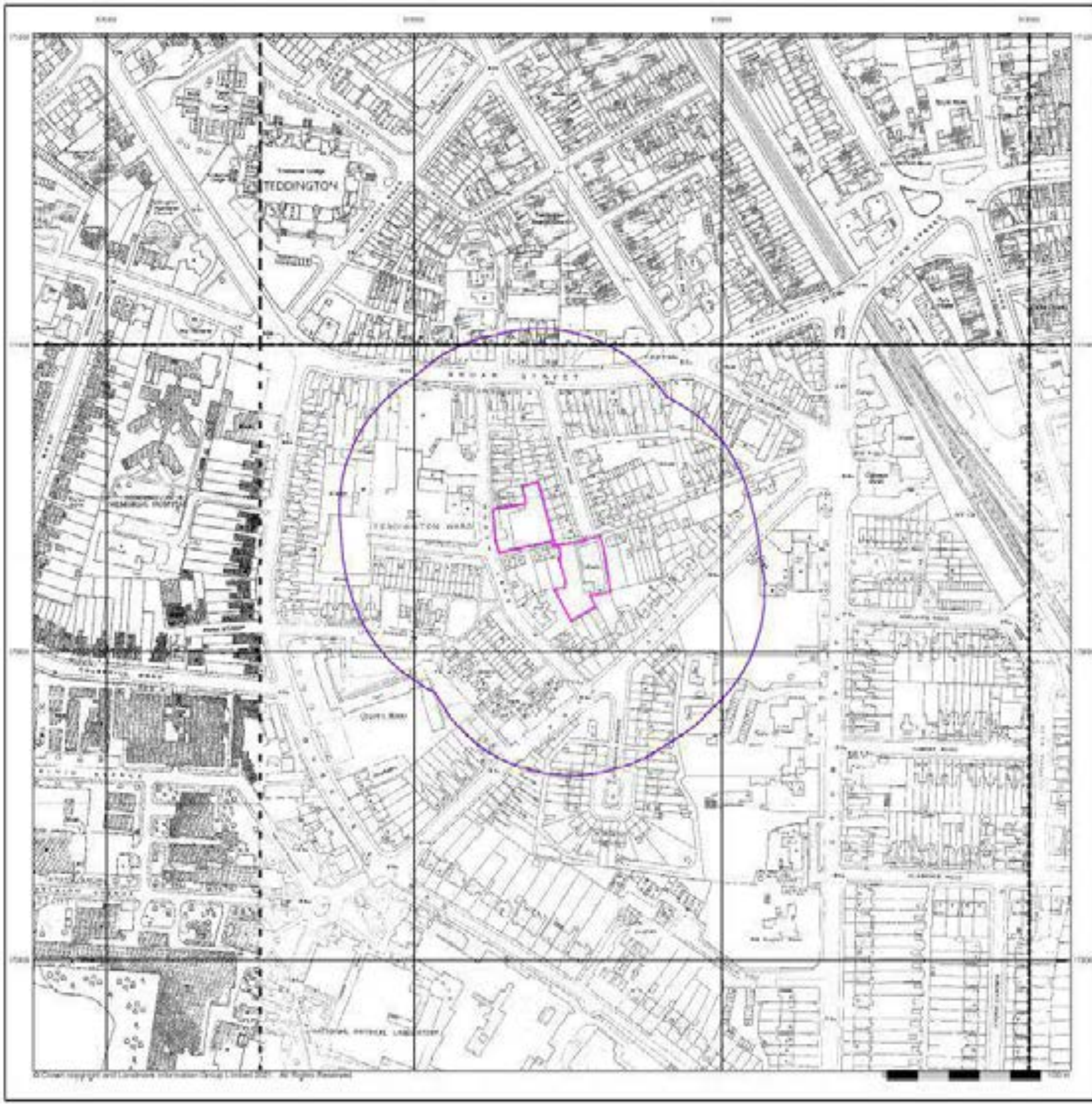
Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP

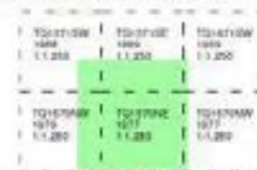
Additional SIMs

Published 1959 - 1989

Source map scale - 1:1,250

The SIM cards (Ordnance Survey's "Survey of Information on Microfilm") are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13

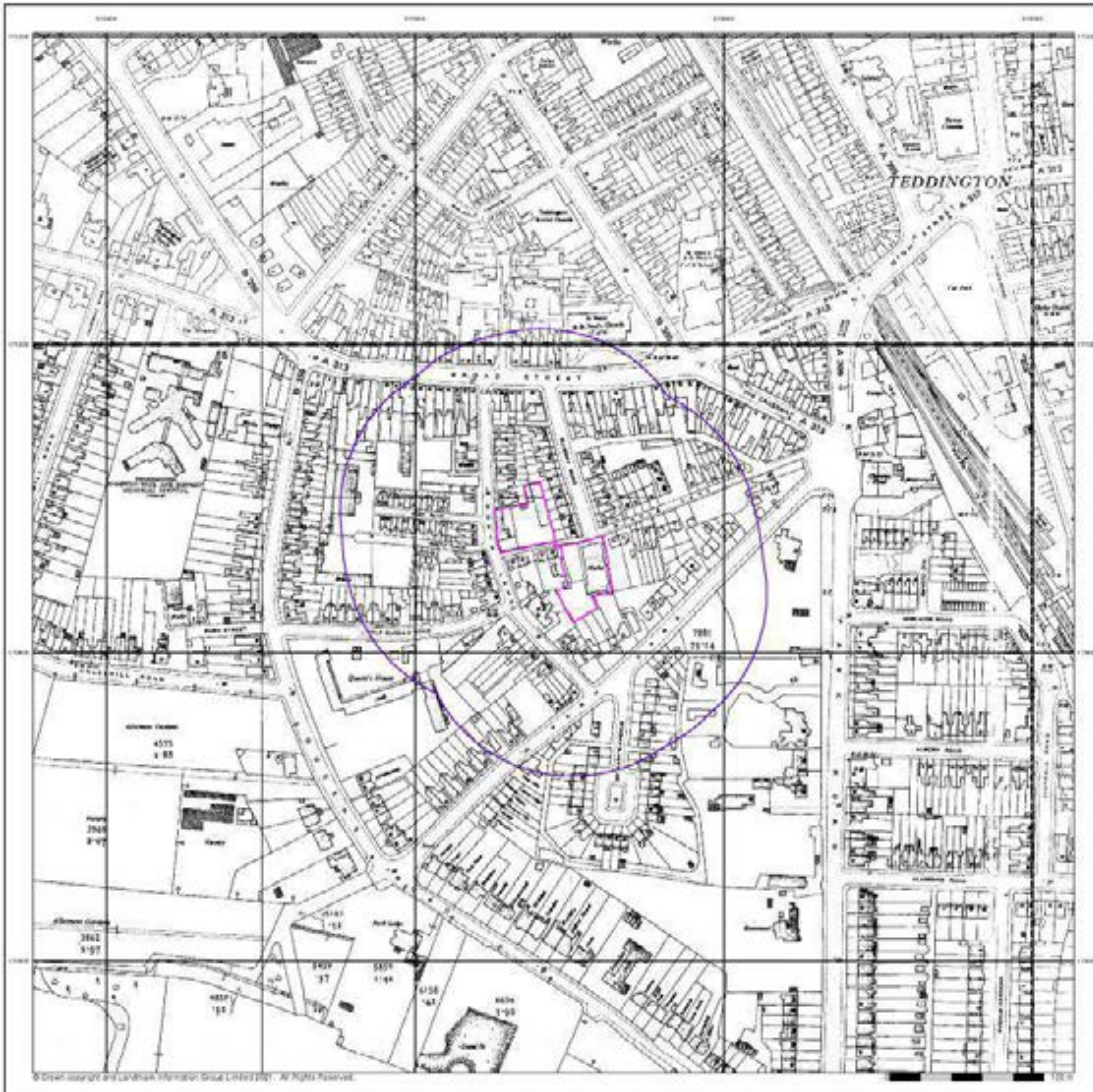
Order Details

Order Number: 271376665_1_1
Customer Ref: TW11
National Grid Reference: 515690, 170670
Slice: A
Site Area (Ha): 0.26
Search Buffer (m): 100

Site Details

Cleray Hall Social Club, Cleray Road, TEDDINGTON, TW11 0HQ

Landmark INFORMATION GROUP



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Ordnance Survey Plan

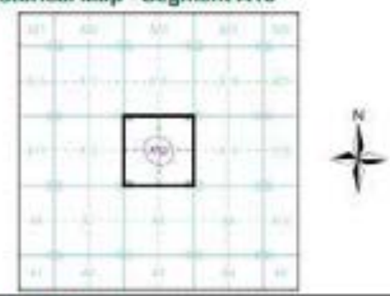
Published 1960 - 1962

Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

Historical Map - Segment A13



Order Details

Order Number: 271376665_1_1
Customer Ref: TW11
National Grid Reference: 515690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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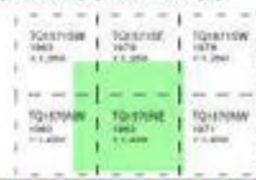
Ordnance Survey Plan

Published 1963 - 1979

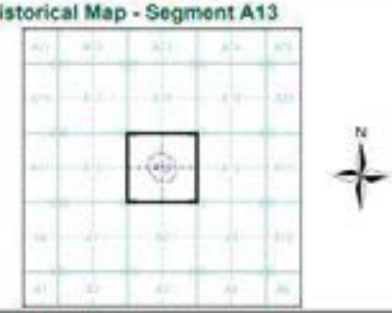
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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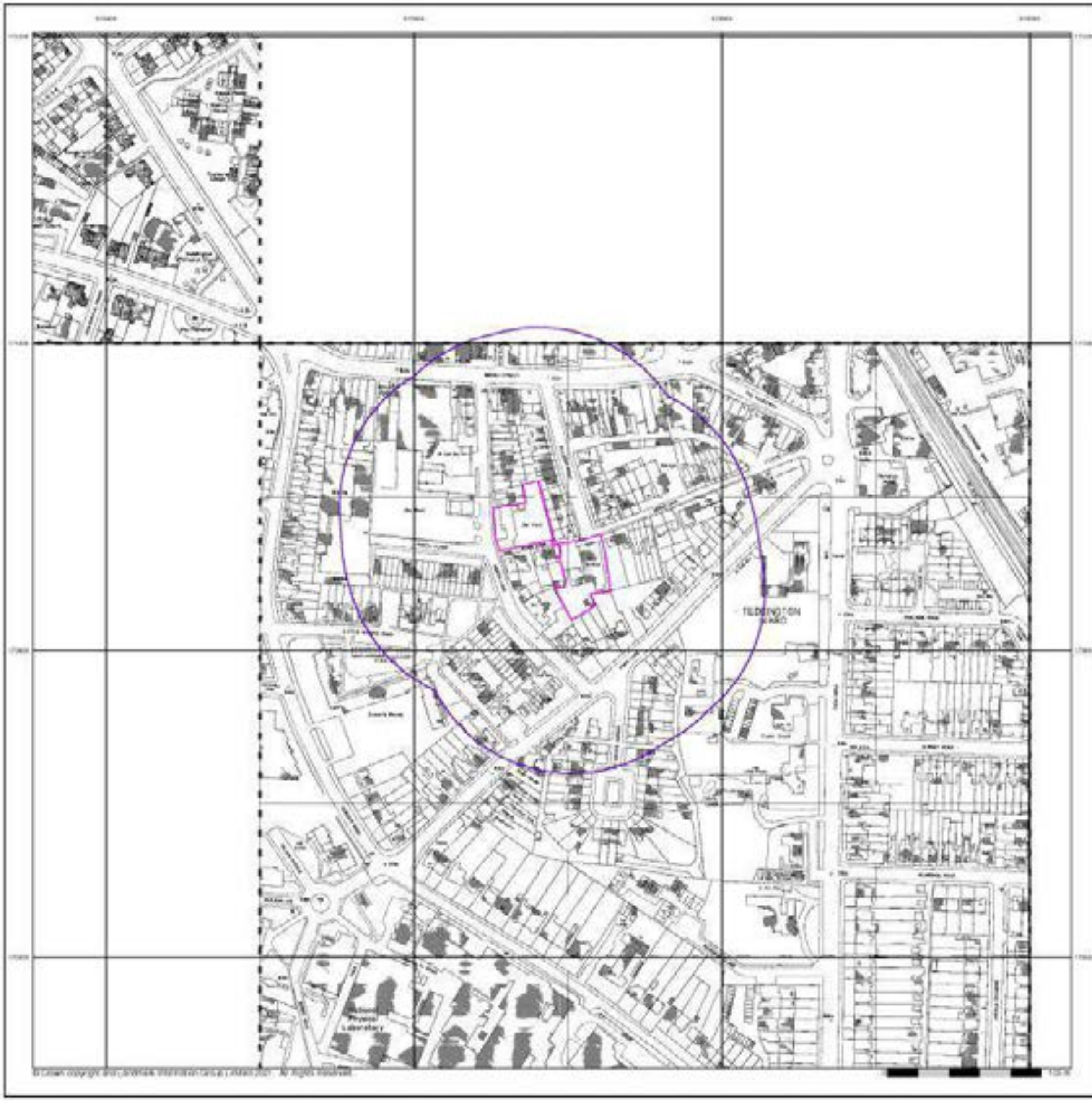
Customer Ref: TW11
National Grid Reference: 515690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

Landmark



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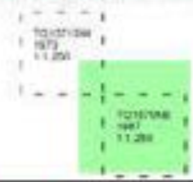
Ordnance Survey Plan

Published 1973 - 1987

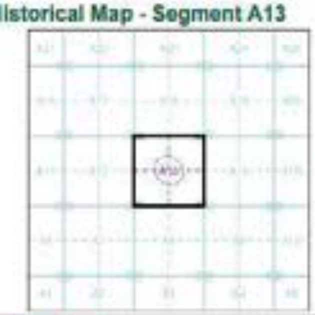
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	271376665_1_1
Customer Ref:	TW11
National Grid Reference:	515690, 170870
Slice:	A
Site Area (Ha):	0.25
Search Buffer (m):	100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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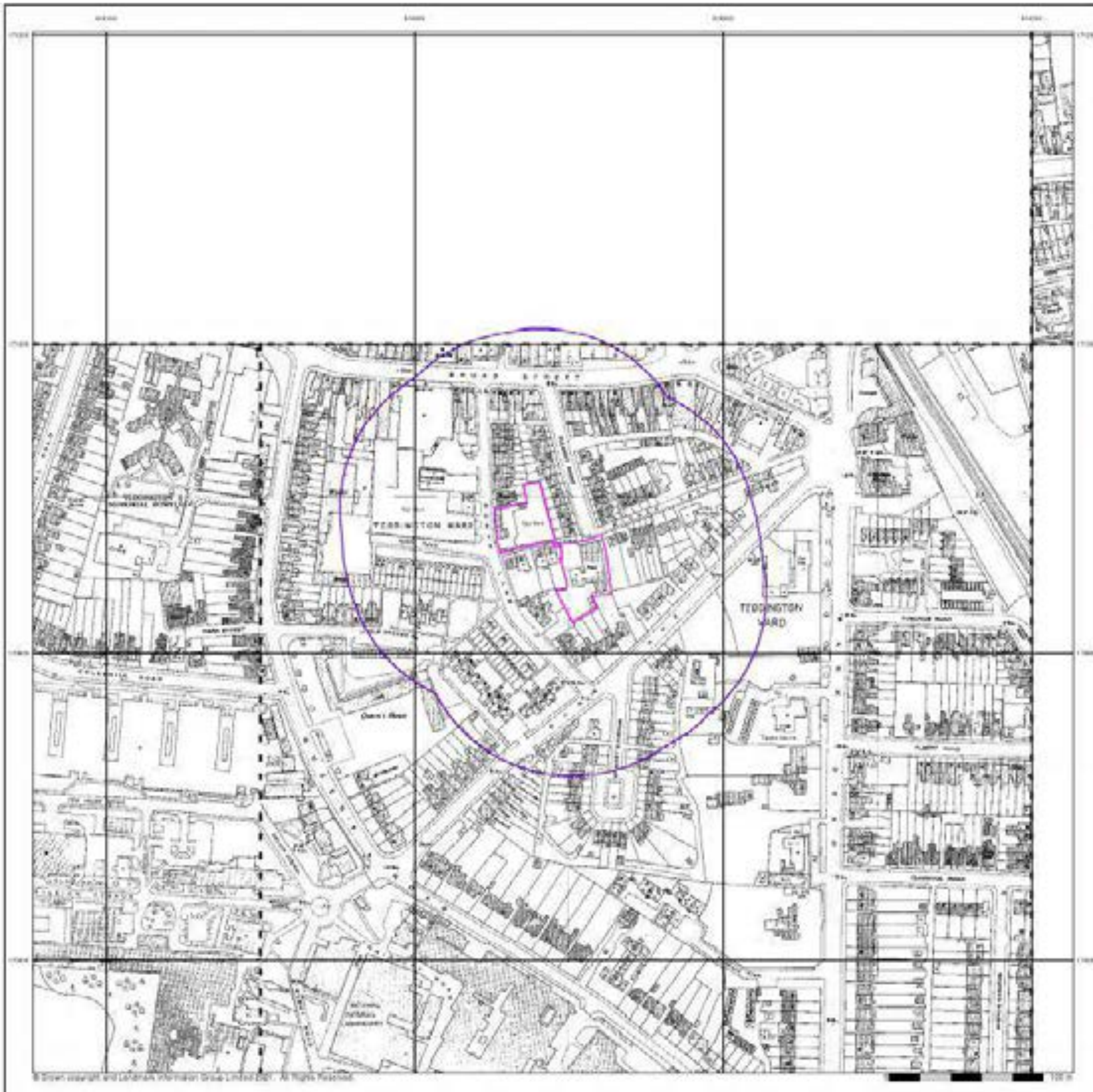

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Additional SIMs

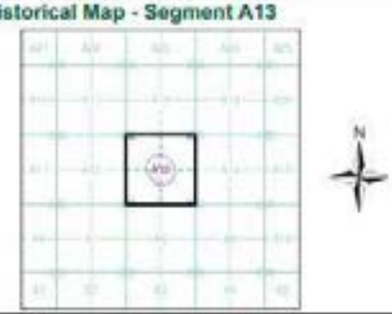
Published 1983 - 1990

Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

Historical Map - Segment A13



Order Details

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Customer Ref: TW11
National Grid Reference: 515090, 170670
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

Landmark

L

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LANDMARK INFORMATION GROUP

Additional SIMs

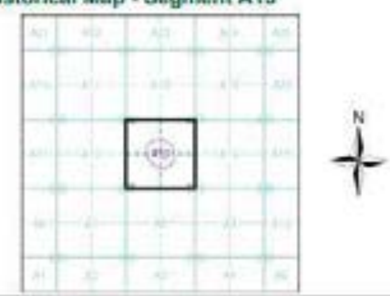
Published 1986

Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and landuse. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

Historical Map - Segment A13



Order Details

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Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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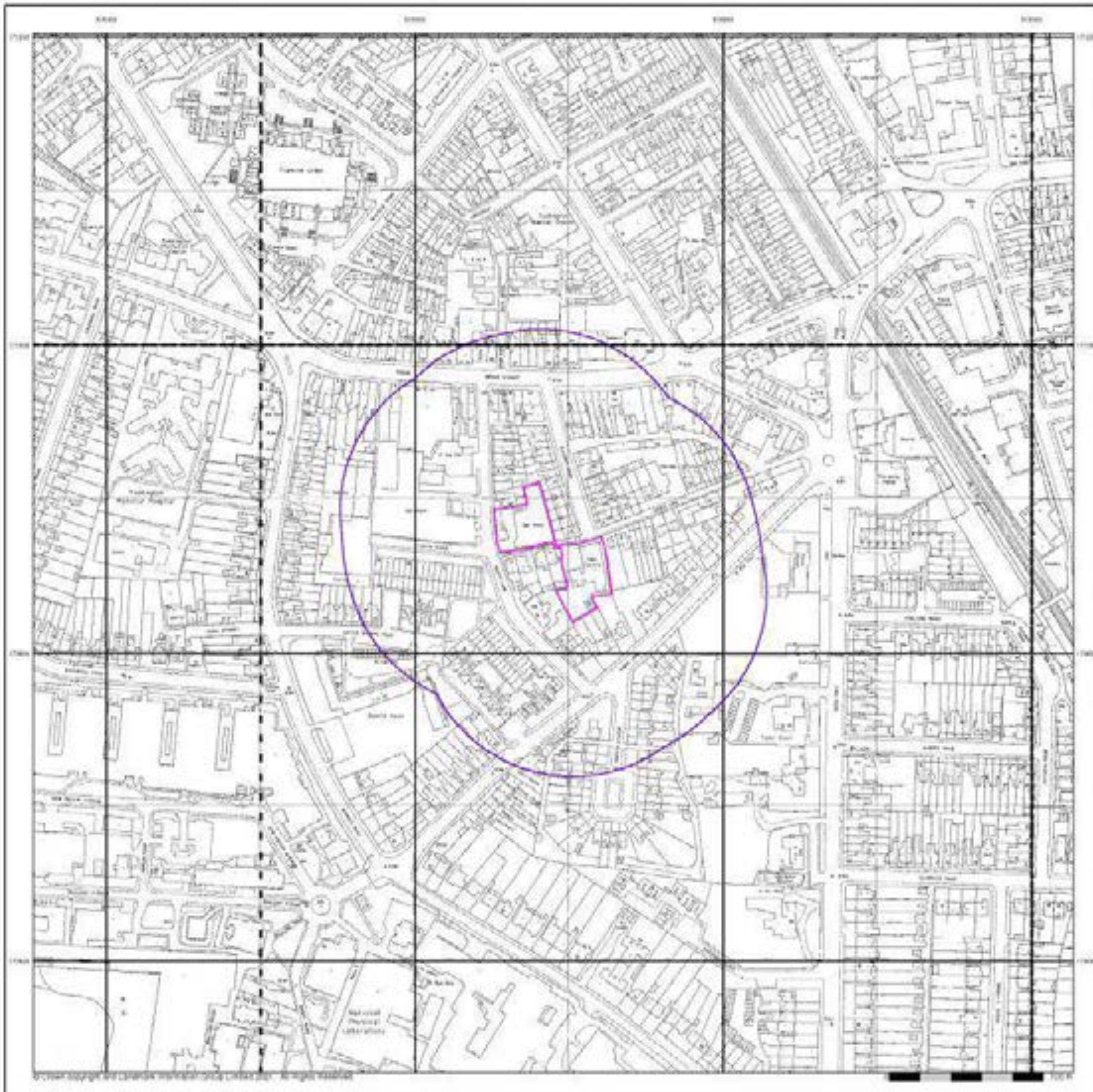

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LANDMARK INFORMATION GROUP®

Large-Scale National Grid Data

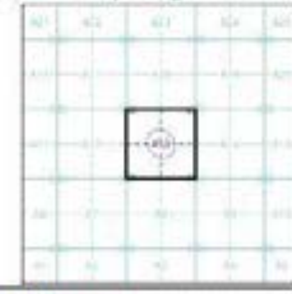
Published 1991

Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

Historical Map - Segment A13



N

Order Details

Order Number: 271376665_1_1
Customer Ref: TW11
National Grid Reference: 515690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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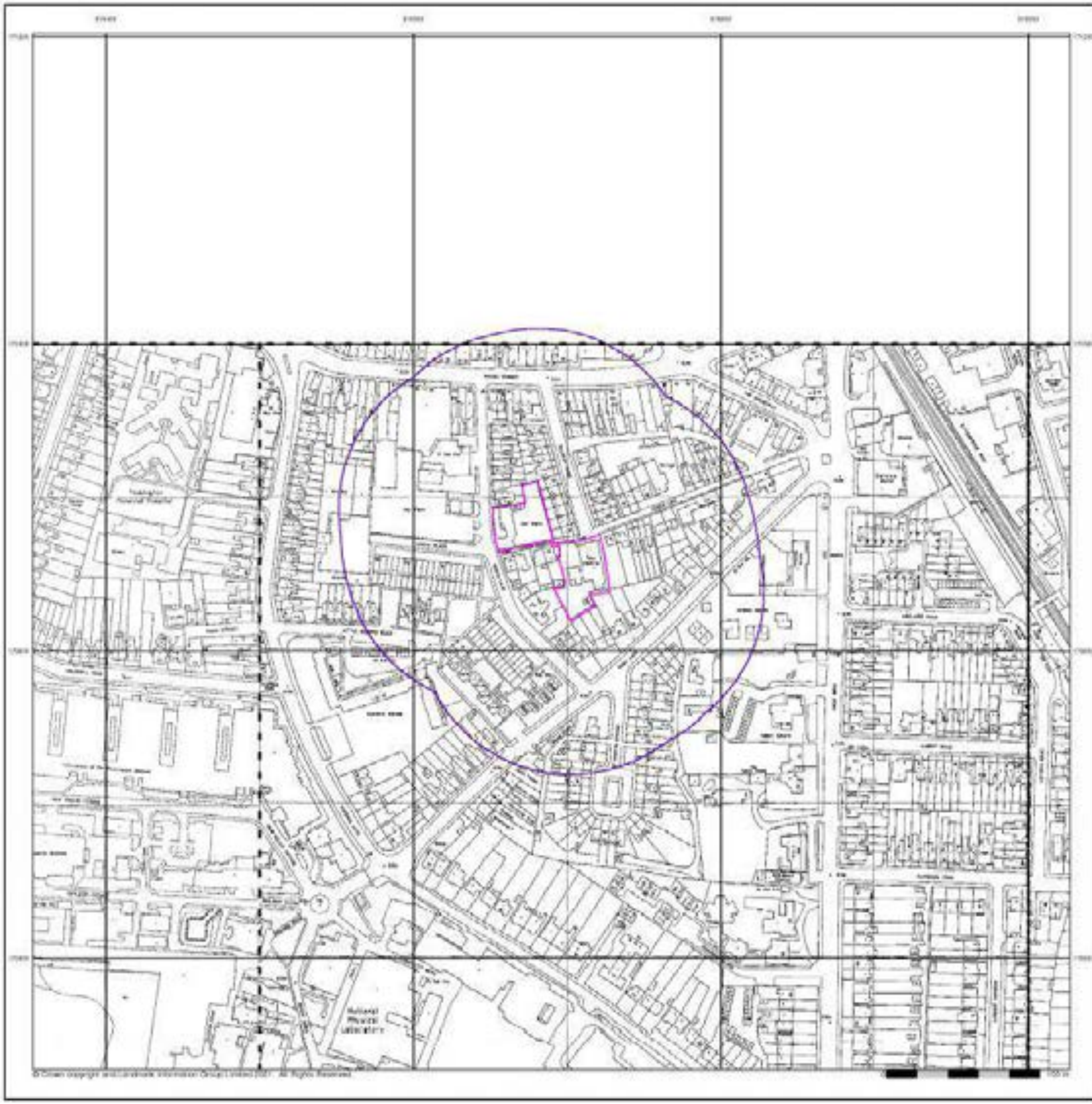

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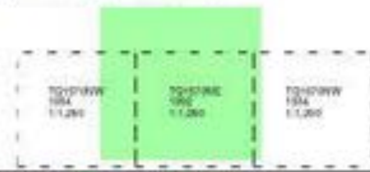
Large-Scale National Grid Data

Published 1992 - 1994

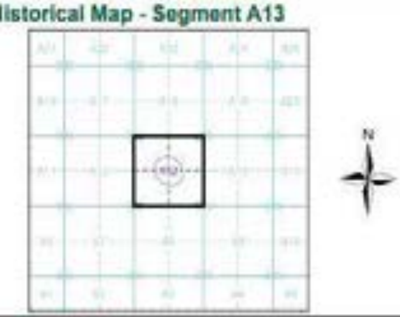
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the forerunners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	271370005_1_1
Customer Ref:	TW11
National Grid Reference:	515800, 170870
Slice:	A
Site Area (Ha):	0.28
Search Buffer (m):	100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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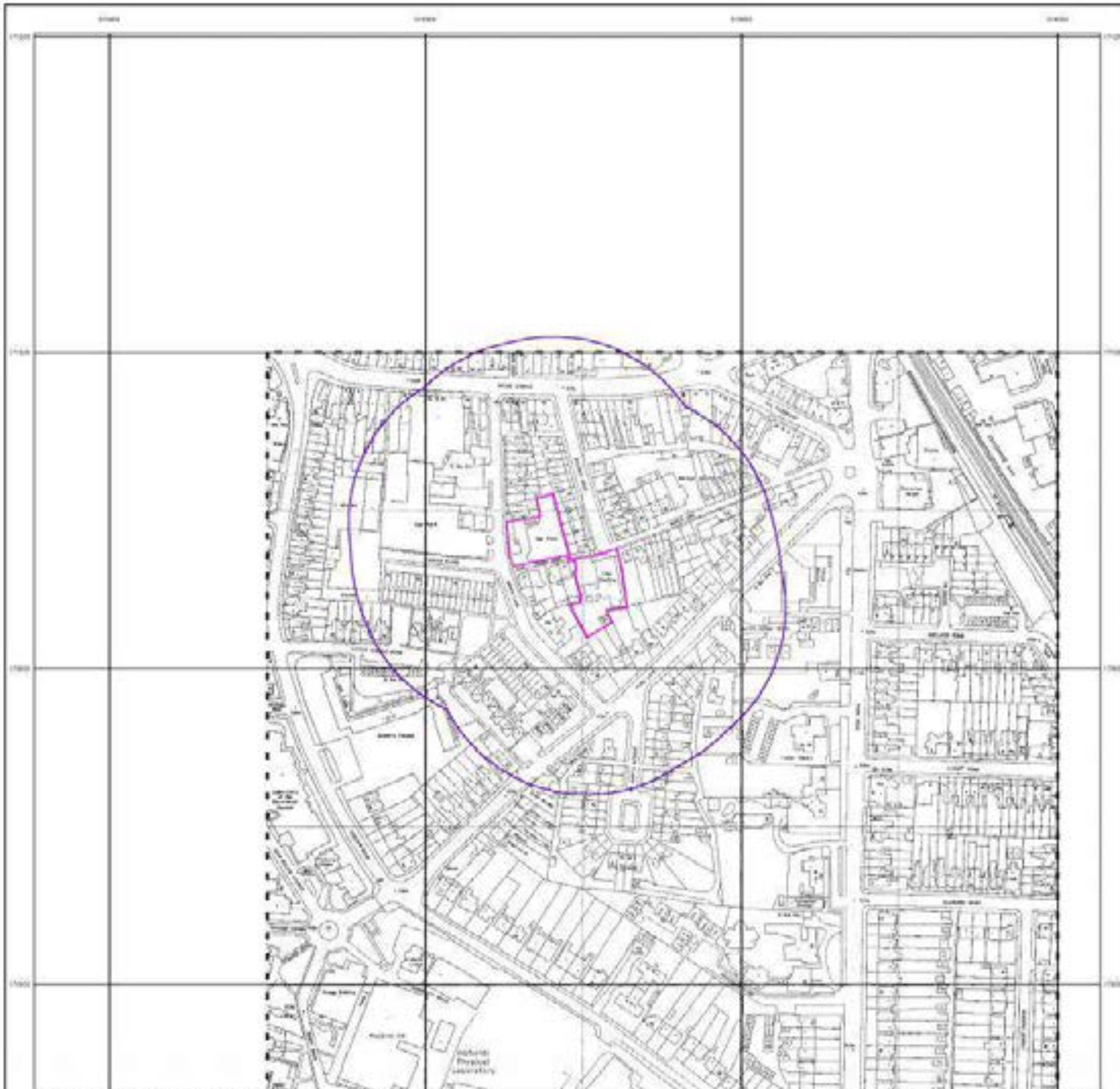

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LANDMARK INFORMATION GROUP

Large-Scale National Grid Data

Published 1994

Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1995. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

Historical Map - Segment A13

Order Details

Order Number: 271376665_1_1
Customer Ref: TW11
National Grid Reference: 515690, 170870
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 100

Site Details

Elleray Hall Social Club, Elleray Road, TEDDINGTON, TW11 0HG

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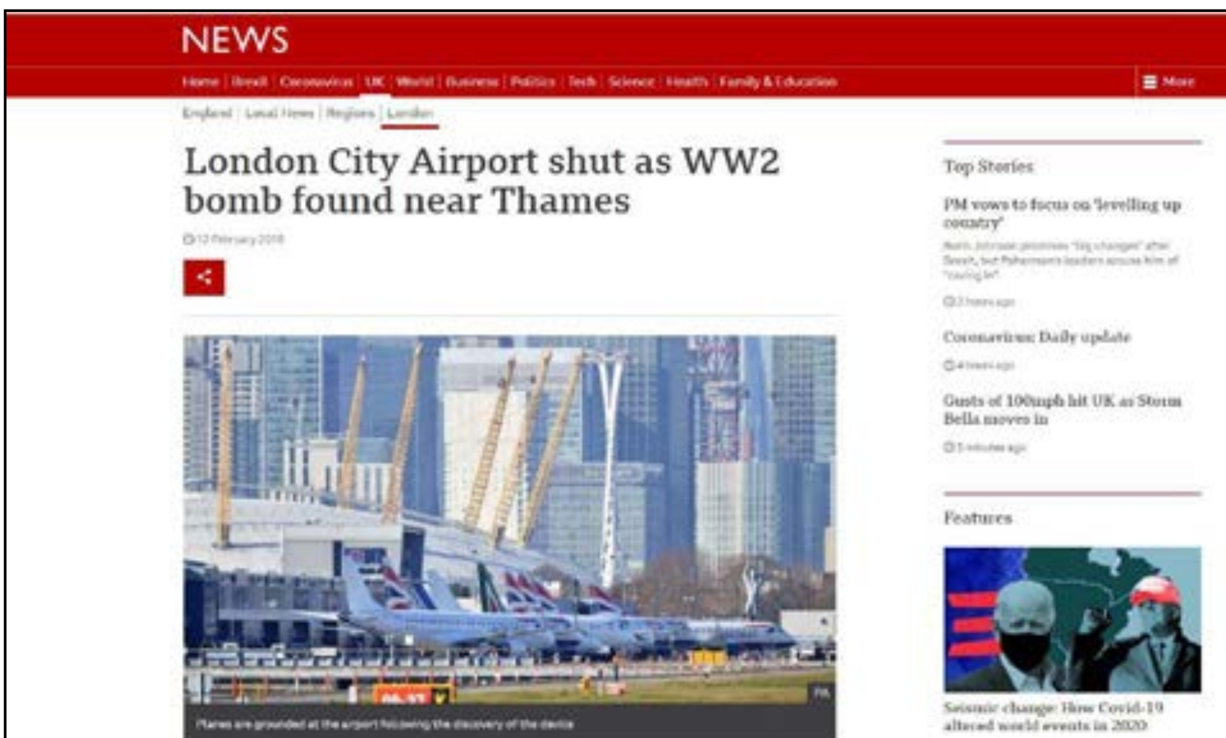
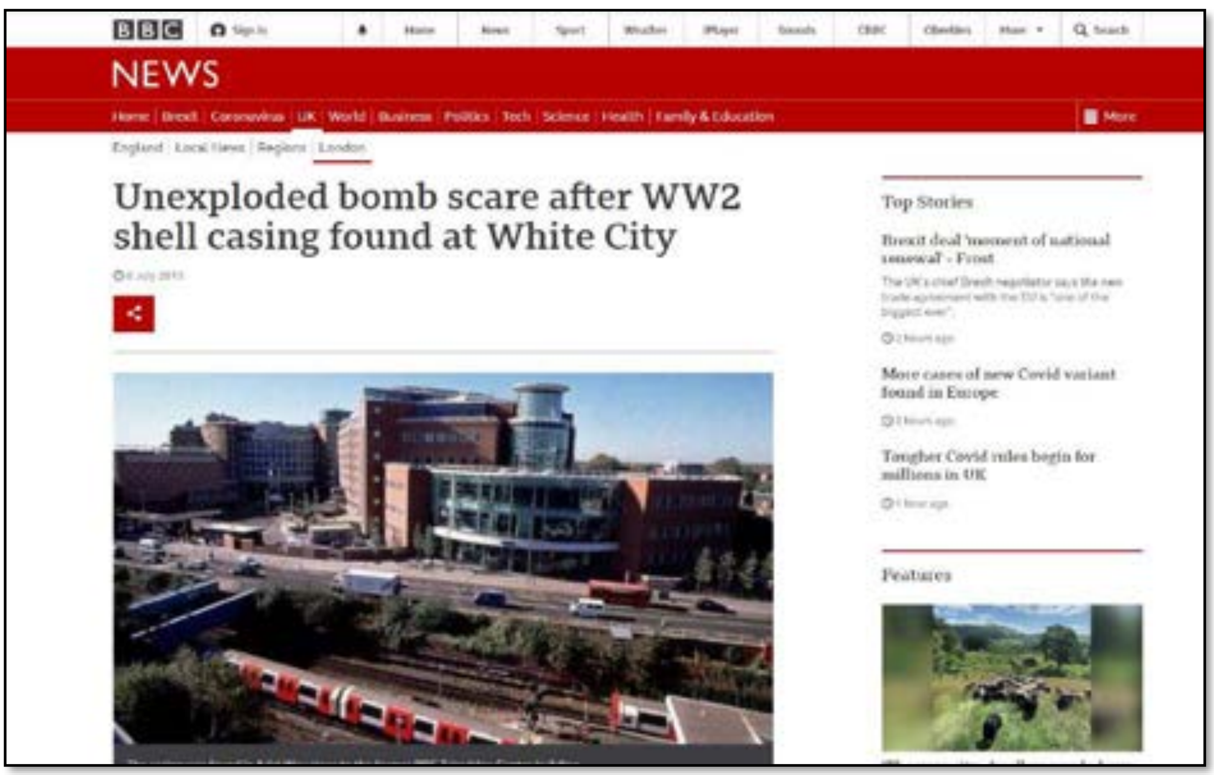
SOME BOMB INCIDENTS IN THE UK IN RECENT YEARS

Kingston (2019)

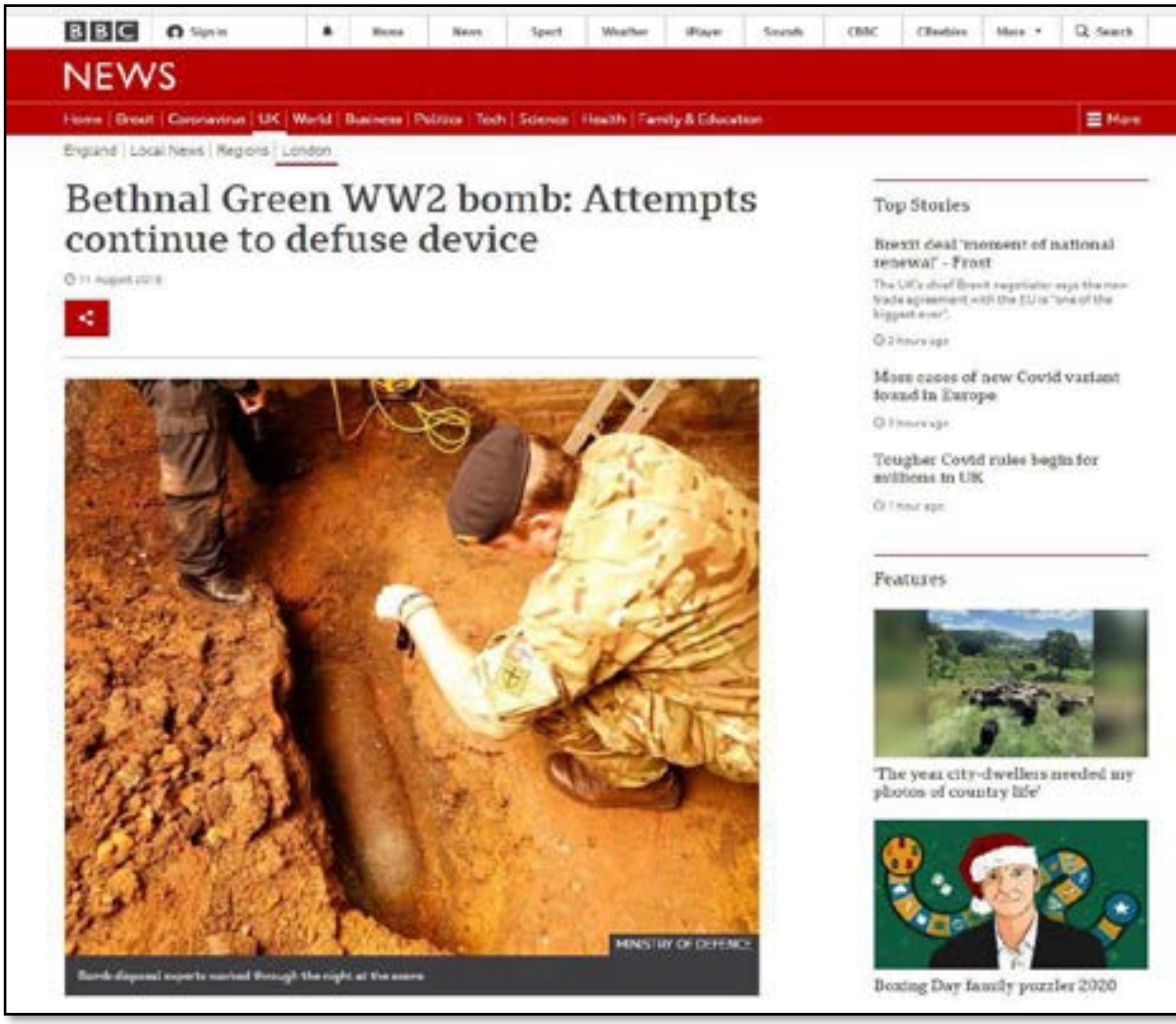


City Airport (2018)

Wembley (May 2015)



White City (July 2015)



Bethnal Green (April 2015)

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JOMAS ASSOCIATES LTD

6-9 The Square

Stockley Park

Uxbridge

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Website: www.jomasassociates.com

Tel: 0843-289-2187

Fax: 0872-115-4505

Email: info@jomasassociates.com