



Intrusive Geoenvironmental and Geotechnical Site Assessment

Downley Road
Havant
PO9 2JD

July 2024

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Prepared For:
Royal London Property Group

Prepared By:
TRC Companies Limited
20 Red Lion Street
London
WC1R 4PS

Registered Office: 150 Minories, London EC3N 1LS | Company Number: 06749633

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Executive Summary

TRC Companies Limited (TRC) was commissioned by the Royal London Property Group (the 'Client') to undertake a Tier 2 (formerly known as Phase II) Geoenvironmental and Geotechnical Site Assessment at Downley Road, Havant, PO9 2JD (hereafter referred to as the 'Site').

This Executive Summary is part of the complete report; and findings, opinions or conclusions in this Executive Summary are made in context with the complete report. TRC recommends that the user reads the entire report for all supporting information related to findings opinions and conclusions.

Executive Summary	
Site Details	
Client	Royal London Property Group
Site Address & Grid Reference	Downley Road, Havant, PO9 2JD Easting 472809, Northing 107616
Site Area	1.7 ha
Proposed Development	The proposed development will comprise the demolition of existing structures and construction of one warehouse type building, subdivided into three units, with associated car parking, loading yards, and limited soft landscaping.
Site Setting	
Current Site Use	The Site is currently an inactive plot of land, which comprises a single storey industrial unit fronted by two storey offices and ancillary areas with soft landscaping. The Site was recently occupied by Dunham-Bush Ltd, a refrigeration manufacturer and distributor.
Site History	Earliest available mapping (1867) shows that the Site comprised undeveloped agricultural land. By 1963, the Site had been developed into a factory, as part of a broader industrialisation of the area. By 1993, the Site had been developed to reflect its current land use.
Expected Geology	Made Ground – Expected based on BGS borehole logs from south-eastern corner of Site. Superficial deposits – River Terrace Deposits, Head Deposits Bedrock geology – London Clay Formation
Expected Hydrogeology	Superficial deposits – Secondary (A) Aquifer Bedrock geology - Unproductive Strata The Site lies within an Environmental Agency (EA) designated groundwater Source Protection Zone 1c, associated with superficial deposits. The Site is underlain by a Secondary (A) Aquifer which is unconfined. Groundwater is therefore considered to be sensitive to contamination.
Expected Hydrology	The nearest surface water feature is an unnamed river 136m west of the Site which may be in hydraulic connectivity with groundwater via superficial River Terrace Deposits. Surface water is therefore considered to be sensitive to contamination.
Investigation Findings	
Ground Conditions	Made Ground was encountered between ground level and a maximum of 1.20m bgl.

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	Superficial geology, comprising River Terrace Deposits, were encountered underlying Made Ground to at least 10m bgl, where the deepest borehole terminated. Bedrock geology was not encountered during the investigation.
Groundwater Conditions	During the ground investigation, groundwater was encountered within the deep borehole CP102 at 5.00m bgl and at 9.00m bgl rising to 7.50m bgl within the River Terrace Deposits. During subsequent monitoring, groundwater was encountered within CP102 at between 5.34m and 5.88m bgl within River Terrace Deposits. Dry conditions were encountered within the remaining shallower boreholes.
Geotechnical Assessment	
Geotechnical Hazards	The previous assessment and ground investigation have identified a number of geotechnical hazards at the Site which relate to the proposed development. These are Made Ground to depths of at least 1.20m, buried obstructions, ground conditions aggressive to buried concrete, variable nature of River Terrace Deposits, volume change potential of soils and, adjacent railway embankment in the immediate east and potential consultation with Network Rail. These are discussed in detail along with mitigation measures in section 6 of this report.
Foundations	Shallow foundations are recommended for the proposed structures. Details of the foundation options including allowable bearing pressures are discussed in section 6.3.
Floor Slabs	Ground bearing slabs on previously treated ground to a suitable specification could be adopted. Details are provided in section 6.4.
Excavations	Excavations for shallow foundations, floor slabs, and laying services should be readily achievable using standard excavation plant. However, hard surfacing and old foundations, may require the use of a breaking apparatus. Details for anticipated excavations are provided in section 6.5.
Pavements	Assuming excavation formation soils to comprise Made Ground and River Terrace Deposits, an equilibrium CBR value of 3% is recommended for pavements preliminary design. Confirmatory in-situ CBR testing at final formation level is recommended just prior to pavement construction. Details for proposed pavements are provided in section 6.6 of this report.
Buried Concrete	Overall, with reference to the BRE Digest SD1 (2005) and considering the results of both soil and groundwater samples, design sulphate and ACEC classes of DS-2 and AC-2 for Made Ground and DS-1 and AC-1 for River Terrace Deposits are recommended, respectively.
Soakaways	Soakaway testing did not form part of the scope of works, however given the predominantly granular nature of the superficial deposits, shallow soakaways may be viable for future developments. Suitability of ground conditions for shallow soakaways would be subject to confirmation of infiltration rates via in-situ testing in accordance with BRE 365.
Contaminated Land Assessment	
Human Health	No exceedances of Generic Assessment Criteria (GAC) for the protection of human health were identified within the soils underlying the Site based on the proposed

Executive Summary	
	commercial end use. No asbestos fibres were identified in any of the Made Ground samples analysed.
Controlled Waters	Copper was identified in excess of the EQS protective of surface water receptors in a groundwater sample obtained from CP102. The nearest surface water receptor is an unnamed river 134m west of the Site and water in this feature may be in hydraulic continuity with groundwater in the superficial deposits beneath the Site. The single marginal exceedance of copper is considered unlikely to pose a significant risk to the surface water feature due to the distance.
Ground Gas, radon and Organic Vapour	Gas monitoring indicates that the Site would be classified as Characteristic Situation 1 (very low risk). The Site lies within an area where radon may be above the action level and basic radon protection measures are required. Due to the potential risk of radon gas, a detailed BGS GeoReport should be commissioned to establish requirements for radon protection for future buildings. There is not considered to be a risk from organic vapour.
Remediation	Based on the results of this assessment, contamination has not been identified in relation to a proposed commercial/industrial end use, and remediation is not required; however, the following mitigation measures are considered to be required: • Installation of basic radon protection measures • Capping of landscaped areas to facilitate planting • Installation of buried services in corridors of clean soil The selection of appropriate water supply pipework should be confirmed by the local water supply company.
Recommendations	
<u>Geoenvironmental</u> While no significant sources of contamination have been identified during this investigation, further sampling and testing beneath the former above ground storage tanks, beneath the existing buildings, and beneath the electricity substation would be prudent following demolition to confirm the findings of this investigation and assessment. Furthermore, a Remediation Strategy and Verification Plan is likely to be required by the Local Planning Authority. The Site lies within an area where radon may be above the action level and basic radon protection measures are required. Due to the potential risk of radon gas, a detailed BGS GeoReport should be commissioned to establish requirements for radon protection for future buildings. <u>Geotechnical</u> Additional exploratory holes are recommended to delineate the sequence of strata beneath the existing building on Site, as to-date access has been restricted and the structure covers a majority of the Site. Soakaway testing in accordance with BRE 365 is also recommended should shallow soakaways be required for future developments.	

1.0 Introduction

1.1 Appointment and Purpose

TRC Companies Limited (TRC) was commissioned by the Royal London Property Group (the 'Client') to undertake a Tier 2 (formerly known as Phase II) Geoenvironmental and Geotechnical Site Assessment at Downley Road, Havant, PO9 2JD (hereafter referred to as the 'Site').

A Site location plan is presented as Figure 1 in Annex A.

The purpose of this Tier 2 report is to evaluate the environmental condition of underlying soils and groundwater for due diligence purposes, to support a future planning application and aid foundation design for the proposed development.

1.2 Proposed Development

The proposed development will comprise the demolition of existing structures and construction of one warehouse type building, subdivided into three units, with associated car parking, loading yards, and limited soft landscaping.

Based on the above, the proposed development is considered to fall into geotechnical category 2 with respect to BS EN 1997 (Eurocode 7).

The end user sensitivity is considered to be low for the proposed commercial/industrial end use.

A proposed development plan is presented as Figure 3 in Annex A.

1.3 Available Information & Standards

This report is based on the following information:

- Historical uses of the Site and surroundings;
- Current use and condition of the Site;
- Environmental setting in terms of geology, hydrogeology, hydrology and surrounding land uses;
- Relevant publicly available environmental records; and,
- Intrusive investigation including geoenvironmental and geotechnical sampling and testing.

This report was conducted with due regard to the following guidance and standards:

- The National Planning Policy Framework;
- BS5930:2015 (+A1:2020) Code of Practice for Ground Investigations;
- BS EN 1997 Eurocode 7;
- BS8485:2015 (+A1:2019) Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings;
- BS8576:2013 Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds (VOCs);
- BS10175:2011 (+A2:2017) Investigation of Potentially Contaminated Sites – Code of Practice; and,
- Land Contamination: Risk Management (LCRM) 2020.

The geotechnical appraisal has been carried out in accordance with Eurocode 7. Sections 1 to 5, together with Annexes A to E, comprise the Ground Investigation Report.

Preliminary geotechnical recommendations are presented in Section 6 and these may need to be verified in a Geotechnical Design Report once structural details of the proposed development are confirmed.

1.4 Significant Assumptions

This report presents TRC's observations, findings, and conclusions as they existed on the date that this report was issued. This report is subject to modification if TRC becomes aware of additional information after the date of issue of this report that is material to its findings and conclusions.

The reliability of information provided by others to TRC cannot be guaranteed to be accurate or complete. Performance of this Tier 2 Geoenvironmental and Geotechnical Site Assessment is intended to reduce, but not eliminate, uncertainty of geoenvironmental and geotechnical conditions associated with the subject site; therefore, the findings and conclusions made in this report should not be construed to warrant or guarantee the subject site, or express or imply, including without limitation, warranties as to its marketability for a particular use. TRC found no reason to question the validity of information received unless explicitly noted elsewhere in this report.

1.5 User Reliance

This report was prepared for the Royal London Property Group. Reliance on this report by any other third party is subject to requesting and fully executing a reliance letter between TRC and the third party that acknowledges the TRC Standard Terms and Conditions with the Client, to the same extent as if they were the Client thereunder.

TRC has been provided with information from third parties for information purposes only and without representation or warranty, express or implied as to its accuracy or completeness and without any liability on such third parties part to revise or update the information. Where reliance has been provided by third parties to potential purchasers this is noted in our report.

2.0 The Site

2.1 Location

The Site comprises an approximate 1.7 ha plot of land located to the east of Downley Road, Havant, PO9 2JD, centred on National Grid Reference Easting 472809, Northing 107616, approximately 1.2km north of Havant town centre.

A Site location plan is presented as Figure 1 in Annex A.

2.2 Site Description

The Site is located within an area of predominantly commercial land use.

The Site is a rectangular parcel of land, 150m long by 100m wide, located to the east of Downley Road. The Site is currently inactive but was previously occupied by an air conditioning unit manufacturer and distributor. The Site is accessed via Downley Road by metal gating in both the north and south. The Site houses a large single storey brick-framed industrial unit fronted by a two storey masonry office building with ancillary areas. Along the front of the offices, towards Downley Road, runs an area of soft landscaping. The remaining of the exterior of the buildings is covered with hardstanding. The building and hardstanding appeared in good condition not indicating significant ground movement beneath the Site. There is a small electrical substation in the north of the Site. There is evidence that the Site previously had two tank yards with aboveground storage tanks, but these have since been removed.

The Site has an average elevation of approximately 19m above Ordnance Datum (aOD). Topographically the Site is flat.

A Site visit was not completed prior to the Site investigation due to access restrictions; however, a Site walkover was performed during the Site investigation. This included within the interior of the industrial unit, offices, and ancillary areas.

An annotated Site layout plan is presented in Figure 2 in Annex A.

2.3 Surrounding Area

Land uses in the immediate vicinity include the following principal features:

Table 2.1: Summary of Surrounding Land Use

Direction	Land Use
North	The Site is bound to the north by commercial and industrial units which comprise a builders merchant, a vegan dog food supplier, a garden centre and a tattoo supplies warehouse.
East	The Site is bound to the east by a railway line that is approximately oriented north-south, beyond which are residential buildings.
South	The Site is bound to the south by commercial and industrial units which comprise an electrical products wholesaler, a gym and a motor vehicle parts warehouse.
West	The Site is bound to the west by Downley Road, beyond which are a number of trees along with commercial and industrial units which comprise a vehicle depot, a veterinarian and a building contractor.

2.4 Site Environmental Setting

2.4.1 Geology

It is anticipated that the Site is underlain by variable thickness of Made Ground, overlying possible Head Deposits which in turn overlie River Terrace Deposits which are underlain by the London Clay Formation at depth.

2.4.2 Hydrogeology

British Geological Survey (BGS) geological mapping and hydrogeological mapping presented by DEFRA (MAGIC website) indicate the following hydrogeological information for the Site:

Table 2.2: Summary of Hydrogeology

Geology	Geological Description	Aquifer Status	Aquifer Description
Superficial Deposits: Head Deposits	Clay and Gravel	Secondary (Undifferentiated) Aquifer / Secondary (A) Aquifer	It is not possible to apply either an A or B definition because of the variable characteristics of the ground type.
Superficial Deposits: River Terrace Deposits	Sand and Gravel	Secondary (A) Aquifer	Permeable strata capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers, lakes or wetlands.
Bedrock: London Clay Formation	Clay and Silt	Unproductive Strata	Geological strata with low permeability that have negligible significance for water supply or river base flow. They consist of deposits that naturally offer protection to any aquifers that may be present beneath.

The Site lies within a groundwater Source Protection Zone (SPZ) 1c (Inner Protection Zone), which relates to the superficial deposits.

There are no active groundwater abstractions within 1km of the Site boundary.

The Landmark Envirocheck report indicates the potential for groundwater flooding of property situated below ground level and potential for groundwater flooding to occur at ground surface.

Historical BGS boreholes in the surrounding area indicate the presence of groundwater within the River Terrace Deposits between 1.40m and 6.00m bgl.

2.4.3 Hydrology

The nearest surface water feature is an unnamed river 134m west of the Site.

There are no active surface water abstractions within 1km of the Site boundary.

The Site is located within Flood Zone 1. Land within Flood Zone 1 has a low probability of flooding from rivers and the sea.

2.5 Summary of Site History

Earliest available mapping (1867) shows that the Site comprised undeveloped agricultural land. By 1963, the southern part of the Site had been developed into a factory, as part of a broader industrialisation of the area. By 1993, the Site had been developed to reflect its current land use.

2.6 Previous Investigations, Reports or Remediation

The following site-specific assessment has been reviewed and is referred to in this report:

Table 2.3: Summary of Previous Site Assessments

Report Details	Summary of Geoenvironmental and Geotechnical Findings
'Desk Based Geoenvironmental and Geotechnical Site Assessment' issued by TRC Companies Limited, dated December 2023, report ref.no.: 562241.0000.0000	<u>Expected Geology</u> The Site is anticipated to have Made Ground present associated with the past developments. Superficial deposits of Head Deposits and River Terrace Deposits are expected. The bedrock geology is expected to be the London Clay Formation. <u>Expected Hydrogeology</u> The Superficial deposits underlying the Site are designated as a Secondary (A) Aquifer. The bedrock geology is designated as Unproductive Strata. The Site lies within a groundwater SPZ 1c. The Site is underlain by a Secondary (A) Aquifer which is unconfined, groundwater is therefore considered to be sensitive to contamination. <u>Expected Hydrology</u> The nearest surface water feature is an unnamed river approximately 132m west of the Site. This may be in hydraulic connectivity with the groundwater via the Superficial Deposits. Surface water is therefore considered to be sensitive to contamination. <u>Initial Conceptual Site Model</u> On-Site, the Made Ground, tank yards and substation at the Site could be sources of asbestos fibres in soil, heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons, PCBs, BTEX, MTBE and ground gases. Off-Site, the gas holder and historic industrial works are a potential source of asbestos fibres in soil, heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons, phenols, cyanides, ammonium and ground gases. Potentially complete contaminant linkages have been identified and are considered to pose a low risk to the identified receptors. <u>Geotechnical Assessment</u> Geotechnical hazards identified on the Site are: • Made Ground due to past developments; • Buried obstructions, such as old foundations and basements, large gravels and cobbles within the Made Ground and River Terrace Deposits; • Ground conditions aggressive to buried concrete; • Running sands in case loose granular deposits are present;

Report Details	Summary of Geoenvironmental and Geotechnical Findings
	• Volume change potential soils; • Shallow groundwater; and, • Adjacent railway line embankment to the immediate east. <u>Unexploded Ordnance (UXO) Risk Assessment</u> The Site lies within an area of moderate risk of potential UXO. A detailed UXO Risk Assessment was carried out for the Site and found that the risk of Allied and German UXO was considered Low. Recommended UXO risk mitigation measures include a UXO risk management plan and site-specific UXO awareness briefings to all personnel conducting intrusive works. <u>Recommendations</u> A ground investigation should be performed in accordance with LCRM (2020), BS10175:2011 (+A2:2017), BS5930:2015 (+A1:2020), and Eurocode 7 Part 2 (and the associated national annex), and to current relevant technical guidance. This will confirm the geology, groundwater regime and engineering properties of the underlying ground, as well as target identified contaminant linkages and ensure the geotechnical hazards are addressed. Basic radon protection measures are necessary in any proposed development.

3.0 Ground Investigation

3.1 Scheduled Scope of Works

The scheduled TRC Tier 2 investigation scope of works comprised:

- Three cable percussive boreholes (CP101, CP102, CP103) to a maximum depth of 10.0m bgl;
- Five windowless sample boreholes (WS101, WS102, WS103, WS104, WS105) to a maximum depth of 5.0m bgl;
- In-situ logging, ground sampling and testing;
- Field screening for contamination using a Photo-Ionisation Detector (PID);
- Construction of five gas and groundwater monitoring wells;
- Field monitoring of bulk ground gases and groundwater levels on four occasions; and,
- Collection of groundwater samples for laboratory testing.

3.2 Investigation Rationale

The ground investigation was designed by TRC on behalf of the Client to gather information on the geoenvironmental and geotechnical ground, groundwater and ground-borne gas conditions at the Site.

The TRC investigation aimed to gain good general coverage of the Site. The ground investigation also targeted the areas suspected to have previously been the location of above ground.

Table 3.1: Summary of Exploratory Hole Locations

Exploratory Hole	Location
CP101	Located in the south-eastern corner of the Site in an area of hardstanding
CP102	Located in the western portion of the Site, alongside Downley Road, in an area of soft landscaping
CP103	Located in the north-eastern portion of the Site in an area of hardstanding, slightly east of the location of the electricity substation
WS101	Located in the south-western corner of the Site
WS102	Located in the eastern portion of the Site on an area of hardstanding that used as thoroughfare for vehicles delivering to the Site
WS103	Located in the south of the Site on an area of hardstanding that was previously a tank yard
WS104	Located in the northwest of the Site on an area of soft landscaping
WS105	Located in the north of the Site on an area of hardstanding that was previously a tank yard and near an electricity substation

3.3 Investigation Methodology

3.3.1 Ground Investigation

The TRC Tier 2 investigation was conducted at the Site from the 9th October 2023 to the 11th October 2023.

TRC commissioned Southeastern Drilling Services and Borehole Solutions Ltd to undertake the borehole drilling at the Site. The exploratory holes were advanced using a Dando 4000 for cable percussive locations and a GTR SFX 790 rig for windowless sampling locations. The drilling works were overseen by a TRC engineer who performed field assessment and logging of the exploratory holes.

The works included the following key actions:

- Review of available underground services plans for the Site;
- Each of the proposed exploratory hole locations was cleared using a Cable Avoidance Tool (CAT) and ground penetrating radar (GPR) by an independent utilities surveyor;
- Each of the proposed exploratory hole locations on hardstanding was broken out by a concrete corer prior to drilling;
- Cable percussive drilling was performed at CP102 and CP103 by the Southeastern Drilling Services, including in-situ geotechnical testing;
- Windowless sampling drilling was performed at WS101, WS103, WS104 and WS105 by Borehole Solutions Ltd, including in-situ geotechnical testing;
- A UXO Engineer supported the safe completion of the exploratory holes by performing a remote safety briefing ahead of drilling.
- On-site ground logging, testing, and assessment of potential indicators of contamination;
- Field screening using a PID;
- Collection of soil and groundwater samples for environmental and geotechnical laboratory analysis;
- Construction of gas and groundwater monitoring wells in five borehole locations, CP102, CP103, WS103, WS104 and WS105;
- WS101 was backfilled with arisings; and,
- Surveying of the exploratory holes final locations.

The following alterations to exploratory hole depths were made during the course of the ground investigation:

- CP101 was abandoned due to time and access constraints;
- CP103 was terminated at 4.50m bgl due to time and access constraints;
- WS101 was terminated at 2.00m bgl due to refusal on flint cobbles;
- WS102 was abandoned due to time and access constraints;
- WS103 was terminated at 2.00m bgl due to refusal on flint cobbles;
- WS104 was terminated at 1.00m bgl due to refusal on flint cobbles; and,
- WS105 was terminated at 1.20m bgl due to refusal on flint cobbles.

The exploratory hole location plan for the ground investigation undertaken, is presented as Figure 4 in Annex A.

The exploratory hole logs are presented in Annex C and include the in-situ sampling and testing undertaken at the Site.

3.3.2 Groundwater and Ground Gas Monitoring

The ground conditions encountered with respect to the response zone of the monitoring installations are summarised in the table below.

Table 3.2: Monitoring Wells Summary

Exploratory Hole	Response Zone (m bgl)	Response Zone Strata (m bgl)	
CP102	2.00 – 10.00	2.00 – 10.00	River Terrace Deposits
CP103	1.00 – 4.50	1.00 – 4.50	River Terrace Deposits
WS103	0.50 – 2.00	0.50 – 2.00	River Terrace Deposits
WS104	0.50 – 1.00	0.50 – 1.00	River Terrace Deposits
WS105	0.50 – 1.00	0.50 – 1.00	River Terrace Deposits

Groundwater and ground gas monitoring was conducted by a TRC technician on four occasions. The dates of the monitoring visits were 25th October 2023, 2nd November 2023, 7th November 2023 and 16th November 2023.

During each visit, groundwater elevation and potential presence of any free phase oils was measured using an oil/water interface probe. Gas monitoring was undertaken using a portable gas analyser at each monitoring well head. The field assessment gathered data relating to the concentrations of permanent ground gases (e.g. methane, carbon dioxide, carbon monoxide and oxygen).

Groundwater sampling was also undertaken in CP102 using a dedicated disposable bailer.

3.4 Geotechnical In-Situ Testing

In-situ testing was undertaken for geotechnical purposes. The details of the in-situ test results are presented in the logs within Annex C.

The Site based geotechnical testing is summarised in the table below.

Table 3.3: In-situ Tests (Geotechnical)

Test Type and Standard	Number
Standard penetration test (BS EN ISO 22476-3:2005+A1:2011)	16

Any limitations to the in-situ testing that require consideration during the evaluation of the data are described in the following paragraphs.

Although the Standard Penetration Test (SPT) is a standardised test, uncorrected SPT 'N' values display a considerable amount of scatter. Calibrated SPT hammers were used during the ground investigation and in our evaluation, presented in Section 5, the results have been normalised to 'N₆₀' in accordance with Eurocode 7.

Some elevated SPT N values, likely due to encountering coarse gravels and cobbles within the River Terrace Deposits were recorded between 1.20m and 7.00m bgl. As discussed in Section 5, these are not considered representative of the stratum as a whole and have been discounted from subsequent analysis. The following SPT results have been discounted from the assessment in Section 5:

- CP102 at 2.50m bgl
- CP102 at 3.50m bgl
- CP102 at 7.00m bgl
- CP103 at 2.50m bgl
- CP103 at 3.50m bgl
- WS101 at 2.00m bgl
- WS103 at 2.00m bgl
- WS104 at 1.00m bgl
- WS105 at 1.20m bgl

The above factors have been considered in the appraisal of geotechnical results presented in Section 5.

3.5 Geotechnical Laboratory Testing

Laboratory testing was undertaken for geotechnical purposes.

The geotechnical laboratory testing is summarised in the table below.

Table 3.4: Laboratory Tests (Geotechnical)

Test Type and Standard (BS 1377 unless stated differently)	Number
Water (moisture) content (BS EN ISO 17892-1)	2
Liquid and plastic limits and plasticity index (BS EN ISO 17892-12)	2
Particle size distribution - wet sieving (BS EN ISO 17892-4)	9
Water soluble sulphate content 2:1 aqueous extract (BRE SD1 2005)	12
Total sulphur content (BRE SD1 2005)	12
Acid soluble sulphate content (BRE SD1 2005)	12
Soil pH (BRE SD1 2005)	12
Sulphate content in groundwater (BRE SD1 2005)	1
Groundwater pH (BRE SD1 2005)	1

As with in-situ testing, it is necessary to consider the limitations associated with any laboratory testing and to review any potentially anomalous results. In all geotechnical tests the specimen is selected from a much larger volume of material which may have an inherent degree of variability, particularly in Made Ground.

Water content determinations on disturbed samples may not be representative due to the disturbance arising from the sampling process. Moisture content results can be influenced by climatic factors and it cannot be guaranteed that the values determined at the time of investigation will be the same as those at the time of construction.

Obtaining coarse grained soils from cable tool or windowless boreholes can result in a loss of materials due to the nature of the sampling process. This can have an influence on the results of particle size distribution analyses.

The above factors have been considered in the appraisal of the geotechnical results given in Section 5.

The full set of laboratory geotechnical results is presented in Annex E.

3.6 Environmental Laboratory Analysis

A total of 12 soil samples were collected for environmental analysis during the investigation works. All soil samples were packed in laboratory provided containers and delivered to I2 Analytical Limited for chemical analysis.

All soil samples were collected in order to provide environmental data on the quality of near surface and shallow soils beneath the Site. Representative samples of Made Ground and River Terrace Deposits were collected where feasible. The analytical suite of soils included the following parameters:

- Asbestos (Made Ground only);
- Heavy metals suite;
- Polycyclic aromatic hydrocarbons (PAH);
- Total petroleum hydrocarbons – Criteria Working Group (TPH-CWG); and,
- Volatile organic compounds (VOC).

A groundwater sample was collected from one of the boreholes. The sample was sent to I2 Analytical Limited and analysed for the following:

- Heavy metals suite;

- PAH;
- TPH-CWG; and,
- VOCs.

The full set of chemical results are presented in Annex F.

4.0 Ground Conditions

4.1 Ground Profile

The investigation observed that the soils underlying the Site generally comprised the following:

Table 4.1: Ground Profile

Stratum	From		To		Thickness (m)
	m bgl	m aOD ¹	m bgl	m aOD ¹	
Made Ground	0.00	19.00	0.30 - 1.20	18.70- 17.80	0.30 - 1.20
River Terrace Deposits	0.30 - 1.20	18.70- 17.80	>10.00	<9.00	>8.80

1. Assuming a ground level of 19.00m aOD across the site.

Published British Geological Survey (BGS) borehole records in proximity to the south-eastern Site boundary recorded London Clay Formation at 6.70m bgl. However, the London Clay Formation was not encountered during the investigation despite exploratory holes locally reaching depths of 10.0m bgl.

Published BGS maps indicate Head Deposits in the north-western portion of the Site. However, Head Deposits were not encountered during the investigation.

With the exception of the previously discussed discrepancies, the ground conditions encountered broadly correspond with the publicly available records of ground conditions published by the BGS.

4.2 Made Ground

The Made Ground was encountered in all of the exploratory holes from ground level to depths of between 0.30m and 1.20m bgl. Made Ground was locally mantled by bituminous or reinforced concrete hardstanding ranging in thickness from 0.10m to 0.40m.

The Made Ground was heterogeneous in nature and comprised brown, slightly clayey, sand gravel or slightly silty gravelly clay. Sand was fine to coarse grained. Gravel was angular to subrounded, fine to coarse grained. Gravel consisted of brick, flint, sandstone and concrete. Medium to high cobble content was recorded within Made Ground. Cobbles consisted of brick and flint. Possible topsoil from ground level to 0.15m bgl was encountered at WS101.

4.3 River Terrace Deposits

Superficial geology of the River Terrace Deposits were encountered in all of the exploratory holes underlying Made Ground to depths in excess of 10.00m bgl (<9.00m aOD). The base of the River Terrace Deposits was not confirmed during the investigation.

The River Terrace Deposits generally comprised brown very clayey sandy gravel, brownish grey sandy gravel or orangish brown slightly silty slightly clayey sandy gravel. Sand was fine to coarse grained. Gravel was angular to subrounded, fine to coarse grained. Gravel consisted of flint and sandstone. Medium to high cobble content of flint. Cohesive sublayers of the stratum were encountered locally within WS101 and WS103 at 0.50m – 1.20m bgl in the south of the Site, where the stratum comprised firm to stiff brown silty gravelly clay.

4.4 Groundwater

Water strikes observed during the Site works and the results of the monitoring visits are summarised in the table below.

Table 4.2: Groundwater Observations

Exploratory Hole	Water Strikes				Standing Water Level During Monitoring			
	Struck		Rose to		Shallowest		Deepest	
	m bgl	m aOD	m bgl	m aOD	m bgl	m aOD	m bgl	m aOD
CP102	5.00	13.83	ND	-	-	-	-	-
CP102	9.00	9.83	7.50	11.33	5.34	13.49	5.88	12.95
CP103	ND	-	ND	-	ND	-	ND	-
WS101	ND	-	ND	-	-	-	-	-
WS103	ND	-	ND	-	ND	-	ND	-
WS104	ND	-	ND	-	ND	-	ND	-
WS105	ND	-	ND	-	ND	-	ND	-

ND = Not Detected

During the ground investigation, groundwater was encountered within the deep borehole CP102 at 5.00m bgl and at 9.00m bgl rising to 7.50m bgl within the River Terrace Deposits.

During subsequent monitoring, groundwater was encountered within the deep borehole CP102 at between 5.34m and 5.88m bgl within River Terrace Deposits. Dry conditions were encountered within the remaining shallower boreholes.

According to the ground investigation and monitoring data, groundwater is anticipated within the River Terrace Deposits at around 5.35m bgl. Groundwater may be subject to seasonal variations especially after periods of prolonged rain or drought.

Historical BGS boreholes in the surrounding area indicate the presence of groundwater within the River Terrace Deposits between 1.40m and 6.00m bgl.

The groundwater monitoring data are presented in Annex D.

4.5 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of contamination was encountered during the ground investigation.

5.0 Geotechnical Assessment

5.1 Strata Properties

5.1.1 Made Ground

Due to the relatively shallow depth to which Made Ground was encountered, no SPTs were conducted in the material.

Two particle size distribution tests undertaken on samples of the Made Ground recorded 11% to 18% cobbles, 33% to 54% gravel, 16% to 21% sand and 14% to 34% clay/silt.

A single moisture content test undertaken on a sample of the Made Ground recorded a value of 16.3%.

A single Atterberg limits test undertaken on a sample of the Made Ground recorded values of 31% for the liquid limit, 18% for the plastic limit, and 13% for the plasticity index. The modified plasticity index was 13%. The results indicate that the cohesive Made Ground, where present, is of low plasticity and of low volume change potential (VCP) in accordance with NHBC Standards.

5.1.2 River Terrace Deposits

Seven SPTs conducted in the River Terrace Deposits yielded N₆₀ values in the range of 17 to 57, indicating the medium dense to dense nature of the material. A further nine SPTs conducted in the material refused upon reaching a blow count of 50, likely due to encountering coarse gravels and cobbles; as previously discussed these values have not been considered representative and are not considered further in the assessment. SPT results are plotted against depth in Figure 5 Annex A.

Seven particle size distribution tests undertaken on samples of the River Terrace Deposits recorded 0% to 19% cobbles, 51% to 88% gravel, 2% to 35% sand and 0% to 29% clay / silt.

A single moisture content test undertaken on a sample of the Made Ground recorded a value of 16.3%.

A single Atterberg limits test undertaken on a cohesive sample of the River Terrace Deposits, recorded values of 41% for the liquid limit, 17% for the plastic limit, and 24% for the plasticity index. The modified plasticity index was 24%. The results indicate that the cohesive sublayers of River Terrace Deposits, where present, are of intermediate plasticity and of medium volume change potential (VCP) in accordance with NHBC Standards.

5.2 Buried Concrete

Twelve soil samples, comprising four from the Made Ground and eight from the River Terrace Deposits, were subjected to pH and water soluble sulphate determinations.

The characteristic value of water soluble sulphate was 22mg/l for the Made Ground and 20mg/l for the River Terrace Deposits.

The same twelve soil samples, were subjected to total sulphur and acid soluble sulphate content testing to allow an assessment to be made in relation to the potential thaumasite form of concrete attack. One of the oxidisable sulphides values calculated for the Made Ground (0.38%) was in excess of 0.3%. Consequently, the results are considered indicative of significant risk from this form of concrete attack. A modification to DS class is therefore proposed for Made Ground.

The characteristic value of pH was 8.4 for the Made Ground and 8.3 for the River Terrace Deposits.

One sample of groundwater obtained during the monitoring programme was subjected to sulphate and pH determinations. The value of sulphate was 25 mg/l and the measured pH value was 7.2.

Overall, with reference to the BRE Digest SD1 (2005) and considering the results of both soil and groundwater samples; a design sulphate class of DS-2 and an ACEC class of AC-2 is recommended for the Made Ground; a design sulphate class of DS-1 and an ACEC class of AC-1 is recommended for the River Terrace Deposits. Mobile groundwater and brownfield conditions have been considered.

6.0 Geotechnical Recommendations

6.1 General

The proposed development will comprise the demolition of existing structures and construction of one warehouse type building, subdivided into three units with associated car parking, loading yards, and limited soft landscaping.

Details of the proposed structures, anticipated loadings and serviceability criteria were under development at the time of the writing of this report, which is based on a preliminary investigation. Further investigation may be required once proposals are fully developed and a detailed Geotechnical Design Report may need to be prepared.

The primary purpose of this report is to support a due diligence process as well as identify risk, assist future design development and inform cost estimates. This report does not constitute a detailed design report for the proposed development.

For the purposes of this assessment, TRC assumed that finished ground levels will be at, or close to, existing ground levels. In the event that these levels are changed, then this assessment should be revisited to examine potential changes in recommendations.

6.2 Geotechnical Hazards

The TRC Tier 1 report and the ground investigation have identified a number of geotechnical hazards at the Site which relate to the proposed development. These are summarised below and discussed in more detail in the following sections along with mitigation measures where appropriate.

- Made Ground recorded to depths of 1.20m. Thicker Made Ground cannot be ruled out locally across the Site;
- Buried obstructions, including old foundations and medium to high cobble content in the Made Ground and the River Terrace Deposits;
- Ground conditions aggressive to buried concrete;
- Locally heterogeneous nature of the River Terrace Deposits with interbedded granular and cohesive material that could result in differential settlement;
- Shallow groundwater was not encountered within the highly permeable River Terrace Deposits but it cannot be ruled out to be present during a wet season or prolonged rain;
- Low and medium volume change potential of cohesive Made Ground and cohesive River Terrace Deposits, respectively, where present; and,
- Adjacent railway embankment to the immediate east and need for consultation with Network Rail.

6.3 Foundations

As described in Section 4, the Site is underlain by Made Ground to a maximum depth of 1.20m bgl over medium dense to dense River Terrace Deposits to depths in excess of 10m bgl.

The Made Ground, unless treated to an appropriate specification, is not considered a competent foundation stratum due to its lithological variability and poor engineering properties.

Shallow pad or strip foundations founded within the medium dense to dense granular River Terrace Deposits will be appropriate to support the proposed buildings at a minimum foundation depth of 1mbgl and at least 100mm within that stratum, where an allowable bearing pressure (ABP) of 180kN/m² is available. A minimum foundation width of 700mm is recommended in order to avoid punching failure of the granular stratum.

The shallow foundations should be taken below any cohesive (silty / clayey) sublayers of the River Terrace Deposits, which were recorded during the ground investigation mainly in the southern area of the Site (WS101

and WS103) at depths between 0.50m – 1.20m bgl. Where these cohesive sublayers are present, it is recommended that the provisions Chapter 4.2 of the NHBC Standards for a medium volume change potential soil are followed with regards to heave protection measures of the foundations.

Due to indications of the lithological variability of the bearing stratum which may include cohesive sublayers, it is recommended that nominal reinforcement of the foundations is allowed to mitigate the potential for differential settlement that may lead to localised potential cracking of the structures.

The anticipated foundation settlement will be less than 25mm assuming the foundation recommendations provided in this report are adhered to.

6.4 Floor Slabs

Use of ground-bearing floor slabs following a shallow ground improvement technique is likely to be the most cost-effective solution for the proposed floor slabs, provided that the required settlement tolerances can be achieved and the finally selected ground treatment solution deals with the 'medium' volume change potential (VCP) of the Site soils in the vicinity of any retained, removed, or proposed vegetation.

The ground improvement in the areas of the proposed slabs is anticipated to include some degree of excavation, segregation of appropriate granular and inappropriate cohesive materials and recompaction of the Made Ground to an appropriate specification. Exclusion of cohesive Made Ground and any cohesive River Terrace Deposits may need to be considered during ground treatment to avoid the VCP of the Site soils. Advice from a specialist ground treatment contractor should be sought once the required floor loadings and settlement tolerances are known.

For a ground-bearing floor slab, the load bearing formation should be carefully inspected to ensure placement of the floor slab on competent natural strata. The formation should be proof rolled and any soft spots removed and replaced with compacted fill to an appropriate specification.

6.5 Excavations

Excavations for shallow foundations, floor slabs, and laying services should be readily achievable using standard excavation plant. However, hard surfacing, old foundations, and the like, may require the use of a breaking apparatus.

For any load bearing formations, careful inspection should be undertaken to ensure placement in competent natural strata unless ground treatment has been carried out and properly validated. Any soft spots identified should be excavated and replaced with compacted granular fill or lean mix concrete. Concrete should be placed as soon as possible following excavation to avoid softening of the ground. A similar recommendation is also made for road pavement formations, although compacted granular fill could be used instead of concrete.

Any relic foundations or other subterranean structures beneath the footprint of the proposed buildings should be fully grubbed out. Such excavations should be surveyed and backfilled with an acceptable granular fill, placed and compacted to an engineering specification. The same recommendations are made for excavations that may be required to remove soil contamination.

In areas of road pavements and hard standing, relic subterranean structures should be broken down to around 1m below finished Site level to minimise the risk of differential settlement due to the presence of hard spots. In soft landscaped areas it may be possible to limit such operations to 0.50m bgl.

Stability in excavation faces in Made Ground and River Terrace Deposits cannot be relied on and allowance should be made for battering faces back to a safe angle of repose, or providing shuttering. Support or battering of the excavation faces to a safe angle of repose will be required for all excavations where man entry is necessary, the nature and extent of which will need to be evaluated under CDM regulations.

The groundwater at the Site is anticipated within the River Terrace Deposits, thus it is considered that any excavations to approximately 5m bgl are anticipated to be dry, although local perched water within the River Terrace Deposits or the Made Ground cannot be ruled out. Measures such as local pumping from a sump may be required for any shallow perched groundwater.

Groundwater levels vary seasonally and the timing of the construction programme may influence the volumes of groundwater that need to be managed. The developer should also consider the impact of weather and potential for rainwater and surface run-off to accumulate within excavations.

6.6 Pavements

Due to the variable thickness of the Made Ground, the medium volume change potential of the cohesive River Terrace Deposits, where present, which may create settlement issues at the Site, pavement surfaces should be constructed in flexible materials such as bituminous compounds or block paving which are more easily able to accommodate ground movement and can be more easily repaired. Heavily loaded areas such as concrete yards and loading areas where less ground settlement can be tolerated, could be constructed on previously treated ground and/or reinforced subbase with geogrids/geotextiles to satisfy design criteria.

The formation level should be rolled and inspected for any soft or loose material; these materials should be removed and replaced with granular fill placed and compacted in accordance with a suitable specification.

Assuming excavation formation soils to comprise Made Ground or River Terrace Deposits and based on the formation preparation outlined above, an equilibrium CBR value of 3% is recommended for preliminary design purposes. Confirmatory in-situ CBR testing at final formation level is recommended just prior to pavement construction.

6.7 Buried Concrete

In the consideration of sulphate attack on buried concrete, reference has been made to BRE Digest SD1 (2005) which classifies the Site as a brownfield site with mobile groundwater conditions. It has also been necessary to assess the potential for the thaumasite form of attack in case these strata are disturbed.

Overall, with reference to the BRE Digest SD1 (2005) and considering the results of both soil and groundwater samples, a design sulphate class of DS-2 and an ACEC class of AC-2 is recommended for the Made Ground; a design sulphate class of DS-1 and an ACEC class of AC-1 is recommended for the River Terrace Deposits.

6.8 Soakaway Potential

Soakaway testing did not form part of the scope of works, however given the predominantly granular nature of the superficial deposits, and the anticipated groundwater level at depths generally greater than 5m bgl, shallow soakaways may be viable for future developments. Suitability of ground conditions for shallow soakaways would be subject to confirmation of infiltration rates via in-situ testing in accordance with BRE 365.

6.9 Recommendations for Further Work

The preceding sections have attempted to provide recommendations for future developments, but further work will be required to fully quantify the risks and allow detailed design. Further works should comprise:

- Additional exploratory holes to delineate the sequence of strata beneath the existing buildings on Site, as to-date access has been restricted.
- Soakaway testing in accordance with BRE 365 should shallow soakaways be required for future developments.

7.0 Human Health Risk Assessment

7.1 Soil Assessment

In order to appraise the significance of the concentrations reported by laboratory testing, TRC has assessed each contaminant species that is elevated above the laboratory method detection limits (MDL) against published screening criteria referred to as Generic Assessment Criteria (GAC). GACs are derived from the following reference material:

- Land Quality Management Limited and Chartered Institute of Environmental Health (November 2014), the LQM/CIEH S4ULs for Human Health Risk Assessment. Document reference: S4UL3435;
- Development of Category 4 Screening Levels for assessment of land affected by contamination – SP1010 (September 2014);
- LQM S4ULs: evaluation of 2017USEPA Toxicological Review of Benzo(a)pyrene; and,
- LQM/CIEH S4ULs for Nickel according to land use (Revised August 2015).

TRC has selected GACs for a commercial / industrial end use, based on the proposed development comprising a commercial / industrial end use.

A conservative value of 1% of soil organic matter (SOM) has been assumed based on the soil type.

A summary of the laboratory data and the screening tables with relevant GACs is presented in Annex G.

7.2 Heavy Metals

Minor concentrations of heavy metals were detected in soil samples (both Made Ground and natural soils). None of the concentrations exceed the GACs.

7.3 Hydrocarbons

Minor concentrations of hydrocarbons were detected in soil samples (both Made Ground and natural soils). None of the concentrations exceed the GACs.

7.4 Asbestos

Asbestos fibres were not identified in any of the 14 No. soil samples tested.

7.5 Volatile Organic Compounds

During the ground investigation, a photoionization detector (PID) used as a screening tool recorded a maximum reading of 7.6ppm at 0.4m bgl within the Made Ground at WS105. However, VOCs were not identified above the laboratory method detection limit in any of the soil samples analysed.

7.6 Discussion

Samples sent for laboratory testing identified no contaminant that exceeded the GACs for a commercial end use, including the areas of the former tank yards.

Asbestos was not identified within the soils at the Site.

Based on the results of this assessment, the ground conditions are unlikely to present a significant risk to the proposed development or future Site users based on a commercial/industrial end use.

While no risks have been identified in relation to human health, some substances may be phytotoxic and could potentially impact the establishment and healthy growth of planting introduced to any proposed areas of soft landscaping. The landscape architect for the scheme will be able to advise on the suitability of the soil for

planting. However, it is recommended that any soft landscaped areas should be capped with clean material i.e. 150mm topsoil overlying 150mm subsoil with a geotextile membrane to prevent mixing.

8.0 Controlled Waters Risk Assessment

In order to appraise the significance of the groundwater/soil leachate concentrations recorded, TRC has assessed each contaminant species that is elevated above the laboratory LOD against the following published guidance values:

- Drinking Water Standards (DWS) England and Wales (2000) (amended);
- Environmental Quality Standards (EQS) for freshwater; and,
- Society of Brownfield Risk Assessment (SoBRA) Guidelines.

Groundwater monitoring recorded groundwater in one monitoring well ranging from 5.34m to 5.88m bgl. No free phase oils or hydrocarbons odours were identified. A groundwater sample was taken from the monitoring well and sent to I2 Analytical Limited for laboratory analysis.

8.1 Groundwater Assessment

Laboratory testing indicates no exceedances of UK DWS and therefore there is not considered to be a risk to groundwater.

8.2 Surface Water Assessment

The laboratory analysis reported elevated concentrations of copper (dissolved) exceeding the EQS in the groundwater sample collected. The exceedance is summarised in the below table.

Table 8.1: Summary of Groundwater Exceedances

Contaminant	EQS (µg/l)	Maximum Concentration (µg/l)	Location of Maximum Concentration	No. of Exceedances
Copper (dissolved)	1	1.5	CP102	1

The nearest surface water feature is an unnamed river 134m west of the Site. Surface water has the potential to be in hydraulic continuity with groundwater in the superficial deposits underlying the Site.

8.3 Discussion

Copper was identified in excess of the EQS protective of surface water receptors in a groundwater sample obtained from CP102. The nearest surface water receptor is an unnamed river 134m west of the Site and water in this feature may be in hydraulic continuity with groundwater in the superficial deposits beneath the Site. The single marginal exceedance of copper is considered unlikely to pose a significant risk to the surface water feature due to the distance.

While groundwater in CP102 may not be representative of groundwater conditions across the Site there is no evidence to suggest soils at the site are a significant source of contamination which could impact controlled waters.

9.0 Ground Gas and Organic Vapour Risk Assessment

A preliminary ground gas risk assessment has been undertaken in accordance with British Standard BS 8485:2015+A1:2019 to assess the impact of permanent ground gases upon the proposed development.

The dataset is considered to be representative and comprehensive as the monitoring visits incorporated periods of falling and rising atmospheric pressure.

9.1 Ground Gas Assessment

Field monitoring for permanent ground gases was performed at six monitoring well locations on four occasions on 25th October 2023, 2nd November 2023, 7th November 2023 and 16th November 2023. The maximum concentrations are summarised in the table below and the complete monitoring data are provided within Annex D.

Table 9.1: Summary of Gas Monitoring Results

Location	Maximum Methane Concentration (%v/v)	Maximum Carbon Dioxide Concentration (%v/v)	Minimum Oxygen Concentration (%v/v)	Maximum Flow Rate (l/hr)
CP102	<0.1	3.0	14.2	0.5
CP103	<0.1	2.3	18.6	0.6
WS103	<0.1	0.5	19.2	0.6
WS104	<0.1	0.6	18.5	0.4
WS105	<0.1	0.1	17.5	0.6

Methane was not detected in any of the monitoring wells during the four monitoring visits.

Carbon dioxide was detected in all of the monitoring wells with concentrations ranging from 0.1% to 3%.

Oxygen concentrations were slightly depleted at CP102 and was noted to correlate to higher carbon dioxide concentrations in this monitoring wells. The other monitoring wells had normal oxygen levels.

Very low flow was detected in all of the monitoring wells during each monitoring visit.

Carbon monoxide was detected in WS105 during the first and second monitoring round. The first monitoring round reported 50ppmv and the second round reported 29ppmv. The source of the carbon monoxide has not been established.

TRC has assessed the permanent ground gas concentrations in accordance with current guidance (BS8485:2015). Based on the results, a gas screening value (GSV) of 0.015 l/hr was calculated, which would classify the Site as Characteristic Situation 1 (very low risk).

Based on the results, it is considered that ground gas protection will not be required for the proposed development.

9.2 Organic Vapour from Soil Assessment

For hydrocarbons and other VOCs the LQM S4ULs are considered to be protective of human health from indoor inhalation of organic vapour. Based on the results presented in section 7, there were no exceedances of volatile contaminants.

Organic vapour protection measures are not considered to be required.

9.3 Organic Vapour from Groundwater Assessment

In order to appraise the significance of volatile substances in groundwater to human health, TRC has assessed each contaminant species that is elevated above the laboratory LOD against the following published guidance values:

- SoBRA, Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater, Version 1 (2017).

There are no exceedances of the SoBRA GAC.

Organic vapour protection measures are not considered to be required.

9.4 Radon

BGS records indicate that the Site is in an intermediate probability radon area where 5-10% of homes are estimated to be at or above the Action Level. On this basis, the BGS states that basic radon protection measures are necessary in the construction of new dwellings or extensions.

9.5 Discussion

Based on the results of this assessment the site is classified as characteristic situation 1 (very low risk) and no ground gas protection measures or organic vapour protection measures are considered to be required.

However, the site is located in an area where basic radon protection measures would be required. Due to the potential risk of radon gas, a detailed BGS GeoReport should be commissioned to establish requirements for radon protection for future buildings..

10.0 Contaminated Land Risk Assessment

The methodology of this risk assessment uses the source-pathway-receptor pollutant linkage to provide a qualitative appraisal of environmental risks and potential liabilities associated with soil and groundwater contamination at the Site. The conceptual site model (CSM) has been prepared considering the proposed end use as commercial and industrial end use.

10.1 Sources of Contamination

The ground investigation performed at the Site by TRC identified the following sources of contamination:

- Concentrations of copper in excess of EQS in groundwater.
- Potential for radon to be above action level

10.2 Pathways

Based on the information presented in this report the following potentially active pathways have been identified.

- Dermal contact or ingestion with soil and groundwater
- Inhalation of soil dust or respirable fibres of asbestos
- Leaching of contaminants and vertical migration into groundwater
- Lateral migration of contaminants in groundwater
- Contact with buried services
- Migration of ground gas/organic vapour and ingress into buildings

10.3 Receptors

Based on the information presented in this report the following receptors have been identified.

- Future site users
- Neighbouring site users
- Construction and maintenance workers
- Construction materials
- Groundwater
- Surface water

10.4 Revised Conceptual Site Model

The following CSM has been prepared to take into consideration the findings from the intrusive investigation.

Table 10.1: Revised Conceptual Site Model

Source	Pathway	Receptor	Risk
Concentrations of copper exceeding the EQS in groundwater	Lateral migration n groundwater	Surface water (unnamed river to the west of the Site)	Low The Site is directly underlain by high permeability superficial deposits of the River Terrace Deposits and groundwater is considered likely to be in hydraulic connection with off-site surface water features. However, the exceedance identified is marginal and therefore considered unlikely

Source	Pathway	Receptor	Risk
			to pose a risk to controlled water given the distance to the receptor.
Radon (Site is in an intermediate probability radon area where 5-10% of homes are estimated to be at or above the Action Level).	Migration of radon and ingress into buildings	Future Site users	Moderate The Site lies within an area where basic radon protection measures are required.

11.0 Summary and Conclusions

11.1 Findings

The Site comprises an approximate 1.7 ha plot of land on Downley Road, Havant, PO9 4JD. The Site investigation targeted locations relating to the proposed development comprising commercial / light industrial units. The investigation also targeted potential sources of contamination.

The ground conditions were found to comprise Made Ground to 1.20m bgl overlying mainly granular superficial deposits representing the River Terrace Deposits between 0.30m bgl and 10m bgl. The base of the River Terrace Deposits was not established.

According to the ground investigation and monitoring data, groundwater is anticipated within the River Terrace Deposits at around 5.35m bgl. Groundwater may be subject to seasonal variations especially after periods of prolonged rain or drought.

No methane was detected in any of the monitoring wells. Carbon dioxide concentrations ranged between 0.1% and 3.0%. Very low flow rates were detected in all monitoring wells. Carbon monoxide was identified in one of the monitoring wells (WS105) with a maximum concentration of 50ppmv. The source of the carbon monoxide has not been established.

11.2 Summary of Geotechnical Assessment

The primary purpose of this assessment is to support the due diligence process, identify geotechnical risk, allow design development and inform cost estimates. This report does not constitute a detailed geotechnical design report for the proposed development.

The previous report and ground investigation have identified a number of geotechnical hazards at the Site which relate to the proposed development. These are Made Ground to depths of 1.20m, buried obstructions, ground conditions aggressive to buried concrete, variable nature of River Terrace Deposits, volume change potential soils, and adjacent railway embankment to the immediate east and potential need for consultation with Network Rail, and are discussed in detail along with mitigation measures in Section 6 of this report.

Shallow foundations are recommended for the proposed structures. Details of the foundation options including allowable bearing pressures are discussed in Section 6.3.

Ground bearing slabs on previously treated Made Ground and or cohesive superficial deposits to a suitable specification could be adopted. Details are provided in section 6.4 of this report.

Recommendations about proposed excavations, earthworks, classification for buried concrete design, and proposed pavements for the development are given in sections 6.5 to 6.7.

Soakaway testing did not form part of the scope of works, however given the predominantly granular nature of superficial depots, shallow soakaways may be viable for future developments. Suitability of ground conditions for shallow soakaways would be subject to confirmation of infiltration rates via in-situ testing in accordance with BRE 365.

Additional work is recommended to further clarify matters related to geotechnical hazards, as discussed in detail in Section 6.9.

11.3 Summary of Contaminated Land Risk Assessment

11.3.1 Soil

There were no exceedances of the GAC in soils for the proposed residential/commercial end use and there is not considered to be a potential risk to human health receptors.

11.3.2 Groundwater/Soil Leachate

There was an elevated concentration of copper (dissolved) in excess of the EQS within the single groundwater samples analysed. However, based on the results of this assessment it is considered unlikely that the Site poses a significant risk to controlled waters.

11.3.3 Ground Gas, Radon and Organic Vapour

Based on the results of this assessment the Site would be classified as Characteristic Situation 1 (very low risk) and no ground gas protection measures or organic vapour protection measures would be required for the proposed development.

However, the site is located in an area where basic radon protection measures would be required. Due to the potential risk of radon gas, a detailed BGS GeoReport should be commissioned to establish requirements for radon protection for future buildings.

11.3.4 Remediation and Mitigation Measures

Based on the results of the generic risk assessments undertaken contamination has not been identified in relation to a proposed commercial/industrial end use and remediation is not required, however, the following mitigation measures are recommended:

- Basic radon protection measures
- Capping of soft landscaped areas to facilitate planting
- Installation of buried services in corridors of clean soil

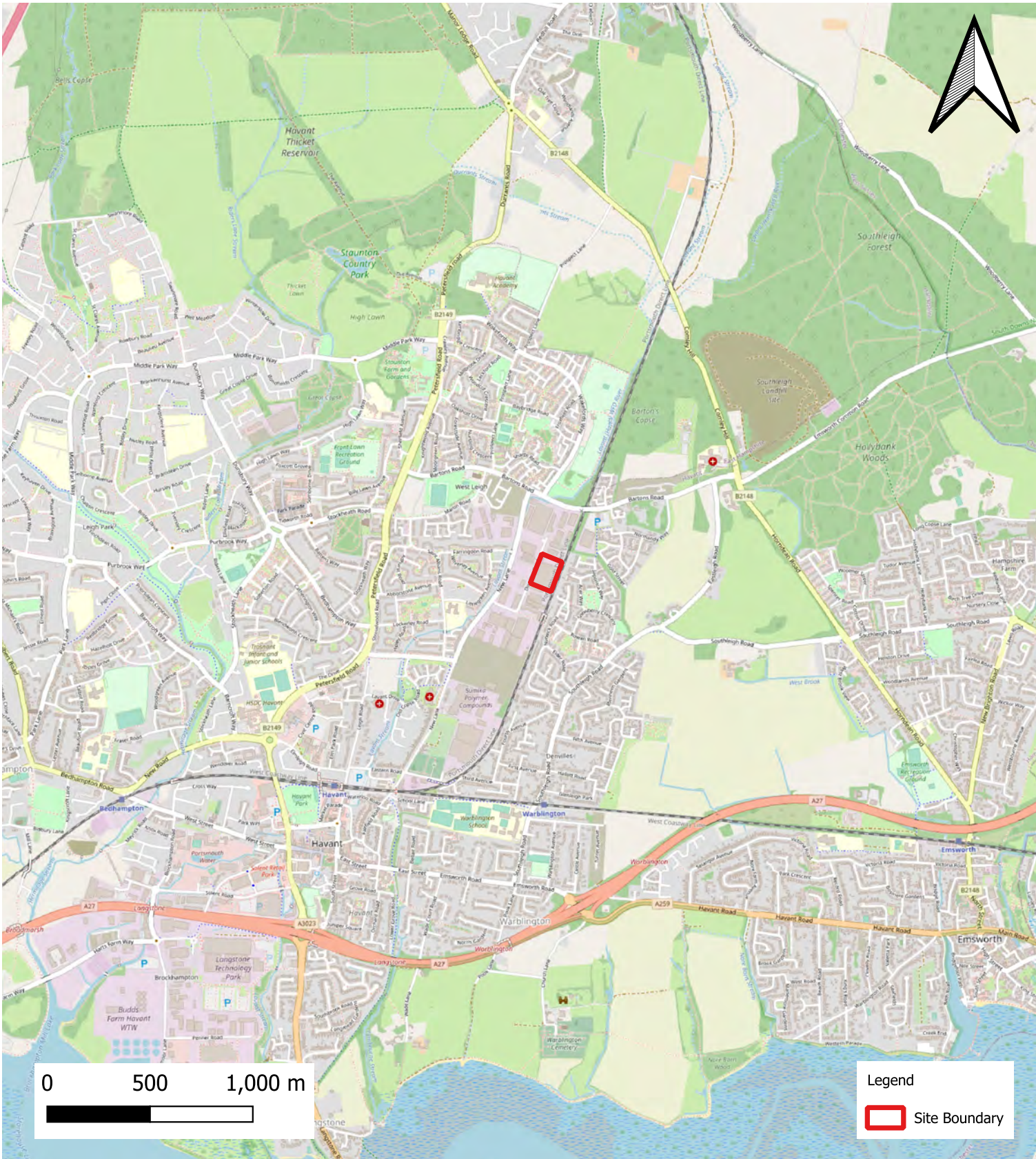
The selection of appropriate water supply pipework should be confirmed by the local water supply company.

While no significant sources of contamination have been identified during this investigation further sampling and testing beneath the former above ground storage tanks and beneath the existing buildings would be prudent following demolition to confirm the findings of this investigation and assessment. Furthermore, a Remediation Strategy and Verification Plan is likely to be required by the Local Planning Authority.

Materials destined for off-site disposal to landfill may require further assessment in accordance with WM3 'Guidance on the classification and assessment of waste' (1st edition version 1.2 GB 2021) to determine their waste classification.

If materials are to be re-used on site or imported from another development site, a materials management plan may be required in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice in order to demonstrate that the material is not a waste.

Annex A: Figures



NOTES	COPYRIGHT NOTES				REVISIONS				TRC 20 Red Lion Street Holborn London WC1R 4PQ		TITLE					
	Google imagery June 2018 © OpenStreetMap contributors- data is available under the Open Database License. Cartography licensed as CC BY-SA.				SITE LOCATION PLAN						TRC PROJECT NO.		SCALE			
									562241		25,000:1 @ A3 1500:1 @ A3					
					P01	FIRST ISSUE				CLIENT ROYAL LONDON PROPERTY FUND				PURPOSE OF ISSUE		STATUS
						Initials	TS	TS	15/04/24					SUITABLE FOR INFORMATION		
REV.	REVISION NOTES/COMMENTS				PROJECT DOWNLEY ROAD, HAVANT				DRAWING NO		REVISION					
	Initials								FIGURE 01			PO1				



NOTES	COPYRIGHT NOTES Google imagery June 2018				REVISIONS				 Work.Life 20 Red Lion Street, London, WC1R 4PS		TITLE				
											ANNOTATED SITE LAYOUT PLAN				
	TRC PROJECT NO.		SCALE												
	562241		1:850 @ A3												
					P01		FIRST ISSUE		CLIENT		PURPOSE OF ISSUE		STATUS		
Initials							LS								LS
REV.					REVISION NOTES/COMMENTS				PROJECT		DRAWING NO		REVISION		
					Initials										
								DOWNLEY ROAD, HAVANT		FIGURE 02		PO1			



NOTES

COPYRIGHT NOTES

Google imagery June 2018

REVISIONS

P01	FIRST ISSUE			
	Initials	LS	LS	08/07/24
REV.	REVISION NOTES/COMMENTS			
	Initials			



Work.Life
20 Red Lion Street,
London,
WC1R 4PS

CLIENT
ROYAL LONDON PROPERTY GROUP

PROJECT
DOWNLEY ROAD, HAVANT

TITLE
PROPOSED DEVELOPMENT PLAN

TRC PROJECT NO.
562241

SCALE

PURPOSE OF ISSUE
SUITABLE FOR INFORMATION

DRAWING NO
FIGURE 03

STATUS

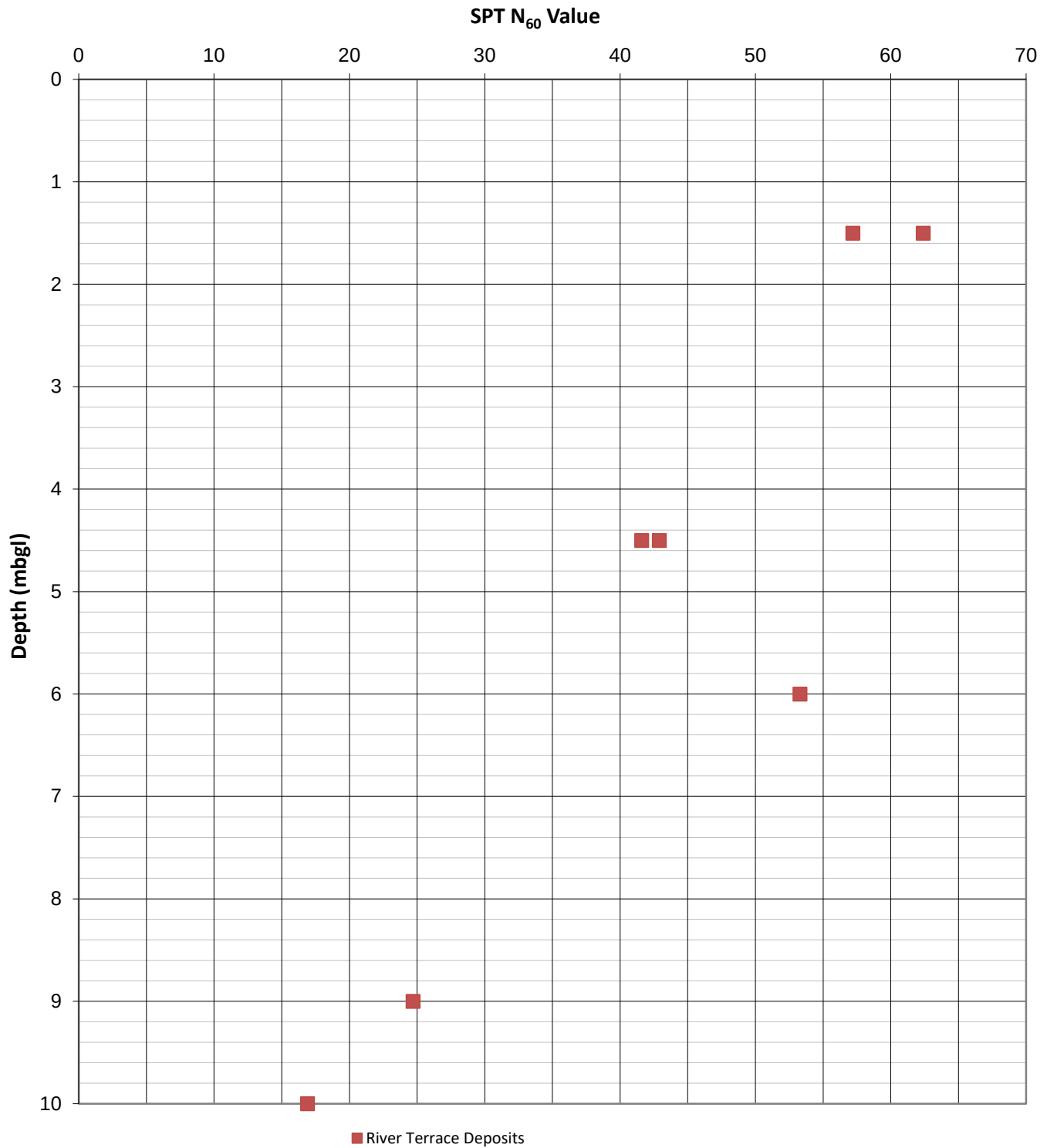
REVISION
PO1



NOTES	COPYRIGHT NOTES Google imagery June 2018				REVISIONS				TRC Work.Life 20 Red Lion Street, London, WC1R 4PS		TITLE EXPLORATORY HOLE LOCATION PLAN					
											TRC PROJECT NO. 562241		SCALE 1:850 @ A3			
					P01		FIRST ISSUE				CLIENT		PURPOSE OF ISSUE		STATUS	
							Initials TS TS 08/07/24				ROYAL LONDON PROPERTY FUND		SUITABLE FOR INFORMATION			
									REV.		REVISION NOTES/COMMENTS				PROJECT	
Initials				DOWNLEY ROAD, HAVANT							FIGURE 04		PO1			

SPT N₆₀ Value Vs Depth

Client	Royal London Property Group	Job No.	562241
Site	Downley Road, Havant	Date Drawn	09/07/2024



TRC Companies Limited
20 Red Lion St, London
WC1R 4PS

Status

F

Fig:

Rev.

A

5

Annex B: Site Photographs

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
1	09/10/2023		
Description Concrete barrier blocking the site access being cleared by lorry			

Photo No.	Date		
2	09/10/2023		
Description CP102 - inspection pit arisings			

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
3	09/10/2023		
Description CP102 - inspection pit arisings			

Photo No.	Date		
4	09/10/2023		
Description CP102 - overview of rig			

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
5	09/10/2023		
Description CP102 - recovery from 1.30m to 1.50m bgl			

Photo No.	Date		
6	09/10/2023		
Description CP102 - recovery from 1.5m to 2.0m bgl			

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
7	09/10/2023		
Description CP102 - recovery from 2.3m to 2.6m bgl			

Photo No.	Date		
8	09/10/2023		
Description CP102 - recovery from 3.5m to 4.0m bgl			

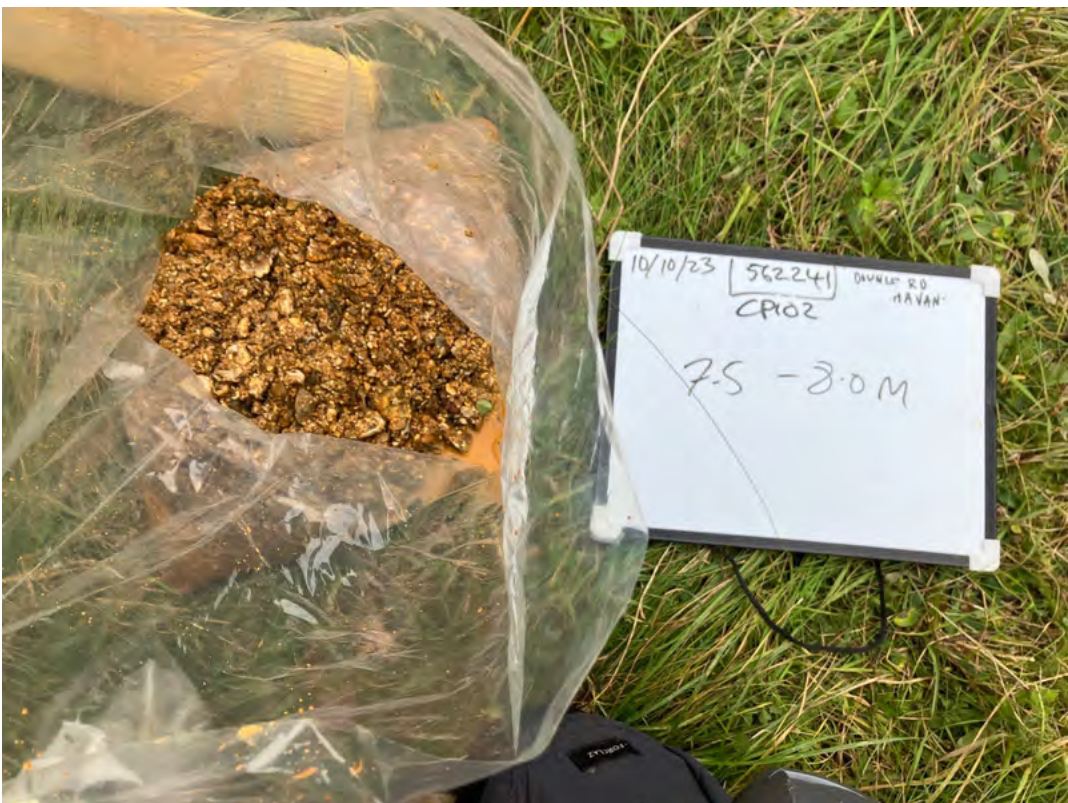
Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
9	09/10/2023		
Description CP102 - recovery from 4.5m to 5.0m bgl			

Photo No.	Date		
10	09/10/2023		
Description CP102 - recovery from 5.5m to 6.5m bgl			

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
11	09/10/2023		
Description CP102 - recovery from 6.0m to 6.5m bgl			

Photo No.	Date		
12	09/10/2023		
Description CP102 - recovery from 7.5m to 8.0m bgl			

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
13	09/10/2023		
Description CP102 - recovery from 9.5m to 10.0m bgl			

Photo No.	Date	
14	09/10/2023	
Description CP102 - monitoring well install		

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
15	09/10/2023		
Description CP103 - inspection pit arisings			

Photo No.	Date		
16	09/10/2023		
Description CP103 - recovery from 1.5m to 2.0m bgl			

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
17	09/10/2023		
Description CP103 - recovery from 3.5m to 4.0m bgl			

Photo No.	Date	
18	09/10/2023	
Description WS105 - recovery from 0.2m to 1.0m bgl		

Photograph Log

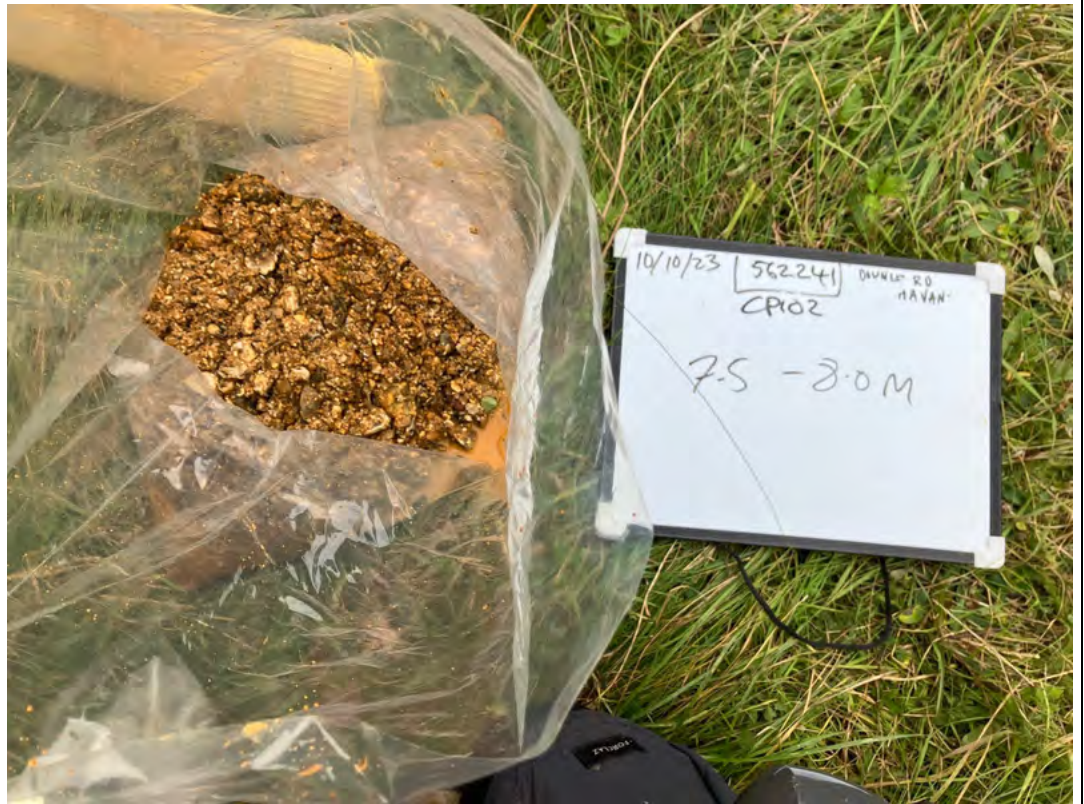
Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
19	09/10/2023		
Description CP103 - monitoring well install			

Photo No.	Date	
20	09/10/2023	
Description CP103 - monitoring well install		

Photograph Log

Client: Canmoor Projects		Site Location: Downley Road, Havant, PO9 2JD	Project No.: 562241
Photo No. 20	Date 09/10/2023		
Description Using a concrete corer at WS103A			

Photo No.	Date	
21	09/10/2023	
Description		
WS103A - concrete core		

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
22	09/10/2023		
Description WS103A - recovery from 0.3m - 1.2m bgl			

Photo No.	Date	
23	09/10/2023	
Description WS103 - Monitoring well install		

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
24	09/10/2023		
Description WS101 - recovery from 0.2m to 1.2m bgl			

Photo No.	Date		
25	09/10/2023		
Description WS101 - recovery from 1.0m to 2.0m bgl			

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
26	09/10/2023		
Description WS104 - recovery from 0.2m to 1.0m bgl			

Photo No.	Date	
27	09/10/2023	
Description WS104 - monitoring well install		

Photograph Log

Client:		Site Location:	Project No.:
Canmoor Projects		Downley Road, Havant, PO9 2JD	562241
Photo No.	Date		
28	09/10/2023		
Description Concrete barrier put back into place by lorry			

Annex C: Exploratory Hole Logs

Composite Materials and Lithology

Legend	Code	Description	Legend	Code	Description
	101	Topsoil		730	Boulders
	102	Made Ground or Fill		801	Mudstone
	103	Asphalt		802	Siltstone
	104	Concrete		803	Sandstone
	201	Clay		804	Limestone or Dolomite
	301	Silt		805	Chalk
	401	Sand		806	Coal
	501	Gravel		807	Breccia
	601	Peat		808	Conglomerate
	701	Cobbles		809	Fine Grained Igneous

Backfill

Legend	Code	Description
	901	Sand Filter
	902 908	Gravel Filter Ballast
	903	Bentonite
	904	Grout
	905	Arisings
	906 912	Concrete Paving Slab
	907	Asphalt
	999	Void

NB: Composite soil types are represented by combined legends. Each type will have its own code within the AGS data.

In-Situ Testing

Prefix	Type	Comments
SPT(S)	Standard Penetration Test	Uncorrected test results at relevant start depth. Hammer ID and Energy Ratio reported on log and in relevant AGS fields
SPT(C)	(S) Split Spoon (C) Solid Cone	
HV	Hand Vane Test	Undrained Shear Strength reported in kPa.
PP	Hand Penetrometer Test	Unconfined Compressive Strength reported in kPa
PID	On-Site Volatile Headspace Testing by Photo Ionization Detector	Screening reported as ppmv. Headspace testing undertaken as per contract documents
PPM	In-Situ Permeability Test	Permeability (k) reported in m/s. Please refer to individual test sheets for data and methodology

Sampling

Prefix	Type	Comments
D	Small Disturbed Sample	Nominally 1kg
B	Bulk Disturbed Sample	Nominally 5kg
LB	Large Bulk Disturbed Sample	25kg to 60kg depending on material type, for compaction related tests
U	Undisturbed sample - thick wall driven tube	For CP, nominally 100mm diameter, 450mm length. For WS, nominally 38mm diameter, 100mm length. Blows to drive tube and recovery found in remarks
UT	Undisturbed Sample – Thin wall driven tube	Nominally 100mm diameter, 450mm length. Blows to drive tube and recovery found in remarks
P	Pushed piston sample	Nominally 100mm diameter, 1000mm length. Recovery found in remarks
C	Core sample	-
AMAL	Amalgamated Sample	Details of samples used noted in remarks as well as relevant AGS field
W	Water sample	Not for environmental testing purposes
ES	Environmental sample	Multiple containers used where appropriate
EW	Environmental water sample	Multiple containers used where appropriate

Installations

Legend	Description
	Piezometer Plain Pipe
	Piezometer Slotted Pipe

Water Observations

Legend	Description
	Water strike
	Standing water level after specified time

Details are provided on each log through the Water Strike Table

Rotary Boreholes:

T.C.R. - Total Core Recovery %
 S.C.R. - Solid Core Recovery %
 R.Q.D. - Rock Quality Designation %
 F.I. - Fracture Index

All soil and rock descriptions in general accordance with BS5930, BS EN ISO 14688 and BS EN ISO 14689

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

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

SPT Hammer Ref: SEDS8
Test Date: 29/04/2023
Report Date: 02/05/2023
File Name: SEDS8.spt
Test Operator: TJ

Instrumented Rod Data

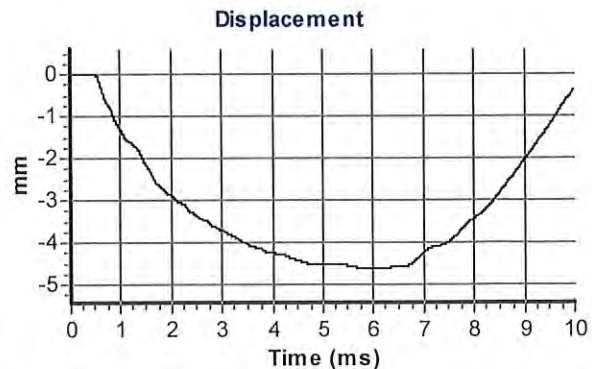
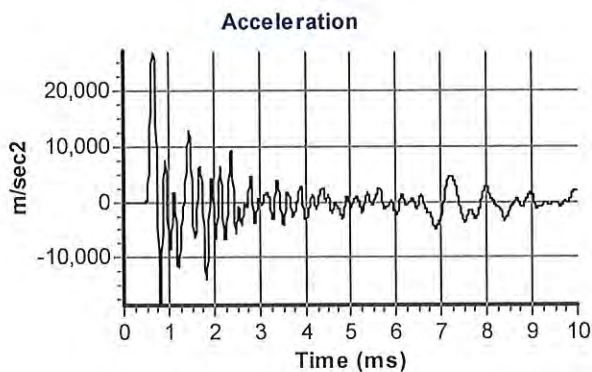
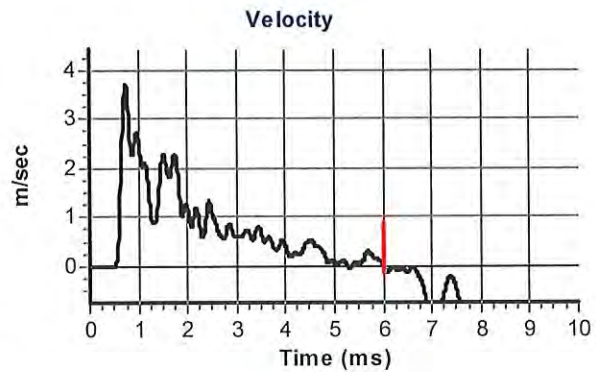
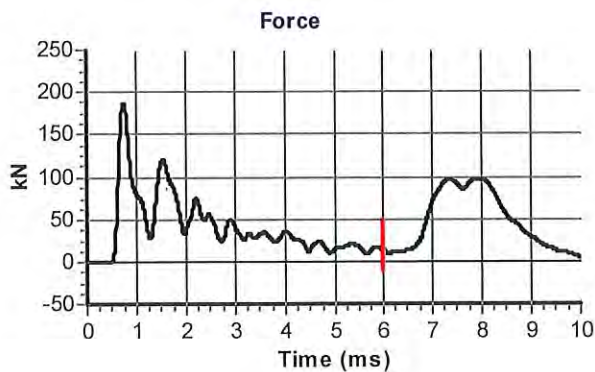
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.7
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 64786
Accelerometer No.2: 64789

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 14.7

Comments / Location

CHARLWOODS



Calculations

Area of Rod A (mm^2): 996
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 367

Energy Ratio E_r (%): **78**

Signed: N P Burrows

Title: Field Operations Manager

The recommended calibration interval is 12 months

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

22-24 Aaron Road
Whittlesey
Peterborough
PE7 2EX

SPT Hammer Ref: 113
Test Date: 01/01/2023
Report Date: 01/01/2023
File Name: 113.spt
Test Operator: NG

Instrumented Rod Data

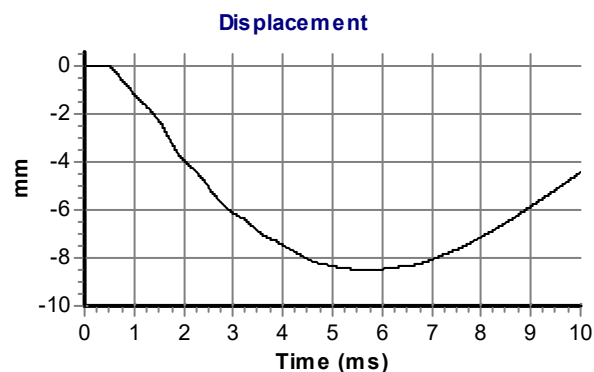
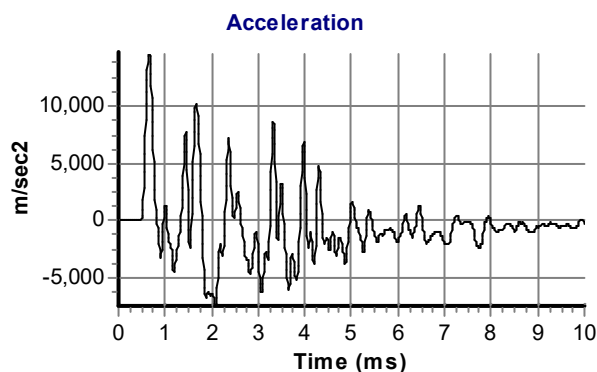
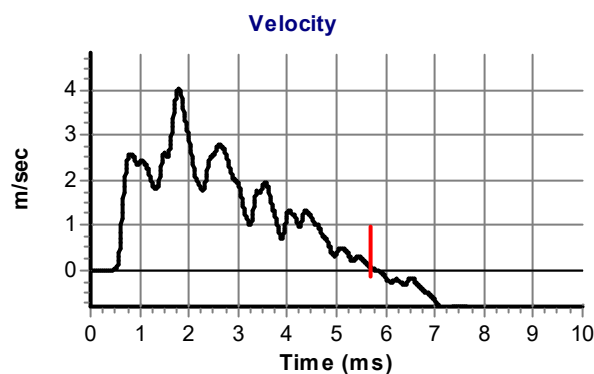
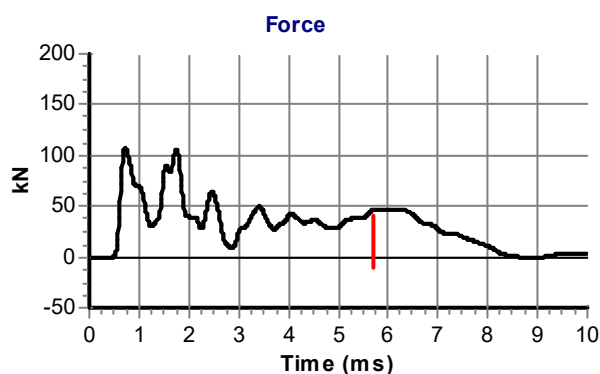
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.3
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 11853
Accelerometer No.2: 10332

SPT Hammer Information

Hammer Mass m (kg): 63.0
Falling Height h (mm): 760
SPT String Length L (m): 15.0

Comments / Location

Nordmeyer Geotool MVP on Crawler
S/N: 113



Calculations

Area of Rod A (mm²): 944
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 353

Energy Ratio E_r (%): **75**

P. Rodgman
Signed: Phil Rodgman
Title: Mr



Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
10.00	150	10.00	150								

1. Utility survey carried out prior to excavation.
2. Hand pitted up to 1.2m bgl.
3. Groundwater was encountered at 5m bgl whilst drilling before draining. Groundwater was encountered again at 9m bgl whilst drilling, rising to 7.5m bgl.
4. Response zone of standard piezometer installation between 2.0m and 10m bgl.



[illegible]

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
4.50	150	4.50	150								

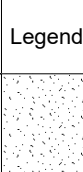
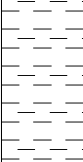
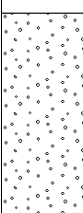
1. Utility survey carried out prior to excavation.
2. Hand pitted up to 1.2m bgl.
3. No groundwater was encountered.
4. Borehole terminated at 4.5m bgl due to time constraints on site access.
5. Response zone of standard piezometer installation between 1.0m and 4.5m bgl.



[illegible]

Remarks 1. Utility survey carried out prior to excavation. 2. Hand pitted up to 1.2m bgl. 3. No groundwater was encountered. 4. Borehole terminated at 2.0m bgl due to refusal on flint cobble. 5. No installation. Hole was backfilled with arisings.	
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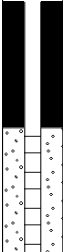
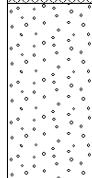
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Grey reinforced concrete.
					0.40 0.50	18.08 17.98	 	MADE GROUND: Brown silty slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is very angular to rounded, fine to coarse grained. Gravel consists of flint, sandstone. Stiff brown slightly silty slightly gravelly CLAY. Gravel is very angular to sub-rounded, fine to coarse grained. Gravel consists of flint. [RIVER TERRACE DEPOSITS]
		0.60 0.60 0.60	D ES PID	PID=0.20				
		1.00	SPT	N=10 (2,2/2,3,2,3)	1.20	17.28		Very dense brown slightly silty slightly sandy GRAVEL. Sand is fine to coarse. Gravel is very angular to sub-rounded, fine to coarse grained. Gravel consists of flint. High cobble content of flint. No recovery. [RIVER TERRACE DEPOSITS]
		2.00	SPT	N=50 (25 for 125mm/50 for 215mm)	2.00	16.48		End of Borehole at 2.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
1.50	100	2.00	100								

1. Utility survey carried out prior to excavation.
2. Hand pitted up to 1.2m bgl.
3. No groundwater was encountered.
4. Borehole terminated at 2.0m bgl due to refusal on flint cobble.
5. Response zone of standard piezometer installation between 0.5m and 1.5m bgl.

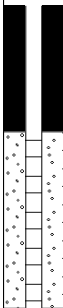
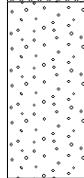




Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 0.10	D ES	PID=0.00	0.30	18.52		MADE GROUND: Dark brown slightly gravelly clay. Gravel is fine. Gravel consists of flint. Possible topsoil.	
		0.50 0.50	ES PID					Very dense grey slightly clayey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is very angular to sub-rounded, fine to coarse grained. Gravel consists of flint and sandstone. Medium cobble content of flint. [RIVER TERRACE DEPOSITS]	
		1.00 1.00	SPT PID	N=50 (8, 12/50 for 220mm) PID=0.90	1.00	17.82		End of Borehole at 1.000m	1
									2
									3
									4
									5
									6

Remarks	
1. Utility survey carried out prior to excavation.	
2. Hand pitted up to 1.2m bgl.	
3. No groundwater was encountered.	
4. Borehole terminated at 1.0m bgl due to refusal on flint cobble.	
5. Response zone of standard piezometer installation between 0.5m and 1.0m bgl.	



Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	18.83		Light grey reinforced concrete.	1
		0.40	ES	PID=7.60	0.50	18.53		MADE GROUND: Brown slightly silty gravelly CLAY. Gravel is very angular to sub-rounded, fine to coarse grained. Gravel consists of brick and flint.	
		0.40	PID						
		0.80	D	PID=1.90	1.20	17.83		Brown clayey very sandy GRAVEL. Sand is fine to coarse. Gravel is very angular to rounded, fine to coarse grained. Gravel consists of flint, mudstone, sandstone. Medium cobble content of flint. [RIVER TERRACE DEPOSITS]	
		0.80	ES						
0.80	PID								
		1.20	SPT	N=50 (9,9/50 for 255mm)			End of Borehole at 1.200m	2	
								3	
								4	
								5	
								6	

Remarks - Utility survey carried out prior to excavation. - Hand pitted up to 1.2m bgl. - No groundwater was encountered. - Borehole terminated at 1.2m bgl due to refusal on flint cobble. - Response zone of installation between 0.5m and 1.0m bgl.	
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Annex D: Field Data

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Downley Road, Havant

Client:

TRC

Site:

Downley Road, Havant

Date:

25.10.2023

Quote No:

562241

Visit No:

1 of 4

Operator:

Martin Dorfling

Project Manager:

Lauren Sadowski

	GAS CONCENTRATIONS												VOLATILES		FLOW DATA			WELL AND WATER DATA		Comments	
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)		Depth of well (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady					
CP102	<0.0	<0.0	NR	NR	2.9	2.9	1	1	<0.1	<0.1	14.6	14.6	0.4	ND	0.3	0.3	-0.03	60	5.88		10.00
CP103	<0.0	<0.0	NR	NR	0.2	0.2	<0.1	<0.1	<0.1	<0.1	21.0	21.0	0.3	ND	0.3	0.3	0.05	60	dry	4.37	
WS103	<0.0	<0.0	NR	NR	0.5	0.5	<0.1	<0.1	<0.1	<0.1	19.4	19.4	0.4	ND	0.3	0.3	-0.02	60	dry	1.45	
WS104	<0.0	<0.0	NR	NR	0.6	0.6	1	1	<0.1	<0.1	18.5	18.5	<0.1	ND	0.3	0.3	-0.02	60	dry	0.82	
WS105	<0.0	<0.0	NR	NR	<0.1	<0.1	50	50	<0.1	<0.1	20.6	20.6	13.6	ND	0.4	0.4	-0.07	60	dry	0.84	
Max	<0.1	<0.1	<0.1	<0.1	2.9	2.9	50	50	<0.1	<0.1	21.0	21.0	13.6	ND	0.4	0.4	0.05	60	5.88	10.00	
Min	<0.1	<0.1	<0.1	<0.1	0.2	0.2	1	1	<0.1	<0.1	14.6	14.6	<0.1	ND	0.3	0.3	-0.07	60	DRY	0.82	

ND - Not detected
NR - Not recorded
NA - Non applicable

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:

Dry

Moist

x

Wet

Snow

Frozen

Wind:

Calm

x

Light

Moderate

Strong

Cloud cover:

None

Slight

Cloudy

x

Overcast

Precipitation:

None

Slight

x

Moderate

Heavy

Time monitoring performed:

08:30

Start

End

Barometric pressure (mbar):

993

Start

994

End

Pressure trend (Daily):

x

Falling

Steady

Rising

Source:

Air Temperature (Deg. C):

10

Before

10

After

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: G507726

Gas Range: CH₄ 0 - 100% CO₂ 0 - 100% O₂ 0 - 25%

Gas Flow range: +100/-50 l/hour

Differential Pressure: (+/-) 1000 Pa

Date of last calibration: 12/01/2023

Date of next calibration: 12/07/2023

Ambient air check: CH₄ <0.1 CO₂ 0.1 O₂ 21.0

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Downley Road, Havant

Client:

TRC

Site:

Downley Road, Havant

Date:

02.11.2023

Quote No:

562241

Visit No:

2 of 4

Operator:

Martin Dorfling

Project Manager:

Lauren Sadowski

	GAS CONCENTRATIONS												VOLATILES		FLOW DATA			WELL AND WATER DATA		Comments	
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)		Depth of well (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady					
CP102	<0.1	<0.1	NR	NR	3.0	3.0	<0.1	<0.1	<0.1	<0.1	14.5	14.5	0.3	ND	0.5	0.5	0.05	60	5.34		9.96
CP103	<0.1	<0.1	NR	NR	2.3	2.3	<0.1	<0.1	<0.1	<0.1	18.6	18.6	0.1	ND	0.4	0.4	0.07	60	dry	4.24	
WS103	<0.1	<0.1	NR	NR	0.5	0.5	<0.1	<0.1	<0.1	<0.1	19.2	19.2	0.2	ND	0.4	0.4	0.03	60	dry	1.45	
WS104	<0.1	<0.1	NR	NR	0.1	0.1	<0.1	<0.1	<0.1	<0.1	21.0	21.0	<0.1	ND	0.4	0.4	0.07	60	dry	0.82	
WS105	<0.1	<0.1	NR	NR	0.1	0.1	29	29	<0.1	<0.1	17.5	17.5	11.0	ND	0.5	0.5	-0.02	60	dry	0.84	
Max	<0.1	<0.1	NR	NR	3.0	3.0	29	29	<0.1	<0.1	21.0	21.0	11.0	NA	0.5	0.5	0.07	60	5.34	9.96	
Min	<0.1	<0.1	<0.1	<0.1	0.1	0.1	29	29	<0.1	<0.1	14.5	14.5	<0.1	NA	0.4	0.4	-0.02	60	DRY	0.82	

ND - Not detected
NR - Not recorded
NA - Non applicable

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:

Dry

Moist

x

Wet

Snow

Frozen

Wind:

x

Calm

Light

Moderate

Strong

Cloud cover:

x

None

Slight

Cloudy

Overcast

Precipitation:

x

None

Slight

Moderate

Heavy

Time monitoring performed:

08:30

Start

End

Barometric pressure (mbar):

954

Start

954

End

Pressure trend (Daily):

Falling

Steady

x

Rising

Source:

Air Temperature (Deg. C):

12

Before

12

After

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:

G507726

Gas Range:

CH₄ 0 - 100%

CO₂ 0 - 100%

O₂ 0 - 25%

Gas Flow range:

+100/-50 l/hour

Differential Pressure:

(+/-) 1000 Pa

Date of last calibration:

12/01/2023

Date of next calibration:

12/07/2023

Ambient air check:

CH₄

0.0

CO₂

0.1

O₂

20.9

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Downley Road, Havant

Client:

TRC

Site:

Downley Road, Havant

Date:

07.11.2023

Quote No:

562241

Visit No:

3 of 4

Operator:

Martin Dorfling

Project Manager:

Lauren Sadowski

	GAS CONCENTRATIONS												VOLATILES		FLOW DATA			WELL AND WATER DATA		Comments	
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)		Depth of well (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady					
CP102	<0.1	<0.1	NR	NR	2.6	2.6	<0.1	<0.1	<0.1	<0.1	14.2	14.2	0.1	ND	0.4	0.4	-0.62	60	5.51		9.96
CP103	<0.1	<0.1	NR	NR	1.5	1.5	<0.1	<0.1	<0.1	<0.1	19.7	19.7	<0.1	ND	0.4	0.4	0.00	60	dry	4.24	
WS103	<0.1	<0.1	NR	NR	0.3	0.3	<0.1	<0.1	<0.1	<0.1	20.4	20.4	<0.1	ND	0.4	0.4	0.00	60	dry	1.45	
WS104	<0.1	<0.1	NR	NR	0.1	0.1	<0.1	<0.1	<0.1	<0.1	21.4	21.4	<0.1	ND	0.4	0.4	0.00	60	dry	0.82	
WS105	<0.1	<0.1	NR	NR	<0.1	<0.1	3.0	3.0	<0.1	<0.1	21.4	21.4	5.1	ND	0.4	0.4	0.00	60	dry	0.84	
Max	<0.1	<0.1	NR	NR	2.6	2.6	3.0	3.0	<0.1	<0.1	21.4	21.4	5.1	ND	0.4	0.4	0.00	60	5.51	9.96	
Min	<0.1	<0.1	NR	NR	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	14.2	14.2	<0.1	ND	0.4	0.4	-0.62	60	DRY	0.82	

ND - Not detected
NR - Not recorded
NA - Non applicable

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:

Dry

Moist

x

Wet

Snow

Frozen

Wind:

Calm

x

Light

Moderate

Strong

Cloud cover:

None

x

Slight

Cloudy

Overcast

Precipitation:

x

None

Slight

Moderate

Heavy

Time monitoring performed:

08:30

Start

End

Barometric pressure (mbar):

1009

Start

1009

End

Pressure trend (Daily):

x

Falling

Steady

Rising

Source:

Air Temperature (Deg. C):

11

Before

11

After

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: G507726

Gas Range: CH₄ 0 - 100% CO₂ 0 - 100% O₂ 0 - 25%

Gas Flow range: +100/-50 l/hour

Differential Pressure: (+/-) 1000 Pa

Date of last calibration: 12/01/2023

Date of next calibration: 12/07/2023

Ambient air check:

CH₄ 0.0 CO₂ 0.1 O₂ 20.9

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Downley Road, Havant

Client:

TRC

Site:

Downley Road, Havant

Date:

16.11.2023

Quote No:

562241

Visit No:

4 of 4

Operator:

Martin Dorfling

Project Manager:

Lauren Sadowski

	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				WELL AND WATER DATA		Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady					
CP102	<0.1	<0.1	NR	NR	2.2	2.2	2	2	<0.1	<0.1	15.4	15.4	<0.1	ND	0.4	0.4	-0.30	60	5.68	9.96	
CP103	<0.1	<0.1	NR	NR	1.5	1.5	<0.1	<0.1	<0.1	<0.1	19.4	19.4	<0.1	ND	0.6	0.6	-0.14	60	dry	4.24	
WS103	<0.1	<0.1	NR	NR	0.3	0.3	<0.1	<0.1	<0.1	<0.1	20.2	20.2	<0.1	ND	0.6	0.6	0.09	60	dry	1.45	
WS104	<0.1	<0.1	NR	NR	0.1	0.1	<0.1	<0.1	<0.1	<0.1	21.2	21.2	<0.1	ND	0.4	0.4	0.00	60	dry	0.82	
WS105	<0.1	<0.1	NR	NR	0.1	0.1	3	3	<0.1	<0.1	21.1	21.1	<0.1	ND	0.6	0.6	0.05	60	dry	0.84	
Max	<0.1	<0.1	NR	NR	2.2	2.2	3	3	<0.1	<0.1	21.2	21.2	<0.1	ND	0.6	0.6	0.09	60	5.68	9.96	
Min	<0.1	<0.1	NR	NR	0.1	0.1	<0.1	<0.1	<0.1	<0.1	15.4	15.4	<0.1	ND	0.4	0.4	-0.30	60	DRY	0.82	

ND - Not detected
NR - Not recorded
NA - Non applicable

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:

Dry

Moist

x

Wet

Snow

Frozen

Wind:

Calm

x

Light

Moderate

Strong

Cloud cover:

None

Slight

Cloudy

x

Overcast

Precipitation:

None

Slight

x

Moderate

Heavy

Time monitoring performed:

10:30

Start

End

Barometric pressure (mbar):

1009

Start

1009

End

Pressure trend (Daily):

Falling

Steady

x

Rising

Source:

Air Temperature (Deg. C):

6

Before

6

After

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:

G507726

Gas Range:

CH₄ 0 - 100%

CO₂ 0 - 100%

O₂ 0 - 25%

Gas Flow range:

+100/-50 l/hour

Differential Pressure:

(+/-) 1000 Pa

Date of last calibration:

12/01/2023

Date of next calibration:

12/07/2023

Ambient air check:

CH₄

0.0

CO₂

0.1

O₂

21.6

Annex E: Laboratory Geotechnical Data

GEOLABS Limited
Bucknalls Lane
Garston
Watford
Hertfordshire
WD25 9XX

Tel: +44(0) 1923 892 190
Fax: +44(0) 1923 892 191
email: admin@geolabs.co.uk
web: www.geolabs.co.uk

TRC Companies Limited
Work.Life
20 Red Lion Street
London
WC1R 4PS

01 November 2023

Report No : GEO/39079/01

Page 1 of 1

For the attention of Mr H McAllister

Our ref **GEO / 39079**
Your Ref **562241**

Date samples received 13/10/2023
Date written instructions received 16/10/2023
Date testing commenced 17/10/2023
Date of sample disposal 29/11/2023

Project **DOWNLEY RD, HAVANT**

Further to your instructions we have pleasure in enclosing the results of the tests you requested in the attached figures.

LABORATORY TEST REPORT

Item No	Test Quantity	Description
1	~	Geotechnical Test Summary
~	2	Water Content
~	2	Liquid & Plastic Limits
2	~	Geochemical Test Summary
~	12	BRE SD1 Suite B - Natural ground + pyrite
3	9	Particle Size Distribution

Any opinions or interpretations expressed herein are outside the scope of UKAS accreditation. All results contained in this report are provisional unless signed by an approved signatory. The results contained in this report relate only to samples received in the laboratory and are tested 'as received' unless otherwise stated. This report should not be reproduced, except in full, without the written approval of the laboratory. The results reported are applicable only to the test items received by the laboratory.

All the necessary data required by the documented test procedures has been recorded and will be stored for a period of not less than 6 years. This data will be issued to yourselves at your request. All samples will be disposed of after the date shown above. Written confirmation will be required to retain the samples beyond this period and a storage charge may be applied.

We trust that the above meets your requirements and should you require any further information or assistance, please do not hesitate to contact us.

Yours faithfully
on behalf of **GEOLABS Limited**



S Burke
Senior Technician

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
CP102	0.30		B	Brown sandy very gravelly silty CLAY with occasional cobbles and brick fragments.															Particle Size Distribution Chemical
CP102	1.00		D																Chemical
CP102	1.50		B	Brown sandy silty clayey GRAVEL.															Particle Size Distribution Chemical
CP102	2.50		B	Brown very sandy GRAVEL.															Particle Size Distribution
CP102	3.50		B																Chemical
CP102	9.50		B	Brown slightly silty slightly clayey very sandy GRAVEL.															Particle Size Distribution Chemical
CP103	0.30		B	Dark brown mottled brown clayey silty sandy GRAVEL with occasional cobbles and brick fragments.															Particle Size Distribution Chemical
CP103	0.70		B	Brown clayey silty very sandy GRAVEL.															Particle Size Distribution Chemical
CP103	1.50		B	Multicoloured slightly silty slightly sandy GRAVEL with occasional cobbles.															Particle Size Distribution Chemical
CP103	2.50		B	Grey slightly sandy GRAVEL with rare cobbles and rare roots.															Particle Size Distribution

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

Checked and Approved by  S Burke - Senior Technician 01/11/2023	Project Number: GEO / 39079 Project Name: DOWNLEY RD, HAVANT 562241	
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SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
CP103	3.50		B	Multicoloured slightly sandy GRAVEL with cobbles.															Particle Size Distribution Chemical
WS101	0.30		D	Brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium. Sand is fine.	16.3	31	18	13	98										Chemical
WS103A	0.60		D	Brown slightly gravelly slightly sandy CLAY. Gravel is fine. Sand is fine.	21.5	41	17	24	99										Chemical
WS103A	1.20		D																Chemical

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

Checked and Approved by



S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

**DOWNLEY RD, HAVANT
562241**



SUMMARY OF CHEMICAL TESTS ON SOIL

Location	Depth m	Sample Ref	Sample Type	pH Value	Total Acid Soluble Sulphate as SO ₄ %	Water Soluble Sulphate as SO ₄ 2:1 Water:Soil Extract g/l	Total Sulphur %	Water Soluble Chloride g/l	Water Soluble Nitrate g/l	Magnesium g/l	Organic Content %	Mass Loss on Ignition %	Carbonate Content %
CP102	0.30		B	8.7	0.054	0.022	0.055	-	-	-	-	-	-
CP102	1.00		D	8.4	0.055	< 0.010	0.032	-	-	-	-	-	-
CP102	1.50		B	8.7	0.017	0.023	0.030	-	-	-	-	-	-
CP102	3.50		B	9.1	< 0.010	< 0.010	0.011	-	-	-	-	-	-
CP102	9.50		B	8.9	< 0.010	< 0.010	0.051	-	-	-	-	-	-
CP103	0.30		B	8.6	0.045	< 0.010	0.14	-	-	-	-	-	-
CP103	0.70		B	8.7	0.030	< 0.010	0.057	-	-	-	-	-	-
CP103	1.50		B	9.0	< 0.010	< 0.010	0.020	-	-	-	-	-	-
CP103	3.50		B	9.1	0.024	0.016	0.023	-	-	-	-	-	-
WS101	0.30		D	8.5	0.047	< 0.010	0.039	-	-	-	-	-	-
WS103A	0.60		D	8.4	0.031	< 0.010	0.026	-	-	-	-	-	-
WS103A	1.20		D	8.3	0.031	< 0.010	0.034	-	-	-	-	-	-

Tested by Eurofins Chemtest Ltd : MCERTS / UKAS No 2183

Checked and Approved by:



S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

**DOWNLEY RD, HAVANT
562241**

GEOLABS®

PARTICLE SIZE DISTRIBUTION

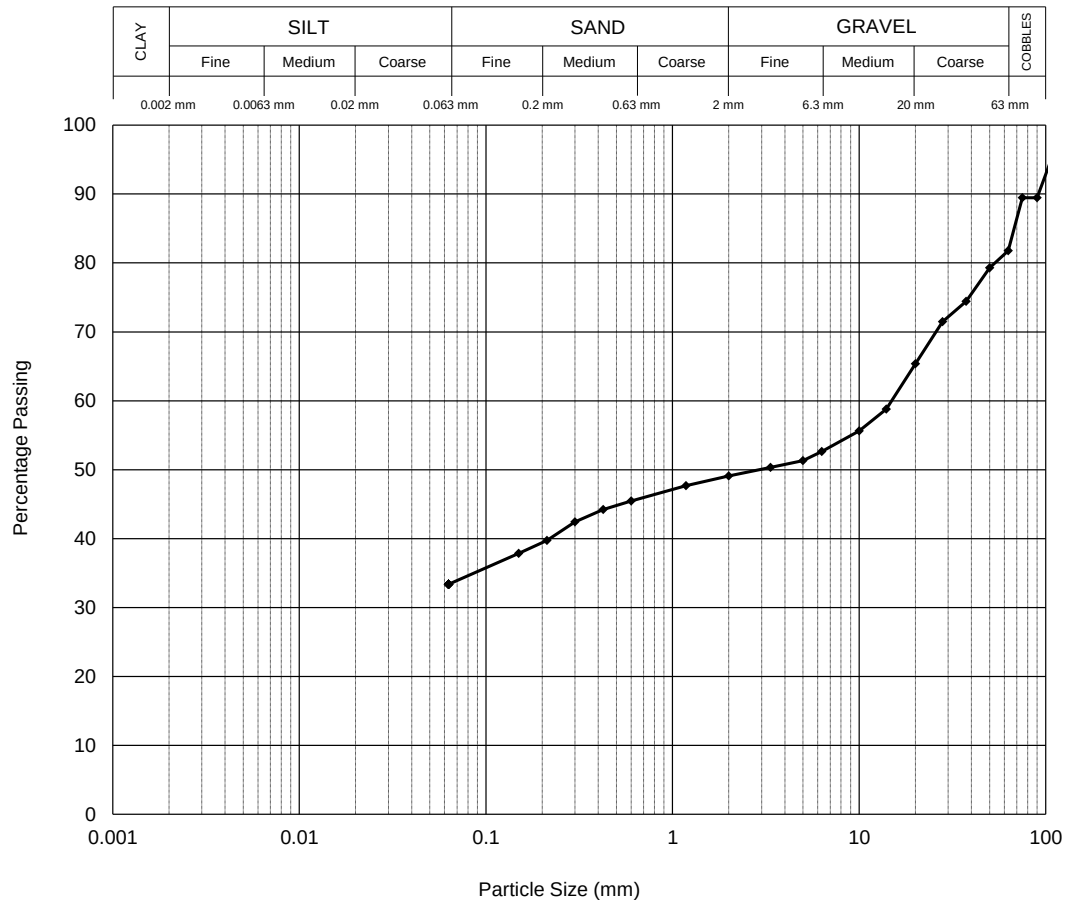
Location CP102
Depth (m) 0.30
Sample Type B

Description

Brown sandy very gravelly silty CLAY with occasional cobbles and brick fragments.

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	89
75.0 mm	89
63.0 mm	82
50.0 mm	79
37.5 mm	74
28.0 mm	71
20.0 mm	65
14.0 mm	59
10.0 mm	56
6.30 mm	53
5.00 mm	51
3.35 mm	50
2.00 mm	49
1.18 mm	48
600 µm	45
425 µm	44
300 µm	42
212 µm	40
150 µm	38
63 µm	33



Particle Proportions	
Cobbles	18.2
Gravel	32.6
Sand	15.7
Silt & Clay	33.5

Tested by AW
Checked and Approved by

S Burke

S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

**DOWNLEY RD, HAVANT
562241**



PARTICLE SIZE DISTRIBUTION

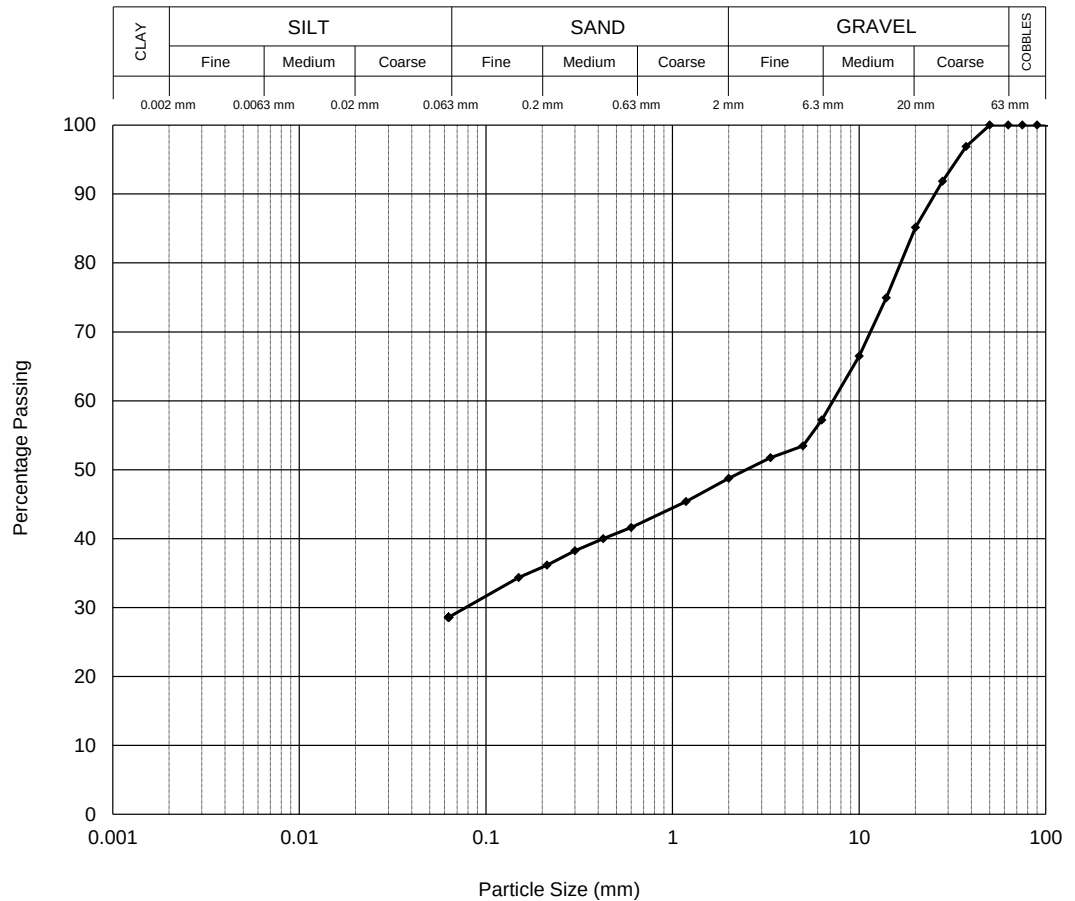
Location CP102
Depth (m) 1.50
Sample Type B

Description

Brown sandy silty clayey GRAVEL.

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	97
28.0 mm	92
20.0 mm	85
14.0 mm	75
10.0 mm	66
6.30 mm	57
5.00 mm	53
3.35 mm	52
2.00 mm	49
1.18 mm	45
600 µm	42
425 µm	40
300 µm	38
212 µm	36
150 µm	34
63 µm	29



Particle Proportions	
Cobbles	0.0
Gravel	51.3
Sand	20.2
Silt & Clay	28.5

Tested by DW
Checked and Approved by

S Burke

S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

DOWNLEY RD, HAVANT
562241



PARTICLE SIZE DISTRIBUTION

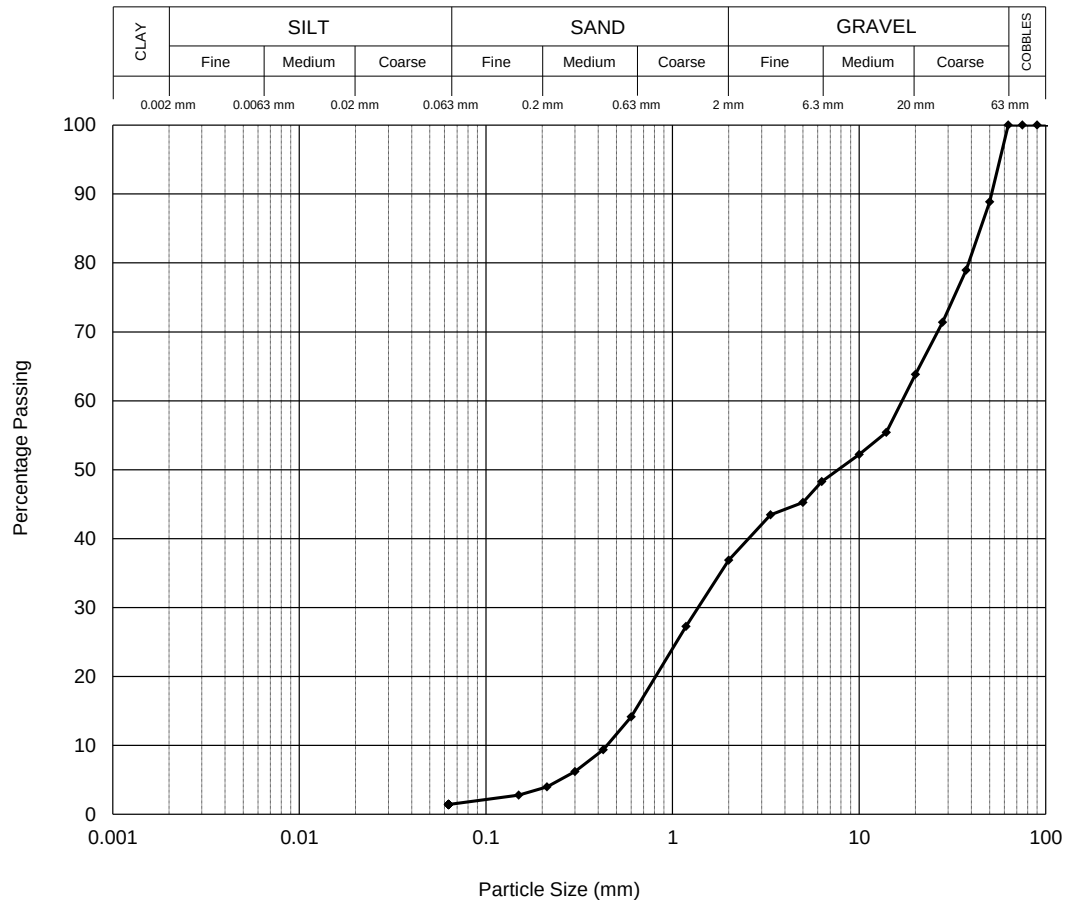
Location CP102
 Depth (m) 2.50
 Sample Type B

Description

Brown very sandy GRAVEL.

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	89
37.5 mm	79
28.0 mm	71
20.0 mm	64
14.0 mm	55
10.0 mm	52
6.30 mm	48
5.00 mm	45
3.35 mm	43
2.00 mm	37
1.18 mm	27
600 µm	14
425 µm	9
300 µm	6
212 µm	4
150 µm	3
63 µm	1



Particle Proportions	
Cobbles	0.0
Gravel	63.1
Sand	35.4
Silt & Clay	1.5

Tested by AW
 Checked and Approved by

S Burke

S Burke - Senior Technician
 01/11/2023

Project Number:

GEO / 39079

Project Name:

DOWNLEY RD, HAVANT
562241



PARTICLE SIZE DISTRIBUTION

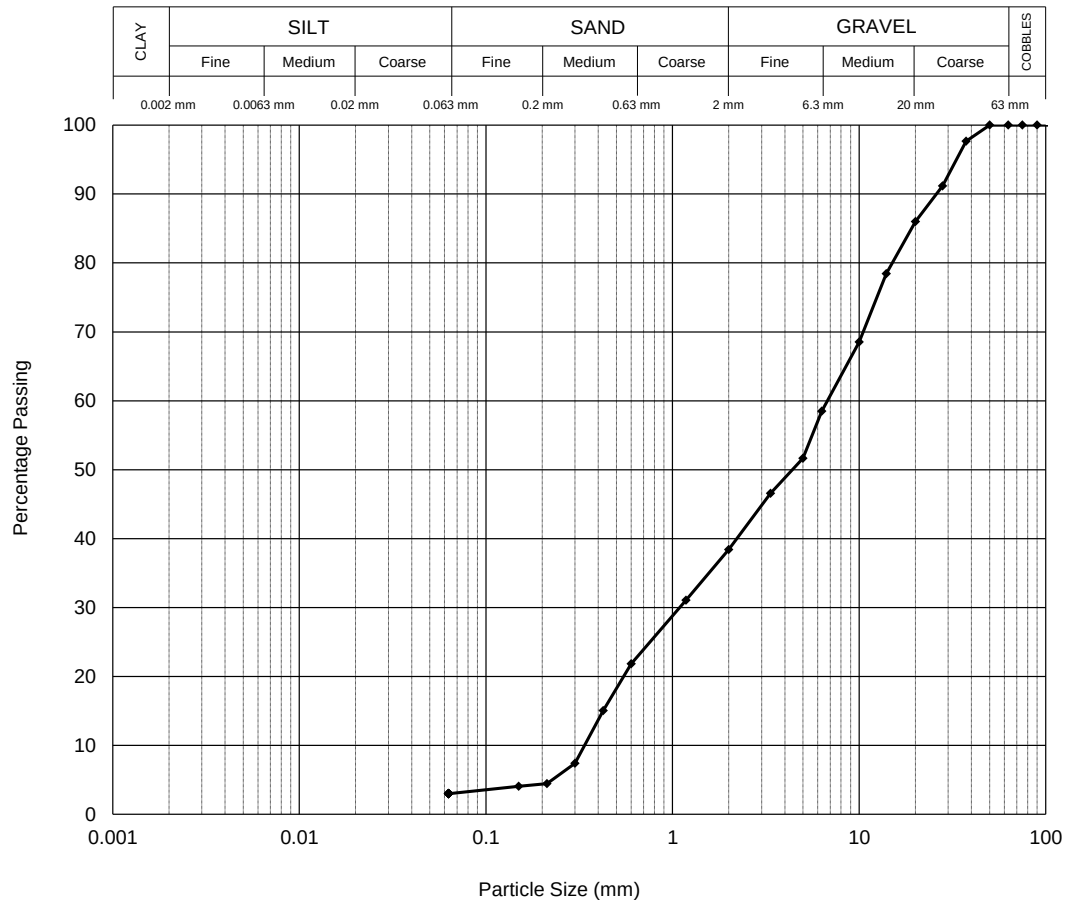
Location CP102
Depth (m) 9.50
Sample Type B

Description

Brown slightly silty slightly clayey very sandy GRAVEL.

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	98
28.0 mm	91
20.0 mm	86
14.0 mm	78
10.0 mm	69
6.30 mm	58
5.00 mm	52
3.35 mm	47
2.00 mm	38
1.18 mm	31
600 µm	22
425 µm	15
300 µm	7
212 µm	4
150 µm	4
63 µm	3



Particle Proportions	
Cobbles	0.0
Gravel	61.6
Sand	35.4
Silt & Clay	3.0

Tested by AW
Checked and Approved by

S Burke

S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

DOWNLEY RD, HAVANT
562241



PARTICLE SIZE DISTRIBUTION

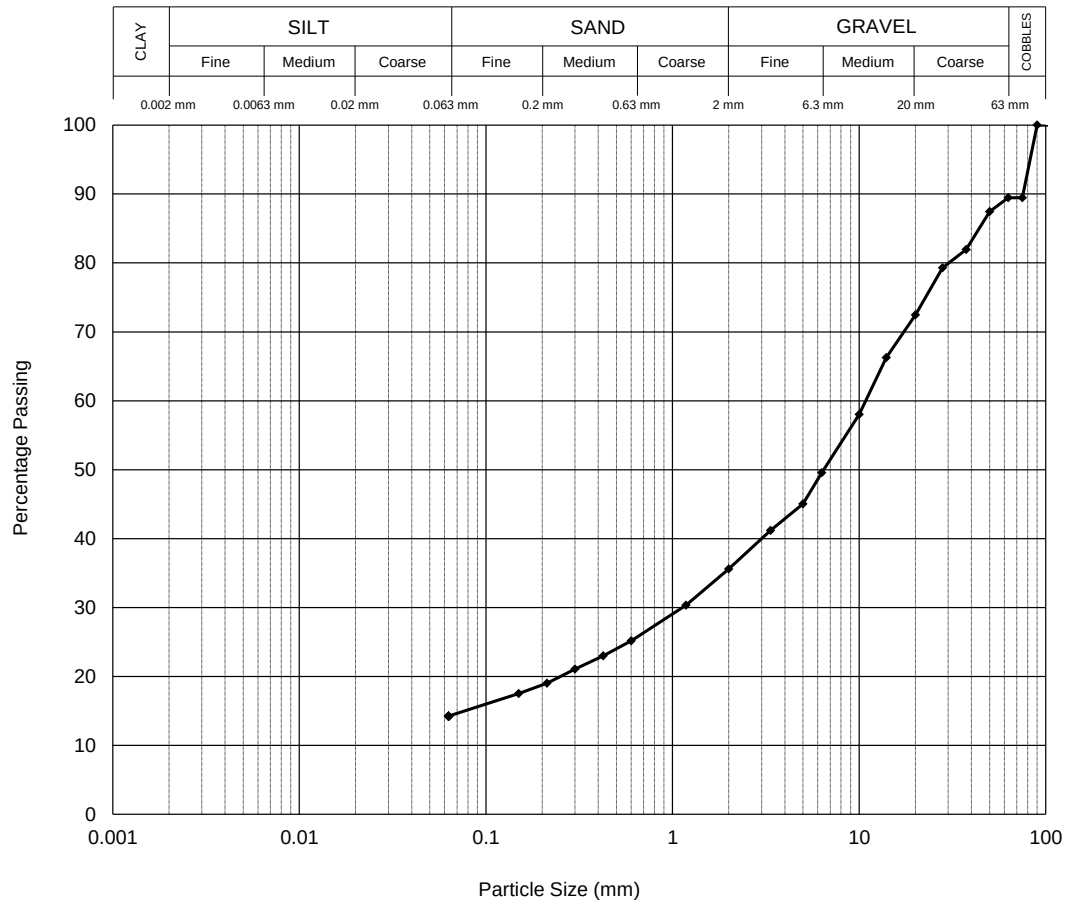
Location CP103
Depth (m) 0.30
Sample Type B

Description

Dark brown mottled brown clayey silty sandy GRAVEL with occasional cobbles and brick fragments.

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	89
63.0 mm	89
50.0 mm	87
37.5 mm	82
28.0 mm	79
20.0 mm	72
14.0 mm	66
10.0 mm	58
6.30 mm	50
5.00 mm	45
3.35 mm	41
2.00 mm	36
1.18 mm	30
600 µm	25
425 µm	23
300 µm	21
212 µm	19
150 µm	18
63 µm	14



Particle Proportions	
Cobbles	10.5
Gravel	53.9
Sand	21.3
Silt & Clay	14.3

Tested by AW
Checked and Approved by

S Burke

S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

**DOWNLEY RD, HAVANT
562241**



PARTICLE SIZE DISTRIBUTION

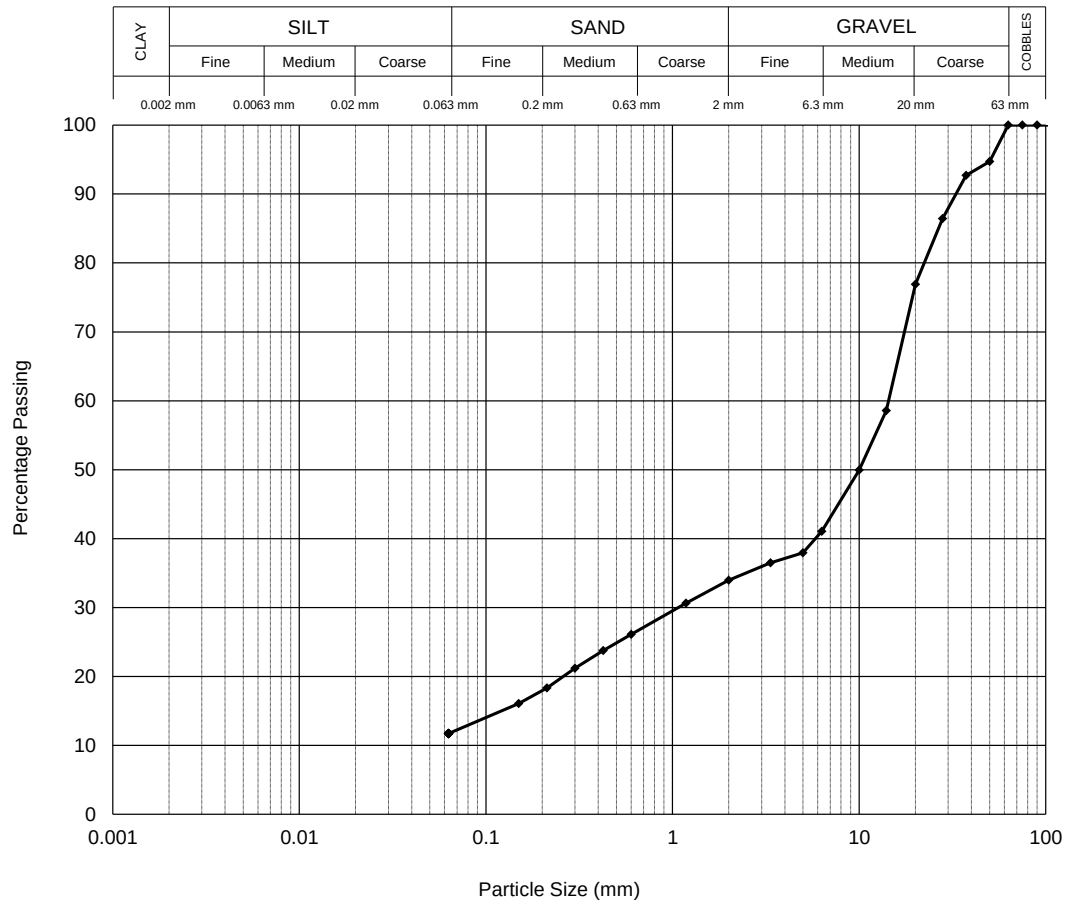
Location CP103
 Depth (m) 0.70
 Sample Type B

Description

Brown clayey silty very sandy GRAVEL.

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	95
37.5 mm	93
28.0 mm	86
20.0 mm	77
14.0 mm	59
10.0 mm	50
6.30 mm	41
5.00 mm	38
3.35 mm	36
2.00 mm	34
1.18 mm	31
600 µm	26
425 µm	24
300 µm	21
212 µm	18
150 µm	16
63 µm	12



Particle Proportions	
Cobbles	0.0
Gravel	66.0
Sand	22.3
Silt & Clay	11.7

Tested by AW
 Checked and Approved by

S Burke

S Burke - Senior Technician
 01/11/2023

Project Number:

GEO / 39079

Project Name:

DOWNLEY RD, HAVANT
562241



PARTICLE SIZE DISTRIBUTION

Location CP103
Depth (m) 1.50
Sample Type B

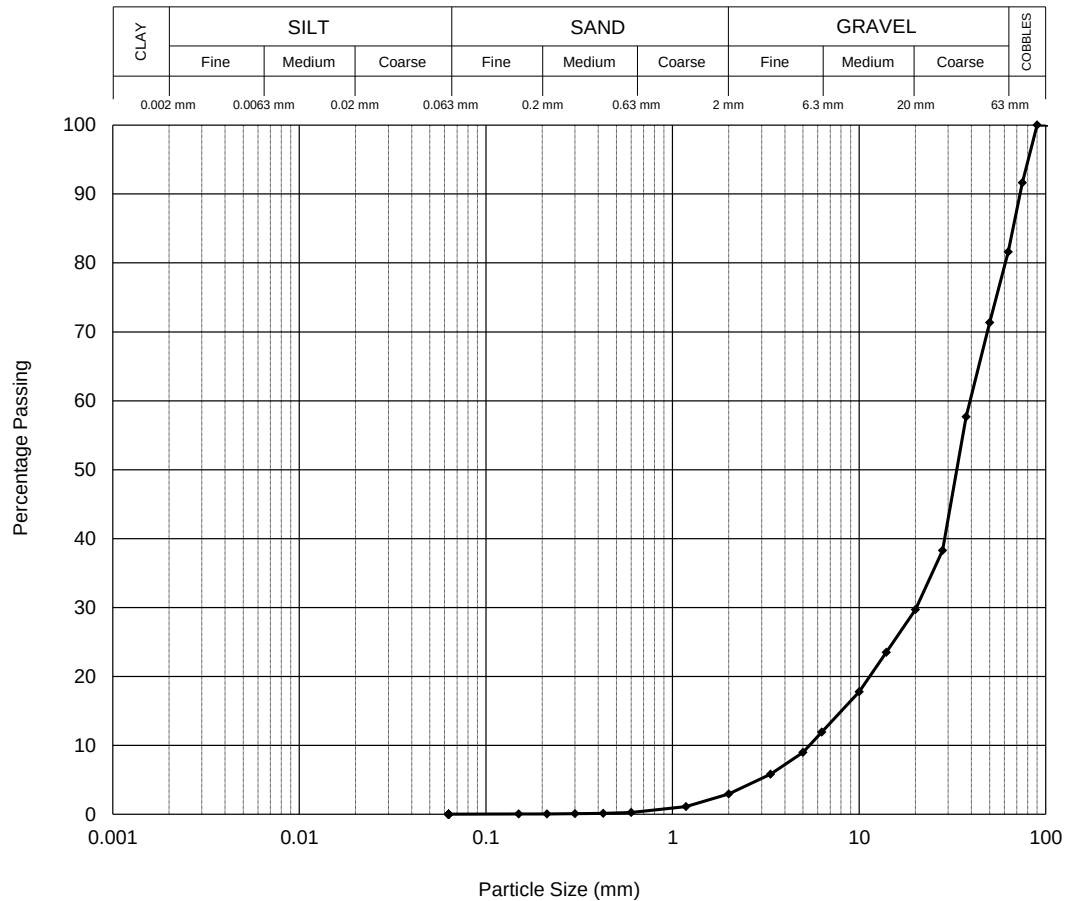
Description

Multi-coloured slightly silty slightly sandy GRAVEL with occasional cobbles.

Remarks Insufficient sample supplied to comply with BS EN ISO 17892-4 : 2016 minimum mass requirements

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	92
63.0 mm	82
50.0 mm	71
37.5 mm	58
28.0 mm	38
20.0 mm	30
14.0 mm	24
10.0 mm	18
6.30 mm	12
5.00 mm	9
3.35 mm	6
2.00 mm	3
1.18 mm	1
600 µm	0
425 µm	0
300 µm	0
212 µm	0
150 µm	0
63 µm	0



Particle Proportions	
Cobbles	18.4
Gravel	78.6
Sand	2.9
Silt & Clay	0.1

Tested by AW
Checked and Approved by

S Burke

S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

DOWNLEY RD, HAVANT
562241



PARTICLE SIZE DISTRIBUTION

Location CP103
Depth (m) 2.50
Sample Type B

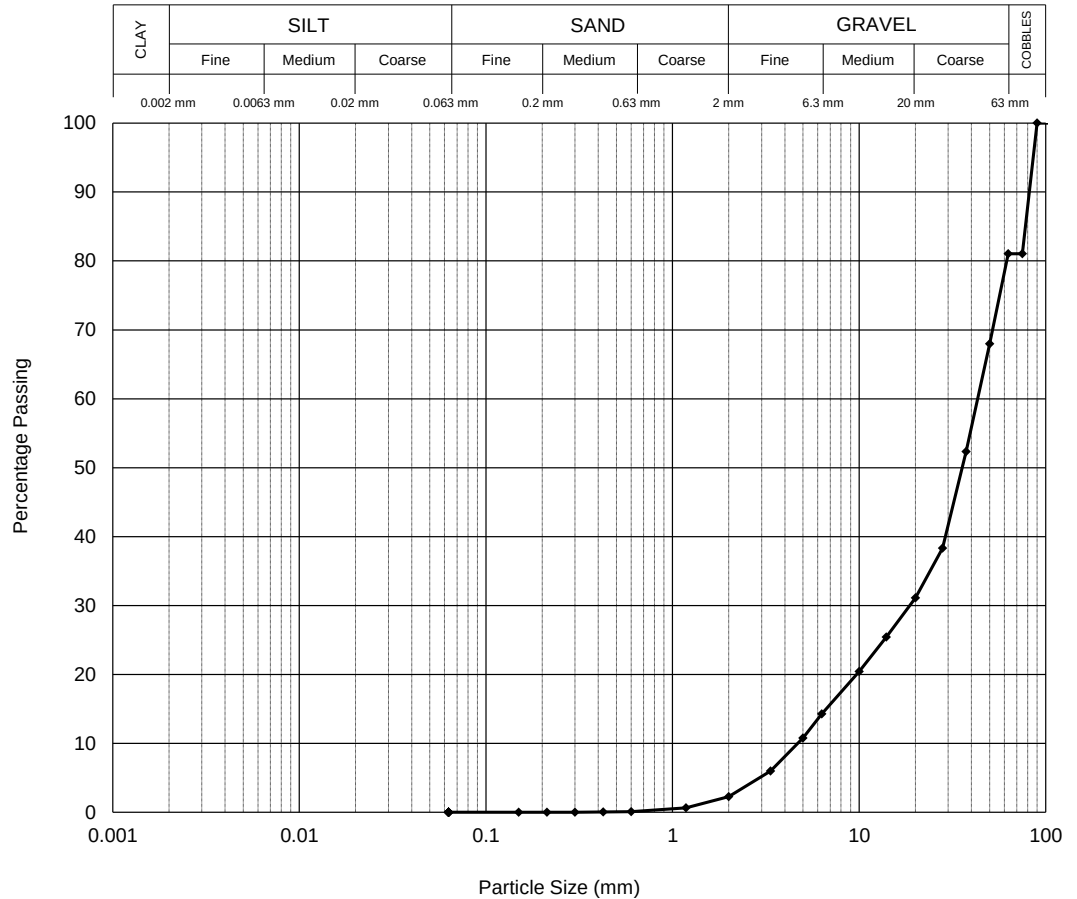
Description

Grey slightly sandy GRAVEL with rare cobbles and rare roots.

Remarks Insufficient sample supplied to comply with BS EN ISO 17892-4 : 2016 minimum mass requirements

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	81
63.0 mm	81
50.0 mm	68
37.5 mm	52
28.0 mm	38
20.0 mm	31
14.0 mm	25
10.0 mm	20
6.30 mm	14
5.00 mm	11
3.35 mm	6
2.00 mm	2
1.18 mm	1
600 µm	0
425 µm	0
300 µm	0
212 µm	0
150 µm	0
63 µm	0



Particle Proportions	
Cobbles	19.0
Gravel	78.8
Sand	2.2
Silt & Clay	0.0

Tested by AW
Checked and Approved by

S Burke

S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

**DOWNLEY RD, HAVANT
562241**



PARTICLE SIZE DISTRIBUTION

Location CP103
Depth (m) 3.50
Sample Type B

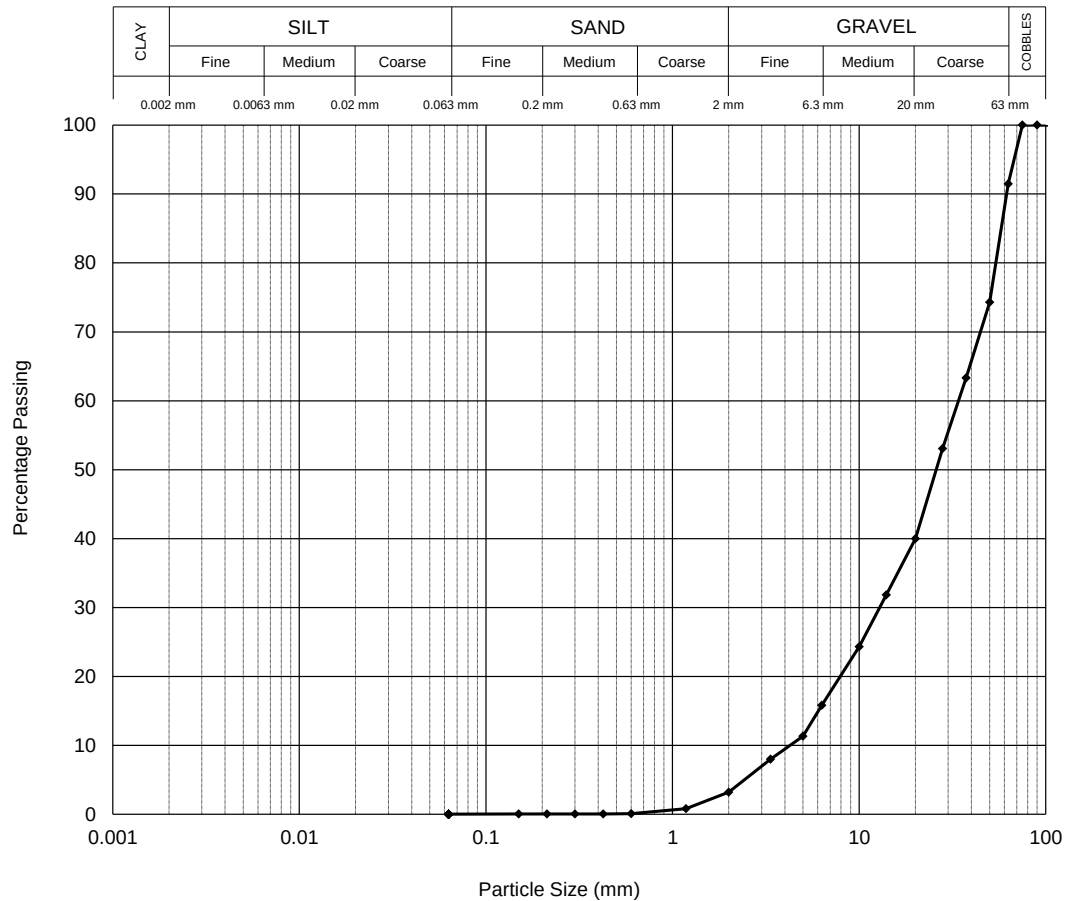
Description

Multicoloured slightly sandy GRAVEL with rare cobbles.

Remarks Insufficient sample supplied to comply with BS EN ISO 17892-4 : 2016 minimum mass requirements

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

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	91
50.0 mm	74
37.5 mm	63
28.0 mm	53
20.0 mm	40
14.0 mm	32
10.0 mm	24
6.30 mm	16
5.00 mm	11
3.35 mm	8
2.00 mm	3
1.18 mm	1
600 µm	0
425 µm	0
300 µm	0
212 µm	0
150 µm	0
63 µm	0



Particle Proportions	
Cobbles	8.5
Gravel	88.3
Sand	3.2
Silt & Clay	0.0

Tested by DW
Checked and Approved by

S Burke

S Burke - Senior Technician
01/11/2023

Project Number:

GEO / 39079

Project Name:

**DOWNLEY RD, HAVANT
562241**



Annex F: Laboratory Chemical Data



Lauren Sadowski
TRC Companies Ltd
20 Red Lion Street, London
WC1R 4PQ

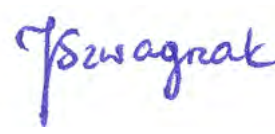
i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

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

e: lsadowski@trccompanies.com

Analytical Report Number : 23-62468

Project / Site name:	Downley Road Havant	Samples received on:	12/10/2023
Your job number:	562241	Samples instructed on/ Analysis started on:	16/10/2023
Your order number:	562241	Analysis completed by:	21/10/2023
Report Issue Number:	1	Report issued on:	23/10/2023
Samples Analysed:	13 soil samples		

Signed: 

Joanna Szwagrak
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 23-62468
 Project / Site name: Downley Road Havant
 Your Order No: 562241

Lab Sample Number	2844710				2844711	2844712	2844713	2844714
Sample Reference	CP102				CP102	CP102	CP103	CP103
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30				3.60	0.20	0.30	0.70
Date Sampled	09/10/2023				09/10/2023	11/10/2023	11/10/2023	11/10/2023
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	28	< 0.1	38	< 0.1
Moisture Content	%	0.01	NONE	11	5.7	13	5.8	11
Total mass of sample received	kg	0.001	NONE	0.8	0.7	0.8	0.8	0.7

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	N/A	IZJ	IZJ	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.4	8.6	8.5	10.3	8.2
Total Cyanide	mg/kg	1	MCERTS	-	-	< 1.0	-	-
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	160	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	0.0794	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	79.4	-	-
Organic Matter (automated)	%	0.1	MCERTS	-	-	1.2	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	0.7	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.52	1.8	1.8	1.9	2.2
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.08	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.05	0.34	0.13	0.18	0.19
Fluorene	mg/kg	0.05	MCERTS	0.06	0.4	0.13	0.18	0.19
Phenanthrene	mg/kg	0.05	MCERTS	0.19	1.1	0.29	0.46	0.39
Anthracene	mg/kg	0.05	MCERTS	0.15	0.78	0.24	0.49	0.4
Fluoranthene	mg/kg	0.05	MCERTS	0.18	0.42	0.13	0.41	0.17
Pyrene	mg/kg	0.05	MCERTS	0.16	0.32	0.11	0.38	0.13
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.08	0.09	< 0.05	0.22	0.06
Chrysene	mg/kg	0.05	MCERTS	0.09	0.1	< 0.05	0.27	0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.1	< 0.05	< 0.05	0.26	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.05	< 0.05	< 0.05	0.17	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.08	0.07	< 0.05	0.28	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.19	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.34	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.71	5.48	2.78	5.7	3.78
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Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number	2844710	2844711	2844712	2844713	2844714
Sample Reference	CP102	CP102	CP102	CP103	CP103
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30	3.60	0.20	0.30	0.70
Date Sampled	09/10/2023	09/10/2023	11/10/2023	11/10/2023	11/10/2023
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	6.3	11	6	11
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	< 0.2	< 0.2	0.2	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	< 0.2	0.7	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	25	14	36	11	31
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	14	36	11	31
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	7.6	23	35	20
Lead (aqua regia extractable)	mg/kg	1	MCERTS	26	5.5	20	28	13
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	8.8	24	12	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	80	26	68	96	51

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0##	< 5.0##	< 5.0	< 5.0##	< 5.0##
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0##	< 5.0##	< 5.0	< 5.0##	< 5.0##
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Petroleum Hydrocarbons

Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	0.1	NONE	-	-	< 0.1	-	-
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TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	1.4	2.2
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	4.3	4.1	4	8.8	4.6
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	8.5	< 8.0	33	9.5
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	31	25	650	160
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	NONE	19	43	35	690	180

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	1.4	2.1	3.6	3
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	3.4	3.5	8.9	7.1
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	18	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	320	66
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	< 10	< 10	350	85

Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number	2844710	2844711	2844712	2844713	2844714
Sample Reference	CP102	CP102	CP102	CP103	CP103
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30	3.60	0.20	0.30	0.70
Date Sampled	09/10/2023	09/10/2023	11/10/2023	11/10/2023	11/10/2023
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Chloroethane	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
Bromomethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
Trichlorofluoromethane	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
1,1-dichloroethene	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
1,1-dichloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
2,2-Dichloropropane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Chloroform	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,2-dichloroethane##	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,1-Dichloropropene##	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
Carbontetrachloride	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
1,2-dichloropropane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Trichloroethene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Dibromomethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Bromodichloromethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Toluene##	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,3-Dichloropropane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Dibromochloromethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Tetrachloroethene	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
1,2-Dibromoethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Chlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
p & m-xylene##	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
Styrene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Bromoform##	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	< 5.0
Isopropylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,1,2,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Bromobenzene	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
N-Propylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
2-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
4-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Tert-Butylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Sec-Butylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,3-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
P-Isopropyltoluene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,4-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,2-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Butylbenzene	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0



Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number				2844710	2844711	2844712	2844713	2844714
Sample Reference				CP102	CP102	CP102	CP103	CP103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	3.60	0.20	0.30	0.70
Date Sampled				09/10/2023	09/10/2023	11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0
Hexachlorobutadiene	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	-	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-62468
 Project / Site name: Downley Road Havant
 Your Order No: 562241

Lab Sample Number				2844715	2844716	2844717	2844718	2844719
Sample Reference				WS105a	WS105a	WS105a	WS103A	WS101
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.80	0.60	0.30
Date Sampled				11/10/2023	11/10/2023	11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	74	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	14	3.5	16	11
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.8	0.7	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	N/A	N/A	IZJ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.2	8.1	8	7.9	7.9
Total Cyanide	mg/kg	1	MCERTS	-	< 1.0	-	-	-
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	660	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.329	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	329	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	-	0.9	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	0.5	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	1.2	2.5	4.1	2.7	3.4
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.26	0.18
Acenaphthene	mg/kg	0.05	MCERTS	0.12	0.22	0.49	1.2	0.26
Fluorene	mg/kg	0.05	MCERTS	0.11	0.25	0.64	1.9	0.36
Phenanthrene	mg/kg	0.05	MCERTS	0.27	0.67	1.8	5.4	1.5
Anthracene	mg/kg	0.05	MCERTS	0.28	0.7	1.6	8.3	1.4
Fluoranthene	mg/kg	0.05	MCERTS	0.1	0.29	0.78	2.4	3.2
Pyrene	mg/kg	0.05	MCERTS	0.09	0.21	0.59	1.8	2.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.25	0.65	1.7
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.18	0.59	1.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.18	0.55	2.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.05	0.15	0.93
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.14	0.43	2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	0.22	1.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.23
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.09	0.24	1.2

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.14	4.85	10.9	26.7	23.9
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Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number				2844715	2844716	2844717	2844718	2844719
Sample Reference				WS105a	WS105a	WS105a	WS103A	WS101
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.80	0.60	0.30
Date Sampled				11/10/2023	11/10/2023	11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	13	7	9.6	10
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	0.4	0.4	0.2	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.8
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	24	30	18	27	29
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	30	18	27	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	26	43	9.8	20	99
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	17	9.1	16	49
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	28	12	19	33
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	220	82	29	62	120

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0##	< 5.0	< 5.0##	< 5.0##	< 5.0##
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0##	< 5.0	< 5.0##	< 5.0##	< 5.0##
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Petroleum Hydrocarbons

Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	0.1	NONE	-	< 0.1	-	-	-
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TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	21	6.8	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	25	11	5	2.2	5.1
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	18	13	< 8.0	< 8.0	9
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	100	63	< 8.0	9.6	19
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	NONE	170	94	14	16	33

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	2.9	2.9	4.3	2.9	2.5
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	6.6	5.6	4.5	9.4	2.8
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	17	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	30	19	< 10	< 10	11
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	NONE	44	33	18	36	21

Analytical Report Number: 23-62468
 Project / Site name: Downley Road Havant
 Your Order No: 562241

Lab Sample Number				2844715	2844716	2844717	2844718	2844719
Sample Reference				WS105a	WS105a	WS105a	WS103A	WS101
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.80	0.60	0.30
Date Sampled				11/10/2023	11/10/2023	11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
VOCs								
Chloromethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Chloroethane	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
Bromomethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
Trichlorofluoromethane	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
1,1-dichloroethene	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
1,1-dichloroethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
2,2-Dichloropropane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Chloroform	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,2-dichloroethane##	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,1-Dichloropropene##	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0	< 5.0
Carbontetrachloride	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
1,2-dichloropropane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Trichloroethene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Dibromomethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Bromodichloromethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Toluene##	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,3-Dichloropropane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Dibromochloromethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Tetrachloroethene	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
1,2-Dibromoethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Chlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0	< 5.0
p & m-xylene##	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0	< 5.0
Styrene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Bromoform##	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0	< 5.0
Isopropylbenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,1,2,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Bromobenzene	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
N-Propylbenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
2-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
4-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Tert-Butylbenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Sec-Butylbenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,3-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
P-Isopropyltoluene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,4-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,2-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Butylbenzene	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0



Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number				2844715	2844716	2844717	2844718	2844719
Sample Reference				WS105a	WS105a	WS105a	WS103A	WS101
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.80	0.60	0.30
Date Sampled				11/10/2023	11/10/2023	11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0
Hexachlorobutadiene	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0	-	< 5.0	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number				2844720	2844721	2844722
Sample Reference				WS101	WS104	WS104
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				2.00	0.50	0.10
Date Sampled				11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	68	77	< 0.1
Moisture Content	%	0.01	NONE	6.3	4.6	11
Total mass of sample received	kg	0.001	NONE	0.8	0.9	0.8

Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	IZJ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.1	8.1	7.9
Total Cyanide	mg/kg	1	MCERTS	-	-	-
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	7.4	10	51
Acenaphthylene	mg/kg	0.05	MCERTS	0.07	0.11	0.91
Acenaphthene	mg/kg	0.05	MCERTS	0.49	1.3	5.1
Fluorene	mg/kg	0.05	MCERTS	0.83	1.9	8.4
Phenanthrene	mg/kg	0.05	MCERTS	2.3	5.2	21
Anthracene	mg/kg	0.05	MCERTS	2	6	27
Fluoranthene	mg/kg	0.05	MCERTS	0.86	2.3	9.3
Pyrene	mg/kg	0.05	MCERTS	0.62	1.7	7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.26	0.62	2.2
Chrysene	mg/kg	0.05	MCERTS	0.24	0.55	2.5
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.18	0.48	1.7
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.09	0.23	0.88
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.15	0.39	1.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.08	0.2	0.91
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.24
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.1	0.21	0.93

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	15.7	31.1	140
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Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number				2844720	2844721	2844722
Sample Reference				WS101	WS104	WS104
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				2.00	0.50	0.10
Date Sampled				11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	7.7	11
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	< 0.2	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	27	17	29
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	17	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	18	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	16	11	20
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	11	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	53	29	62

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0##	< 5.0##	< 5.0##
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0##	< 5.0##	< 5.0##
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0

Petroleum Hydrocarbons

Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	0.1	NONE	-	-	-
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TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	2.2	2.8	3.1
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10	12

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	4.9	8.9	39
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	5	11	32
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	17	44
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	16
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	NONE	20	46	130

Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number				2844720	2844721	2844722
Sample Reference				WS101	WS104	WS104
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				2.00	0.50	0.10
Date Sampled				11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
VOCs						
Chloromethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Chloroethane	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
Bromomethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
Trichlorofluoromethane	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
1,1-dichloroethene	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
1,1-dichloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
2,2-Dichloropropane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Chloroform	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,2-dichloroethane##	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,1-Dichloropropene##	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Carbontetrachloride	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
1,2-dichloropropane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Trichloroethene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Dibromomethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Bromodichloromethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Toluene##	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,3-Dichloropropane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Dibromochloromethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Tetrachloroethene	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
1,2-Dibromoethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Chlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-xylene##	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Styrene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Bromoform##	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Isopropylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,1,2,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Bromobenzene	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
N-Propylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
2-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
4-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Tert-Butylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Sec-Butylbenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,3-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
P-Isopropyltoluene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,4-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,2-dichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Butylbenzene	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0



Analytical Report Number: 23-62468
Project / Site name: Downley Road Havant
Your Order No: 562241

Lab Sample Number				2844720	2844721	2844722
Sample Reference				WS101	WS104	WS104
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				2.00	0.50	0.10
Date Sampled				11/10/2023	11/10/2023	11/10/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0
Hexachlorobutadiene	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 23-62468
Project / Site name: Downley Road Havant

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2844710	CP102	None Supplied	0.3	Brown loam with gravel and vegetation.
2844711	CP102	None Supplied	3.6	Brown sand with gravel and stones.
2844712	CP102	None Supplied	0.2	Brown clay and sand with gravel and vegetation.
2844713	CP103	None Supplied	0.3	Brown sand with gravel and stones.
2844714	CP103	None Supplied	0.7	Brown clay and sand with gravel.
2844715	WS105a	None Supplied	0.4	Brown clay and sand with gravel.
2844716	WS105a	None Supplied	0.4	Brown clay with gravel.
2844717	WS105a	None Supplied	0.8	Brown clay with chalk and stones.
2844718	WS103A	None Supplied	0.6	Brown clay with gravel.
2844719	WS101	None Supplied	0.3	Brown clay and loam with gravel and vegetation.
2844720	WS101	None Supplied	2	Brown clay and sand with stones and gravel
2844721	WS104	None Supplied	0.5	Brown clay and sand with stones and gravel
2844722	WS104	None Supplied	0.1	Brown clay and sand with gravel.

Analytical Report Number : 23-62468
Project / Site name: Downley Road Havant

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
PRO (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. Refer to CoA for band specific accreditation.	In-house method with silica gel split/clean up.	L088/76-PL	D	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

Analytical Report Number : 23-62468
 Project / Site name: Downley Road Havant

Water matrix abbreviations:
 Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
 For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
 For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
 Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
 Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Quality control parameter has a high recovery (outside of limit); however the associated result is below the reporting limit, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

Lauren Sadowski
TRC Companies Ltd
20 Red Lion Street, London
WC1R 4PQ

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

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

e: lsadowski@trccompanies.com

Analytical Report Number : 23-62974

Project / Site name:	Downley Road, Havant	Samples received on:	12/10/2023
Your job number:	562241	Samples instructed on / Analysis started on:	16/10/2023
Your order number:	562241	Analysis completed by:	26/10/2023
Report Issue Number:	1	Report issued on:	27/10/2023
Samples Analysed:	1 soil sample		



Signed: _____

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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

Analytical Report Number: 23-62974
 Project / Site name: Downley Road, Havant
 Your Order No: 562241

Lab Sample Number				2847547
Sample Reference				CP103
Sample Number				None Supplied
Depth (m)				2.70
Date Sampled				11/10/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	75
Moisture Content	%	0.01	NONE	1.7
Total mass of sample received	kg	0.001	NONE	0.8

General Inorganics

pH - Automated	pH Units	N/A	NONE	8
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Speciated PAHs

Naphthalene	mg/kg	0.05	NONE	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05
Acenaphthene	mg/kg	0.05	NONE	< 0.05
Fluorene	mg/kg	0.05	NONE	< 0.05
Phenanthrene	mg/kg	0.05	NONE	< 0.05
Anthracene	mg/kg	0.05	NONE	< 0.05
Fluoranthene	mg/kg	0.05	NONE	< 0.05
Pyrene	mg/kg	0.05	NONE	< 0.05
Benzo(a)anthracene	mg/kg	0.05	NONE	< 0.05
Chrysene	mg/kg	0.05	NONE	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	NONE	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	NONE	< 0.05
Benzo(a)pyrene	mg/kg	0.05	NONE	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	NONE	< 1.0
Boron (water soluble)	mg/kg	0.2	NONE	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	NONE	< 0.2
Chromium (hexavalent)	mg/kg	1.8	NONE	< 1.8
Chromium (III)	mg/kg	1	NONE	2.7
Chromium (aqua regia extractable)	mg/kg	1	NONE	3.1
Copper (aqua regia extractable)	mg/kg	1	NONE	17
Lead (aqua regia extractable)	mg/kg	1	NONE	1.7
Mercury (aqua regia extractable)	mg/kg	0.3	NONE	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	NONE	1.8
Selenium (aqua regia extractable)	mg/kg	1	NONE	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	NONE	8.2

Monoaromatics & Oxygenates

Benzene	µg/kg	5	NONE	< 5.0
Toluene	µg/kg	5	NONE	< 5.0
Ethylbenzene	µg/kg	5	NONE	< 5.0
p & m-xylene	µg/kg	5	NONE	< 5.0
o-xylene	µg/kg	5	NONE	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0

Analytical Report Number: 23-62974
 Project / Site name: Downley Road, Havant
 Your Order No: 562241

Lab Sample Number				2847547
Sample Reference				CP103
Sample Number				None Supplied
Depth (m)				2.70
Date Sampled				11/10/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS 1D AL}	mg/kg	0.02	NONE	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 _{HS 1D AL}	mg/kg	0.02	NONE	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 _{HS 1D AL}	mg/kg	0.05	NONE	< 0.10
TPH-CWG - Aliphatic >EC10 - EC12 _{EH CU 1D AL}	mg/kg	1	NONE	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH CU 1D AL}	mg/kg	2	NONE	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH CU 1D AL}	mg/kg	8	NONE	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH CU 1D AL}	mg/kg	8	NONE	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10

TPH-CWG - Aromatic >EC5 - EC7 _{HS 1D AR}	mg/kg	0.01	NONE	< 0.10
TPH-CWG - Aromatic >EC7 - EC8 _{HS 1D AR}	mg/kg	0.01	NONE	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 _{HS 1D AR}	mg/kg	0.05	NONE	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 _{EH CU 1D AR}	mg/kg	1	NONE	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH CU 1D AR}	mg/kg	2	NONE	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH CU 1D AR}	mg/kg	10	NONE	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	NONE	< 10
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10

Analytical Report Number: 23-62974
 Project / Site name: Downley Road, Havant
 Your Order No: 562241

Lab Sample Number				2847547
Sample Reference				CP103
Sample Number				None Supplied
Depth (m)				2.70
Date Sampled				11/10/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	

VOCS

Chloromethane	µg/kg	5	NONE	< 5.0
Chloroethane	µg/kg	5	NONE	< 5.0
Bromomethane	µg/kg	5	NONE	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0
Trichlorofluoromethane	µg/kg	5	NONE	< 5.0
1,1-dichloroethene	µg/kg	5	NONE	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	NONE	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0
1,1-dichloroethane	µg/kg	5	NONE	< 5.0
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0
Chloroform	µg/kg	5	NONE	< 5.0
1,1,1-Trichloroethane	µg/kg	5	NONE	< 5.0
1,2-dichloroethane	µg/kg	5	NONE	< 5.0
1,1-Dichloropropene	µg/kg	5	NONE	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	NONE	< 5.0
Benzene	µg/kg	5	NONE	< 5.0
Carbontetrachloride	µg/kg	5	NONE	< 5.0
1,2-dichloropropane	µg/kg	5	NONE	< 5.0
Trichloroethene	µg/kg	5	NONE	< 5.0
Dibromomethane	µg/kg	5	NONE	< 5.0
Bromodichloromethane	µg/kg	5	NONE	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	NONE	< 5.0
Trans-1,3-dichloropropene	µg/kg	5	NONE	< 5.0
Toluene	µg/kg	5	NONE	< 5.0
1,1,2-Trichloroethane	µg/kg	5	NONE	< 5.0
1,3-Dichloropropane	µg/kg	5	NONE	< 5.0
Dibromochloromethane	µg/kg	5	NONE	< 5.0
Tetrachloroethene	µg/kg	5	NONE	< 5.0
1,2-Dibromoethane	µg/kg	5	NONE	< 5.0
Chlorobenzene	µg/kg	5	NONE	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0
Ethylbenzene	µg/kg	5	NONE	< 5.0
p & m-xylene	µg/kg	5	NONE	< 5.0
Styrene	µg/kg	5	NONE	< 5.0
Bromoform	µg/kg	5	NONE	< 5.0
o-xylene	µg/kg	5	NONE	< 5.0
Isopropylbenzene	µg/kg	5	NONE	< 5.0
1,1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0
Bromobenzene	µg/kg	5	NONE	< 5.0
N-Propylbenzene	µg/kg	5	NONE	< 5.0
2-Chlorotoluene	µg/kg	5	NONE	< 5.0
4-Chlorotoluene	µg/kg	5	NONE	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	NONE	< 5.0
Tert-Butylbenzene	µg/kg	5	NONE	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	NONE	< 5.0
Sec-Butylbenzene	µg/kg	5	NONE	< 5.0
1,3-dichlorobenzene	µg/kg	5	NONE	< 5.0
P-Isopropyltoluene	µg/kg	5	NONE	< 5.0
1,4-dichlorobenzene	µg/kg	5	NONE	< 5.0
1,2-dichlorobenzene	µg/kg	5	NONE	< 5.0

Analytical Report Number: 23-62974
 Project / Site name: Downley Road, Havant
 Your Order No: 562241

Lab Sample Number				2847547
Sample Reference				CP103
Sample Number				None Supplied
Depth (m)				2.70
Date Sampled				11/10/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Butylbenzene	µg/kg	5	NONE	< 5.0
1,2-Dibromo-3-chloropropane	µg/kg	5	NONE	< 5.0
1,2,4-Trichlorobenzene	µg/kg	5	NONE	< 5.0
Hexachlorobutadiene	µg/kg	5	NONE	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	NONE	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-62974

Project / Site name: Downley Road, Havant

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2847547	CP103	None Supplied	2.7	Non Soil**

Analytical Report Number : 23-62974

Project / Site name: Downley Road, Havant

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	NONE
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	NONE
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. Refer to CoA for band specific accreditation.	In-house method with silica gel split/clean up.	L088/76-PL	D	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Analytical Report Number : 23-62974

Project / Site name: Downley Road, Havant

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

**Unaccredited sample matrix



Lauren Sadowski
TRC Companies Ltd
20 Red Lion Street, London
WC1R 4PQ

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

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

e: lsadowski@trccompanies.com

Analytical Report Number : 23-65090

Project / Site name:	Downley Road, Havant	Samples received on:	26/10/2023
Your job number:	562241	Samples instructed on/ Analysis started on:	26/10/2023
Your order number:	562241	Analysis completed by:	02/11/2023
Report Issue Number:	1	Report issued on:	02/11/2023
Samples Analysed:	1 water sample		

Signed: _____

Joanna Szwarzak
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 23-65090
Project / Site name: Downley Road, Havant

Your Order No: 562241

Lab Sample Number	2858886			
Sample Reference	CP102			
Sample Number	None Supplied			
Depth (m)	6.00			
Date Sampled	25/10/2023			
Time Taken	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

General Inorganics

pH (L099)	pH Units	N/A	ISO 17025	7.2
Sulphate as SO4	mg/l	0.045	ISO 17025	25.2

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16
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Heavy Metals / Metalloids

Boron (dissolved)	µg/l	10	ISO 17025	30
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.32
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.06
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.4
Copper (dissolved)	µg/l	0.5	ISO 17025	1.5
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	0.9
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.7
Zinc (dissolved)	µg/l	0.5	ISO 17025	7.8

Monoaromatics & Oxygenates

Benzene	µg/l	3	ISO 17025	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0

Analytical Report Number: 23-65090
Project / Site name: Downley Road, Havant

Your Order No: 562241

Lab Sample Number					2858886
Sample Reference					CP102
Sample Number					None Supplied
Depth (m)					6.00
Date Sampled					25/10/2023
Time Taken					None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6 _{HS_1D_AL}	µg/l	1	NONE	< 1.0
TPH-CWG - Aliphatic >C6 - C8 _{HS_1D_AL}	µg/l	1	NONE	< 1.0
TPH-CWG - Aliphatic >C8 - C10 _{HS_1D_AL}	µg/l	1	NONE	< 1.0
TPH-CWG - Aliphatic >C10 - C12 _{EH_1D_AL_MS}	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C12 - C16 _{EH_1D_AL_MS}	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C16 - C21 _{EH_1D_AL_MS}	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35 _{EH_1D_AL_MS}	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic (C5 - C35) _{HS+EH_1D_AL_MS}	µg/l	10	NONE	< 10

TPH-CWG - Aromatic >C5 - C7 _{HS_1D_AR}	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8 _{HS_1D_AR}	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10 _{HS_1D_AR}	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12 _{EH_1D_AR_MS}	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C12 - C16 _{EH_1D_AR_MS}	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C16 - C21 _{EH_1D_AR_MS}	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C21 - C35 _{EH_1D_AR_MS}	µg/l	10	NONE	< 10
TPH-CWG - Aromatic (C5 - C35) _{HS+EH_1D_AR_MS}	µg/l	10	NONE	< 10

VOCs

Chloromethane	µg/l	3	ISO 17025	< 3.0
Chloroethane	µg/l	3	ISO 17025	< 3.0
Bromomethane	µg/l	3	ISO 17025	< 3.0
Vinyl Chloride	µg/l	3	NONE	< 3.0
Trichlorofluoromethane	µg/l	3	NONE	< 3.0
1,1-Dichloroethene	µg/l	3	ISO 17025	< 3.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	3	NONE	< 3.0#
Trans 1,2-dichloroethylene	µg/l	3	ISO 17025	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0
1,1-Dichloroethane	µg/l	3	ISO 17025	< 3.0
2,2-Dichloropropane	µg/l	3	ISO 17025	< 3.0
Chloroform	µg/l	3	ISO 17025	< 3.0
1,1,1-Trichloroethane	µg/l	3	ISO 17025	< 3.0
1,2-Dichloroethane	µg/l	3	ISO 17025	< 3.0
1,1-Dichloropropene	µg/l	3	ISO 17025	< 3.0
Cis-1,2-dichloroethene	µg/l	3	ISO 17025	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0
Carbontetrachloride	µg/l	3	ISO 17025	< 3.0
1,2-Dichloropropane	µg/l	3	ISO 17025	< 3.0
Trichloroethene	µg/l	3	ISO 17025	< 3.0
Dibromomethane	µg/l	3	ISO 17025	< 3.0
Bromodichloromethane	µg/l	3	ISO 17025	< 3.0
Cis-1,3-dichloropropene	µg/l	3	ISO 17025	< 3.0
Trans-1,3-dichloropropene	µg/l	3	ISO 17025	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0
1,1,2-Trichloroethane	µg/l	3	ISO 17025	< 3.0
1,3-Dichloropropane	µg/l	3	ISO 17025	< 3.0
Dibromochloromethane	µg/l	3	ISO 17025	< 3.0
Tetrachloroethene	µg/l	3	ISO 17025	< 3.0
1,2-Dibromoethane	µg/l	3	ISO 17025	< 3.0
Chlorobenzene	µg/l	3	ISO 17025	< 3.0
1,1,1,2-Tetrachloroethane	µg/l	3	ISO 17025	< 3.0

Analytical Report Number: 23-65090
Project / Site name: Downley Road, Havant

Your Order No: 562241

Lab Sample Number				2858886
Sample Reference				CP102
Sample Number				None Supplied
Depth (m)				6.00
Date Sampled				25/10/2023
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	
Ethylbenzene	µg/l	3	ISO 17025	< 3.0
p & m-Xylene	µg/l	3	ISO 17025	< 3.0
Styrene	µg/l	3	ISO 17025	< 3.0
Bromoform	µg/l	3	ISO 17025	< 3.0
o-Xylene	µg/l	3	ISO 17025	< 3.0
Isopropylbenzene	µg/l	3	ISO 17025	< 3.0
1,1,2,2-Tetrachloroethane	µg/l	3	ISO 17025	< 3.0
Bromobenzene	µg/l	3	ISO 17025	< 3.0
n-Propylbenzene	µg/l	3	ISO 17025	< 3.0
2-Chlorotoluene	µg/l	3	ISO 17025	< 3.0
4-Chlorotoluene	µg/l	3	ISO 17025	< 3.0
1,3,5-Trimethylbenzene	µg/l	3	ISO 17025	< 3.0
tert-Butylbenzene	µg/l	3	ISO 17025	< 3.0
1,2,4-Trimethylbenzene	µg/l	3	ISO 17025	< 3.0
sec-Butylbenzene	µg/l	3	ISO 17025	< 3.0
1,3-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0
p-Isopropyltoluene	µg/l	3	ISO 17025	< 3.0
1,4-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0
1,2-Dichlorobenzene	µg/l	3	ISO 17025	< 3.0
Butylbenzene	µg/l	3	ISO 17025	< 3.0
1,2-Dibromo-3-chloropropane	µg/l	3	ISO 17025	< 3.0
1,2,4-Trichlorobenzene	µg/l	3	ISO 17025	< 3.0
Hexachlorobutadiene	µg/l	3	ISO 17025	< 3.0
1,2,3-Trichlorobenzene	µg/l	3	ISO 17025	< 3.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-65090
Project / Site name: Downley Road, Havant

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025

Analytical Report Number : 23-65090
Project / Site name: Downley Road, Havant

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	ISO 17025
Cr (III) in water	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

Annex G: Screened Data

Human Health Generic Assessment Criteria

Contaminant of Concern	Units	Generic Assessment Criteria (mg/kg)				Source
		Residential (wHP)	Residential (woHP)	POS (Residential)	Commercial	
Heavy Metals						
Arsenic	mg/kg	37	40	79	640	S4UL
Boron	mg/kg	290	11000	21000	240000	S4UL
Cadmium	mg/kg	11	85	120	190	S4UL
Chromium (hexavalent)	mg/kg	6	6	7.7	33	S4UL
Chromium (III)	mg/kg	910	910	1500	8600	S4UL
Chromium	mg/kg	910	910	1500	8600	S4UL
Copper	mg/kg	2400	7100	12000	68000	S4UL
Lead	mg/kg	200	310	630	2330	C4SL
Mercury	mg/kg	40	56	120	1100	S4UL
Nickel	mg/kg	180	180	230	980	S4UL
Selenium	mg/kg	250	430	1100	12000	S4UL
Zinc	mg/kg	3700	40000	81000	730000	S4UL
Polycyclic Aromatic Hydrocarbons						
Naphthalene	mg/kg	2.3	2.3	4900	190	S4UL
Acenaphthylene	mg/kg	170	2900	15000	83000	S4UL
Acenaphthene	mg/kg	210	3000	15000	84000	S4UL
Fluorene	mg/kg	170	2800	9900	63000	S4UL
Phenanthrene	mg/kg	95	1300	3100	22000	S4UL
Anthracene	mg/kg	2400	31000	74000	520000	S4UL
Fluoranthene	mg/kg	280	1500	3100	23000	S4UL
Pyrene	mg/kg	620	3700	7400	54000	S4UL
Benzo(a)anthracene	mg/kg	7.2	11	29	170	S4UL
Chrysene	mg/kg	15	30	57	350	S4UL
Benzo(b)fluoranthene	mg/kg	2.6	3.9	7.1	44	S4UL
Benzo(k)fluoranthene	mg/kg	77	110	190	1200	S4UL
Benzo(a)pyrene	mg/kg	2.2	3.2	5.7	35	S4UL
Indeno(1,2,3-cd) pyrene	mg/kg	27	45	82	500	S4UL
Dibenz(a,h)anthracene	mg/kg	0.24	0.31	0.57	3.5	S4UL
Benzo(ghi)perylene	mg/kg	320	360	640	3900	S4UL
Monoaromatics						
Benzene	µg/kg	87	380	72000	27000	S4UL
Toluene	µg/kg	130000	880000	56000000	56000000	S4UL
Ethylbenzene	µg/kg	47000	83000	24000000	5700000	S4UL
p & m-xylene	µg/kg	56000	79000	41000000	5900000	S4UL
o-xylene	µg/kg	60000	88000	41000000	6600000	S4UL
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	49000	73000	-	7900000	EIC/AGS/CL:AIRE
Petroleum Hydrocarbons (Aliphatic)						
TPH-CWG – Aliphatic >EC5 – EC6	mg/kg	42	42	570000	3200	S4UL
TPH-CWG – Aliphatic >EC6 – EC 8	mg/kg	100	100	600000	7800	S4UL
TPH-CWG – Aliphatic >EC8 – EC10	mg/kg	27	27	13000	2000	S4UL
TPH-CWG – Aliphatic >EC10 – EC12	mg/kg	130	130	13000	9700	S4UL
TPH-CWG – Aliphatic >EC12 – EC16	mg/kg	1100	1100	13000	59000	S4UL
TPH-CWG – Aliphatic >EC16 – EC21	mg/kg	65000	65000	250000	1600000	S4UL

Human Health Generic Assessment Criteria

TPH-CWG – Aliphatic >EC21 – EC35	mg/kg	65000	65000	250000	1600000	S4UL
Petroleum Hydrocarbons (Aromatic)						
TPH-CWG – Aromatic >EC5 – EC7	mg/kg	70	370	56000	26000	S4UL
TPH-CWG – Aromatic >EC7 – EC8	mg/kg	130	860	56000	56000	S4UL
TPH-CWG – Aromatic >EC8 – EC10	mg/kg	34	47	5000	3500	S4UL
TPH-CWG – Aromatic >EC10 – EC12	mg/kg	74	250	5000	16000	S4UL
TPH-CWG – Aromatic >EC12 – EC16	mg/kg	140	1800	5100	36000	S4UL
TPH-CWG – Aromatic >EC16 – EC21	mg/kg	260	1900	3800	28000	S4UL
TPH-CWG – Aromatic >EC21 – EC35	mg/kg	1100	1900	3800	28000	S4UL
Volatile Organic Compounds						
Chloromethane	µg/kg	8.3	8.5	-	1000	EIC/AGS/CL:AIRE
Chloroethane	µg/kg	8300	8400	-	960000	EIC/AGS/CL:AIRE
Bromomethane	µg/kg	-	-	-	-	-
Vinyl Chloride	µg/kg	0.64	0.77	3500	59	S4UL
Trichlorofluoromethane	µg/kg	-	-	-	-	-
1,1-Dichloroethene	µg/kg	230	230	-	26000	EIC/AGS/CL:AIRE
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	110	120	-	14000	EIC/AGS/CL:AIRE
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	49000	73000	-	7900000	EIC/AGS/CL:AIRE
1,1-Dichloroethane	µg/kg	2400	2500	-	280000	EIC/AGS/CL:AIRE
2,2-Dichloropropane	µg/kg	-	-	-	-	-
Trichloromethane	µg/kg	910	1200	2500000	99000	S4UL
1,1,1-Trichloroethane	µg/kg	8800	9000	140000000	660000	S4UL
1,2-Dichloroethane	µg/kg	7.1	9.2	29000	670	S4UL
1,1-Dichloropropene	µg/kg	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	190	190	-	22000	EIC/AGS/CL:AIRE
Benzene	µg/kg	87	380	72000	27000	S4UL
Tetrachloromethane	µg/kg	26	26	890000	2900	S4UL
1,2-Dichloropropane	µg/kg	24	24	-	3300	EIC/AGS/CL:AIRE
Trichloroethene	µg/kg	16	17	120000	1200	S4UL
Dibromomethane	µg/kg	-	-	-	-	-
Bromodichloromethane	µg/kg	16	19	-	2100	EIC/AGS/CL:AIRE
Cis-1,3-dichloropropene	µg/kg	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	-	-	-	-	-
Toluene	µg/kg	130000	880000	56000000	56000000	S4UL
1,1,2-Trichloroethane	µg/kg	600	880	-	94000	EIC/AGS/CL:AIRE
1,3-Dichloropropane	µg/kg	-	-	-	-	-
Dibromochloromethane	µg/kg	-	-	-	-	-
Tetrachloroethene	µg/kg	180	180	1400000	19000	S4UL
1,2-Dibromoethane	µg/kg	-	-	-	-	-
Chlorobenzene	µg/kg	460	460	11000000	56000	S4UL
1,1,1,2-Tetrachloroethane	µg/kg	1200	1500	1400000	110000	S4UL
Ethylbenzene	µg/kg	47000	83000	24000000	5700000	S4UL
p & m-Xylene	µg/kg	56000	79000	41000000	5900000	S4UL
Styrene	µg/kg	8100	35000	-	3300000	EIC/AGS/CL:AIRE
Tribromomethane	µg/kg	-	-	-	-	-
o-Xylene	µg/kg	60000	88000	41000000	6600000	S4UL

Human Health Generic Assessment Criteria

1,1,2,2-Tetrachloroethane	µg/kg	1600	3900	1400000	270000	S4UL
Isopropylbenzene	µg/kg	11000	12000	-	1400000	EIC/AGS/CL:AIRE
Bromobenzene	µg/kg	870	910	-	97000	EIC/AGS/CL:AIRE
n-Propylbenzene	µg/kg	34000	40000	-	4100000	EIC/AGS/CL:AIRE
2-Chlorotoluene	µg/kg	-	-	-	-	-
4-Chlorotoluene	µg/kg	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	-	-	-	-	-
tert-Butylbenzene	µg/kg	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	350	410	-	42000	EIC/AGS/CL:AIRE
sec-Butylbenzene	µg/kg	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	400	440	300000	30000	S4UL
p-Isopropyltoluene	µg/kg	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	23000	24000	90000000	2000000	S4UL
1,4-Dichlorobenzene	µg/kg	61000	61000	17000000	4400000	S4UL
Butylbenzene	µg/kg	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	2600	2600	15000000	220000	S4UL
Hexachlorobutadiene	µg/kg	290	320	25000	31000	S4UL
1,2,3-Trichlorobenzene	µg/kg	1500	1500	1800000	102000	S4UL

Key	
Source Reference	Document
S4UL	Nathanail, CP et al (2015) The LQM/CIEH S4ULs for human health risk assessment.
C4SL	Department for Environment, Food and Rural Affairs (2014) SP1010: Development of category 4 screening levels for assessment of land affected by contamination – policy companion document.
EIC/AGS/CL:AIRE	Environmental Industries Commission, The Association of Geotechnical and Geoenvironmental Specialists and Contaminated Land: Applications in Real Environments (2009) The EIC/AGS/CL:AIRE soil generic assessment criteria for human health risk assessment.

Notes:

The above GAC are for guidance only when assessing risk to human health receptors for specific development scenarios.

The absence of GAC for a substance does not necessarily imply there is no risk.

Some substances may be known by alternative names.

GAC given for organic compounds are based on the assumption of 1% soil organic matter.

Abbreviations:

GAC	Generic Assessment Criteria
wHP	With homegrown produce
woHP	Without homegrown produce
POS	Public open space

Water Quality Standards

Contaminant of Concern	Units	EQS	Source	DWS	Source
General Inorganics					
Total Cyanide	µg/l	1	GUK 22	50	WSR 18
Sulphate	mg/l	400	GUK 22	250	WSR 18
Chloride	mg/l	250	GUK 22	250	WSR 18
Ammonium as NH ₄	µg/l	-	-	500	WSR 18
Heavy Metals					
Arsenic	µg/l	50	GUK 22	10	WSR 18
Boron	µg/l	2,000	GUK 22	1,000	WSR 18
Cadmium	µg/l	0.08	GUK 22	5	WSR 18
Chromium (hexavalent)	µg/l	3.4	GUK 22	5.4	US EPA RfD
Chromium	µg/l	4.7	GUK 22	50	WSR 18
Copper	µg/l	1	GUK 22	2,000	WSR 18
Lead	µg/l	1.2	GUK 22	10	WSR 18
Mercury	µg/l	0.07	GUK 22	1	WSR 18
Nickel	µg/l	4	GUK 22	20	WSR 18
Selenium	µg/l	-	-	10	WSR 18
Zinc	µg/l	10.9	GUK 22	5000	US EPA
Polycyclic Aromatic Hydrocarbons					
Naphthalene	µg/l	2	GUK 22	0.1	DWI 17
Acenaphthylene	µg/l	-	-	0.1	DWI 17
Acenaphthene	µg/l	-	-	0.1	DWI 17
Fluorene	µg/l	-	-	0.1	DWI 17
Phenanthrene	µg/l	-	-	0.1	DWI 17
Anthracene	µg/l	0.1	GUK 22	0.1	DWI 17
Fluoranthene	µg/l	0.0063	GUK 22	0.1	DWI 17
Pyrene	µg/l	-	-	0.01	DWI 17
Benzo(a)anthracene	µg/l	-	-	0.1	DWI 17
Chrysene	µg/l	-	-	0.1	DWI 17
Benzo(b)fluoranthene	µg/l	0.00017	GUK 22	0.1	DWI 17
Benzo(k)fluoranthene	µg/l	0.00017	GUK 22	0.1	DWI 17
Benzo(a)pyrene	µg/l	0.00017	GUK 22	0.1	DWI 17
Indeno(1,2,3-cd) pyrene	µg/l	0.00017	GUK 22	0.1	DWI 17
Dibenz(a,h)anthracene	µg/l	-	-	0.1	DWI 17
Benzo(ghi)perylene	µg/l	0.00017	GUK 22	0.1	DWI 17
Total EPA-16 PAHs	µg/l	-	-	0.1	DWI 17
Monoaromatics					
Benzene	µg/l	10	GUK 22	10	PHG 17
Toluene	µg/l	74	GUK 22	700	PHG 17
Ethylbenzene	µg/l	20	EQS R&D	300	PHG 17
p & m-xylene	µg/l	30	GUK 22	500	PHG 17
o-xylene	µg/l	30	GUK 22	500	PHG 17
MTBE (Methyl Tertiary Butyl Ether)	µg/l	-	-	-	-
Petroleum Hydrocarbons (Aliphatic)					
TPH-CWG – Aliphatic >EC5 – EC6	µg/l	-	-	15000	PHG 17
TPH-CWG – Aliphatic >EC6 – EC 8	µg/l	-	-	15000	PHG 17

Water Quality Standards

TPH-CWG – Aliphatic >EC8 – EC10	µg/l	-	-	300	PHG 17
TPH-CWG – Aliphatic >EC10 – EC12	µg/l	-	-	300	PHG 17
TPH-CWG – Aliphatic >EC12 – EC16	µg/l	-	-	300	PHG 17
TPH-CWG – Aliphatic >EC16 – EC21	µg/l	-	-	300	PHG 17
TPH-CWG – Aliphatic >EC21 – EC35	µg/l	-	-	300	PHG 17
Petroleum Hydrocarbons (Aromatic)					
TPH-CWG – Aromatic >EC5 – EC7	µg/l	-	-	10	PHG 17
TPH-CWG – Aromatic >EC7 – EC8	µg/l	-	-	700	PHG 17
TPH-CWG – Aromatic >EC8 – EC10	µg/l	-	-	300	PHG 17
TPH-CWG – Aromatic >EC10 – EC12	µg/l	-	-	90	PHG 17
TPH-CWG – Aromatic >EC12 – EC16	µg/l	-	-	90	PHG 17
TPH-CWG – Aromatic >EC16 – EC21	µg/l	-	-	90	PHG 17
TPH-CWG – Aromatic >EC21 – EC35	µg/l	-	-	90	PHG 17
Volatile Organic Compounds					
Chloromethane	µg/l	-	-	-	-
Chloroethane	µg/l	-	-	-	-
Bromomethane	µg/l	-	-	-	-
Vinyl Chloride	µg/l	0.375	WFD 15	0.5 (0.3)	WSR 18 (WHO 22)
Trichlorofluoromethane	µg/l	-	-	-	-
1,1-Dichloroethene	µg/l	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	-	-	-	-
Cis-1,2-dichloroethene	µg/l	-	-	50	WHO 22
MTBE (Methyl Tertiary Butyl Ether)	µg/l	-	-	-	-
1,1-Dichloroethane	µg/l	-	-	-	-
2,2-Dichloropropane	µg/l	-	-	-	-
Trichloromethane	µg/l	2.5	GUK 22	100 (300)	WSR 18 (WHO 22)
1,1,1-Trichloroethane	µg/l	100	GUK 22	-	-
1,2-Dichloroethane	µg/l	10	GUK 22	3 (30)	WSR 18 (WHO 22)
1,1-Dichloropropene	µg/l	-	-	-	-
Trans-1,2-dichloroethene	µg/l	-	-	50	WHO 22
Tetrachloromethane	µg/l	12	GUK 22	-	-
1,2-Dichloropropane	µg/l	-	-	-	-
Trichloroethene	µg/l	10	GUK 22	10 (8)	WSR 18 (WHO 22)
Dibromomethane	µg/l	-	-	-	-
Bromodichloromethane	µg/l	-	-	100	WSR 18
Cis-1,3-dichloropropene	µg/l	-	-	-	-
Trans-1,3-dichloropropene	µg/l	-	-	-	-
1,1,2-Trichloroethane	µg/l	400	GUK 22	-	-
1,3-Dichloropropane	µg/l	-	-	-	-
Dibromochloromethane	µg/l	-	-	100	WSR 18
Tetrachloroethene	µg/l	10	GUK 22	100	WHO 22
1,2-Dibromoethane	µg/l	-	-	0.4	WHO 22
Chlorobenzene	µg/l	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/l	-	-	-	-
Styrene	µg/l	50	GUK 22	20	WHO 22
Tribromomethane	µg/l	-	-	100	WSR 18
1,1,2,2-Tetrachloroethane	µg/l	-	-	-	-

Water Quality Standards

Isopropylbenzene	µg/l	-	-	-	-
Bromobenzene	µg/l	-	-	-	-
n-Propylbenzene	µg/l	-	-	-	-
2-Chlorotoluene	µg/l	-	-	-	-
4-Chlorotoluene	µg/l	-	-	-	-
1,3,5-Trimethylbenzene	µg/l	-	-	-	-
tert-Butylbenzene	µg/l	-	-	-	-
1,2,4-Trimethylbenzene	µg/l	-	-	-	-
sec-Butylbenzene	µg/l	-	-	-	-
1,3-Dichlorobenzene	µg/l	-	-	-	-
p-Isopropyltoluene	µg/l	-	-	-	-
1,2-Dichlorobenzene	µg/l	20	GUK 22	1000	WHO 22
1,4-Dichlorobenzene	µg/l	20	GUK 22	300	WHO 22
Butylbenzene	µg/l	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/l	-	-	1	WHO 22
1,2,4-Trichlorobenzene	µg/l	0.4	GUK 22	-	-
Hexachlorobutadiene	µg/l	-	-	0.6	WHO 22
1,2,3-Trichlorobenzene	µg/l	0.4	GUK 22	-	-
Semi-volatile Organic Compounds					
Aniline	µg/l	-	-	-	-
Phenol	µg/l	7.7	GUK 22	-	-
2-Chlorophenol	µg/l	50	GUK 22	-	-
Bis(2-chloroethyl)ether	µg/l	-	-	-	-
1,3-Dichlorobenzene	µg/l	-	-	-	-
Bis(2-chloroisopropyl)ether	µg/l	-	-	-	-
2-Methylphenol	µg/l	-	-	-	-
Hexachloroethane	µg/l	-	-	-	-
Nitrobenzene	µg/l	-	-	-	-
4-Methylphenol	µg/l	-	-	-	-
Isophorone	µg/l	-	-	-	-
2-Nitrophenol	µg/l	-	-	-	-
2,4-Dimethylphenol	µg/l	-	-	-	-
Bis(2-chloroethoxy)methane	µg/l	-	-	-	-
2,4-Dichlorophenol	µg/l	4.2	GUK 22	-	-
4-Chloroaniline	µg/l	-	-	-	-
Hexachlorobutadiene	µg/l	-	-	0.6	WHO 22
4-Chloro-3-methylphenol	µg/l	-	-	-	-
2,4,6-Trichlorophenol	µg/l	-	-	200	WHO 22
2,4,5-Trichlorophenol	µg/l	-	-	-	-
2-Methylnaphthalene	µg/l	-	-	-	-
2-Chloronaphthalene	µg/l	-	-	-	-
Dimethylphthalate	µg/l	800	GUK 22	-	-
2,6-Dinitrotoluene	µg/l	-	-	-	-
2,4-Dinitrotoluene	µg/l	-	-	-	-
Dibenzofuran	µg/l	-	-	-	-
4-Chlorophenyl phenyl ether	µg/l	-	-	-	-
Diethyl phthalate	µg/l	200	GUK 22	-	-

Water Quality Standards

4-Nitroaniline	µg/l	-	-	-	-
Azobenzene	µg/l	-	-	-	-
Bromophenyl phenyl ether	µg/l	-	-	-	-
Hexachlorobenzene	µg/l	-	-	-	-
Carbazole	µg/l	-	-	-	-
Dibutyl phthalate	µg/l	8	GUK 22	-	-
Anthraquinone	µg/l	-	-	-	-
Butyl benzyl phthalate	µg/l	-	-	-	-

Key	
Source Reference	Document
PHG 17	Petroleum Hydrocarbons in Groundwater (CL:AIRE, 2017, ISBN 978-1-905046-31-7).
DWI 17	DEFRA, Drinking Water Inspectorate, 2017.
WFD 15	The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.
WSR 18	The Water Supply (Water Quality) Regulations 2018 (Statutory Instrument 2018 No. 647).
EQS R&D	Proposed Environmental Quality Standards for Ethylbenzene in Water R&D Technical Report P2-115/TR4 (Annual Average) 2002.
GUK 22	Gov.UK February 2022. Surface water pollution risk assessment for your environmental permit. (www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit).
WHO 22	World Health Organisation Guidelines for drinking water quality: fourth edition incorporating the first and second addenda 2022.
US EPA RfD	US EPA Reference Dose, presented in the Drinking Water Inspectorate 2015.
US EPA	US EPA Secondary Drinking Water Standards.

Notes:

The above GAC are for guidance only when assessing risk to groundwater and surface water receptors.

The absence of GAC for a substance does not necessarily imply there is no risk.

Some substances may be known by alternative names.

EQS referenced are annual average concentrations for inland (freshwater) surface waters.

Alternative EQS are available for assessing risk to estuarine or marine water environments.

The EQS for cadmium is based on hardness band 40mg to less than 50mg CaCO₃/l.

Abbreviations:

EQS	Environmental Quality Standards
DWS	UK Drinking Water Standards
GAC	Generic Assessment Criteria

Generic Assessment Criteria for Assessing Vapour Risk to Human Health from Volatile Contaminants in Groundwater

Contaminant of Concern	Units	SoBRA Generic Assessment Criteria (µg/l)	
		Residential	Commercial
Polycyclic Aromatic Hydrocarbons			
Naphthalene	µg/l	220	23000
Acenaphthylene	µg/l	170000	15000000
Acenaphthene	µg/l	220000	20000000
Fluorene	µg/l	-	-
Phenanthrene	µg/l	-	-
Anthracene	µg/l	-	-
Fluoranthene	µg/l	210000	18000000
Pyrene	µg/l	-	-
Benzo(a)anthracene	µg/l	-	-
Chrysene	µg/l	-	-
Benzo(b)fluoranthene	µg/l	0.00017	-
Benzo(k)fluoranthene	µg/l	0.00017	-
Benzo(a)pyrene	µg/l	0.00017	-
Indeno(1,2,3-cd) pyrene	µg/l	-	-
Dibenz(a,h)anthracene	µg/l	0.00017	-
Benzo(ghi)perylene	µg/l	0.00017	-
Monoaromatics			
Benzene	µg/l	210	20000
Toluene	µg/l	230000	230000
Ethylbenzene	µg/l	10000	960000
p & m-xylene	µg/l	9500	94000
o-xylene	µg/l	12000	1100000
MTBE (Methyl Tertiary Butyl Ether)	µg/l	83000	7800000
Petroleum Hydrocarbons (Aliphatic)			
TPH-CWG – Aliphatic >EC5 – EC6	µg/l	1900	190000
TPH-CWG – Aliphatic >EC6 – EC 8	µg/l	1500	150000
TPH-CWG – Aliphatic >EC8 – EC10	µg/l	57	5700
TPH-CWG – Aliphatic >EC10 – EC12	µg/l	37	3600
TPH-CWG – Aliphatic >EC12 – EC16	µg/l	-	-
TPH-CWG – Aliphatic >EC16 – EC21	µg/l	-	-
TPH-CWG – Aliphatic >EC21 – EC35	µg/l	-	-
Petroleum Hydrocarbons (Aromatic)			
TPH-CWG – Aromatic >EC5 – EC7	µg/l	210000	20000000
TPH-CWG – Aromatic >EC7 – EC8	µg/l	220000	21000000
TPH-CWG – Aromatic >EC8 – EC10	µg/l	1900	190000
TPH-CWG – Aromatic >EC10 – EC12	µg/l	6800	660000
TPH-CWG – Aromatic >EC12 – EC16	µg/l	39000	3700000
TPH-CWG – Aromatic >EC16 – EC21	µg/l	-	-
TPH-CWG – Aromatic >EC21 – EC35	µg/l	-	-
Volatile Organic Compounds			
1,1-Dichloroethene	µg/l	160	16000
MTBE (Methyl Tertiary Butyl Ether)	µg/l	83000	7800000
1,1-Dichloroethane	µg/l	2700	260000

Generic Assessment Criteria for Assessing Vapour Risk to Human Health from Volatile Contaminants in Groundwater

1,1,1-Trichloroethane	µg/l	3000	290000
1,2-Dichloroethane	µg/l	8.9	850
Benzene	µg/l	210	20000
1,2-Dichloropropane	µg/l	22	2600
Toluene	µg/l	230000	21000000
1,1,2-Trichloroethane	µg/l	520	49000
1,1,1,2-Tetrachloroethane	µg/l	240	22000
Ethylbenzene	µg/l	10000	960000
p & m-Xylene	µg/l	9500	94000
Styrene	µg/l	8800	810000
o-Xylene	µg/l	12000	1100000
1,1,2,2-Tetrachloroethane	µg/l	1600	150000
Isopropylbenzene	µg/l	850	86000
n-Propylbenzene	µg/l	2700	240000
1,2,4-Trimethylbenzene	µg/l	24	2200
1,2-Dichlorobenzene	µg/l	2000	220000
1,2,4-Trichlorobenzene	µg/l	68	7200
1,2,3-Trichlorobenzene	µg/l	35	3100

Key	
Source Reference	Document
SoBRA	Society of Brownfield Risk Assessment, Development of Generic Assessment Criteria for Assessing Vapour Risk to Human Health from Volatile Contaminants in Groundwater, 2017

Notes:

The above GAC are for guidance only when assessing risk to human health from volatile contaminants in groundwater.

The absence of GAC for a substance does not necessarily imply there is no risk.

Some substances may be known by alternative names.

Abbreviations:

GAC	Generic Assessment Criteria
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