



Knowsley Redevelopments Ltd

Former Contract Chemicals Ltd, Knowsley

Site Investigation Interpretative Report —

January 2022

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Contains Google data.

Report Title	Contract Chemicals, Knowsley Site Investigation Interpretative Report	Site Address	Former Contract Chemicals Ltd, Penrhyn Road, Knowsley Business Park, Knowsley, L34 9HY
Author	G&J Geoenvironmental Consultants Ltd	Contamination / Geotechnical	Contamination & Geotechnical
Work Stage	Site Investigation	Report Date	January 2022
Brief Description of the Report Contents	Report assessing the development constraints with the site with particular reference to the historical land uses and ground conditions. A site investigation was undertaken between 15th and 18 th November 2021, to evaluate the chemical and geotechnical properties of the underlying Made Ground and natural strata, with subsequent groundwater and gas monitoring. Provides preliminary recommendations for the site development.		

Document Control

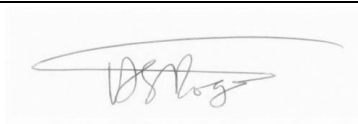
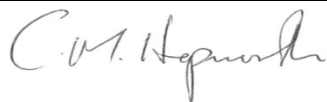
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Contents Page

1.0	Introduction	1
1.1	Instruction.....	1
1.2	Project Team	1
1.3	Report Format	1
1.4	Terms and Conditions.....	2
2.0	Site Setting	5
2.1	Site Location and Layout.....	5
2.2	Site Description.....	5
2.3	Desk Study	6
2.4	Proposed Development.....	0
2.5	Previous Ground Investigations	0
3.0	Ground Investigation	6
3.1	General	6
3.2	Scope of Investigation Works	6
3.3	Sub-Contractors Details	8
3.4	Laboratory Testing	9
4.0	Ground Conditions and Geotechnical Properties.....	10
4.1	Introduction.....	10
4.2	Made Ground.....	11
4.3	Glacial Till.....	16
4.4	Chester Formation.....	18
4.5	Sulphate and pH	20
4.6	Summary of Geotechnical Parameters	23
4.7	Groundwater Observations.....	23
4.8	Visual and Olfactory Evidence of Contamination	25
4.9	Soil Chemistry.....	26
4.10	Groundwater Chemistry	28
4.11	Ground Gases	29
5.0	Engineering Design Recommendations.....	31

5.1	Site Preparation	31
5.2	Foundations.....	32
5.3	Floor Slabs.....	33
5.4	Road Pavement.....	34
5.5	Drainage	35
6.0	Generic Quantitative Assessment – Human Health.....	36
6.1	Methodology and Relevant Assessment Criteria.....	36
6.2	Assessment Criteria	36
6.3	Characterisation and Assessment.....	37
6.4	Asbestos.....	39
7.0	Generic Quantitative Assessment – Controlled Waters.....	40
7.1	Methodology.....	40
7.2	Water Quality Standards	40
8.0	Generic Quantitative Assessment – Ground Gas Risks	45
8.1	Background	45
8.2	Assessment Criteria	46
8.3	Characterisation	47
9.0	Conclusions and Recommendations.....	49
9.1	Further Investigation	49
9.2	Geotechnical Recommendations	49
9.3	Contamination Risk Assessment.....	50
10.0	References.....	53

APPENDIX CONTENTS

Appendix A – Previous Exploratory Hole Logs

Appendix B – Exploratory Hole Logs

Appendix C – Investigation Photos

Appendix D – Gas and Groundwater Monitoring Records

Appendix E – Soil and Groundwater Chemical Analysis Certificates

Appendix F – Geotechnical Analysis Certificates

1.0 Introduction

1.1 Instruction

G&J Geoenvironmental Consultants Ltd (G&J) was commissioned by Knowsley Redevelopments Ltd to carry out a ground investigation at the former Contract Chemicals Ltd site in Knowsley, Merseyside. The investigation is required to support the redevelopment of the site, for a commercial end-use.

The objectives of this investigation are to assess the ground conditions in order to provide development options for the site by assessing the geotechnical and environmental risks.

The design of the ground investigation has been informed by the layout of the site, the ground conditions, the investigation objectives and available information from past studies.

1.2 Project Team

The key members of the project are listed below in Table 1.1.

Table 1.1 Project Team

Role	Organisation	Contact	Position
Client	Knowsley Redevelopments Ltd	Jim Kelly	Managing Director
Geoenvironmental Consultant	G&J	Chris Hepworth	Managing Director
Planning Consultants / Quantity Surveyors	Trinity Property Consultants	Andrew Wilson	Director

1.3 Report Format

This report is presented as follows:

Section 2 presents the site information and results of the initial desk-based research;

Section 3 presents details of the ground investigation, including the scope of the ground investigation and the scheduled analysis;

Section 4 of the report presents a factual summary of the ground conditions encountered including geology, the presence of visual or olfactory evidence of contamination, ground gas observations and a summary of the factual chemical and geotechnical results, with an assessment of the characteristic values of the geotechnical parameters;

Section 5 presents an assessment of the engineering design recommendations;

Sections 6, 7 and 8 of the report present the findings of a generic quantitative assessment in respect to risks to human health and controlled waters from land contamination, and from ground gases;

Section 9 of the report presents geo-environmental conclusions and recommendations; and

Section 10 presents a list of references used in the preparation of this report.

1.4 Terms and Conditions

This report has been prepared for Knowsley Redevelopments Ltd in consideration of the proposed commercial end use of the site. Much of the geo-environmental information relates to the site in its present state and should not be used in a different context without reference to G&J.

This report details the findings of work carried out between 15th – 18th November 2021, and monitoring visits undertaken on 6th, 16th, 23rd and 29th December 2021, and 6th and 14th January 2022. The report has been prepared by G&J on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, all potential environmental constraints or liabilities associated with the site may not have been revealed.

The report has been prepared for the exclusive benefit of Knowsley Redevelopments Ltd and those parties designated by them for the purpose of providing geo-environmental and geotechnical recommendations for the site. The report contents should only be used in that context. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

G&J has used reasonable skill, care and diligence in the design of the investigation of the site. Information provided by third parties has been used in good faith and is taken at face value; however, G&J cannot guarantee its accuracy or completeness. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths at the time of the investigation. At intermediate locations, conditions can only be inferred.

1.5 Policy Context – Land Contamination

The primary legal and policy mechanisms for managing contaminated land are Part IIA of the Environmental Protection Act 1990 and the National Planning Policy Framework.

Part IIA provides a statutory definition of Contaminated Land and supporting guidance which defines how to decide whether or not land meets this definition. For land to be determined as contaminated land, the onus is on demonstrating with sufficient certainty that land is in such condition, by reasons of substances in, on or under the ground that;

- a) Significant harm is being caused or there is a significant possibility of such harm being caused; or
- b) Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.

Significant harm and how to determine if a significant possibility of such harm exists is defined in the statutory guidance which accompanies Part IIA. The guidance also defines four categories of land with respect to the risks to human health and the water environment and how the degree of risk relates to the statutory definition of contaminated land, as summarised in the following figure:

Figure 1.1 Part IIA Categories

Land Category	Human Health	Water	
1	Unacceptably high probability that Significant Harm would occur if no action taken	Strong case that a Significant Possibility of Significant Pollution exists	Part IIA Contaminated Land
2	The risks are sufficient that a Significant Possibility of Significant Harm exists	Of sufficient concern to present a Significant Possibility of Significant Pollution	
3	Not low risk but does not pose a Significant Possibility of Significant Harm	The risks are not sufficient to constitute Significant Possibility of Significant Pollution	Not Part IIA Contaminated Land
4	Low risk to human health and no possibility of meeting the statutory definition	No/low risk to controlled waters and would not meet the statutory definition	



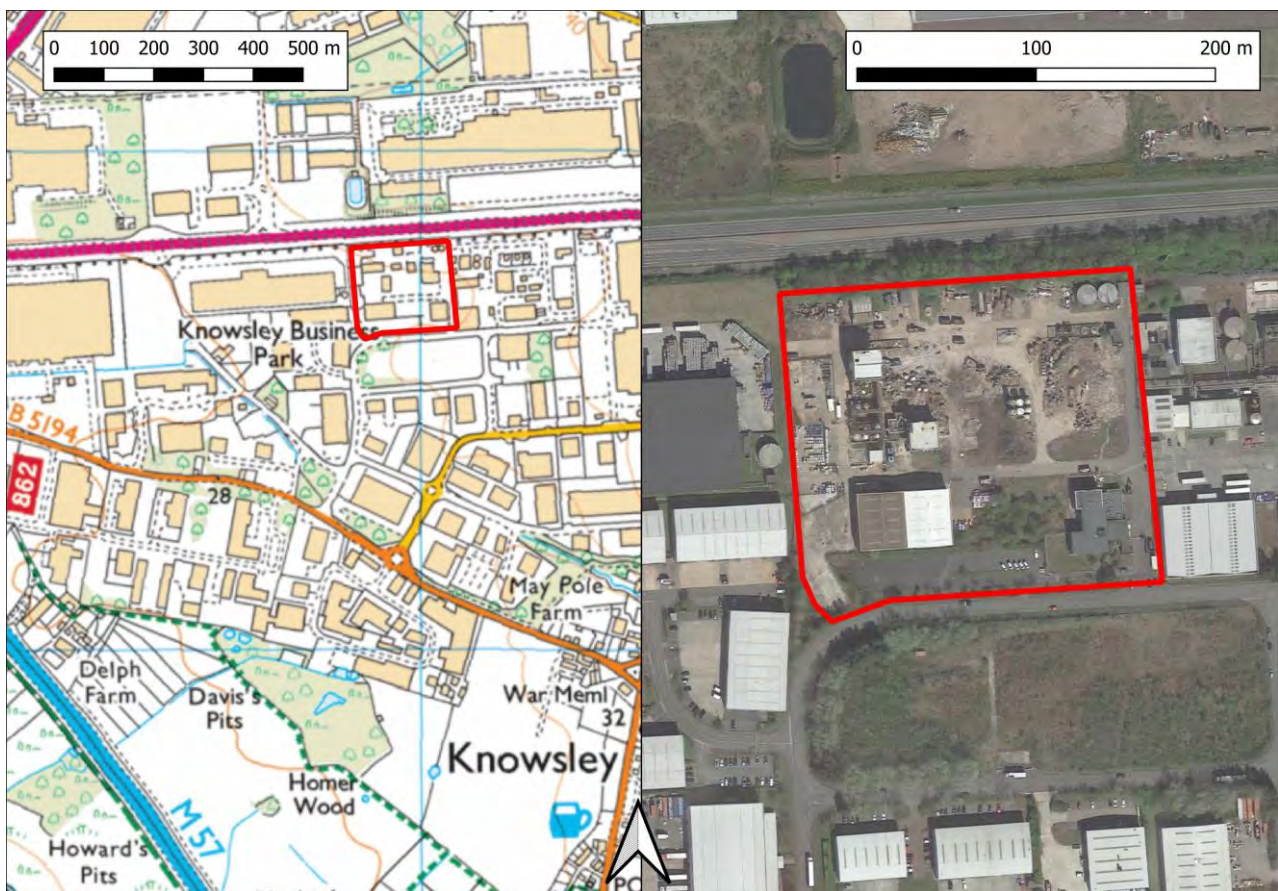
In terms of planning policy, a precautionary approach is adopted whereby it is necessary to demonstrate with sufficient confidence that the site cannot meet the statutory definition of contaminated land. Although the above categorisation is not explicitly applicable to planning decisions, a site classed as Category 4 should be considered suitable for development in accordance with planning policy. While a Category 3 site could be considered suitable, the reduced level of confidence associated with such a site means this is less likely.

2.0 Site Setting

2.1 Site Location and Layout

The site is located off Penrhyn Road, Knowsley, approximately 1km east of Junction 4 of the M57 motorway. The site is approximately centred on National Grid Reference 342970, 396725; the site location and current layout are shown in Figure 2.1.

Figure 2.1 Site Location and Layout



Contains OS and Google data.

2.2 Site Description

The site covers an area of approximately 3.5ha and is approximately rectangular in shape. Prior to recent demolition and clearance works the central and eastern portions of the site comprised disused chemical processing plants and tank farms, with warehousing and storage in the west and office space and car parking in the south. The details of the former layout and specific features is presented in G&J's previous desk study (see Section 2.3, below). At the time of the site works the only structures remaining on site

were the warehouse in the south-west, which was undergoing demolition, and part of the previous office block in the south east, which was being used as a site office. The northern two-thirds of the site had been cleared and comprised bare soil, with two stockpiles of crushed demolition rubble. In the southern third of the site, as well as the previously mentioned structures, limited areas of hardstanding remained together with an overground area of landscaping and a pond.

The site slopes very gently down to the south, with ground levels of approximately 32mAOD in the north and 30mAOD in the south, a gradient of approximately 1 in 90.

To the immediate north of site is the embanked A580 'East Lancashire Road' with the Brintonwood Trading Estate beyond. The southern boundary is formed by Penrhyn Road, with an area of rough ground beyond. To the west of the site is a distribution warehouse where a number of businesses operate. To the east is a chemical works operated by Algal Omega 3 Ltd, including an electricity sub-station.

2.3 Desk Study

A Phase I Interpretative Desk Study was carried out by G&J in February 2021, as referenced below;

- '*Former Contract Chemical Ltd, Knowsley – Interpretative Desk Study*', G&J Geoenvironmental Consultants Ltd, Report Ref: GJ224-DTS-V1, February 2021.

The principal findings of the Desk Study were as follows;

2.3.1 Geology and Hydrogeology

The site is anticipated to be underlain by Devensian Till in the north and the Shirdley Hill Sand Formation in the south, and then a bedrock consisting of the sandstone of the Chester Formation. A surficial layer of Made Ground is anticipated due to the past uses and development of the site;

The Shirdley Hill Sand Formation is classed as Secondary (A) Aquifer by the Environment Agency (EA), and the Devensian Till deposits as a Secondary (undifferentiated) Aquifer. The underlying Chester Formation is classed as Principal Aquifer. The site is within Zone 3 (total catchment) of a Groundwater Source Protection Zone. The closest groundwater abstraction is approximately 500m to the west of site where water is taken for evaporative cooling. Potable water is taken approximately 980m to the east of site from a number of boreholes.

2.3.2 Hydrology

The nearest watercourse is Knowsley Brook. Historical maps show this running east to west across the site; however, it now flows in a culvert, which plans show to run beneath the western margin of the site. Anecdotal evidence suggests it flows beneath the northern and western edges of the site.

2.3.3 Site History

The site was largely undeveloped agricultural land/rough ground until around 1980, when development of the current site commenced, including the culverting of Knowsley Brook. Since then the site has seen some development between 1988 and 2003, the most significant being the construction of the Bonner building in 1997.

Anecdotal evidence suggests that during the Second World War period the site was occupied by Nissan Hut accommodation for workers at the Royal Ordnance Factory Kirby, which was located to the north of the A580.

2.3.4 Potential Contamination Sources

The site history as a chemical works and the wide variety of chemicals and processes used during its operation have resulted in several potential contamination sources. The most prominent of these being the main processing areas such as the Surfactant Hall, Bonner building, Diol Plant, Technical Development Centre (TDC) and adjacent tank farms. In addition, other sources such as fuel tanks, electricity substations, IBCs and smaller chemical containers were identified during the site walkover.

The potential for contamination originating off-site to have significantly affected the site is comparatively low, although another chemical works is present adjacent to the east.

Table 2.1 presents a summary of the main potential sources and the primary contaminants of concern. Figure 2.2 shows the locations of these identified sources.

Table 2.1 Summary of Main Potential Contaminant Sources

Source	Potential Contaminants
Surfactant Hall and Tank Farm (S1)	• Sodium cyanate • Sodium thiocyanate • Hydrochloric Acid • Acetic Acid
Technical Development Centre (TDC) (S2)	• Various organic and inorganic contaminants
Bonner Building and Tank Farm (S3)	• Bromine • Butyric acid • Hydrochloric acid • Ethanol
Diol Plant and Tank Farm (S4)	• Dimethyl amine (1, 2) propane diol • Hydrochloric Acid • Sodium Hydroxide
Warehouse & Bunded Hardstanding (west) (S5)	• Hydrochloric acid wastes • Hydrobromine acid wastes • Sulphur Dioxide absorber waste • Alkaline wastes • Solvent wastes • Diol wastes • Ammonium Sulphate wastes
Equipment Store (S6)	• Hydrocarbons • Inorganics
Substations (S7)	• Hydrocarbons (including PCBS)
Pump House (S8)	• Biocides • Bromgard 420 (zinc based water hardness treatment)
Fuel Tanks (S9)	• Fuel Oils • Petroleum Hydrocarbons
Valve House (S10)	• Gas Condensates
Workshops (S11)	• Petroleum Hydrocarbons
General Contaminants associated with the buildings and Made Ground (S12)	• Metals • PAHs • Asbestos

The site plan shows a complex of buildings and storage areas. Key features include:

- Buildings:** EQUIPMENT STORE, BOILER HOUSE, MAINT. STORE, COOLING TOWERS, WATER STORAGE, TANKS, DIOL PLANT, WORKSHOPS, DIOL SWITCH ROOM, DRYER HOUSE, BONNER BUILDING U4000, T.D.C. U1000, LABS, ENGINEERING OFFICES, SURFACTANT HALL U2000, OFFICE BLOCK, GATE HOUSE, WAREHOUSE, FLAMMABLE STORE, and COOLED STORAGE.
- Tanks and Storage:** Bunded Hardstanding, Bunded Area, Tank Farm, Tanks, Fuel Oil Tank, and various storage tanks.
- Infrastructure:** Chimney, Pond, and a Weighbridge.
- Safety Zones:** Yellow shaded areas labeled S1 through S11, indicating specific safety or operational zones.

It is proposed to redevelop the site for commercial use. The currently proposed development layout is shown in Figure 2.3, below.

[illegible]

The desk study included a review of a number of previous ground investigations that were undertaken at the site between 1993 and 2012. The findings are described in the reports referenced below;

- *'Preliminary Contaminated Site Investigation Contract Chemicals Ltd, Knowsley'*, Cremer & Warner Ltd, Report ref: C397/1, April 1993.
- *'Integrated Pollution Prevention and Control, Pre-Authorisation Desk Study of Contract Chemicals Ltd'*, AIG Consultants Ltd, Report ref: UK99/A1421, July 1999.

- 'Contract Chemicals Ltd, Trade Effluent Overspill Sampling, Final Interpretive Report', Entec UK Limited, Report ref: 11002il, January 2011.
- 'Bromododecane Spillage Investigation, Contract Chemicals Site, Knowsley', AMEC Environment & Infrastructure UK Limite, Report ref: 32144, September 2012

In addition, five boreholes were drilled in 2021, primarily to allow the sampling of groundwater and provide information in support of the surrender of an environmental permit.

The following sections provides a brief overview of each intrusive investigation, including a summary of the geotechnical and environmental testing undertaken. A plan showing the locations of selected previous exploratory holes and investigation areas is provided in Figure 2.4, below.

Figure 2.4 Selected previous exploratory holes



2.5.1 BGS-held Boreholes 1969

The BGS holds borehole logs for three locations within the site, and for one on or very close to the site's south-western boundary. These boreholes were drilled in 1969, prior to the construction of the chemical works, as part of an investigation for the overall industrial estate.

The borehole in the north-western part of the site encountered a firm to stiff 'Boulder Clay' to a depth of 2.74m (beneath 0.3m of topsoil), overlying a 'stiff red marl with bands of shaley fine sandstone' to a depth of 5.18m, and then a 'red sandstone'. Similar strata were encountered in the north-east the site, but with a horizon of sand and gravel beneath the topsoil, to a depth of 0.74m.

In the south-east of the site the topsoil was underlain by a slightly gravelly sand to 2.44mbgl, and then the 'hard red sandy marl' with sandstone bands. In the south-western part of the site the near surface granular layer was thinner (to 0.76mbgl, and was a sand and gravel), and was underlain by a 'compact red coarse silt', considered to be weathered marl. A 'fine red shaley sandstone' was present below 1.68m depth.

The logs for these boreholes are provided in Appendix A.

2.5.2 Cremer & Warner 1993

Cremer & Warner were commissioned by Contract Chemicals to undertake a site investigation to assess ground contamination conditions on the western boundary of the current site and the eastern boundary of the adjacent distribution warehouse.

The intrusive investigation was designed on a grid pattern resembling four rows with two trial pit locations on each row, with a total of eight trial pits excavated to a maximum depth of 0.8mbgl. Additionally two boreholes were sunk to a maximum depth of 3.5mbgl, both of which were installed with gas/groundwater monitoring equipment.

Nine sub-surface soil samples were taken and then combined into four composite samples reflecting the four rows as mentioned above. Results indicated that soil contamination was greatest in the samples within the Contract Chemicals site, however, lower amounts were also detected in samples from the adjacent warehouse site. Contamination comprised organic compounds, the most prevalent being benzene compounds, naphthalene, benzophenone, diamines and an unknown brominate.

The results suggested that contaminated surface run-off was migrating from the Contract Chemicals site into the distribution warehouse site.

2.5.3 Sub Soils Surveys 1997 (information taken from Appendices of AIG 1999 Report)

The investigation carried out by Sub Soils in 1997 comprised 3 boreholes to between 9.1mbgl and 12.1mbgl located in the proposed footprint of the Bonner Building.

These boreholes revealed between 1.1m and 2.6m of Made Ground (gravelly clay) overlying the medium dense, locally gravelly sand of the Shirdley Hill Sand Formation which had a thickness of up to 1.8m. This was underlain by very stiff, locally firm, reddish brown very sandy, slightly gravelly clay (Glacial Till), and then reddish brown sandstone and mudstone; rockhead varied in depth from 6.6mbgl to 10.9mbgl, indicating significant local variation. Standing groundwater levels of between 5.7mbgl and 6.3mbgl were reported.

The very stiff Glacial Tills were found to have undrained shear strengths of between 189kPa and 572kPa. A test carried out on the underlying mudstone gave an undrained shear strength of 418kPa, whilst SPTs carried out in the 'rock' strata gave N-values ranging from 123 (for 300mm penetration) to between 50 and 106 blows for 225mm penetration or less.

Although the investigation was primarily geotechnical in nature, chemical testing showed chemical concentrations were below the lowest 'threshold trigger values' presented by the Interdepartmental Committee on the Redevelopment of Contamination Land (ICRCL).

The logs for these boreholes are provided in Appendix A.

2.5.4 CCL Investigation 1997 (information taken from Appendices of AIG 1999 Report)

CCL also undertook a series of investigations in the footprint of the Bonner building and the Flammable Store where 7 shallow soil samples were taken. In both locations the CCL investigation considered the soils to have only limited amounts of contamination when compared to the ICRCL threshold values.

2.5.5 Entec 2010

Entec UK Ltd undertook a site investigation in 2010 in response to an overspill from a trade effluent outflow within the Contract Chemicals site to the distribution warehouse to the west. The scope of the works comprised five hand dug pits excavated to a maximum depth of 0.8mbgl. Four of the pits were dug in areas directly impacted by the spill and one outside used as a 'control' sample. Two samples were taken from each pit and tested for a chemical suite comprising SVOCs, VOCs, alcohols, pH, metals, TPH-CWG and water soluble sulphate.

The results of the investigation found that there was slightly elevated organic contamination in samples from the spill area, however none of these exceeded Generic Assessment Criteria (GACs) for a commercial land use.

It was considered that the impact to soils in the affected area was not considerable and therefore residual contamination was not a hazard to human health.

2.5.6 AMEC 2012

AMEC were commissioned by Contract Chemicals in 2012 to undertake a site investigation after a spillage of 1-bromododecane from an IBC. The spill occurred on the western boundary of the Contract Chemicals site and was observed to have flowed into the adjacent distribution warehouse. The scope of the works comprised four dynamic boreholes advanced to a maximum depth of 2.3mbgl and six hand dug pits excavated to a maximum depth of 0.7mbgl. Two of the boreholes were installed with gas/groundwater monitoring equipment.

A total of 16 samples were taken during the investigation and were subsequently tested for SVOCs. The samples obtained during the 2012 investigation were compared to adjacent samples from the 2010 investigation, particularly for bromododecane concentrations. The 2012 results identified significantly greater concentrations of bromododecane in shallow soils suggesting the contamination was directly linked to the 2012 spill rather than the 2010 trade effluent outflow spillage. Data collected from subsequent groundwater monitoring indicated that the impact on groundwater quality was limited.

2.5.7 GRM 2021

GRM were commissioned by Portway Remediation to drill five boreholes to provide information to support the surrender of an environmental permit.

These boreholes (GRM BH01 to BH05 shown in Figure 2.4) encountered between 0.7m and 1.8m of Made Ground, overlying what were reported to be 'Glacial Deposits', including sand, gravelly sand, sandy clay, and gravelly clay; it is anticipated that some of this material actually represents the weathered Chester Formation bedrock strata. Rock strata (sandstone) was encountered in the two boreholes close to the site's southern boundary at depths of 2.4mbgl and 3.5mbgl.

The chemical testing of the soils that was undertaken as part of this investigation did not reveal concentrations in excess of the relevant GACs for a commercial end-use, although a concentration of 800ug/kg of 1,3-dichlorobenzene was noted in a sample from 0.6mbgl in BH2 (see Figure 2.4); no significant contamination was recorded in the groundwater, although no sample was retrieved from BH2.



The logs for these boreholes are provided in Appendix A.

3.0 Ground Investigation

3.1 General

A ground investigation was undertaken across the site, under the direction of G&J. The principle objective of the investigation was to determine the geotechnical and geo-environmental properties of the Made Ground and confirm the depth and nature of the underlying natural deposits.

3.2 Scope of Investigation Works

The intrusive ground investigation was undertaken between 15nd and 18th November 2021, and monitoring visits were undertaken on 6th, 16th, 23rd and 29th December 2021, and 6th and 14th January 2022.

The investigation was undertaken in general accordance with Eurocode 7 (EC7) Part 2 (BS EN 1992-2: 2007) and, where there is no conflict, also with BS 5930: 2015. Soil logging has been undertaken in accordance with the relevant European Standards, listed in the references for this report. G&J had responsibility for setting out exploratory holes and also for determining the in-situ testing and sampling regime, and for scheduling appropriate analysis based on the proposed scope.

The works comprised the following key elements:

- Clearance of positions for services and surveying of locations to National Grid and Ordnance Datum;
- Excavation of 14no trial pits to a maximum depth of 2.2mbgl;
- Drilling of 11no. window sample boreholes to a maximum depth of 3.45mbgl;
- Drilling of 5no. cable percussion boreholes to a maximum depth of 7.95m;
- In-situ Standard Penetration Tests in each borehole;
- Retrieval of representative disturbed soil samples from each borehole and trial pit;
- Installation of monitoring standpipes in 11no. borehole locations;
- 6 return visits to monitor gas and groundwater levels, and to sample groundwater on one occasion;
- Chemical and geotechnical laboratory analysis of selected soil and groundwater samples;

The exploratory hole locations were determined to target the main potential source areas described in Section 2.3.4, and to provide a good overall coverage of the site. However, the locations were also significantly influenced by site constraints including underground services (most notably the culverted stream the runs beneath the north of the site), remaining structures, stockpiles, standing water and ground conditions. The exploratory hole locations are shown in Figure 3.1, below, and Appendix B.

Figure 3.1 Exploratory hole locations



Exploratory hole locations were cleared and marked out prior to the investigation.

Standard Penetration Tests were generally carried out in the cable percussion and window sample boreholes at 1.0m intervals. The results of these tests are given as a Standard Penetration "N" value or as a blow count for a given penetration at the appropriate position on the borehole logs presented in Appendix B.

Representative small disturbed and bulk samples of materials encountered were obtained and these were placed in appropriate containers for transport to a UKAS/MCERTS accredited environmental or geotechnical laboratory.

The encountered soils were described by an experienced geo-environmental engineer. A detailed description of all strata encountered, groundwater conditions and the position and type of samples taken are included on the borehole logs presented in Appendix B, together with a larger scale location plan than that provided above.

Monitoring standpipes were installed in eleven of the borehole locations (BH101, BH103, BH104, BH105, WS101, WS102, WS106, WS107, WS108, WS109, and WS110), in order to allow subsequent monitoring of gas and groundwater levels, and the sampling of groundwater. Standpipes were located to provide representative coverage across the site.

Investigation photographs are presented in Appendix C.

Gas and groundwater monitoring has been undertaken on 6th, 16th, 23rd and 29th December 2021, and 6th and 14th January 2022. Monitoring visits comprised the measurement of concentrations of methane, oxygen, carbon dioxide, carbon monoxide, hydrogen sulphide, relative and atmospheric pressure, gas flow rate and groundwater level. Gas and groundwater monitoring records are presented in Appendix D.

3.3 Sub-Contractors Details

Table 3.1 below presents details of the contractors used during the ground investigation.

Table 3.1 Ground investigation Contractor Details

Ground Investigation Activity	Contractor	Contact Details
Window Sampling and Cable Percussion Drilling	DMW Drilling Ltd	58, Parkway, Westhaughton, Bolton, BL5 2RY
Trial Pitting (JCB-3CX)	Boundary Plant Ltd	Hammond Road, Knowsley Industrial Park, Liverpool, L33 7U
Chemical laboratory analysis	DETS Ltd	Unit 1, Rose Lane Industrial Estate, Rose Lane, Lenham Heath, Kent, ME17 2JN
Geotechnical laboratory analysis	i2 Analytical	i2 Analytical Ltd, 7 Woodshots Meadow, Croxley Green Business Park, Watford, WD18 8YS

3.4 Laboratory Testing

Table 3.2 presents details of the chemical and geotechnical testing undertaken. Chemical test certificates are provided in Appendix E, and geotechnical test certificates in Appendix F.

Table 3.2 Laboratory Analysis Summary

Analysis	Total No. Samples
Soil Chemical Analysis	
Heavy Metals	33
pH	
SOM	
PAH EPA 16	
TPH CWG (inc BTEX/MTBE)	
Asbestos ID and Screen	
Cyanide	
Phenols	
Thiocyanate	
Sulphur	
W/S Sulphate	
VOC + TICs, SVOC + TICs	22
PCBs	3
Groundwater Chemical Analysis	
Heavy Metals	10
pH	
PAH EPA 16	
TPH CWG (inc BTEX/MTBE)	
Cyanide, Sulphate, Phenols	
Soil Geotechnical Analysis	
Atterberg Limits & Moisture Content	13
Particle Size Distribution by wet sieve	10
OMC/MDD 2.5kg rammer	5
Remoulded CBR	5
Water soluble sulphate & pH	6
Quick Undrained Triaxial (shear strength)	3

4.0 Ground Conditions and Geotechnical Properties

4.1 Introduction

The cable percussion boreholes, window sample boreholes and trial pits were advanced to maximum depths of 7.95mbgl, 3.44mbgl and 2.2mbgl, respectively.

A description of the ground conditions encountered beneath the site is summarised below in Table 4.1. Exploratory hole logs are provided in Appendix B. The geotechnical laboratory test results are provided in Appendix F and contamination testing is included in Appendix E. Exploratory hole locations are shown in Figure 3.1, and in Appendix B.

Table 4.1 Strata Encountered

Stratum Location/Description	Depth to Top (mbgl)	Thickness (m)	SPT N Value
MADE GROUND Predominantly red-brown CLAY with varying components of sand and gravel, commonly including fragments of brick, concrete and sandstone and less frequent plastic, wood etc. Some more granular layers of clayey, gravelly SAND at various locations Loose, light grey sandy GRAVEL of limestone and sandstone recorded in TP111, TP112, TP113, WS107 and WS111, commonly in thin near surface bands.	GL	0.4 to 3.0	0 to 22 (typically 6 to 12)
GLACIAL TILL Generally firm to stiff, reddish brown, sandy, gravelly CLAY. The gravel is commonly fine to medium, subangular to rounded including quartzite, sandstone and mudstone. Loose to medium dense, reddish brown SAND present as thin horizons within the above.	0.4 to 3.00	0.3 to >4.75	8 to >50 (cohesive)

Stratum Location/Description	Depth to Top (mbgl)	Thickness (m)	SPT N Value
CHESTER FORMATION Commonly loose to very dense, reddish brown SAND with varying clay and gravel components. Also present as firm to very stiff, reddish brown CLAY with varying sand and gravel components. Quickly becomes weak SANDSTONE / MUDSTONE at shallow depth (occasionally present directly beneath the Glacial Till)	0.40 to 6.50	>0.45 to >1.75	13 to >50 (typically >50)

4.2 Made Ground

Made Ground was encountered throughout the site to depths of between 0.4m and 3.0mbgl, but typically between 1.0m and 2.0mbgl.

Although previous areas of hardstanding have been removed across most of the site, limited areas of tarmac or concrete hardstanding, underlain by hardcore, were locally still present (e.g. TP111 and around the remaining warehouse structure).

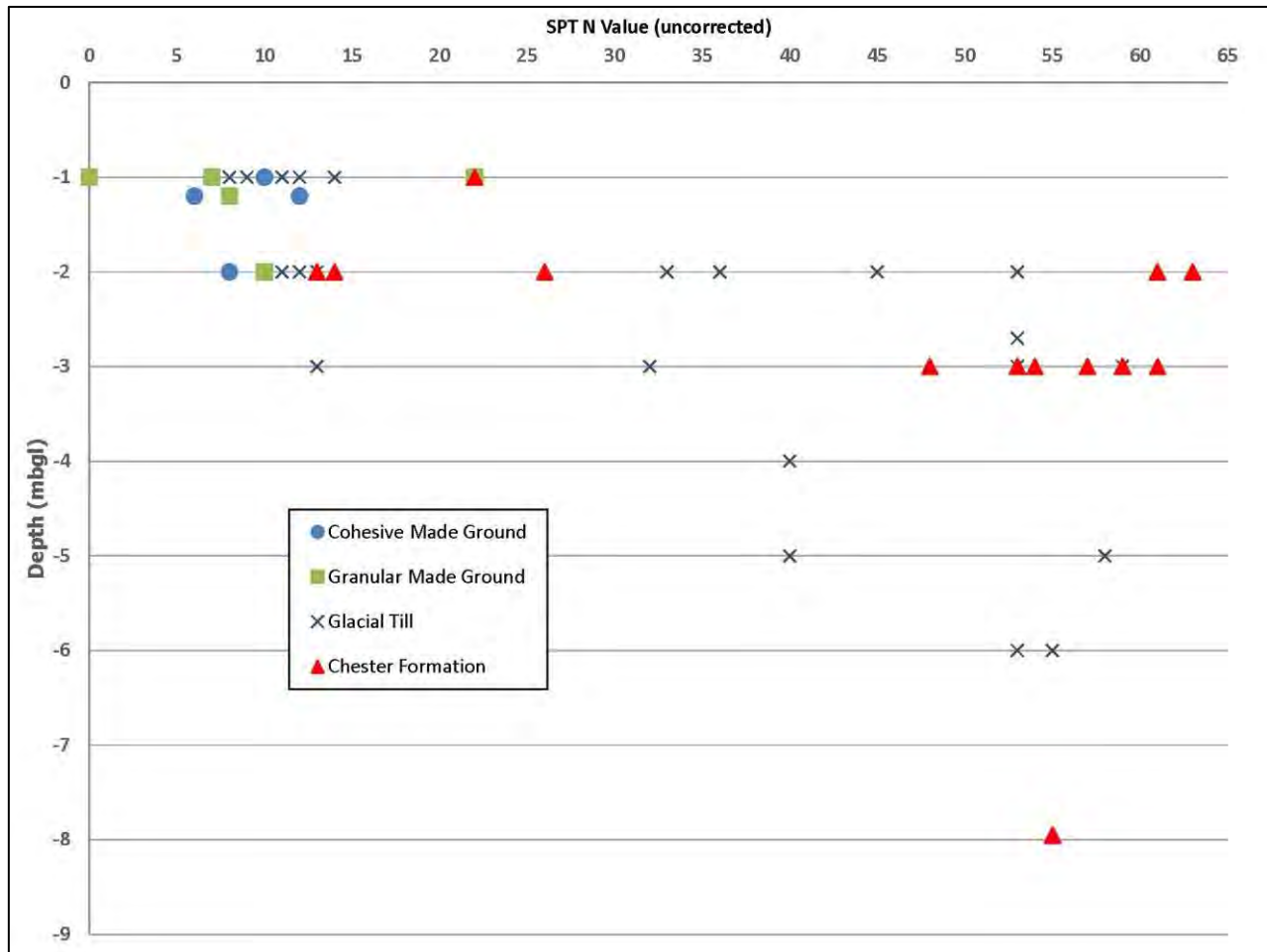
The observed Made Ground typically comprised reworked natural soils (Glacial Till and Chester Formation), with entrained man-made materials such as brick and concrete fragments. These materials were predominantly cohesive (e.g. sandy to very sandy, gravelly to very gravelly clay) but granular (e.g. slightly clayey, gravelly sand) horizons were also present. Cobble-sized brick and concrete fragments were present locally. These materials were typically reddish brown in colour, but were also locally dark grey, dark brown or black.

Other observed Made Ground materials included light grey sandy gravel of limestone and sandstone (in exploratory holes TP111, TP112, TP113, WS07 and WS111, where it provided a sub-base for hardstanding), and in WS106 only, a black clayey sand.

4.2.1 Strength

The uncorrected SPT N values in the Made Ground at depths of between 1m and 2mbgl predominantly range from 6 to 12, although N values of 0 (zero) and 22 were recorded. Plot 4.1 summarises these results.

Figure 4.1 Plot of uncorrected SPT N values against Depth (All strata).



Seven of the tests were undertaken on cohesive material, with N values typically ranging from 6 to 12; using the Stroud and Butler (1975) relationship with an f_1 of 5 for low plasticity soils, this range of typical N values suggests undrained shear strengths of 30 to 60kPa, indicating a range from low to medium strength in descriptive terms.

The uncorrected SPT N values in the five tests in granular Made Ground do not suggest a general increase with depth, probably attesting to their relatively recent and un-engineered placement, and localised 'surging' of the ground to remove substructures during the demolition works. Relative densities are typically loose, in descriptive terms, with materials locally being very loose or medium dense.

Based on the above information, a weight density of between 15kN/m³ and 18kN/m³ can be expected for the cohesive Made Ground (Figure 1, BS8004:2015), in its current state, and between 15kN/m³ and 17kN/m³ for the granular Made Ground.

At this stage, it is clear that the material has not been placed to an engineering specification and it is not a suitable formation in its present condition.

4.2.2 Particle Size Distribution

Particle size distribution analysis (PSD) was undertaken on seven samples of the Made Ground. The analysis is summarised in Table 4.2 below:

Table 4.2 Summary of PSD Analysis on Made Ground

Location	Depth (m)	% passing 63µm	% sand	% gravel	Uniformity Coefficient		SHW Class
TP105	1.5-1.6	50	45	4	>1.7	Sandy slightly gravelly CLAY	2A/2B
TP108	0.2-0.3	47	47	6	>2	Sandy slightly gravelly CLAY	2A/2B
TP109	1.2-1.3	20	51	29	>5.4	Very gravelly very clayey SAND	2C
BH101	0.0-0.5	31	48	21	>4	Very gravelly very clayey SAND	2C
BH102	0.5-1.0	27	55	18	>4.1	Very clayey gravelly SAND	2A/2B
BH104	0.5-1.0	28	37	34	>12	Very clayey SAND & GRAVEL	2C
BH105	0.5-1.0	26	37	37	>20	Very clayey SAND & GRAVEL	2C
Min	0.2	20	37	4	-	-	-
Max	5.0	50	51	37	-	-	-
Average (granular)	N/A	26.4	45.6	27.8	N/A	Very clayey very gravelly SAND	2C
Average (cohesive)	N/A	48.5	46.0	5.0	N/A	Sandy slightly gravelly CLAY	2A/2B

The analysis suggests that the cohesive Made Ground material is a sandy, slightly gravelly clay, and falls into SHW Classes 2A or 2B (wet or dry cohesive material). The 'granular' materials were determined to be very clayey, very gravelly sand, or very clayey sand and gravel; these materials comply with an SHW Class 2C (stony cohesive material).

4.2.3 Compaction

Three samples of the cohesive Made Ground material (from TP105, TP109 and TP110), and one of the granular material (BH102), underwent moisture content/dry density relationship testing using a 2.5kg

rammer in accordance with BS1377-4 1990. This enables the Optimum Moisture Content (OMC) and Maximum Dry Density (MDD) to be established.

The results of the compaction tests are summarised in Table 4.3 below.

Table 4.3 Summary of Compaction Testing on the Glaciofluvial Deposits

Location	Depth (m)	MC as received (%)	MDD (Mg/m ³)	OMC (%)
TP105	0.7-0.8	14	1.94	11
TP109	0.4-0.5	19	1.82	14
TP110	0.5-0.6	13	1.97	12
BH102	0.5-1.0	15	2.03	9.5
Min	0.4	13	1.82	9.5
Max	1.0	19	2.03	14
Average (cohesive)	N/A	15.3	1.91	12.3

The results show that the cohesive materials are variable with respect to MDD, but with little variation in the OMC (within 2% of the mean average OMC of 12.3%); the granular sample (very clayey sand) had an OMC of 9.5%.

The received moisture content of the granular sample was significantly wetter (5.5%) than its OMC value; the cohesive samples were also generally significantly wetter (1% to 5%) than their OMC values.

4.2.4 Atterberg Limits

Atterberg Limits testing was carried out on five samples of Made Ground, as summarised in Table 4.4, below. These samples were determined to be low plasticity clays, with a low volume change potential or non-shrinkable.

Based on the equation given in BS8002:2015 (section 4.3.1.4.8 page 19), these soils will have effective angles of shearing resistance of approximately 28° to 29°.

Based on these results it is considered that, in their present state, the cohesive Made Ground soils will fall into SHW Class 2A (wet cohesive material) for the purpose of earthworks.

Table 4.4 Summary of Atterberg Limits Testing on Made Ground

Location	Depth (m)	MC as received (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Corrected Plasticity Index
TP108	0.2-0.3	14	24	13	11	9.9
TP110	0.5-0.6	14	29	15	14	12.3
TP112	0.5-0.6	13	28	16	12	11.3
WS108	1.0-1.1	13	26	14	12	9.6
WS109	1.6-1.7	18	30	17	13	12.2
Min	N/A	13	24	13	11	9.6
Max	N/A	18	30	17	14	12.3
Average	N/A	14.4	27.7	15.0	12.4	11.1

4.2.5 CBR

Remoulded CBR testing was carried out on three samples of the cohesive Made Ground material (including two on which compaction testing, above, was also undertaken), and on one of the granular material. The CBR testing was undertaken with the sample at its 'as received moisture content', following compaction with a 2.5kg rammer; this was done to assess CBR values likely to be achievable following future earthworks with the material in its current state. The results are summarised in Table 4.5, below.

From the test results it appears that CBR values of less than 2% should be anticipated for much of the cohesive Made Ground material when compacted with its current moisture contents, and CBR values of greater than 5% are unlikely to be achieved without significant drying (potentially requiring the addition of lime or cement).

The granular material that was tested (from TP107), was observed to be very wet when sampled and had a 'as received moisture content' of 15%; it is suggested that a moisture content of 10% or possibly less would be required for optimum compaction. This material would require significant drying prior to use in earthworks if acceptable CBR values are to be achieved.

Table 4.5 Summary of CBR Testing on the Made Ground

Sample Location	Depth (m)	Test MC (%)	CBR (%)
TP105	0.7-0.8	14	3.1 & 4.0
TP107	0.4-0.5	15	0.4 & 0.5
TP109	0.4-0.5	18 & 19	1.6 & 2.2
BH105	0.5-1.0	15 & 14	1.1 & 1.6
Min	0.4	14	0.4
Max	1.0	19	4.0

4.3 Glacial Till

All five of the cable-percussion boreholes, four of the trial pits and nine of the window samples boreholes encountered deposits considered to be Glacial Till, at depths of between 0.4m (TP102) and 3.0mbgl (BH101). These deposits were predominantly cohesive, although thin granular horizons were present locally within them.

The cohesive deposits were typically firm to stiff (but locally soft to firm or very stiff), reddish brown (locally mottled grey), sandy to very sandy, slightly gravelly to gravelly clay; the gravel included quartzite, sandstone and mudstone.

The thin horizons of granular material were loose to medium dense, reddish brown sand.

It is considered possible that, due to their similarity, some of the materials described as Glacial Till are in fact weathered Chester Formation strata (Section 4.4, below).

4.3.1 Strength

The uncorrected SPT N values in the observed cohesive deposits ranged from 8 to 14 at 1m depth (4 tests), 11 to >50 at 2m depth (7 tests), 13 to >50 at 3m depth (5 tests), 40 at 4m depth (2 tests), and >50 at 5m and 6mbgl (1 test at each depth). The variation in SPT N values with depth in the Glacial Tills is shown in Figure 4.1, above. Using the Stroud and Butler (1975) relationship with an f_1 of 5 for low plasticity soils, these ranges of N values suggest undrained shear strengths of 40 to 70kPa at 1mbegl, 55 to >250kPa at 2mbegl, 65 to >250kPa at 3mbegl, 200kPa at 4mbegl, and >250kPa at 5mbegl. These strengths indicate the presence of clays of medium strength at 1m depth, to medium to very high strength at 2m and 3m depth, and very high strength deeper than 4m depth.

Three 'undisturbed' U100 samples of the Glacial Till underwent unconsolidated, undrained triaxial compression (quick undrained) testing, to determine the materials undrained shear strength. The results are summarised in Table 4.6, below.

Table 4.6 Summary of quick undrained triaxial tests on the Glacial Till

Location	Depth (m)	Moisture Content (%)	Bulk Density (Mg / m ³)	Dry Density (Mg / m ³)	Undrained Shear Strength (kPa)
BH101	4.0-4.45	9.8	2.26	2.06	404
BH102	2.0-2.45	14	2.19	1.92	153
BH103	2.0-2.45	10	2.28	2.07	142

Based on the above information, a weight density of between 16kN/m³ and 20kN/m³ can be expected for the cohesive glacial deposits (Figure 1, BS8004:2015).

4.3.2 Particle Size Distribution

Two particle size distribution analyses (PSD) were undertaken on the Glacial Till material; the analyses are summarised in Table 4.7 below:

Table 4.7 Summary of PSD Analysis on the Glacial Till

Location	Depth (m)	% passing 63µm	% sand	% gravel	Uniformity Coefficient		SHW Class
TP101	1.2-1.3	67	30	3	-	Slightly gravelly slightly sandy CLAY	2A/2B
TP102	1.4-1.5	50	41	9	>1.9	Slightly gravelly sandy CLAY	2A/2B
Average	N/A	58.5	35.5	6.0	N/A	Slightly gravelly sandy CLAY	2A/2B

The analysis suggests that the cohesive Glacial Till material is a slightly gravelly, slightly sandy to sandy clay; they comply with SHW Class 2A or 2B, wet or dry cohesive material.

4.3.3 Atterberg Limits

Atterberg Limits testing was carried out on seven samples of cohesive Glacial Till material, as summarised in Table 4.8, below. These samples were predominantly determined to be low to medium plasticity clays, and of a low volume change potential. Following correction, taking into account the <425µm fraction, four of the seven samples were found to be non-shrinkable (modified PI of <10).

Based on these results it is considered that, in their present state, the cohesive Glacial Till soils will fall into SHW Class 2A (wet cohesive material) for the purpose of earthworks.

Based on the equation given in BS8002:2015 (section 4.3.1.4.8 page 19), these soils will have effective angles of shearing resistance of approximately 26° to 30°.

Table 4.8 Summary of Atterberg Limits Testing on the Glacial Till

Location	Depth (m)	MC as received (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Corrected Plasticity Index (%)
WS101	0.8-0.9	17	38	18	20	17.6
WS103	2.3-2.4	7.9	23	12	11	9.1
WS105	1.3-1.4	18	27	16	11	9.7
WS106	1.7-1.8	15	23	13	10	8.6
WS107	1.4-1.5	18	37	18	19	19
WS111	2.3-2.4	12	23	13	10	8.1
BH101	4.5	9.3	26	13	13	11.3
Min	0.8	7.9	23	12	10	17.6
Max	4.5	18	38	18	20	8.1
Average	N/A	14.3	29.1	15.1	14.0	13.3

4.3.4 CBR

Remoulded CBR testing was carried out on one sample of Glacial Till material (TP101) that was determined by grading analysis (above) to be a slightly gravelly slightly sandy clay (Class 2A/2B). The CBR testing was undertaken with the sample at its 'as received moisture content', following compaction with a 2.5kg rammer. The results are summarised in Table 4.9.

Table 4.9 Summary of CBR Testing on the Glaciofluvial Deposits

Location	Depth (m)	Test MC (%)	CBR (%)
TP101	1.2-1.3	18	2.1

From the limited test results it appears that CBR values of 2% may be achievable for the cohesive Glacial Till material when compacted with its current moisture contents; however, to achieve greater CBR values (and to achieve satisfactory levels of compaction) some drying is likely to be required.

4.4 Chester Formation

Four of the cable-percussion boreholes, seven of the trial pits and seven of the window samples boreholes encountered strata considered to represent the Chester Formation, at depths of between 0.4m (WS110) and 6.5mbegl (BH101). Both sandstone and mudstone were encountered, with the weathered strata being both granular and cohesive.

Sandstone strata encountered were typically reddish brown, but locally yellowish brown, thinly bedded and locally slightly to very clayey. The mudstone strata (WS107) were thinly laminated.

The granular weathered Chester Formation strata were reddish brown, locally light brown, locally slightly clayey to very clayey, slightly gravelly to very gravelly sand; the gravel comprised sandstone lithorelicts.

The cohesive weathered Chester Formation strata were typically firm to stiff, reddish brown locally yellowish brown, slightly sandy to very sandy, slightly gravelly to gravelly clay; the gravel comprised sandstone and mudstone lithorelicts.

4.4.1 Strength

The variation in SPT N values with depth in the Chester Formation material is shown in Figure 4.1, above.

The limited SPT N values in the observed cohesive weathered strata were 14 at 2m depth and 50 blows for 280mm penetration (N approximates to 73) at 2.7m depth.

Using the Stroud and Butler (1975) relationship with an f_1 of 5 for low plasticity soils, the ranges of N values for the cohesive weathered material suggest undrained shear strengths of 70kPa at 2mbegl and >250kPa at 2.7mbegl. These strengths indicate the presence of clays of medium strength at 2m depth, and very high strength at 2.7m.

The limited SPT N values in the granular weathered strata were 22 at 1m depth (1 test), 13 and 50 for 240mm penetration (N approximates to 63) at 2m, and 50 for 275mm penetration (N approximates to 65) at 7.95mbgl. Based on these results the relative densities of the granular weathered material are typically medium dense at 1m depth, medium dense to very dense at 2m depth, and very dense at 7.95m depth.

SPT N values in the materials described as sandstone or mudstone rock typically exceed 50, with a range of 50 blows for 285mm penetration (N approximates to 53) to 60 blows for 245mm penetration (N approximates to 73). Using a simple correlation of UCS of 5 times N value, approximate strengths of 0.26 to 0.36MPa has been assessed for the upper level of the Chester Formation. Site observations suggested that the rock strengths ranged from extremely weak to weak.

Based on the above information, a weight density of between 18kN/m^3 and 21kN/m^3 can be expected for the weathered Chester Formation soils (Figure 1, BS8004:2015).

4.4.2 Particle Size Distribution

Particle size distribution analysis (PSD) was undertaken on one sample of the cohesive weathered Chester Formation material; the analyses are summarised in Table 4.10 below:

Table 4.10 Summary of PSD Analysis on the weathered Chester Formation

Location	Depth (m)	% passing 63µm	% sand	% gravel	Uniformity Coefficient		SHW Class
TP106	1.8-1.9	34	54	13	>3.2	Slightly gravelly sandy CLAY	2A/2B

The analysis suggests that the cohesive weathered Chester Formation material is a slightly gravelly, sandy clay which complies with SHW Class 2A or 2B, wet or dry cohesive material.

4.4.3 Compaction

One sample of the cohesive weathered Chester Formation material (TP107) underwent moisture content/dry density relationship testing using a 2.5kg rammer in accordance with BS1377-4 1990. This testing reveals an OMC value of 10%, and an MDD value of 2.06%; the slightly elevated 'as received moisture content' was 12%.

4.4.4 Atterberg Limits

Atterberg Limits testing was carried out on one sample of cohesive weathered Chester Formation material (TP105 at 1.5m to 1.6m depth). This sample was determined to be a low plasticity clay, and of a low volume change potential.

Based on these limited results it is considered that, in their present state, the cohesive weathered Chester Formation material will be fall into SHW Class 2A (wet cohesive material) for the purpose of earthworks.

Based on the equation given in BS8002:2015 (section 4.3.1.4.8 page 19), these soils will have effective angles of shearing resistance of approximately 27°.

4.5 Sulphate and pH

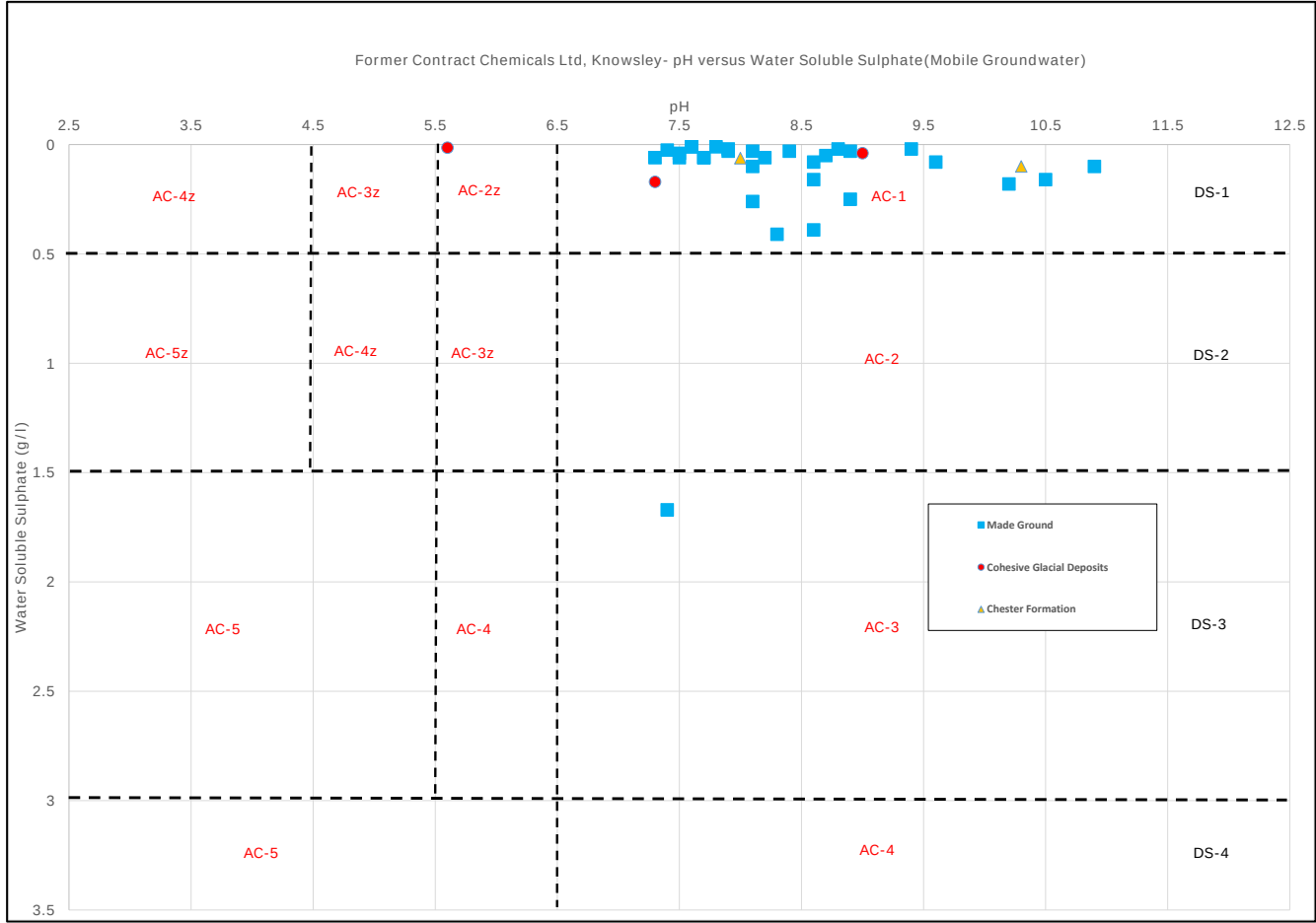
Representative samples of the Made Ground and natural strata were tested for water soluble sulphates and pH. Figure 4.2 summarises the results of the testing. The full results are included in Appendix F. Figure 4.2 shows an overall range of water soluble SO₄ between 0.01g/l to 1.67g/l and a pH ranging from 5.6 to 10.9. It is clear from the plot that most samples fall into the DS-1 and AC-1 area, with one sample of Made Ground material having a higher water soluble sulphate content, and one sample of the Glacial Till material having a lower pH; looking at the results for the site as a whole it is clear that these two results are anomalous. However, following the guidance in BRE Special Digest 1:2005, characteristic values have been determined for the site by taking the mean of the highest 20% of the water soluble sulphate results and

the lowest 20% of the pH results, giving values of 0.68g/l and 6.9, respectively. On the basis of mobile groundwater, the site as a whole can be categorised with a design sulphate value for subsurface concrete of DS-2 and an ACEC class of AC-2.

The results of the groundwater analysis (Appendix E) revealed sulphate contents ranging from 13mg/l to 273mg/l, and pH values between 6.9 and 12.3. These results suggest a design sulphate value for subsurface concrete of DS-1 and an ACEC class of AC-1; in agreement with many of the soil samples.

It is suggested that a design sulphate value for subsurface concrete of DS-2 and an ACEC class of AC-2 be adopted for this site.

Figure 4.2 pH against Sulphate (All Strata)



4.6 Summary of Geotechnical Parameters

Table 4.11 provides a summary of characteristic values of geotechnical parameters. For the Made Ground the values are for the material in its present state. It is considered that by appropriate ground engineering measures the material can be improved.

Table 4.11 Summary of Geotechnical Parameters

Geotechnical Parameter	Characteristic Values			
	Made Ground	Glacial Till	Weathered Chester Formation	Chester Formation (rock)
PSD (SHW Table 6/2)	2A/2B & 2C	2A/2B	2A/2B & 1A/1B	n/a
Plasticity Index (%)	11	14	17*	n/a
Angle of internal shearing resistance, ϕ' (°)	28*	27	27 (cohesive)* >30 (granular)*	n/a
Undrained Shear Strength (Cu)	35*	40@1m, 75@2m, 125@3m, 200@4m.	70@2m, >250@3m	n/a
UCS (MPa)	n/a	n/a	n/a	0.3
Weight Density (Mg/m ³)	16*	18	19	21*
CBR (%)	<2*	2	n/a	n/a
DS / ACEC	DS-2, AC-2	DS-1, AC-2z	DS-1/AC-1	DS-1/AC-1*
SHW Classification	2A & 2C	2A	2A & 1A/1B	n/a
OMC (%)	12 (cohesive) 10 (granular)	14*	12 (cohesive)*	n/a

*Assessed on limited or no test data; n/a - not applicable.

4.7 Groundwater Observations

Groundwater flow or seepages were observed in exploratory holes BH101, BH104, TP102, TP106, TP107, TP108, TP109, TP110, TP112, TP113, WS101, and WS106; however, the exploratory techniques used may have masked small water seepages in other boreholes. Where observed, groundwater was predominantly associated with the lower part of the Made Ground, although locally groundwater was encountered in the underlying natural deposits, cohesive and granular. It was typically struck, where present, at depths

shallower than 2mbegl; the exception being the strike at 4.5mgl in borehole BH101, in natural strata, and at 2.2mbegl in borehole BH104 at the base of the Made Ground.

Six groundwater monitoring visits were undertaken after the ground investigation. Monitoring was undertaken from the eleven standpipes installed by G&J (BH101, BH103, BH104, BH105, WS101, WS102, WS106, WS107, WS108, WS109 and WS110), plus one of the pre-existing GRM boreholes (GRM BH04). Table 4.12, below summarises the groundwater monitoring data.

Table 4.12 Summary of Groundwater Monitoring Results

Location	Depth of standpipe base (m)	Depth to Groundwater (mbgl)		Groundwater Level (mAOD)	
		Minimum	Maximum	Highest	Lowest
BH101	8.38	2.32	-	27.51	-
BH103	6.30	1.29	1.85	28.33	27.77
BH104	3.02	0.29	0.70	28.79	28.38
BH105	3.10	0.44	0.95	29.59	29.08
WS101	3.46	0.28	1.07	29.15	28.36
WS102	2.56	0.44	1.88	30.25	28.81
WS106	2.04	0.62	1.35	27.39	26.66
WS107	3.55	0.33	2.00	28.43	26.76
WS108	3.10	2.79	-	26.67	-
WS109	3.21	1.30	2.18	28.80	27.92
WS110	2.08	0.77	1.58	29.94	29.13
GRM-BH04	2.99	1.22	2.40	27.51	-

N/A = Ground levels of boreholes not known.

The standing water levels appear to be associated with the Made Ground (i.e. BH101, BH103, BH104, BH105, WS106, WS109 and WS110), natural cohesive deposits (i.e. WS101, WS102 and WS107), or natural granular deposits (i.e. WS108 and WS110). Where the data suggests that standing groundwater levels are

within the natural cohesive deposits; it seems more likely that in these cases groundwater has collected in the installations following minor ingress from overlying Made Ground or thin natural granular horizons.

4.8 Visual and Olfactory Evidence of Contamination

A 'solvent odour' was reported in the Made Ground in exploratory holes WS104, BH104, TP101, TP103 to TP106 inclusive, and TP108. A 'hydrocarbon odour' was reported in the Made Ground in exploratory holes TP106 and TP107. All of these exploratory holes were located in the northern half of the site. . Figure 4.3, below summarises the distribution of these reported odours.

Figure 4.3 Evidence of Contamination



4.9 Soil Chemistry

Table 4.13 presents a summary of the results of chemical analyses undertaken on soil samples from the site. The table presents the highest, 2nd highest and lowest concentrations for each contaminant (where appropriate), as an indication of the spread of results. Substances not recorded above laboratory detection limits are not included in the tables. The significance of these results is discussed in the Risk Assessment in Section 6.

Full soil chemical analytical results are presented in Appendix E.

Table 4.13 Summary of soil analytical results

Substance	No of samples	units	Highest	2 nd Highest	Lowest
Arsenic	29	mg/kg	22	9	<2
Cadmium	23	mg/kg	2.3	0.8	<0.2
Chromium	23	mg/kg	53	40	8
Copper	23	mg/kg	56	38	<4
Lead	23	mg/kg	78	63	<3
Nickel	23	mg/kg	86	37	4
Zinc	23	mg/kg	204	163	14
Total Sulphur	23	%	0.24	0.14	<0.02
Sulphide	23	mg/kg	65	<5	<5
Organic Matter (SOM)	23	%	4.5	3.5	0.4
Total Organic Carbon (TOC)	23	%	2.6	1.7	0.2
pH	23	pH units	10.9	10.5	7.2
EPH (C10-C40)	23	mg/kg	368	331	<6
Naphthalene	23	mg/kg	0.27	0.22	<0.1
Benzo(a)pyrene*	23	mg/kg	3.26	2.09	<0.1
Total PAHs*	23	mg/kg	30.9	15.4	<1.6
Total Aliphatic Hydrocarbons*	26	mg/kg	101	55	<21
Total Aromatic Hydrocarbons*	26	mg/kg	144	127	<21
Benzene	26	µg/kg	17	7	<2
Toluene	26	µg/kg	111	89	<5
Ethylbenzene	26	µg/kg	246	160	<2

Contract Chemicals, Knowsley
Site Investigation Interpretative Report



Substance	No of samples	units	Highest	2 nd Highest	Lowest
p & m-xylene	26	µg/kg	494	305	<2
o-xylene	26	µg/kg	296	71	<2
Asbestos	27	-	Detected in 1 sample		
Dibromomethane	18	µg/kg	52	29	<5
Dibromochloromethane	18	µg/kg	15	<5	<5
Bromoform	18	µg/kg	909	168	<10
Chloroform	18	µg/kg	136	70	<5
Isopropylbenzene	18	µg/kg	14	13	<5
Bromobenzene	18	µg/kg	6	<5	<5
Chlorobenzene	18	µg/kg	100	78	<5
2-Chlorotoluene	18	µg/kg	101	<5	<5
4-Chlorotoluene	18	µg/kg	104	<5	<5
n-Propylbenzene	18	µg/kg	17	11	<5
n-Butylbenzene	18	µg/kg	634	<5	<5
1,2,4-Trimethylbenzene	18	µg/kg	39	11	<5
1,3,5-Trimethylbenzene	18	µg/kg	10	8	<5
1,2-Dichlorobenzene	18	µg/kg	512400	41460	<0.1
p-Cresol	18	µg/kg	0.33	0.29	<0.15
2-Methylnaphthalene	18	µg/kg	0.4	0.4	<0.1
3-Nitroaniline	18	µg/kg	0.2	<0.1	<0.1
Dibenzofuran	18	µg/kg	0.4	<0.1	<0.1
Azobenzene	18	µg/kg	0.5	<0.1	<0.1
1-Bromo-2,4-dichlorobenzene	18	µg/kg	1750	55	<10
1-Bromo-2,3-dichlorobenzene	18	µg/kg	1990	88	<10
Benzene, 1,2-diethyl	18	µg/kg	104	<10	<10
Hexane, 1,6-dibromo-	18	µg/kg	75	<10	<10
Cyclic octaatomic sulfur	18	µg/kg	30.4	2.9	<0.1
1,4-Benzenediamine, N-(1,3-dimethylbutyl)-N'-phenyl-	18	µg/kg	449	<0.1	<0.1

*For full Speciated PAH and TPH bandings see results in Appendix E

4.10 Groundwater Chemistry

Table 4.14 presents a summary of the results of chemical analyses undertaken on groundwater samples from the site. The table presents the highest, 2nd highest and lowest concentrations for each contaminant (where appropriate), as an indication of the spread of results. Substances not recorded above laboratory detection limits are not included in the tables. The significance of these results is discussed in the Risk Assessment in Section 7.

Full soil chemical analytical results are presented in Appendix E.

Table 4.14 Summary of groundwater analytical results

Substance	No of samples	units	Highest	2 nd Highest	Lowest
Arsenic	10	ug/l	63	27	<5
Boron	10	ug/l	387	125	56
Cadmium	10	ug/l	1.8	<0.4	<0.4
Chromium	10	ug/l	40	20	<5
Copper	10	ug/l	160	70	<5
Lead	10	ug/l	197	22	<5
Mercury	10	ug/l	1.14	0.79	<0.05
Nickel	10	ug/l	137	97	<5
Selenium	10	ug/l	21	13	<5
Zinc	10	ug/l	1500	314	12
Total Sulphate as SO ₄	10	mg/l	273	164	13
Cyanide	10	ug/l	215	168	<5
pH	10	pH units	8.4	8.2	8.0
Ammoniacal Nitrogen as NH ₄	10	ug/l	20000	18400	95
Total Organic Carbon	10	mg/l	370	147	12.9
Total Phenols (monohydric)	10	ug/l	694	294	<10
EPH (C10-C40)	10	ug/l	5277	3428	<10
Naphthalene	10	ug/l	1.8	0.15	0.01
Acenaphthylene	10	ug/l	0.01	<0.01	<0.01
Acenaphthene	10	ug/l	0.13	0.05	<0.01
Fluorene	10	ug/l	0.15	0.04	<0.01

Substance	No of samples	units	Highest	2 nd Highest	Lowest
Phenanthrene	10	ug/l	0.05	0.03	<0.01
Fluoranthene	10	ug/l	0.21	0.13	<0.01
Pyrene	10	ug/l	0.14	0.14	<0.01
Chrysene	10	ug/l	0.07	<0.01	<0.01
Benzo(a)pyrene	10	ug/l	0.09	<0.01	<0.01
Total PAHs*	10	ug/l	2.11	0.75	<0.16
Total Aliphatic Hydrocarbons*	10	ug/l	1219	895	<70
Total Aromatic Hydrocarbons*	10	ug/l	3324	1290	<70
Total Petroleum Hydrocarbons (>C5-C35)	10	ug/l	3770	2510	<140
Benzene	10	ug/l	33	<1	<1
Toluene	10	ug/l	582	86	<5
Ethylbenzene	10	ug/l	38	15	<5
p & m-xylene	10	ug/l	127	86	<10
o-xylene	10	ug/l	70	53	<5
Chloroform	10	ug/l	161	<5	<5
Chlorobenzene	10	ug/l	493	229	<5
1,3,5-Trimethylbenzene	10	ug/l	167	<5	<5
1,2-Dichlorobenzene	10	ug/l	8357	8151	<5
Propyl Sulphide	10	ug/l	787	184	<5
1,4-Dichlorobenzene	10	ug/l	1.1	1.0	<0.1
2,4,6-Trichlorophenol	10	ug/l	0.2	<0.1	<0.1
4-Chloroaniline	10	ug/l	1.6	0.7	<0.1

4.11 Ground Gases

A summary of the gas monitoring results is presented in Section 8 of this report. Records from the individual gas monitoring visits are presented in Appendix D. In brief:

- Methane has been detected on at least one visit in boreholes BH101, BH103, BH104, BH105, WS101, WS107, WS108 and WS109; concentrations in excess of 1% were detected in BH103 (3.6 – 14.1%), WS107 (2.3 – 3.5%) and WS108 (12.3%).



- A maximum of 9.4% by volume of carbon dioxide was detected, in borehole WS107 where readings were consistently above 5% by volume. Concentrations in excess of 5% by volume were also detected in boreholes BH102 and BH103.
- Oxygen levels as low as 2.8% by volume were detected in borehole BH103, with concentrations lower than 10% by volume also being detected in boreholes WS106, WS107 and WS108.
- The maximum recorded borehole flow rate was 1.2l/hr in borehole WS107.

5.0 Engineering Design Recommendations

5.1 Site Preparation

The principal geotechnical constraints to the development of the site are:

- Localised presence of Made Ground up to 3m thick (typically between 1m and 2m) comprising predominantly reworked natural soils with entrained man-made material. Locally very soft or very loose;
- Potential buried substructures associated with past development, including a culverted stream.

5.1.1 Made Ground

Although Made Ground is present across most of the site to some degree, thicker deposits are present in two main locations; the south-eastern area adjacent to and north of the office building (thicknesses of 2.6m (WS109) and 3.0m (BH101) recorded), and in the north-western part of the site, where thicknesses of 2.2m (BH104) and greater than 2.0m (TP103) were recorded). Figure 5.1, below, shows the observed thickness of Made Ground in relation to the proposed layout.

In its current state, due to its variable strength/relative density and typically high moisture content, the Made Ground is not considered a suitable bearing material for either foundations or a ground bearing floor slab, and ground improvement works will be required.

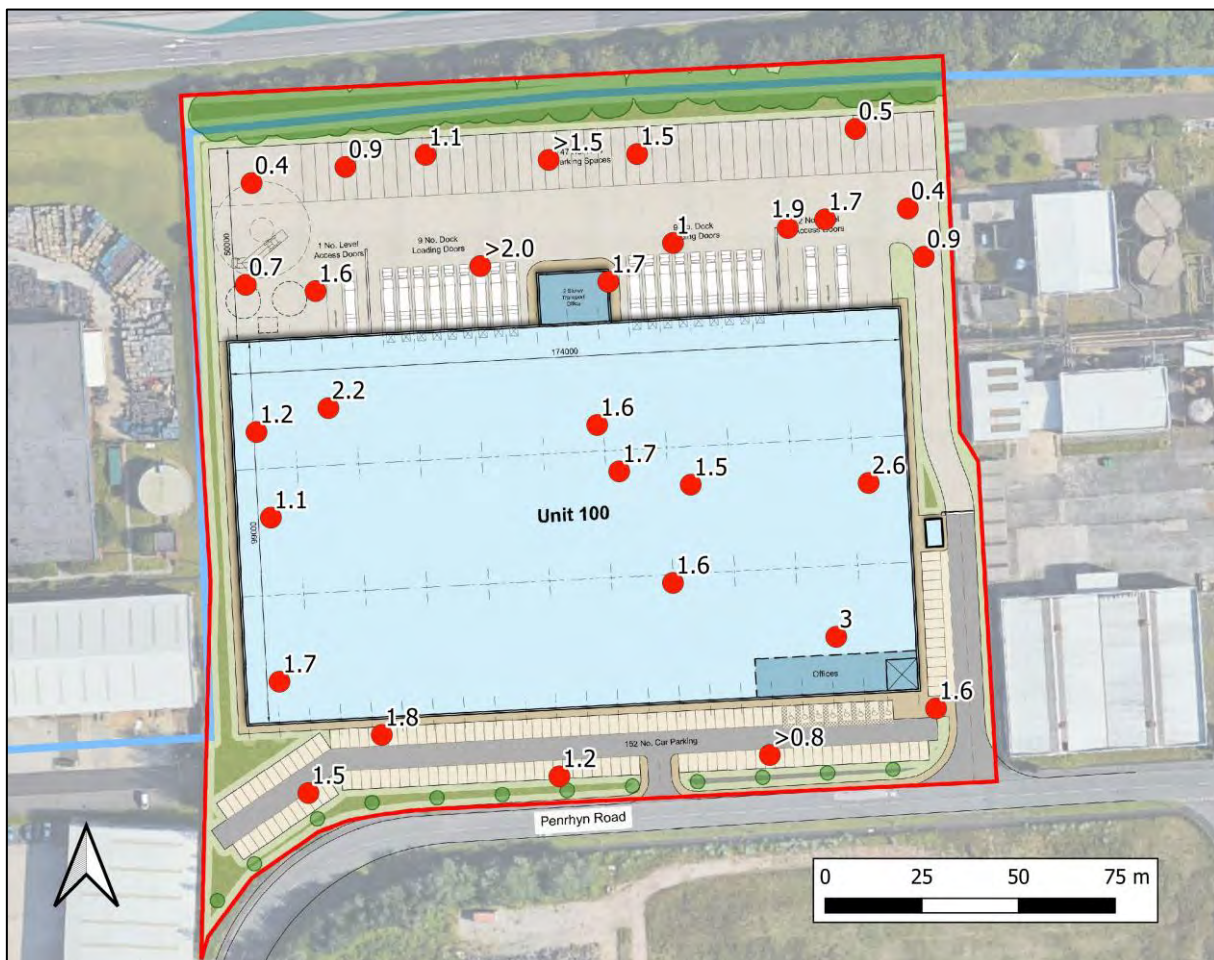
5.1.2 Buried Substructures

It is understood that generally substructures including old foundations have been removed as part of the site demolition/clearance works, resulting in locally deepened Made Ground or Disturbed Ground. There is the potential for previously unidentified substructures to remain; if encountered during future development works any new foundations should extend past the base of these sub-structures or any excavations resulting from their removal.

If not already achieved, the route and depth of the culverted Knowsley Brook should be confirmed, together with the integrity of the culvert. If the culvert is considered likely to underlie the proposed building footprint or be within influencing distance of future foundations then either the development proposals may

require modification or, with the agreement of the relevant authorities, the route of the culvert altered; alternatively, with the appropriate permissions, it may be possible to design the proposed building and its foundations to span across sections of the culvert.

Figure 5.1 Observed Made Ground thickness (m)



5.2 Foundations

In its current state the Made Ground within the site is considered unsuitable as a bearing stratum and all new foundations should be carried down through it, to found on the more competent natural cohesive, granular or rock strata.



Due to the variable minimum foundation depths and founding strata (firm clays to extremely weak rock), at this stage it is suggested that a foundation solution comprising concrete pads (nominally 1.5m x 1.5m) on vibro-replacement concrete columns be adopted, with the columns extending to either very stiff clay or extremely weak sandstone to minimise the risk of differential settlement. A minimum column length of 3m is suggested. The use of stone columns is unlikely to be acceptable considering the presence of contamination in the Made Ground and the underlying Principal Aquifer. A specialist vibro-replacement contractor should be consulted, regarding the suitability of the site for this technique and likely achievable allowable bearing capacities.

A potential alternative to the above foundation solution would be to utilise pad foundations at a relatively shallow depth in improved Made Ground (see Section 5.3, below); however, due to the variation in Made Ground thickness and the nature of the underlying natural strata, this solution may have a greater risk of differential settlement occurring. Significant further assessment would be required if this option were to be considered.

5.3 Floor Slabs

The composition of the Made Ground indicates that it is not a suitable subgrade in its current condition as it was not placed to any engineering specification. However, there are a number of options for improving the Made Ground as outlined below.

5.3.1 Excavate and replace

The existing Made Ground could be removed down to the natural strata and replaced to an engineering specification for Class 2C or 2A/2B materials, as appropriate, in accordance with the Specification of Highway Works, with compaction to 95% of maximum dry density. This option could provide a uniform subgrade, with an anticipated CBR of 2 to 3%. This will require a capping layer of Class 6F2 and sub base, or a thickened sub base without capping, to provide a suitable formation for the floor slab and areas of highway pavement. Due to the presence of locally thicker deposits of Made Ground, taking this approach would result in excavations locally as deep as 3m below FFL but typically less than 2m. It should be noted that in its current state the Made Ground materials will generally require drying prior to replacement.

5.3.2 High Energy Impact Compaction (HEIC)

As an alternative to full excavation and replacement, the Made Ground could potentially be compacted in-situ using HEIC (Landpac) or similar in-situ impact compaction technique. This will provide the same formation as excavation and replacement subject to verification testing (plate load testing and in-situ density testing). A similar capping / subbase and or subbase thickness will be required. The presence of existing underground services, adjacent properties and the culverted stream within the site area may restrict the use of this technique. A specialist contractor should confirm the suitability of the Made Ground for such techniques.

5.3.3 Lime Stabilisation

The Made Ground appears to be suitable for lime stabilisation. Based on the source material of the Made Ground, it is anticipated to generally have a low TOC (of less than 2%); an overall upper limit of 2% TOC is generally considered acceptable (British Lime Association Technical Data (BLATD)). The Plasticity Index of the source material Made Ground (average of 12.5%) is just above the lower limit of 10% (BLATD) and the generally low Sulphate content (0.001 to 1.67g/l) is also favourable (BLATD). Lime stabilisation can be used to increase the CBR to 5%, or possibly 15%, to eliminate the need for capping and reduce the subbase thickness. It is recommended that if this is an option to be taken forward further testing of the Made Ground for TOC, SO₄/pH and plasticity is undertaken to confirm the source material properties.

5.3.4 Piles or Vibro-replacement Concrete Columns

The use of a grid of piles or compacted concrete columns, through the untreated Made Ground, may be an appropriate method of supporting the floor slabs to avoid a need for extensive ground treatment works. A specialist contractor should be consulted regarding the suitability of the ground condition for this approach; significant further ground assessment, especially with respect to future settlement is likely to be required if the concrete column option is adopted.

5.4 Road Pavement

At this stage, prior to any improvement works, all Made Ground should be assumed to have a CBR values of less than 2%. Site observations, suggest that the near surface cohesive natural materials should be able to achieve CBR values of at least 2.5% when properly engineered or proof rolled. The granular deposits



should be able to achieve a CBR value of at least 5%, when suitably drained. Proof rolling and the improvement of soft spots may result in increased CBR values and the incorporation of a geotextile grid into sub-base layers may allow for reduced capping thickness.

Site observations should be confirmed by in situ or laboratory testing in accordance with the adopting Local Authority's preference.

5.5 Drainage

Due to the contaminated nature of the Made Ground and the near surface proximity of the Chester Formation Principal Aquifer it is considered unlikely that the site will be deemed suitable for soakaway drainage.



6.0 Generic Quantitative Assessment – Human Health

6.1 Methodology and Relevant Assessment Criteria

A Generic Quantitative Risk Assessment (GQRA) has been undertaken by comparing recorded contaminant concentrations to Generic Assessment Criteria (GAC) to identify the contaminants of concern that have the potential to adversely affect the health of site users. If the observed concentration of a particular substance is below the GAC then the risk is generally considered to be acceptable and does not generally warrant further assessment. Furthermore, a substance recorded in excess of a particular GAC does not necessarily indicate that a significant risk is present that would require mitigation. Where a GAC is exceeded, further assessment may be necessary to evaluate the significance in line with the current UK tiered risk assessment framework.

6.2 Assessment Criteria

In order to generate generic assessment criteria (GACs) which are protective of human health, the Environment Agency recommends the use of the CLEA 1.06 software in conjunction with advice found on their CLEA web pages. CLEA was initially used to derive Soil Guideline Values (SGVs), the last of which were published in 2009. These were produced for a limited number of substances for three common land uses; residential, allotments and commercial / industrial. SGVs represented concentrations that would present a minimal risk in the context of the exposure scenario for a particular land use.

Following the publication of updated Statutory Guidance for Part IIA of the Environmental Protection Act in 2012, new screening values, designated Category 4 Screening Levels (C4SLs), were published in 2014 which are consistent with the more pragmatic risk based approach adopted by the Guidance. They represent a level of risk which is 'low' rather than 'minimal', but are still strongly precautionary and are consistent with land within Category 4, as described in the Statutory Guidance and summarised in Section 1.5.

The C4SLs have been developed using a modified version of the CLEA framework for six of the most significant substances associated with contaminated land (although more are in development) and cover 6 classes of generic land use. For the purposes of this report, appropriate C4SLs have been used in the first instance, where available.

Where C4SLs do not exist, alternative GACs derived using CLEA are required. Accordingly, the Chartered Institute of Environmental Health (CIEH) in partnership with Land Quality Management (LQM) derived a set of Generic Assessment Criteria Values (GAC) for contaminants of concern using the CLEA software. The LQM/CIEH S4ULs (Suitable for Use levels) published in 2014 present GACs for 89 contaminants of concern under six land use scenarios and for three soil organic matter percentages. They differ from C4SLs in that they are derived based on 'minimal' rather than 'low' risk. The input parameters used for calculating each S4UL value are listed in the substance specific chapters of the reference document associated with the S4ULs, namely 'The LQM/CIEH S4ULs for Human Health Risk Assessment' (Land Quality Press, 2015, Unique publication number S4UL3312). S4ULs have therefore been used where no C4SL is available. In the absence of a C4SL or S4UL, reference had been made to Soil Generic Assessment Criteria (SGAC, CL:AIRE 2010).

6.3 Characterisation and Assessment

The generic screening values that G&J have used to establish whether soils are suitable for the proposed site use are detailed in Table 6.1. The screening values are presented for a commercial land use and a Soil Organic Matter content of 1.0%, which is roughly consistent with the lowest values in the Made Ground.

Table 6.1 GACs –Commercial land uses and 1.0 % SOM

Determinand	Commercial GAC (mg/kg)	Highest (mg/kg)	No. >Commercial GAC	GAC Source
Arsenic	640	22	0	C4SL
Cadmium	410	2.3	0	C4SL
Chromium	8600	53	0	S4UL
Copper	68000	56	0	S4UL
Lead	2300	78	0	C4SL
Nickel	980	86	0	S4UL
Zinc	730000	204	0	S4UL
Naphthalene	190	0.27	0	S4UL
Benzo(a)pyrene (as surrogate for genotoxic PAHs)	77	3.26	0	C4SL
Aliphatic hydrocarbons >C6-C8	7800	0.17	0	S4UL
Aliphatic hydrocarbons >C8-C10	2000	6	0	S4UL
Aliphatic hydrocarbons >C10-C12	9700	62	0	S4UL
Aliphatic hydrocarbons >C12-C16	59000	38	0	S4UL
Aliphatic hydrocarbons >C16-C35	1600000	26	0	S4UL
Aromatic hydrocarbons >C7-C8	56000	0.11	0	S4UL

Contract Chemicals, Knowsley
Site Investigation Interpretative Report



Determinand	Commercial GAC (mg/kg)	Highest (mg/kg)	No. >Commercial GAC	GAC Source
Aromatic hydrocarbons >C8-C10	3500	17	0	S4UL
Aromatic hydrocarbons >C10-C12	16000	21	0	S4UL
Aromatic hydrocarbons >C12-C16	36000	66	0	S4UL
Aromatic hydrocarbons >C16-C21	28000	41	0	S4UL
Aromatic hydrocarbons >C21-C35	28000	92	0	S4UL
Benzene	27	0.017	0	S4UL
Toluene	869	0.11	0	S4UL
Ethylbenzene	518	0.25	0	S4UL
p & m-xylene	1201	0.49	0	SGAC
o-xylene	478	0.30	0	S4UL
1,2,4-Trimethylbenzene	0.35	0.04	0	SGAC
Dibromomethane	-	0.05	-	-
Dibromochloromethane	-	0.03	-	-
Bromoform	760	0.9	0	SGAC
Chloroform	99	0.14	0	S4UL
Isopropylbenzene	1400	0.01	0	SGAC
Bromobenzene	97	0.006	0	SGAC
Chlorobenzene	56	0.1	0	S4UL
2-Chlorotoluene	-	0.1	-	-
4-Chlorotoluene	-	0.1	-	-
n-Propylbenzene	4100	0.02	-	SGAC
n-Butylbenzene	-	0.63	-	-
1,2,4-Trimethylbenzene	0.35	0.04	0	SGAC
1,3,5-Trimethylbenzene	-	0.01	-	-
1,2-Dichlorobenzene	2000	512	0	S4UL
p-Cresol	160000	0.0003	0	SGAC
2-Methylnaphthalene	-	0.0004	-	-
3-Nitroaniline	-	0.0002	-	-
Dibenzofuran	-	0.0004	-	-
Azobenzene	-	0.0005	-	-
1-Bromo-2,4-dichlorobenzene	-	1.75	-	-
1-Bromo-2,3-dichlorobenzene	-	1.99	-	-
Benzene, 1,2-diethyl	-	0.1	-	-
Hexane, 1,6-dibromo-	-	0.08	-	-
Cyclic octaatomic sulfur	-	0.03	-	-
1,4-Benzenediamine, N-(1,3-dimethylbutyl)-N'-phenyl-	-	0.45	-	-



All soil data from the site investigation have been screened against the GAC, as detailed above, to determine the potential risk to human health users. In summary, no exceedances of the available GACs for a commercial end-use have been observed.

It should be noted that the health effects from petroleum hydrocarbons are additive, and so even when there are no exceedances of the GACs for individual fractions, or the exceedances are minor, there may still be an overall significant exceedance. This is calculated by dividing the recorded concentrations of each fraction by the relevant GAC, and adding all the results together. If the sum is less than 1, then there is no overall exceedance of the GAC. When accounting for this additivity, there were no exceedances of the petroleum hydrocarbon GAC for a commercial end-use.

Although some organic contamination was recorded in the soil, most notably in the form of dichlorobenzene, and was often associated with locations where odours were noted, the recorded concentrations do not exceed the commercial GACs and the risks to human health with respect to a commercial development are therefore not considered significant.

6.4 Asbestos

Due to the nature of asbestos and the wide range of factors that influence the level of risk associated with asbestos contamination, no GAC is available. Instead, the risks from asbestos are generally assessed based on lines of evidence which consider factors including the type and amount of asbestos present, its location and distribution, the ground conditions and potential exposure routes for site users.

Of the 33 samples analysed, only 1 was found to contain asbestos. Amosite was detected as a fibre bundle in borehole WS103 (at 0.4 to 0.5mbegl). No obvious ACMs were noted during G&J's site works.

Asbestos only presents a risk where fibres can become airborne. Any proposed development that results in the site being covered by hardstanding or buildings will mitigate the risks to future site users. Furthermore, any landscaped areas would most likely require a cover of clean soil as a growing medium, which would reduce the exposure to the underlying Made Ground. At this stage, based on the available evidence, the risks appear to be very low, but the presence of localised areas of more significant asbestos contamination cannot be ruled out given the site history.

A watching brief and/or validation sampling may be required as part of any redevelopment.

7.0 Generic Quantitative Assessment – Controlled Waters

7.1 Methodology

The potential for soil contamination to adversely affect controlled water receptors has been assessed at this stage by direct comparison of the results of laboratory analysis of groundwater samples with relevant Water Quality Standards (WQSs).

7.2 Water Quality Standards

The underlying Devensian Till deposits are classed as a Secondary (undifferentiated) Aquifer, and the Chester Formation as a Principal Aquifer, while the site also lies within Zone 3 (total catchment) of a Groundwater Source Protection Zone. The nearest 'surface water' feature to the site is Knowsley Brook which flows in a culvert through the site. For the purposes of this assessment, and for reasons of conservatism, the results of groundwater analysis have been compared to the lowest of either freshwater Environmental Quality Standards (EQSs) or UK Drinking Water Standards (DWS); where neither EQS nor DWS values are available the WHO guideline value for drinking water has been adopted (if available).

The following table presents the relevant WQSs for all contaminants that were recorded above detection limits and for which an WQS exists.

Table 7.1 Water Quality Standards

Substance	units	WQS	Source	No. of WQS exceedances (out of 10 samples)
Arsenic	µg/l	10	DWS	3
Boron	µg/l	1000	DWS	0
Cadmium	µg/l	0.15	EQS	1
Chromium	µg/l	4.7	EQS	4
Copper	µg/l	10	EQS	3
Lead	µg/l	7.2	EQS	4
Mercury	µg/l	0.05	EQS	7
Nickel	µg/l	20	EQS/DWS	3
Selenium	µg/l	10	DWS	3

Substance	units	WQS	Source	No. of WQS exceedances (out of 10 samples)
Zinc	µg/l	75	EQS	5
pH	pH units	6 – 9	EQS	1
Cyanide	µg/l	5	EQS	3
Sulphate	mg/l	250	DWS	1
Ammoniacal Nitrogen as NH ₄	µg/l	500	DWS	3
Naphthalene	µg/l	2	EQS	0
Acenaphthylene	µg/l	5.8	EQS	0
Acenaphthene	µg/l	5.8	EQS	0
Benzo(a)pyrene	µg/l	0.01	DWS	1
Fluoranthene	µg/l	0.01	EQS	2
Petroleum Hydrocarbons (EPH)	µg/l	10	Old DWS	4
Total Phenols	µg/l	7.7	EQS	7
Benzene	µg/l	1	DWS	1
Toluene	µg/l	50	EQS	2
Ethylbenzene	µg/l	20	EQS	1
p & m-xylene	µg/l	30	EQS (xylene)	2
o-xylene	µg/l			
Chloroform (Trichloromethane)	µg/l	2.5	EQS	1
Chlorobenzene	µg/l	-	-	-
1,3,5-Trimethylbenzene	µg/l	-	-	-
1,2-Dichlorobenzene	µg/l	1000	WHO	4
1,4-Dichlorobenzene	µg/l	300	WHO	0
Propyl Sulphide	µg/l	-	-	-
2,4,6-Trichlorophenol	µg/l	200	WHO	0
4-chloroaniline	µg/l	-	-	-

The WQSs in Table 8.1 are not directly applicable to groundwater and are therefore considered to be conservative when used as a benchmark for such. It is not unusual for shallow groundwater to record contaminant concentrations in excess of DWSs and EQSs, and exceedances do not therefore necessarily equate to a significant impact.



7.2.1 Inorganic Contaminants

A number of inorganic contaminants have been recorded at concentrations in excess of their respective WQSS. Generally metals were recorded in 2 or 3 locations at elevated concentrations when compared to the WQSS.

Mercury was the most widespread metal contaminant, with the WQS (0.05µg/l) being exceeded at 7 of the 10 sample locations, with a maximum concentration of 1.14ug/l recorded in BH104. The most significant metal contamination was in WS106 where 9 metals exceeded the WQS values.

Concentrations of cyanide exceed the EQS (5µg/l) at 3 locations (BH104, BH105 and WS110), with the highest concentrations in BH105 and WS110 (both 215µg/l).

Concentrations of ammoniacal nitrogen in boreholes BH104 (20,000µg/l), BH105 (18,400µg/l) and WS107 (9,740µg/l) exceed the WQS of 500µg/l.

7.2.2 Organic Contaminants

Significant organic contamination was recorded in four of the ten locations from where groundwater samples were obtained. These were BH103, BH104, BH105 and WS101, which are all located across the central band of the site where the main process areas and tank farms were located. The most notable individual organic compound was 1,2-dichlorobenzene, which was recorded in these four locations at concentrations between 2380 – 8357ug/l. Hydrocarbons in these locations were primarily within the aliphatic C10-12 and aromatic C8-C12 bands, although total hydrocarbon (TPHCWG banding) concentrations (816 – 3770ug/l) were less than the recorded concentrations of 1,2-dichlorobenzene.

Also elevated in one or more of these locations were BTEX compounds, phenols, chlorobenzene, trimethylbenzene, chloroform, propyl sulphide, 4-chloroaniline and a number of PAHs including naphthalene. However, these substances were less widespread and the concentrations much less significant.

All the other locations recorded only trace concentrations of 1,2-dichlorobenzene (<25ug/l), total hydrocarbons (<27ug/l) and some PAHs, most notably naphthalene which was recorded in all 10 locations at concentrations between 0.01 and 1.8ug/l.

Figure 7.1 below, summarises the concentrations of 1,2-dichlorobenzene recorded in all standpipes.

Figure 7.1 1,2-dichlorobenzene concentrations (ug/l)



7.2.3 Summary

Groundwater samples were predominantly taken from shallow groundwater contained either within the Made Ground, or permeable horizons of the Glacial Till. WS108 and WS110 were screened within the weathered Chester Formation, as Glacial Till was absent from these locations.

The most significant contamination is organic contamination (most notably 1,2-dichlorobenzene) in BH103, BH104, BH105 and WS101, all of which are located within the area previously occupied by the main process areas and tank farms. Only trace concentrations of organic contamination were recorded in the other locations.

Contract Chemicals, Knowsley
Site Investigation Interpretative Report



Inorganic contamination is considered to be less significant. The most notable metal contamination was recorded in WS106 in the south-west of the site, while elevated cyanide was recorded in BH104 in the west, and BH105 and WS110, both located in the north-east. Elevated ammoniacal nitrogen concentrations were most significant in BH104 and BH105, but in general such concentrations are not unusual for shallow groundwater.

Given the presence of the Chester Formation Principal Aquifer at shallow depth, further assessment of the risks to the water environment (a Detailed Quantitative Risk Assessment) may be required, particularly with respect to the organic contamination. Following on from this, some mitigation measures (such as addressing any remaining potential soil sources) may be necessary.

8.0 Generic Quantitative Assessment – Ground Gas Risks

8.1 Background

Ground gases including methane, carbon dioxide and small concentrations of trace gases can occur naturally in soils containing organic material and are produced in greatest concentrations in soils with high organic content such as peat and Alluvial soils. These gases can also be generated from the degradation of buried organic materials which may be present in Made Ground materials.

Methane is the principal hazardous gas associated with the degradation of organic material in both natural organic soils and from any organic fraction within Made Ground. Methane is biochemically reactive and is readily oxidised to carbon dioxide under aerobic conditions. However, carbon dioxide can also be generated directly in soils.

Any hydrocarbon contamination on the site also has the potential to degrade and generate methane, carbon dioxide and trace gases, including carbon monoxide and hydrogen sulphide. The makeup of these trace gases will depend largely upon the origin of the organic material and degradation conditions but may include substances with odorous, toxic, carcinogenic or other hazardous properties.

The risks posed from ground gases are primarily from explosion or inhalation, both following accumulation in a confined space. The risks to site users from ground gas in areas of open space are not normally deemed to be significant.

Explosion of ground gases can only occur if the following elements are present:-

1. A source of flammable gas;
2. A confined or enclosed space;
3. A source of ignition; and
4. Sufficient oxygen to support combustion.

The flammability of a particular gas mixture is dependent on a number of factors including composition, temperature and pressure. The potential flammability of methane in a mixture increases with the relative



concentration of oxygen. In addition, the presence of carbon dioxide within a gas mixture will change the potential flammability as it will alter the upper explosive limit of methane.

Any gas or mixture of gases will cause physiological effects if it displaces oxygen in a confined space, to an extent when oxygen concentrations fall below 18 % v/v. This begins with impairment of judgement (17%), followed by anoxia and abnormal fatigue (10–16%), nausea and unconsciousness (6–10%) leading to death (<6 %). Physiological effects can be more severe if carbon dioxide is the cause of oxygen depletion.

8.2 Assessment Criteria

A ground gas risk assessment has been undertaken to quantify the risks to site users occupying any future proposed buildings on the site, based on the currently available information. The assessment of carbon dioxide and methane levels has been undertaken in accordance with the methods described in CIRIA guidance '*Assessing Risk Posed by Hazardous Ground Gases to Buildings*' (CIRIA C665, 2007), British Standard '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*' (BS 8485:2015+A1:2019), and other relevant industry guidance including '*A Pragmatic Approach to Ground Gas Risk Assessment*' (CL:AIRE RB17, 2012).

The methodology described in BS 8485, and used in this assessment, is based on the Modified Wilson and Card Classification (as set out in CIRIA C665), which requires the calculation of Gas Screening Values (GSVs) for the site for methane and carbon dioxide, which are the worst case rates at which hazardous gases are emitted from monitoring installations on the site.

Borehole hazardous gas flow rates (Q_{hg}) are calculated for each borehole standpipe on each monitoring visit using the formula:

$$Q_{hg} = \text{borehole flow rate (l/hr)} \times \text{gas concentration (\%)} / 100$$

To reflect a worst case scenario, for conservatism in the context of this report, this calculation has been applied to the maximum methane, carbon dioxide and flow rates recorded over the monitoring period at each borehole. The Q_{hg} values are used as the GSV to determine a '*Characteristic Situation*' under the Modified Wilson and Card classification.

Carbon monoxide and hydrogen sulphide levels have been assessed against long term exposure limits (LTELs), relating to an 8 hours exposure period, published in the Health and Safety Executive in 2005 in "Guidance Note EH40: Occupational Exposure". The LTEL for carbon monoxide is 30ppm and for hydrogen sulphide is 5ppm.

8.3 Characterisation

Gas readings were obtained from gas taps installed on the top of twelve borehole installations at the site on 6 occasions. Full details of the gas monitoring rounds are contained in Appendix D. A summary of gas readings recorded during the monitoring rounds is presented in Table 8.1 below. The table presents the maximum (CH₄ and CO₂) or minimum (O₂) gas concentrations and maximum flow rates, and includes an indication of the worst case Characteristic Situation (as described in BS 8485) for each location based on the available data.

Table 8.1 Ground Gas Monitoring Summary

Hole	Pressure Range	Gas Concentration (%)			Max. Flow (l/hr)	Max Q _{hg} (l/hr)		Characteristic Situation
		CH ₄ (Max)	CO ₂ (Max)	O ₂ (Min)		CH ₄	CO ₂	
BH101	1003	0.1	0.6	18.3	<0.1	<0.0001	<0.0006	CS1
BH103	991-1035	14.1	8.1	2.6	0.1	0.0141	0.0081	CS1*
BH104	991-1035	0.9	0.2	19.0	0.3	0.0027	0.0006	CS1
BH105	990-1035	0.3	0.2	16.4	0.5	0.0015	0.001	CS1
WS101	991-1035	0.1	1.6	19.9	0.1	0.0001	0.0016	CS1
WS102	991-1035	<0.1	1.7	19.5	0.1	<0.0001	0.0017	CS1
WS106	991-1035	<0.1	0.5	6.9	<0.1	<0.0001	<0.0005	CS1
WS107	992-1035	3.9	9.4	9.7	1.2	0.0468	0.1128	CS2
WS108	1002	12.3	3.1	9.7	0.1	0.0123	0.0031	CS1*
WS109	990-1035	0.2	1.7	12.8	0.7	0.0014	0.0119	CS1
WS110	991-1035	<0.1	0.3	19.9	<0.1	<0.0001	<0.0003	CS1
GRM-BH04	992-1036	<0.1	5.4	12.3	<0.1	<0.0001	<0.0054	CS1*

*Consideration should be given to increasing to CS2 if methane exceeds 1% or carbon dioxide exceeds 5%

The worst-case Q_{hg} value is taken as the Gas Screening Value; based on the available information, GSVs are typically consistent with Characteristic Situation 1 (CS1), which is representative of natural soils with low organic content and 'typical' Made Ground; the monitoring results for borehole WS107, however, are consistent with CS2.

Elevated concentrations of methane (>1%) and/or carbon dioxide (>5%) have been recorded at four



locations (BH102, BH103, WS107 and WS108) on at least one occasion; BS 8485 recommends consideration is given to increasing to sites classified as CS1 to CS2 in such cases.

Ground gas only represents a risk where hazardous gases have the potential to be emitted from the ground and collect in confined places, such as buildings. Flows rates were typically below 1l/hr, and only exceeded 1l/hr at WS107 on one occasion; this suggests that gases are not being generated in significant quantities.

A likely source of the elevated methane and carbon dioxide, at least in some of the standpipes, is the degradation of the hydrocarbons observed in the soil and groundwater beneath the site; however, in other locations such as WS107 and WS108, the source is less obvious.

Other than the presence of hydrocarbons, there is little evidence of significant degradable material in the ground, while organic matter contents of the soil were low.

While the risks are considered to be low, particularly with respect to the proposed warehouse type development, it is suggested that a CS2 classification is conservatively assumed at this stage. A CS2 classification requires the incorporation of basic gas protection measures (often comprising a well constructed slab with a properly installed gas membrane and all joints and penetrations sealed).

Following any remediation and / or earthworks, further monitoring may allow a classification of CS1. However, this approach should be agreed with the local authority before implementation.

Hydrogen sulphide was not detected during any of the monitoring visits. Carbon monoxide was detected on a single monitoring visit in boreholes BH104, BH105 and WS107, at concentrations of 24ppm, 6ppm and 1ppm, respectively; the detected concentrations were well below the Long Term Exposure Limit of 30ppm, respectively, and are therefore considered to pose no risk.

VOCs were detected in nine locations on at least one occasion, but significant concentrations were only recorded in BH104, with a maximum reading of 308ppm. Organic contaminants were recorded in both the soil and groundwater at this location, although locations where similar contamination was recorded did not have the same elevated VOCs.



9.0 Conclusions and Recommendations

9.1 Further Investigation

The investigation work undertaken is considered sufficient to allow a reasonable characterisation of the site in terms geo-environmental and geotechnical properties. However, the following additional works would be beneficial and may be a requirement of the Local Planning Authority;

- Additional ground investigation in the areas that were inaccessible during the site works reported here, particularly the areas beneath stockpiles, standing water and the warehouse that was undergoing demolition. This would likely involve the excavation of trial pits to allow the inspection and sampling of the upper soils, and subsequent chemical laboratory analysis. Such works could be undertaken as a validation exercise during any future remediation / earthworks, or as a stand alone investigation.
- The location, depth and condition of the culverted Knowsley Brook should be confirmed.

9.2 Geotechnical Recommendations

Preliminary geotechnical recommendations are summarised below.

9.2.1 Buried Concrete

Based on guidelines provided in BRE Special Digest 1, the site can be categorised with a design sulphate classification for subsurface concrete of DS-2 and an ACEC class of AC-2.

9.2.2 Foundation Solutions

It is anticipated that the most appropriate foundation solution for the proposed commercial structure will be either shallow pads in conjunction with vibro-concrete columns down to very stiff clay or rock strata, or pads bearing onto improved Made Ground.



9.2.3 Ground Floor Slab

Ground improvement will be required to enable the use of ground-bearing floor slabs on consistent material.

9.2.4 Roads and Pavements

The ground improvement required to allow the use of ground-bearing floor slabs will provide a suitable formation for the construction of road pavements.

In its current condition all Made Ground should be assumed to have a CBR value of less than 2%, re-engineering and/or proof rolling may allow this figure to be increased.

9.2.5 Drainage

Due to the presence of contaminated soils and shallow groundwater, and the underlying Principal Aquifer it is considered that soakaway drainage will not be considered appropriate. Additionally, low permeability clay underlies much of the site, which would impede infiltration.

9.3 Contamination Risk Assessment

Widespread soil contamination that would represent a significant risk to human health with respect to a commercial end-use has not been identified. The most notable soil contamination was in the form of 1,2-dichlorobenzene, but concentrations did not exceed the generic assessment criteria (GAC) for a commercial land use. Asbestos fibres were only detected at one location (WS103).

Elevated concentrations of contaminants have been identified in shallow groundwater. This is most notably in the form of 1,2-dichlorobenzene and other organic contaminants beneath the area of the site formerly occupied by the main process areas and tank farms. Other identified groundwater contamination includes cyanide in two isolated locations.

9.3.1 Detailed Quantitative Risk Assessment (DQRA)

Given the presence of the Chester Formation, which is considered a Principal Aquifer, at shallow depths beneath the site, and the presence of the culverted Knowsley Brook, it is considered that the identified soil



and groundwater contamination potentially presents a risk to controlled waters. It is therefore recommended that a detailed quantitative risk assessment (DQRA) is undertaken to identify any potentially significant risks and provide target concentrations for any remediation works (if required).

The DQRA could form part of the remediation and validation strategy for the site (see 9.3.3), which is a likely requirement of the Local Authority to support any planning application.

9.3.2 Mitigation

Significant mitigation measures are not required to protect human health based on the findings of the investigation and the proposed development. However, a cover of clean soil is likely to be required in any areas of soft landscaping to manage any residual risks (such as the low incidence of asbestos fibres in the Made Ground) and to provide a suitable growing medium.

The DQRA (described above) will determine if any mitigation measures are required to address the risks to the water environment. However, it is likely that the risks could be mitigated by identifying and excavating any soil sources for treatment or disposal, and the pumping out of contaminated groundwater from excavations.

9.3.3 Remediation Strategy and Validation Plan

A Remediation Strategy and Validation Plan will almost certainly be required to support the planning application. This will detail the remediation measures required to address any significant risks (as identified by the DQRA) and a validation strategy to confirm all significant contamination sources have been addressed. This will likely include further soil sampling and analysis as described in Section 9.1, and possibly a programme of groundwater monitoring.

9.3.4 Gas Protection

Based on the currently available information, a Characteristic Situation 2 classification should be assumed for the site, which requires basic gas protection measures in the proposed building. Further post remediation / earthworks monitoring may allow a re-assessment, and may be a requirement of the Local Authority if significant ground disturbance is proposed.



9.3.5 Water Pipelines

Concentrations of mineral oils (petroleum hydrocarbons), BTEX compounds, and VOCs in the Made Ground locally exceed the UKWIR thresholds for PE water pipes; upgraded water pipes are likely to be required for the future development, at least in some parts of the site. The appropriate material for water supply pipes should be discussed with the service provider at the earliest opportunity.

9.3.6 Previously Unidentified Contamination

Should any previously unidentified evidence of significant contamination (odours, staining, suspicious materials, potential ACMs) be encountered during earthworks or construction, the works should be paused and a geo-environmental specialist consulted to determine the most appropriate course of action.

9.3.7 Construction Workers

Given the unique exposure scenario for any construction, investigation or maintenance worker involved in groundworks or excavations, the risks are considered separately from those to other receptors which are described above.

There is always a risk of exposure to contamination for those involved in ground disturbance, particularly in Made Ground and near surface soils where materials such as asbestos can be present. Measures should be taken to minimise exposure of such workers to these risks, in accordance with common good practice and informed by the findings of this ground investigation



10.0 References

1. BS 5930: (2015): Code of Practice for Site Investigation. British Standards Institution
2. BS 10175: (2011): Code of Practice for the Investigation of Potentially Contaminated Sites. British Standards Institution
3. LCRM (2020): Land Contamination Risk Management. Environment Agency
4. BS EN 1997-2: (2007): Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and Testing
5. BS EN ISO 14688-1: (2002): Geotechnical Investigation and testing – Identification and Classification of Soil – Part 1: Identification and Description.
6. BS EN ISO 14688-2: (2004): Geotechnical Investigation and testing – Identification and Classification of Soil – Part 2: Principles for a Classification
7. BS EN ISO 14689-1: (2003): Geotechnical Investigations and testing – Identification and Classification of Rock – Part 1: Identification and description.
8. BS EN ISO 22476-3: (2005): Geotechnical Investigation and Testing – Field Testing – Part 3: Standard Penetration Test.
9. BS 10175: (2011): Code of Practice for the Investigation of Potentially Contaminated Sites. British Standards Institution
10. BS 8485:2015+A1:2019: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. British Standards Institution
11. CIRIA C665 (2007): Assessing the risks posed by hazardous ground gases to buildings
12. RB17 (2012): A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE
13. FB75: Building on fill: geotechnical aspects, 2015, BRE

Contract Chemicals, Knowsley
Site Investigation Interpretative Report



14. BRE Special Digest 1:2005; Concrete in aggressive ground.
15. BRE (2004): Cover Systems for Land Regeneration
16. BRE (2007): Digest 365: Soakaway Design.



APPENDICES



Appendix A – Previous Exploratory Hole Logs

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

5-7, NEW YORK ROAD

LEEDS, 2

42870, 96762.

SJ49NW-132

Contract No. M.1691/F.1217

Borehole No. 3

Location Knowsley

Ground Level

Client Liverpool City Engineer

Date 23rd April 1969

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	φ deg.	m.c %	γ lb/cu. ft.	" N "
Topsoil		1'0"	1'0"						
Firm/Stiff Red Boulder Clay			8'0"	3'0" 	1440	0	16.1	132	
		9'0"		9'0" 	2740	17	13.3	138	
Stiff Red Marl with bands of red shaley fine sandstone			8'0"	14'0" 	2800	10	12.6	143	
		17'0"		17'3" 					50 for 3"
Red Sandstone		20'0"	3'0"						

Water Struck at 9'0"

Maximum Observed Water Level 6'0"

Undisturbed Sample 
 Disturbed Sample 
 Water Sample 
 Penetration Test 

c = Cohesion
 φ = Angle of Internal Friction
 m.c = Moisture Content
 γ = Bulk Density
 N = Standard Penetration Value

Water levels are subject to seasonal or tidal variation and should not be taken as constant

HOLST & CO. LTD.

SITE INVESTIGATION DEPT. 43022, 96770

5-7, NEW YORK ROAD SJ49NW-133

LEEDS, 2

Contract No. M.1691/F.1217

Borehole No. 4

Location Knowsley

Ground Level

Client Liverpool City Engineer

Date 23rd April 1969

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	ϕ deg.	m.c %	γ lb/cu. ft.	N
Topsoil		1'0"	1'0"						
Red Sand and Gravel		2'6"	1'6"						
Hard Brown Boulder Clay			7'6"						
		10'0"		8'0" □	3400	0	12.2	142	
Weathered red shaley fine sandstone with bands of red marl		17'0"	7'0"	14'0" I					50 for 8"
Red Sandstone		20'0"	3'0"	18'6" I					50 for 6"

Water Struck at 9'0"

Maximum Observed Water Level

3'6"

Undisturbed Sample □
Disturbed Sample o
Water Sample Δ
Penetration Test I

c = Cohesion
 ϕ = Angle of Internal Friction
m.c = Moisture Content
 γ = Bulk Density
N = Standard Penetration Value

Water levels are subject to seasonal or tidal variation and should not be taken as constant

HOLST & CO. LTD. 42875, 96645

SITE INVESTIGATION DEPT.
5-7, NEW YORK ROAD SJ49NW-141
LEEDS, 2

Contract No. M.1691/F.1217

Borehole No. 11

Location Knowsley

Ground Level

Client Liverpool City Engineer

Date 25th April 1969

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	φ deg.	m.c %	γ lb/cu. ft.	N
Topsoil		1'0"	1'0"						
Sand and Gravel		2'6"	1'6"						
Compact red coarse silt (weathered marl)		5'6"	3'0"	4'0" [	1220	9	20.9	125	
Fine red shaley sandstone with yellow bands			12'6"						
		18'0"							

Water Struck at 5'6"

Maximum Observed Water Level 4'0"

Undisturbed Sample □
Disturbed Sample ○
Water Sample Δ
Penetration Test I

c = Cohesion
φ = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels are subject to seasonal or tidal variation and should not be taken as constant

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

5-7, NEW YORK ROAD

LEEDS, 2

43029, 96652

SJ49NW-142

Contract No. M.1691/F1217

Borehole No. 12

Location Knowsley

Ground Level

Client Liverpool City Engineer

Date 21st April 1969

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	φ deg.	m.c %	γ lb/cu. ft.	N
Topsoil		1'0"	1'0"						
Greyish brown sand Traces of gravel			7'0"	5'0" I					10
		8'0"							
Hard red sandy marl with bands of weathered red sandstone.			10'0"	II	2080	23	13.3	143	
			12'0"						
		20'0"							

Water Struck at 4'0"

Maximum Observed Water Level 3'0"

Undisturbed Sample □
Disturbed Sample ○
Water Sample Δ
Penetration Test I

c = Cohesion
φ = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels are subject to seasonal or tidal variation and should not be taken as constant

SUB SOIL MANCHESTER <i>Surveys Ltd</i> M29 7LD 0942 883565		Ground Level		Site Reference		Borehole No.	
				97/2		1 1 of 2	
Boring Method Light Cable Percussion		CASING 150mm to depth of 6.0m		Site Knowsley		Client John Newton & Partners	

Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Reduced Level	No. & Type of Sample	Penetration of Sampler		Number of Blows	Symbolic Log			
							From	To					
08.01.97				Brown sandy clay, sand, brick, ash etc. (MAOE GROUND)		1B	0.50	1.00					
					2X	1.35	1.65	13					
				1.70	3X	1.95	2.25	25					
					4D 5X	2.40 2.75	3.05	23					
				3.50	6D 7X	3.40 3.65	3.95	45					
					8U	4.30	4.75						
					90	4.85							
					10U	5.50	5.95						
					110	6.05							
					12U	6.50	6.95						
					13D	7.05							
					14U	7.50	7.95						
							-8.00						

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test

Water Level Observations during boring depths below ground level					Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed	Water level in Cased/Uncased Borehole on Completion depth below ground level		
depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.			Date	Water Level	Depth of Casing
None									

Water Added to Assist Boring at:

REMARKS
Time spent excavating by hand - 45 minutes

SUB SOIL Surveys Ltd	MANCHESTER M29 7LD 0942 883565	Ground Level	Site Reference 97/2	Borehole No. 1 2 of 2

Boring Method Light Cable Percussion	CASING 150mm to depth of 6.0m	Site Knowsley	Client John Newton & Partners
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Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Reduced Level	No. & Type of Sample	Penetration of Sampler		Number of Blows	Symbolic Log
							From	To		
08.01.97	6.0	Dry	10.90 11.2	Very stiff reddish brown very sandy CLAY with a little gravel and sand lenses		150	8.05			
						16U	8.50	8.95		
						17D	9.05			
						18U	9.50	9.95		
						19D	10.05			
						20U	10.50	10.90		NR
				Reddish brown sandy MUDSTONE, weak		21X	11.05	11.20	89	

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test									
Water Level Observations during boring depths below ground level					Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed	Water level in Cased/Uncased Borehole on Completion depth below ground level		
depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.			Date	Water Level	Depth of Casing

Water Added to Assist Boring at:

REMARKS

SUB SOIL	MANCHESTER Surveys Ltd M29 7LD 0942 883565	Ground Level	Site Reference 97/2	Borehole No. 2 1 of 2
	Casing Method Light Cable Percussion	CASING 150mm to depth of 6.0m	Site Knowsley	Client John Newton & Partners

Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Reduced Level	No. & Type of Sample	Penetration of Sampler		Number of Blows	Symbolic Log
							From	To		
09.01.97			2.60 <							

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test

Water Level Observations during boring depths below ground level					Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed	Water level in Cased/Uncased Borehole on Completion depth below ground level		
depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.			Date	Water Level	Depth of Casing
None									
Water Added to Assist Boring at:									

REMARKS

Time spent chiselling - 1.25 hrs. Time spent excavating by hand - 30 minutes

SUB SOIL Surveys Ltd	MANCHESTER M29 7LD 0942 883565	Ground Level	Site Reference 97/2	Borehole No. 2 2 of 2

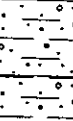
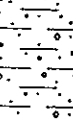
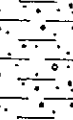
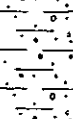
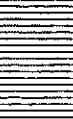
Boring Method Light Cable Percussion	CASING 150mm to depth of 6.0m	Site Knowsley
Client John Newton & Partners		

Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Reduced Level	No. & Type of Sample	Penetration of Sampler		Number of Blows	Symbolic Log
							From	To		
09.01.97	6.0	Dry	10.70	Very stiff reddish brown sandy CLAY with a little gravel and sand lenses		15C	8.05			
						16L	8.50	8.95		
						17C	9.05			
						18L	9.50	9.95		
						19C	10.05			
						20E	10.50	10.90		
				Reddish brown SANDSTONE, weak to moderately weak or stronger		21C	11.05	11.10	50	
						22C	11.30			
						23C	11.70	11.78	50	SP
						24C	12.00			
						25C	12.10	12.15	50	SP NR
			12.15							

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test									
Water Level Observations during boring depths below ground level					Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed	Water level in Cased/Uncased Borehole on Completion depth below ground level		
depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.			Date	Water Level	Depth of Casing
Water Added to Assist Boring at:									

REMARKS

SUB SOIL MANCHESTER <i>Surveys Ltd</i> M29 7LD 0942 883565		Ground Level	Site Reference 97/2	Borehole No. 3	1 of 2
		Boring Method Light Cable Percussion		CASING 150mm to depth of 4.5m	
		Site Knowsley Client John Newton & Partners			

John Newton & Partners											
Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Reduced Level	No. & Type of Sample	Penetration of Sampler		Number of Blows	Symbolic Log	
							From	To			
10.01.97				Clay with stone, brick, cloth etc. (MADE GROUND)		1B	0.50				
			1.10	Medium dense greyish brown silty SAND		2X	1.35	1.65	10		
			1.90	Firm brown sandy CLAY with a little gravel and greyish zones		3D 4X	1.80 1.95	2.25	11		
			2.40	Very stiff reddish sandy brown CLAY with a little gravel and sand lenses		5U	2.40	2.85			
						60	2.95				
						7U	3.50	3.95			
						80	4.05				
						9U	4.50	4.95			
						100	5.05				
						11U	5.50	5.95			
						120	6.05				
			6.60	Reddish brown MUDSTONE, weak		13U	6.50	6.90			
						140 15X	6.90 7.05	7.35	123		
					160	7.50					
					17X	8.05	8.28	106			
			8.00								

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test

Water Level Observations during boring depths below ground level					Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed	Water level in Cased/Uncased Borehole on Completion depth below ground level		
depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.			Date	Water Level	Depth of Casing
6.30					On pulling casing				
Water Added to Assist Boring at:									

REMARKS

Time spent chiselling - 1 hrs. Time spent excavating by hand - 30 minutes

SUB SOIL <i>Surveys Ltd</i>		MANCHESTER M29 7LD 0942 883565	Ground Level	Site Reference 97/2	Borehole No. 3	2 of 2
Boring Method Light Cable Percussion		CASING 150mm to depth of 4.5m		Site Knowsley		Client John Newton & Partners

CASING
150mm to depth of 4.5m

Borehole No. 3 2 of 2

Client John Newton & Partners

Sample Key: B.Bulk	D.Disturbed	U.Open Tube	V.Vane	W.Water	X.Standard Penetration Test
--------------------	-------------	-------------	--------	---------	-----------------------------

Depth of Casing
when sealed
N.S. - Not Sealed

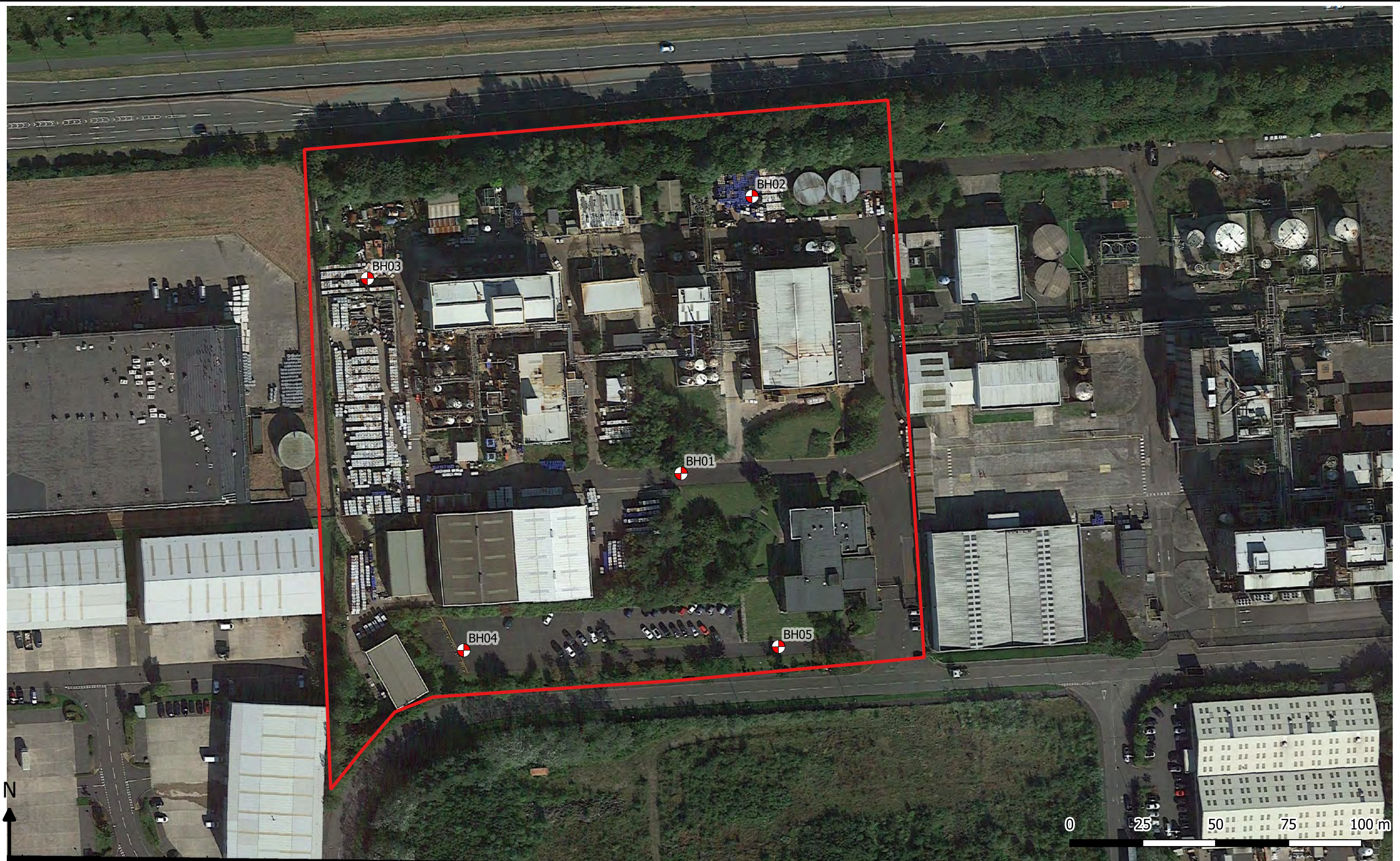
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Date	Water Level	Depth of Casing
------	-------------	-----------------

[illegible]

Water Added to Assist Boring at:

REMARKS



NOTES:

PORTWAY REMEDIATION

CONTRACT CHEMICALS, KNOWSLEY

EXPLORATORY HOLE LOCATION PLAN

P9656

APR 2021

JB

001

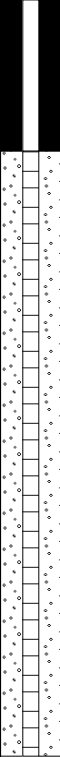
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mail@grm-uk.com www.grm-uk.com

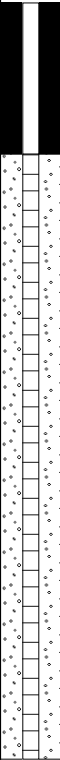
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		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Cable-Percussion Borehole			Borehole No. BH01	
Site Name: Contract Chemicals, Knowsley							Sheet 1 of 1 Ground Level (mAOD)	
Client: Portway Remediation					GRM Project Ref: P9656		Coordinates 342986 E 396708 N	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10		Black TARMACADAM/ASPHALT. MADE GROUND		
		0.50	ES		0.50		Dense, dark brown, sandy GRAVEL. Gravel is fine to coarse, angular to subangular limestone. Sand is fine to coarse. MADE GROUND		
		1.80	ES		1.80		Firm, brown mottled orangish-brown and black, very sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded sandstone and brick. MADE GROUND	1	
		2.50	ES		2.10		Loose to medium dense, greyish-brown, clayey SAND. Sand is fine to coarse. GLACIAL DEPOSITS	2	
		2.60	ES		2.60		Soft, approximately low strength, grey and reddish-brown, very sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to rounded quartzite and sandstone. GLACIAL DEPOSITS		
		3.50	ES				Dense, reddish-brown, clayey, slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium, subrounded to rounded quartzite. GLACIAL DEPOSITS	3	
							Water strike at 3.90m - rising to 2.0m in 20 minutes.	4	
					5.00		End of Borehole at 5.000m	5	
								6	
								7	
								8	
								9	

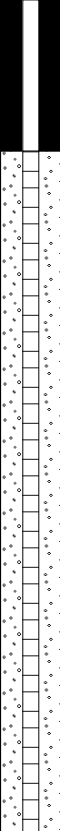
Crew: DMW Drilling Ltd.		Logger: JB		Chiselling Details		
		Depth Top	Duration	Remarks		
Equipment: Cable percussion drilling rig						
Groundwater Remarks: Damp strata at 0.40m. Water strike at 3.90m, rising to 2.0m in 20 minutes.						
		Casing Diameter by Depth				
		Depth Base	Diameter	Remarks		
General Remarks:						
Hole Started: 08/04/2021		Hole Complete: 08/04/2021		Version: FINAL		Scale: 1:50

		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Cable-Percussion Borehole			Borehole No. BH02 Sheet 1 of 1	
Site Name: Contract Chemicals, Knowsley							Ground Level (mAOD)	
Client: Portway Remediation					GRM Project Ref: P9656		Coordinates 343011 E 396803 N	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20		Very hard, dark grey CONCRETE. MADE GROUND		
		0.60	ES				Medium dense, dark brown, reddish-brown and black, clayey, very gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded concrete and quartzite. MADE GROUND	1	
		1.20	ES			1.00	Medium dense, reddish-brown, slightly clayey, slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to rounded sandstone. GLACIAL DEPOSITS		
		2.00	ES			1.70 1.90	Firm, approximately medium strength, reddish-brown, very sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium, subrounded to rounded quartzite. GLACIAL DEPOSITS	2	
		3.00	ES			2.50	Medium dense, reddish-brown mottled dark greyish-brown, clayey, silty, slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium, subrounded to rounded quartzite. Moderate hydrocarbon aroma. GLACIAL DEPOSITS	3	
		3.50	ES				Firm, approximately medium strength, reddish-brown, sandy CLAY. Sand is fine to coarse. GLACIAL DEPOSITS <i>Becoming soft, approximately low strength and very sandy at 3.50m. Water strike at 3.50m. Gravel of limestone recovered below 3.50m, but thought to be Made Ground material falling down outside of casing.</i>	4	
						4.30	Firm to stiff, approximately medium to high strength, reddish-brown, sandy CLAY. Sand is fine to coarse. GLACIAL DEPOSITS		
		5.00	ES			5.00	End of Borehole at 5.000m	5	
								6	
								7	
							8		
							9		

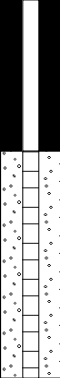
Crew: DMW Drilling Ltd.		Logger: JB		Chiselling Details		
Equipment: Cable percussion drilling rig				Depth Top	Duration	Remarks
Groundwater Remarks: Water strike at 3.50m.				Casing Diameter by Depth		
				Depth Base	Diameter	Remarks
General Remarks:						
Hole Started: 08/04/2021		Hole Complete: 08/04/2021		Version: FINAL		Scale: 1:50

		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Cable-Percussion Borehole			Borehole No. BH03	
Site Name: Contract Chemicals, Knowsley							Sheet 1 of 1 Ground Level (mAOD)	
Client: Portway Remediation					GRM Project Ref: P9656		Coordinates 342879 E 396774 N	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.25		Very hard, light grey CONCRETE with 5mm steel reinforcement on a 30cm grid. Plastic membrane at base.		
		0.60	ES		0.60		MADE GROUND Dense, brown, sandy GRAVEL. Gravel is fine to coarse, angular to subangular limestone. Sand is fine to coarse.	1	
		1.50	ES		1.50		MADE GROUND Firm to stiff, reddish-brown and brown, sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded limestone and quartzite. Rare plastic fragments.	2	
		2.50	ES				MADE GROUND Soft to firm, approximately low to medium strength, very sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium, subangular to rounded sandstone and quartzite.	3	
		3.50	ES		3.70		GLACIAL DEPOSITS <i>Becoming stiff, approximately high strength at 1.50m. With sand pockets from 2.50m.</i>	4	
		4.00	ES		4.20		<i>Becoming soft, approximately low strength at 3.20m.</i> <i>Becoming laminated and silty at 3.60m.</i> Loose, reddish-brown, very silty, slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium, subrounded to rounded quartzite.	5	
							GLACIAL DEPOSITS <i>Water strike at 4.0m - rising to 3.0m in 20 minutes.</i> Very stiff, approximately very high strength, brown, silty, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium, subangular to rounded quartzite and sandstone.	6	
					5.60		GLACIAL DEPOSITS	7	
							End of Borehole at 5.600m	8	
								9	

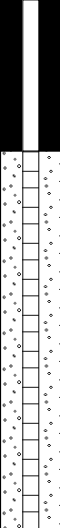
Crew: DMW Drilling Ltd.		Logger: JB		Chiselling Details	
Equipment: Cable percussion drilling rig		Depth Top	Duration	Remarks	
Groundwater Remarks: Water strike at 4.0m - rising to 3.0m in 20 minutes.		5.30	00:45		
General Remarks:		Casing Diameter by Depth			
		Depth Base	Diameter	Remarks	
Hole Started: 08/04/2021		Hole Complete: 09/04/2021		Version: FINAL	Scale: 1:50

		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Cable-Percussion Borehole			Borehole No. BH04 Sheet 1 of 1	
Site Name: Contract Chemicals, Knowsley							Ground Level (mAOD)	
Client: Portway Remediation					GRM Project Ref: P9656		Coordinates 342912 E 396647 N	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10		Black TARMAACADAM/ASPHALT.		
					0.30		MADE GROUND		
					0.70		Dense, light brownish-grey, sandy GRAVEL. Gravel is fine to coarse, angular to subangular limestone. Sand is fine to coarse.		
							MADE GROUND		
							Soft to firm, reddish-brown mottled brown and dark brown, sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded limestone and concrete.	1	
					1.50		MADE GROUND		
							Medium dense, brown and dark brown SAND. Sand is fine to coarse.		
					2.00		GLACIAL DEPOSITS	2	
							Medium dense, light brown, clayey, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular sandstone and quartzite.		
					2.40		GLACIAL DEPOSITS		
				2.60		Firm, approximately medium strength, reddish-brown mottled light brown, silty, slightly sandy CLAY. Sand is fine to coarse.	3		
						GLACIAL DEPOSITS			
						Strong, reddish-brown mottled light brown, silty SANDSTONE.	4		
						CHESTER FORMATION			
						End of Borehole at 2.600m	5		
							6		
							7		
							8		
							9		

Crew: DMW Drilling Ltd.		Logger: JB		Chiselling Details		
Equipment: Cable percussion drilling rig		Depth Top	Duration	Remarks		
Groundwater Remarks: No groundwater encountered.		2.40	00:20			
General Remarks:		Casing Diameter by Depth				
		Depth Base	Diameter	Remarks		
Hole Started: 09/04/2021		Hole Complete: 09/04/2021		Version: FINAL		Scale: 1:50

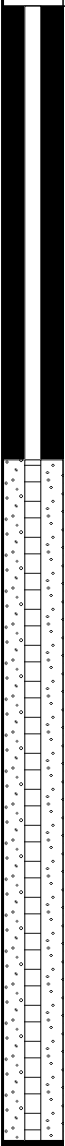
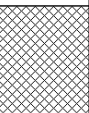
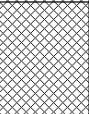
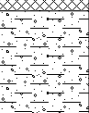
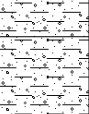
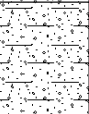
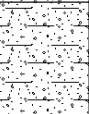
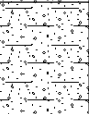
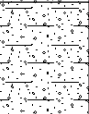
		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Cable-Percussion Borehole			Borehole No. BH05 Sheet 1 of 1	
Site Name: Contract Chemicals, Knowsley							Ground Level (mAOD)	
Client: Portway Remediation					GRM Project Ref: P9656		Coordinates 343020 E 396648 N	

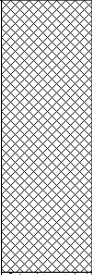
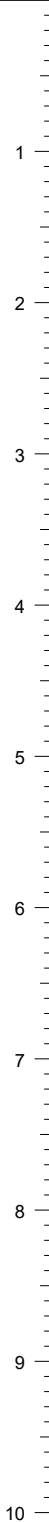
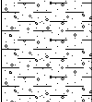
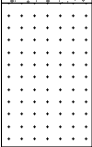
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10		Black TARMACADAM/ASPHALT.		
					0.50		MADE GROUND Dense, light grey, sandy GRAVEL. Gravel is fine to coarse, angular to subangular limestone. Sand is fine to coarse.		
					0.90		MADE GROUND Dense, reddish-brown and brown, very clayey, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular brick and concrete. Rare fragments of wood.	1	
					1.20		MADE GROUND		
					1.50		MADE GROUND Medium dense, brown and dark brown, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular brick, concrete, glass and wood.	2	
					2.50		MADE GROUND Stiff, approximately high strength, reddish-brown, silty, slightly sandy, gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to rounded sandstone and quartzite.	3	
					3.50		GLACIAL DEPOSITS Firm to stiff, approximately medium to high strength, reddish-brown, very silty, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium, subangular sandstone.	4	
					3.80		CHESTER FORMATION Strong, reddish-brown, silty, fine to medium SANDSTONE.	5	
							CHESTER FORMATION End of Borehole at 3.500m	6	
								7	
							8		
							9		

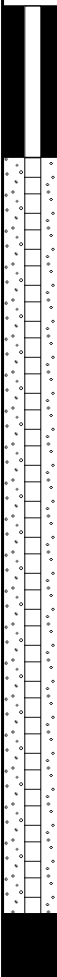
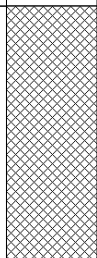
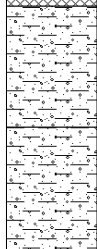
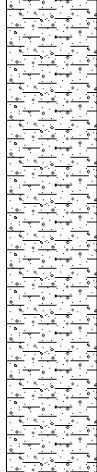
Crew: DMW Drilling Ltd.		Logger: JB		Chiselling Details		
Equipment: Cable percussion drilling rig		Depth Top	Duration	Remarks		
Groundwater Remarks: No groundwater encountered.		3.50	00:45			
General Remarks:		Casing Diameter by Depth				
		Depth Base	Diameter	Remarks		
Hole Started: 09/04/2021		Hole Complete: 09/04/2021		Version: FINAL		Scale: 1:50

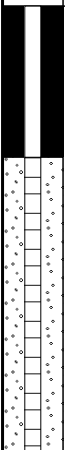
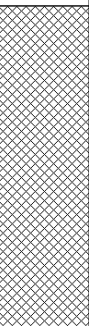
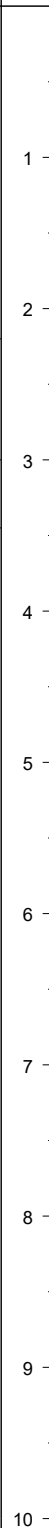
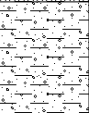


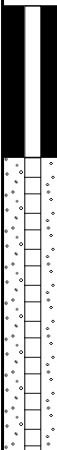
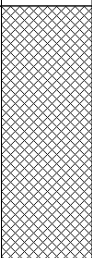
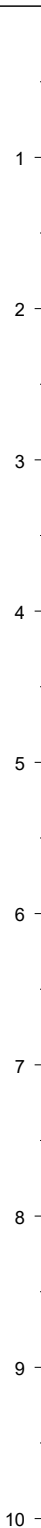
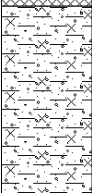
Appendix B – Exploratory Hole Logs

 G&J Geo Environmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. BH101 Sheet 1 of 1					
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 343031E - 396679N		Hole Type CP				
Location: Penrhyn Road, Knowsley, Merseyside				Level: 29.83 m AOD		Scale 1:50				
Client: Knowsley Redevelopments Ltd				Dates: 16/11/2021		Logged By AW				
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.00 - 0.50	B			29.83		Soft reddish brown very sandy CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of sandstone, brick and quartzite. MADE GROUND	1	
		0.50 0.50	D ES							
		1.20 - 1.65	SPTL S S	N=8 (1,1/2,2,2,2)	1.60	28.23		Soft reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded of sandstone. MADE GROUND	2	
		1.20 1.60	D							
		2.00 - 2.45	SPTL S S	N=8 (1,1/1,2,3,2)				Firm reddish brown very sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of quartzite and mudstone. GLACIAL TILL	3	
		2.00								
		3.00 - 3.45	SPTL S B	N=13 (1,2/2,3,4,4)	3.00	26.83		Very stiff reddish brown very sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to rounded of sandstone and occasional quartzite GLACIAL TILL	5	
		3.00 - 3.50 3.00	S							
		4.00 - 4.45	U	Ublow=75 90% Recovery				Dense to very dense reddish brown very clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone. WEATHERED CHESTER FORMATION	7	
		4.50	D		4.50	25.33				
		5.00 - 5.45	SPTL S S	N=40 (6,6/9,10,10,11)				Dense to very dense reddish brown very clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone. WEATHERED CHESTER FORMATION	7	
		5.00								
	6.00 - 6.45	SPTL S D	N=50 (6,9/50 for 285mm)	6.50	23.33		Dense to very dense reddish brown very clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone. WEATHERED CHESTER FORMATION	7		
	6.00 - 6.50 6.00	S								
	7.50	SPTL S	N=50 (7,7/50 for 275mm)	7.95			Dense to very dense reddish brown very clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone. WEATHERED CHESTER FORMATION	7		
	7.95	S								
							End of Borehole at 7.95m		8	
									9	
									10	
Remarks 1) Advanced using a Dando 2000 Cable Percussive drilling rig. 2) Groundwater encountered at 4.2m begl rising to 3.90m begl on completion of borehole.										

		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. BH102 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342914E - 396653N		Hole Type CP			
Location: Penrhyn Road, Knowsley, Merseyside				Level: 27.84 m AOD		Scale 1:50			
Client: Knowsley Redevelopments Ltd				Dates: 16/11/2021		Logged By AW			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 0.20 0.50 - 1.00	D ES B			27.84		Loose to medium dense dark brown clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone and brick fragments. MADE GROUND	
		1.20 - 1.65	SPTL S S	N=8 (1,1/1,2,2,3)					
		1.20							
		1.80	D		1.80	26.04			
		2.00 - 2.45	U	Ublow=60 100% Recovery					
		2.50	D		2.50	25.34			
2.50 - 3.00	B								
		3.00 - 3.45	SPTL S S	50 (25 for 115mm/50 for 245mm)				Firm to stiff reddish brown very sandy slightly gravelly to gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to angular of sandstone. GLACIAL TILL	2
3.00									
								Extremely weak reddish brown thinly bedded weathered, clayey, fine grained SANDSTONE. CHESTER FORMATION	3
							End of Borehole at 3.45m		4
									5
									6
									7
									8
									9
									10
Remarks 1) Advanced using a Dando 2000 Cable Percussive drilling rig. 2) No groundwater encountered.									

		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. BH103 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342975E - 396721N		Hole Type CP			
Location: Penrhyn Road, Knowsley, Merseyside				Level: 29.62 m AOD		Scale 1:50			
Client: Knowsley Redevelopments Ltd				Dates: 17/11/2021		Logged By AW			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50 0.50 0.50	B D ES			29.62		Soft to firm reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of sandstone, quartzite, brick and concrete. MADE GROUND	1
		1.20 - 1.65 1.20 1.70	SPTL S S D	N=12 (2,2/2,3,3,4)	1.70	27.92			
		2.00 - 2.45 2.50	U D	Ublow=44 100% Recovery	2.50	27.12		Stiff reddish brown sandy to very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded sandstone. GLACIAL TILL	2
		3.00 - 3.45 3.00	SPTL S S	N=32 (4,4/5,7,10,10)					
		4.00 - 4.45 4.00	SPTL S S	N=40 (5,7/10,10,11,9)				Very stiff reddish brown very sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded occasionally angular of sandstone, quartzite and mudstone. GLACIAL TILL	3
		5.00 - 5.45 5.00 - 5.50 5.00	SPTL S B S	N=55 (6,6/55 for 285mm)					
		6.00 - 6.45 6.00	SPTL S S	N=50 (7,8/50 for 275mm)	6.45				
	End of Borehole at 6.45m								4
									5
								6	
								7	
								8	
								9	
								10	
Remarks 1) Advanced using a Dando 2000 Cable Percussive drilling rig. 2) No groundwater encountered.									

		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. BH104 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342900E - 396738N		Hole Type CP			
Location: Penrhyn Road, Knowsley, Merseyside				Level: 29.08 m AOD		Scale 1:50			
Client: Knowsley Redevelopments Ltd				Dates: 17/11/2021		Logged By AW			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 0.20 0.50 - 1.00	D ES B			29.08		Soft to firm reddish brown very sandy CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone, quartzite and brick fragments. Strong solvent odor. MADE GROUND	
		1.20 - 1.65 1.20	SPTL S S	N=12 (2,2/2,3,5,2)					
		2.00 - 2.45 2.00 2.50 - 3.00	SPTL S S B	N=26 (3,5/6,6,7,7)	2.20	26.88		Stiff to very stiff reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone and quartzite. GLACIAL TILL	
		3.00 - 3.45 3.00	SPTL S S	50 (25 for 125mm/50 for 285mm)	3.00 3.45	26.08			
		End of Borehole at 3.45m							
Remarks 1) Advanced using a Dando 2000 Cable Percussive drilling rig. 2) Groundwater encountered at 2.20m begl and rose to 1.10m on copletion of borehole.									
									

		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. BH105 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 343028E - 396786N		Hole Type CP			
Location: Penrhyn Road, Knowsley, Merseyside				Level: 30.03 m AOD		Scale 1:50			
Client: Knowsley Redevelopments Ltd				Dates: 18/11/2021		Logged By			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 0.20 0.50 - 1.00	D ES B			30.03		Soft dark grey very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, brick and concrete. MADE GROUND	
		1.20 - 1.65 1.20	SPTL S S	N=6 (1,1/1,2,1,2)	1.70	28.33			
		2.00 - 2.45 2.00 - 2.50 2.00	SPTL S B S	N=36 (6,7/7,9,9,11)	3.00	27.03		Firm to stiff, becoming very stiff, reddish brown very sandy silty, gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone. GLACIAL TILL	
		3.00 - 3.45 3.00	SPTL S S	N=50 (8,10/50 for 265mm)	3.45				
								Weak reddish brown fine grained thinly bedded SANDSTONE. CHESTER FORMATION	
End of Borehole at 3.45m									
Remarks 1) Advanced using a Dando 2000 Cable Percussive drilling rig. 2) No groundwater encountered.									
									

Trial Pit Log

TrialPit No
TP101
Sheet 1 of 1

Project Name: Contract Chemicals, Knowsley

Project No.
GJ224

Co-ords: 342881.19 - 396731.48
Level: 29.16

Date
15/11/2021

Location: Penrhyn Road, Knowsley, Merseyside

Dimensions (m):	2.50
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Scale
1:25

Client: Knowsley Redevelopments Ltd

Depth
2.20

0.70

2.50

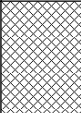
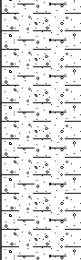
Logged
AW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50 - 0.60 0.50 - 0.60 0.50 - 0.60 1.00 1.20 - 1.30 1.30 - 1.40 1.30 - 1.40	B D ES D B D ES		0.30	28.86		Loose to medium dense reddish brown slightly clayey gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of concrete, brick and sandstone. MADE GROUND	1
				0.80	28.36		Loose dark grey gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of concrete and brick fragments. Strong solvent odor. MADE GROUND	
				1.20	27.96		Firm to stiff dark brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to rounded of sandstone, brick and plastic. Strong solvent odor. MADE GROUND	
				2.20	26.96		Firm reddish brown mottled grey sandy slightly gravelly to gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of sandstone and mudstone. GLACIAL TILL	
				End of Pit at 2.20m				
							3	
							4	
							5	

[illegible]

Stability: Sides generally stable.

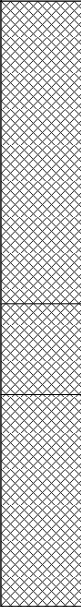


		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP102 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley				Project No. GJ224		Co-ords: 342896.47 - 396767.93 Level: 29.35		Date 15/11/2021	
Location: Penrhyn Road, Knowsley, Merseyside						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: Knowsley Redevelopments Ltd						Depth 1.80		Logged AW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.20 - 0.30	D		0.40	28.95		Loose reddish brown gravelly SAND. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of sandstone and brick fragments. MADE GROUND		
	0.20 - 0.30	ES							
	0.50 - 0.60	D					Firm to stiff reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of quartzite and sandstone. GLACIAL TILL		
	1.40 - 1.50	B		1.30	28.05		Firm to stiff reddish brown sandy to slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of mudstone. GLACIAL TILL		
				1.80	27.55		End of Pit at 1.80m		

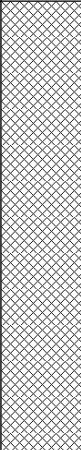
Remarks: 1) Excavated using a tracked 360 excavator. 2) Slight water ingress at 0.2m begl.



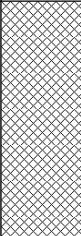
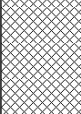
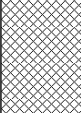
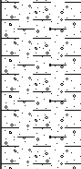
Stability: Sides generally stable.

		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP103 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley				Project No. GJ224		Co-ords: 342939.08 - 396774.39 Level: 29.70		Date 15/11/2021	
Location: Penrhyn Road, Knowsley, Merseyside						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: Knowsley Redevelopments Ltd						Depth 2.00		Logged AW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.50 - 0.60	B D ES		1.00	28.70		Firm reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of quartzite, mudstone and occasional concrete. strong solvent odor. MADE GROUND		
	0.50 - 0.60								
	0.50 - 0.60								
	1.20 - 1.30	B		1.30	28.40		Firm light grey very sandy very gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone and occasional brick fragments. Solvent odor. MADE GROUND		
				2.00	27.70		Firm to stiff reddish brown sandy gravelly to slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone and quartzite. Reworked natural deposits. MADE GROUND		
	End of Pit at 2.00m								
Remarks: 1) Excavated using a tracked 360 excavator. 2) No ground water encountered.									
Stability: Sides generally stable.									



		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP104 Sheet 1 of 1	
Project Name: Contract Chemicals, Knowsley		Project No. GJ224					Co-ords: 342956.75 - 396801.84 Level: 30.82	
Location: Penrhyn Road, Knowsley, Merseyside					Dimensions (m): 0.70		Scale 1:25	
Client: Knowsley Redevelopments Ltd					Depth 1.50		Logged AW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50 0.50	D ES		1.50	29.32		Firm locally soft reddish brown locally very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of sandstone, concrete and glass. Solvent odor. Containing occasional brick and concrete cobbles. MADE GROUND	1
	1.20 - 1.30	B						
								3
								4
								5
Remarks: 1) Excavated using a tracked 360 excavator. 2) No ground water encountered.								
Stability: Sides generally stable.								



		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP105 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley				Project No. GJ224		Co-ords: 342969.31 - 396733.31 Level: 29.97		Date 15/11/2021	
Location: Penrhyn Road, Knowsley, Merseyside						Dimensions (m): 0.70 2.90		Scale 1:25	
Client: Knowsley Redevelopments Ltd						Depth 2.20		Logged AW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.70 - 0.80	B		0.80	29.17		Firm to stiff reddish brown sandy to slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of sandstone, quartzite, concrete, wood and brick fragments. Solvent odor. MADE GROUND		
	0.70 - 0.80	D							
	0.70 - 0.80	ES							
	0.90 - 1.00	D							
	0.90 - 1.00	ES		1.20	28.77		Firm dark brown very sandy sightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of brick, sandstone and wood fragments. containing frequent rootlets. Possible topsoil material. MADE GROUND		
1.50 - 1.60	B		1.60	28.37			Firm to stiff light reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular of sandstone, wood and brick fragments. MADE GROUND		
				... Brick foundation encountered between 1.55m and 1.60m begl.					
					2.20	27.77		Firm light reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular sandstone lithorelicts. WEATHERED CHESTER FORMATION	
	End of Pit at 2.20m								
5									
Remarks: 1) Excavated using a tracked 360 excavator. 2) No ground water encountered.									
Stability: Sides generally stable.									



		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP106 Sheet 1 of 1			
Project Name: Contract Chemicals, Knowsley				Project No. GJ224		Co-ords: 342972.18 - 396770.33 Level: 30.03		Date 15/11/2021		
Location: Penrhyn Road, Knowsley, Merseyside						Dimensions (m): 2.90 0.70		Scale 1:25		
Client: Knowsley Redevelopments Ltd						Depth 2.00		Logged AW		
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results							
▼	0.30 - 0.40 0.30 - 0.40	D ES		1.10	28.93		Firm to stiff reddish brown sandy, locally very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to rounded of sandstone, concrete and brick fragments. Solvent odor. MADE GROUND			1
	0.80 - 1.00	B					Firm to stiff locally soft, reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular sandstone and mudstone. Strong hydrocarbon odor. MADE GROUND			
	1.80 - 1.90	B		1.70	28.33		Loose to medium dense light brown gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular sandstone. WEATHERED CHESTER FORMATION			2
				2.20	27.83		End of Pit at 2.00m			
										3
										4
										5

Remarks: 1) Excavated using a tracked 360 excavator. 2) Groundwater encountered at 1.60m begl and filled base of pit.

Stability: Major side wall collapse.



Trial Pit Log

TrialPit No
TP107
Sheet 1 of 1

Project Name: Contract Chemicals, Knowsley

Project No.
GJ224

Co-ords: 342988.92 - 396780.36
Level: 29.94

Date
15/11/2021

Location: Penrhyn Road, Knowsley, Merseyside

Dimensions (m):	1.80
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Scale
1:25

Client: Knowsley Redevelopments Ltd

Depth
1.50

0.70

1.80

Logged
AW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20	29.74		Firm reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, concrete and brick fragments. MADE GROUND
	0.40 - 0.50	B					Very loose to loose light brown mottled grey gravelly clayey SAND. Sand is fine. Gravel is fine to medium angular sandstone. Hydrocarbon odor. Very wet. MADE GROUND
	0.50 - 0.60	D ES					
				1.00	28.94		Loose to medium dense reddish brown gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to rounded of sandstone. WEATHERED CHESTER FORMATION
	1.20 - 1.30	B					
				1.50	28.44		End of Pit at 1.50m

Remarks:	1) Excavated using a tracked 360 excavator. 2) Groundwater encountered at 0.2m begl.
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Stability: Sides unstable.



		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP108 Sheet 1 of 1	
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 343018.59 - 396784.24 Level: 30.04		Date 15/11/2021		
Location: Penrhyn Road, Knowsley, Merseyside				Dimensions (m): 2.50 0.70		Scale 1:25		
Client: Knowsley Redevelopments Ltd				Depth 2.00		Logged AW		

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼	0.20 - 0.30	B		0.40	29.64	[Cross-hatch pattern]	Firm reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of quartzite, sandstone, and occasional brick and concrete fragments. MADE GROUND	1
	0.50 - 0.60 0.50 - 0.60	D ES					Firm to stiff dark grey sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of quartzite and brick fragments. Strong solvent/ hydrocarbon odor. MADE GROUND	
				1.20	28.84	[Cross-hatch pattern]	Loose to medium dense light grey sandy GRAVEL. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone, brick and concrete. MADE GROUND	
				1.90 2.00	28.14 28.04	[Dotted pattern]	Extremely weak weathered dark reddish brown fine grained thinly bedded SANDSTONE. Recovered as sandy gravel. CHESTER FORMATION End of Pit at 2.00m	
								3
								4
								5

Remarks: 1) Excavated using a tracked 360 excavator. 2) Groundwater encountered at 1.2m begl.

Stability: Sides generally stable.



		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP109 Sheet 1 of 1	
Project Name: Contract Chemicals, Knowsley		Project No. GJ224					Co-ords: 342887.14 - 396666.93 Level: 28.00	
Location: Penrhyn Road, Knowsley, Merseyside					Dimensions (m): 2.30 0.70		Scale 1:25	
Client: Knowsley Redevelopments Ltd					Depth 2.20		Logged AW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼	0.20 - 0.30	D		0.60	27.40		Firm dark brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, quartzite, brick and concrete. MADE GROUND	1
	0.20 - 0.30	ES					Firm to stiff dark greyish black very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, brick, concrete and dressed stone blocks. MADE GROUND	
	0.40 - 0.50	B						
	1.20 - 1.30	B		1.70	26.30		Firm to stiff reddish brown silty, slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular mudstone. WEATHERED CHESTER FORMATION	2
1.20 - 1.30	D							
	1.20 - 1.30	ES		2.20	25.80		End of Pit at 2.20m	3
	1.90 - 2.00	B						
								4
								5

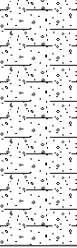
Remarks: 1) Excavated using a tracked 360 excavator. 2) Groundwater encountered at 1.70m begl

Stability: Sides generally stable.



		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP110 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley				Project No. GJ224		Co-ords: 342993.50 - 396717.86 Level: 29.92		Date 18/11/2021	
Location: Penrhyn Road, Knowsley, Merseyside						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: Knowsley Redevelopments Ltd						Depth 2.00		Logged AW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
▼	0.20 - 0.30	D ES		0.40	29.52		Loose to medium dense dark brownish black clayey gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, brick, concrete and plastic. MADE GROUND		
	0.20 - 0.30								
	0.50 - 0.60	B		1.50	28.42		Firm to stiff reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of brick, sandstone and mudstone. MADE GROUND		
1.60 - 1.70	B		1.90	28.02		Loose to medium dense dark brown clayey gravelly SAND. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of quartzite and sandstone. Containing frequent root fragments. Possible former topsoil. GLACIAL TILL			
				2.00	27.92		Firm to stiff reddish brown very sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of sandstone and quartzite. GLACIAL TILL		
							End of Pit at 2.00m		
1 2 3 4 5									
Remarks: 1) Excavated using a tracked 360 excavator. 2) Groundwater encountered at 1.8m begl.									
Stability: Slides generally stable.									



		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP111 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley				Project No. GJ224		Co-ords: 343036.09 - 396809.84 Level: 30.97		Date 18/11/2021	
Location: Penrhyn Road, Knowsley, Merseyside						Dimensions (m): 2.50 0.70		Scale 1:25	
Client: Knowsley Redevelopments Ltd						Depth 1.80		Logged AW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.30	30.67		Loose reddish brown slightly clayey gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone and mudstone. MADE GROUND		
	0.40 - 0.45 0.40 - 0.45 0.50	D ES D		0.50	30.47		Loose light grey sandy GRAVEL. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of limestone and sandstone. MADE GROUND		
	0.90 - 1.00	B					Loose to medium dense reddish brown slightly clayey very gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular sandstone lithorelicts. WEATHERED CHESTER FORMATION	1	
				1.40	29.57		Extremely weak dark reddish brown thinly bedded SANDSTONE. Recovered as a sandy gravel. CHESTER FORMATION		
				1.60	29.37		Weak light yellow fine to medium grained thinly bedded SANDSTONE. Recovered as sandy gravel. CHESTER FORMATION		
				1.80	29.17		End of Pit at 1.80m	2	
								3	
								4	
								5	
Remarks: 1) Excavated using a tracked 360 excavator. 2) No ground water encountered.									
Stability: Sides generally stable.									



		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Trial Pit Log			TrialPit No TP112 Sheet 1 of 1	
Project Name: Contract Chemicals, Knowsley		Project No. GJ224					Co-ords: 343053.75 - 396776.79 Level: 30.65	
Location: Penrhyn Road, Knowsley, Merseyside					Dimensions (m): 2.50 0.70		Scale 1:25	
Client: Knowsley Redevelopments Ltd					Depth 2.20		Logged AW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼	0.20 - 0.30	D		0.14	30.51		Loose to medium dense light grey sandy GRAVEL. Sand is fine to medium. Gravel is fine to medium angular to subangular limestone.	1
	0.20 - 0.30	ES					MADE GROUND	
	0.50 - 0.60	B					Firm to stiff reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone, quartzite and mudstone.	
							MADE GROUND	
	1.10 - 1.30	B		0.90	29.75		Loose to medium dense reddish brown gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular sandstone	2
							WEATHERED CHESTER FORMATION	
				1.70	28.95		Extremely weak weathered reddish brown clayey fine grained SANDSTONE. Recovered as sandy clayey gravel.	3
							CHESTER FORMATION	
				2.20	28.45		End of Pit at 2.20m	4
								5

Remarks: 1) Excavated using a tracked 360 excavator. 2) Groundwater encountered at 0.4m begl.

Stability: Sides generally stable.



Date
18/11/2021

Scale
1:25

Logged
AW

[illegible]

Stability: Sides slightly unstable.



Project Name: Contract Chemicals, Knowsley

Project No.
GJ224

Co-ords: 342979.63 - 396803.36
Level: 30.94

Date
18/11/2021

Location: Penrhyn Road, Knowsley, Merseyside

Dimensions (m): 2.40

Scale
1:25

Client: Knowsley Redevelopments Ltd

Depth
1.70

0.70

2.40

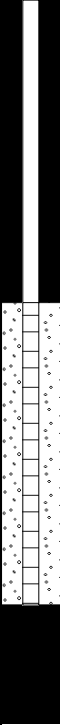
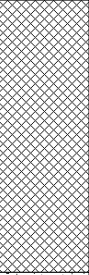
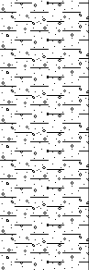
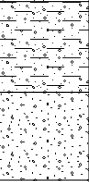
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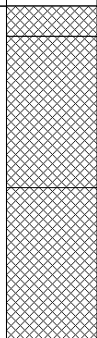
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Stability: Sides generally stable.

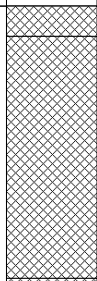
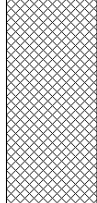
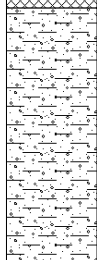




		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS102 Sheet 1 of 1			
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342904E - 396800N		Hole Type WLS				
Location: Penrhyn Road, Knowsley, Merseyside				Level: 30.69 m AOD		Scale 1:25				
Client: Knowsley Redevelopments Ltd				Dates: 16/11/2021		Logged By AW				
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.30 - 0.40 0.30 - 0.40	D ES			30.69		Firm to stiff dark brownish red sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium occasionally coarse angular of brick, concrete, and sandstone. MADE GROUND <i>... Containing brick and concrete cobbles between 0.1m and 0.2m begl.</i>		
		1.00	S	N=8 (2,1/2,2,2,2)	0.90	29.79		Firm reddish brown mottled grey, sandy, locally very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium of subrounded of sandstone and mudstone. GLACIAL TILL		1
		1.90 - 2.00 2.00	D S	N=50 (2,2/50 for 240mm)	1.80 2.10	28.89 28.59		Stiff reddish brown slightly sandy slightly gravelly to gravelly CLAY. Sand is fine to medium. Gravel is fine angular mudstone. WEATHERED CHESTER FORMATION Dense light reddish brown slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium subrounded of sandstone. WEATHERED CHESTER FORMATION		2
				2.39			End of Borehole at 2.39m		3	
									4	
									5	
Remarks 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.										

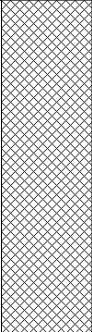
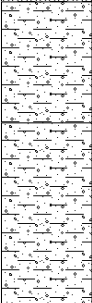
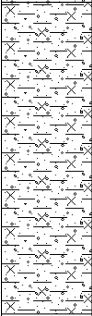
		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS103 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342925E - 396803N		Hole Type WLS			
Location: Penrhyn Road, Knowsley, Merseyside				Level: 30.39 m AOD		Scale 1:25			
Client: Knowsley Redevelopments Ltd				Dates: 16/11/2021		Logged By AW			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	30.39 30.29		Firm to stiff dark reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, brick and concrete. MADE GROUND	
		0.40 - 0.50 0.40 - 0.50	D ES		0.60	29.79		Firm dark grey brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone, brick and concrete. MADE GROUND	
		0.80 - 0.90	D		1.10	29.29		Firm to stiff reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, concrete, and brick fragments. MADE GROUND	
		1.00	S	N=14 (2,2/3,3,4,4)			Firm to stiff becoming very stiff reddish brown sandy slightly gravelly to gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of sandstone and mudstone. GLACIAL TILL		
		2.00	S	N=45 (6,7/9,10,12,14)	2.20	28.19	Very stiff reddish brown sandy to very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of quartzite, sandstone and mudstone. GLACIAL TILL		
		2.30 - 2.40 2.50	D S	50 (11,12/50 for 255mm)	2.81		End of Borehole at 2.81m		
Remarks 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.									

 G&J GeoEnvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS104 Sheet 1 of 1	
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342896E - 396768N		Hole Type WLS
Location: Penrhyn Road, Knowsley, Merseyside				Level: 29.35 m AOD		Scale 1:25
Client: Knowsley Redevelopments Ltd				Dates: 16/11/2021		Logged By AW

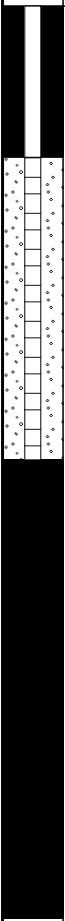
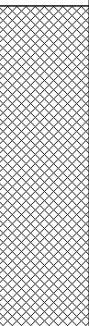
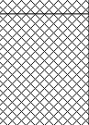
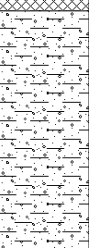
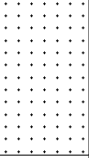
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.30	D	N=0 (0,0/0,0,0,0)	0.10	29.35 29.25		Loose to medium dense light grey clayey gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone, brick and concrete. MADE GROUND	1
		0.20 - 0.30	ES						
		0.40 - 0.50	D		0.90	28.45		Firm to stiff reddish brown grey sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of concrete, brick and sandstone. Slight solvent odor. MADE GROUND	
		1.00	S						
		1.20 - 1.30	D						
		2.00	S	N=50 (10,10/50 for 285mm)	1.60	27.75		Stiff to very stiff reddish brown sandy to very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of quartzite, sandstone and mudstone. GLACIAL TILL	2
					2.44			End of Borehole at 2.44m	3
									4
									5

Remarks
 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.

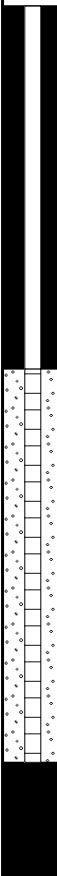


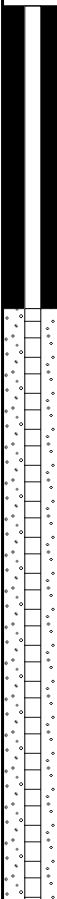
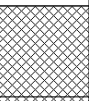
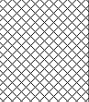
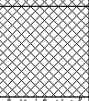
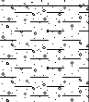
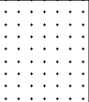
		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log				Borehole No. WS105 Sheet 1 of 1	
Project Name:		Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342885E - 396709N		Hole Type WLS	
Location:		Penrhyn Road, Knowsley, Merseyside				Level: 28.53 m AOD		Scale 1:25	
Client:		Knowsley Redevelopments Ltd				Dates: 16/11/2021		Logged By AW	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.30	D	N=11 (2,2/2,3,3,3)	1.10	27.43		Firm to stiff dark grey sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, concrete, brick and mudstone. MADE GROUND	1
		0.20 - 0.30	ES						
		1.00	S	N=14 (2,2/3,3,4,4)	2.10	26.43		Firm dark brown mottled black, sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded of sandstone, containing frequent carbonaceous fragments. GLACIAL TILL	2
		1.30 - 1.40	D						
		2.00	S	N=50 (8,10/50 for 280mm)	3.13			Firm to stiff reddish brown very sandy slightly gravelly CLAY. Sand is fine. Gravel is fine to medium subangular to subrounded of sandstone. GLACIAL TILL	3
	2.20 - 2.30	D							
	2.70	S					Firm to stiff becoming very stiff reddish brown slightly sandy slightly gravelly CLAY. Sand is fine. Gravel is fine angular mudstone lithorelicts. Contains relict structure. WEATHERED CHESTER FORMATION	4	
								End of Borehole at 3.13m	5
Remarks 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.									
									

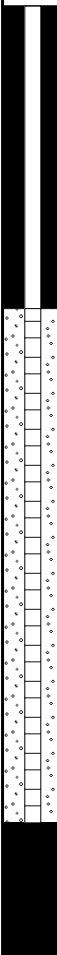
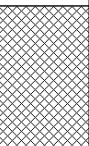
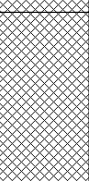
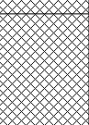
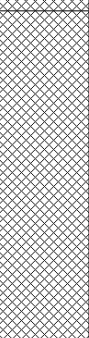
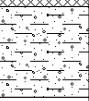
 G&J Geo Environmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS106 Sheet 1 of 1	
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342895E - 396638N		Hole Type WLS
Location: Penrhyn Road, Knowsley, Merseyside				Level: 28.01 m AOD		Scale 1:25
Client: Knowsley Redevelopments Ltd				Dates: 16/11/2021		Logged By AW

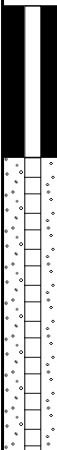
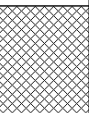
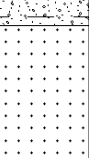
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40 - 0.50 0.40 - 0.50	D ES		28.01		Firm dark brownish black very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone and quartzite. MADE GROUND	1	
		1.00	S	N=0 (0,0/0,0,0,0)	1.10		26.91		
		1.70 - 1.80	D		1.50	26.51		Firm reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular of sandstone and mudstone. GLACIAL TILL	
		2.00	S	N=11 (2,2/2,3,3,3)	2.30	25.71			Medium dense to dense reddish brown slightly gravelly SAND. Sand is fine to medium. Gravel is fine angular sandstone lithorelicts. WEATHERED CHESTER FORMATION
		2.60	S	N=50 (6,10/50 for 265mm)	2.50	25.51			Weak reddish brown thinly bedded fine grained SANDSTONE. CHESTER FORMATION
					3.02			End of Borehole at 3.02m	
	Remarks 1) Advanced using a Premier 110 drilling rig. 2) Groundwater encountered at 1.0m begl.								

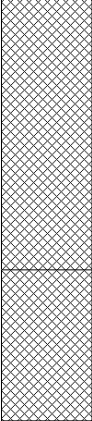
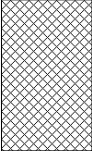
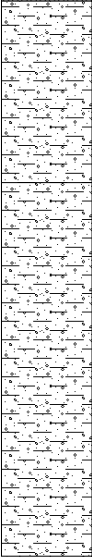
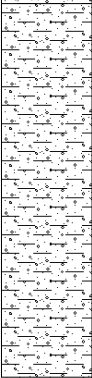


		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS107 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342960E - 396642N		Hole Type WLS			
Location: Penrhyn Road, Knowsley, Merseyside				Level: 28.76 m AOD		Scale 1:25			
Client: Knowsley Redevelopments Ltd				Dates: 17/11/2021		Logged By AW			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
						28.76		Loose light grey sandy GRAVEL. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of limestone. MADE GROUND	1
	0.30 - 0.40	D		0.20	28.56				
	0.30 - 0.40	ES					Loose to medium dense dark brownish black slightly clayey SAND. Sand is fine to medium. Gravel is fine to medium angular to subangular of brick and sandstone. MADE GROUND		
	0.50 - 0.60	D							
	1.00	S	N=12 (4,5/3,3,3,3)						
	1.40 - 1.50	D		1.20	27.56		Firm reddish brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of mudstone and sandstone. GLACIAL TILL	2	
	2.00	S	N=12 (2,3/3,2,3,4)						
	2.30 - 2.35	D		2.20	26.56		Firm dark reddish brown sandy gravelly CLAY. Sand is fine. Gravel is fine to medium angular mudstone lithorelicts. WEATHERED CHESTER FORMATION Extremely weak thinly laminated MUDSTONE. CHESTER FORMATION		
	2.50	S	N=50 (7,10/50 for 255mm)	2.40	26.36				
					2.91		End of Borehole at 2.91m		3
								4	
								5	
Remarks 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.									

		G&J Geoenvrionmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS108 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 342989E - 396692N		Hole Type WLS			
Location: Penrhyn Road, Knowsley, Merseyside				Level: 29.46 m AOD		Scale 1:25			
Client: Knowsley Redevelopments Ltd				Dates: 17/11/2021		Logged By AW			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50 - 0.60 0.50 - 0.60	D D	N=10 (4,4/3,2,2,3)	0.30	29.16		Grass over dark brown very sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of sandstone and brick fragments. MADE GROUND Stiff reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone and occasional brick fragments. MADE GROUND	1
		1.00 - 1.10 1.00	D S	N=10 (4,4/3,2,2,3)	0.90	28.56		Firm to stiff dark greyish black sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of brick and sandstone. MADE GROUND	1
		1.30	28.16		Firm to stiff reddish brown sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of sandstone and mudstone. Geotextile membrane at base of unit. MADE GROUND	2			
		1.60	27.86		Medium dense dark brown slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium subrounded sandstone. WEATHERED CHESTER FORMATION	2			
		2.00	S	N=13 (2,3/3,4,3,3)	2.30	27.16		Firm dark reddish brown very sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular sandstone. WEATHERED CHESTER FORMATION	3
2.40 - 2.50	D	N=48 (7,8/11,12,12,13)	2.80	26.66		Extremely weak to weak reddish brown fine grained slightly clayey SANDSTONE. CHESTER FORMATION	3		
3.00	S	N=48 (7,8/11,12,12,13)	3.35			End of Borehole at 3.35m	4		
								5	
Remarks 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.									

		G&J Geoenviromental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS109 Sheet 1 of 1			
Project Name:		Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 343039E - 396718N		Hole Type WLS		
Location:		Penrhyn Road, Knowsley, Merseyside				Level: 30.10 m AOD		Scale 1:25		
Client:		Knowsley Redevelopments Ltd				Dates: 17/11/2021		Logged By AW		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.20 - 0.30	D	N=7 (1,2/1,2,2,2)	0.50	30.10		Firm to stiff reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of sandstone, brick and concrete. MADE GROUND <i>... Grey sand pocket encountered between 0.1m and 0.15m begl</i>	1	
	0.20 - 0.30	ES								
			0.70 - 0.80	D	N=10 (2,2/2,2,3,3)	1.10	29.60		Firm to stiff reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of quartzite and sandstone. MADE GROUND	
			1.00	S	N=50 (10,10/50 for 255mm)	1.50	29.00		Loose reddish brown slightly gravelly clayey SAND. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of sandstone and quartzite. MADE GROUND	
			1.60 - 1.70	D	N=50 (10,10/50 for 255mm)	2.60	28.60		Loose to medium dense dark reddish brown organic rich clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to subrounded of sandstone, quartzite, wood and frequent rootlets. MADE GROUND	2
		2.00	S	N=50 (10,10/50 for 255mm)	2.90	27.50		Firm to stiff reddish brown gravelly to very sandy CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded of sandstone and quartzite. GLACIAL TILL	3	
		2.70	S	N=50 (10,10/50 for 255mm)	3.11	27.20		Extremely weak reddish brown fine grained thinly bedded SANDSTONE. CHESTER FORMATION End of Borehole at 3.11m	4	
									5	
Remarks 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.										

		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS110 Sheet 1 of 1		
Project Name: Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 343050E - 396789N		Hole Type WLS			
Location: Penrhyn Road, Knowsley, Merseyside				Level: 30.71 m AOD		Scale 1:25			
Client: Knowsley Redevelopments Ltd				Dates: 17/11/2021		Logged By AW			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.30	D ES D		0.40	30.71		Firm to stiff reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subangular of brick sandstone, concrete and limestone. MADE GROUND	
	0.20 - 0.30					30.31			
	0.30 - 0.40								
			1.00	S	N=22 (2,4/4,6,6,6)	1.40	29.31		
		1.50	S	N=60 (10,12/60 for 245mm)	1.90				End of Borehole at 1.90m
Remarks 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.									

		G&J Geoenvironmental 35-37 High Street, Barrow upon Soar, Loughborough, LE12 8PY		Borehole Log			Borehole No. WS111 Sheet 1 of 1		
Project Name:		Contract Chemicals, Knowsley		Project No. GJ224		Co-ords: 343057E - 396660N		Hole Type WLS	
Location:		Penrhyn Road, Knowsley, Merseyside				Level: 30.25 m AOD		Scale 1:25	
Client:		Knowsley Redevelopments Ltd				Dates: 17/11/2021		Logged By AW	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
						30.25		Tarmac. MADE GROUND	1
					0.20	30.05		Dense light grey sandy GRAVEL. Sand is fine to medium. Gravel is fine to medium angular to subangular of limestone. MADE GROUND	
		1.00	S	N=22 (5,10/6,6,5,5)	1.10	29.15		Medium dense dark brown slightly clayey, gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular to subangular of brick and sandstone. MADE GROUND	
		1.40 - 1.50 1.40 - 1.50	D ES		1.60	28.65		Firm dark reddish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of quartzite and sandstone. GLACIAL TILL	
		2.00	S	N=13 (2,3/3,3,3,4)	2.20	28.05		Firm to stiff dark reddish brown very sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subrounded to rounded of quartzite and sandstone. GLACIAL TILL	
		2.30 - 2.40	D						
		3.00	S	N=50 (6,10/50 for 285mm)				3	
					3.44			End of Borehole at 3.44m	4
Remarks 1) Advanced using a Premier 110 drilling rig. 2) No groundwater encountered.									



Appendix C – Investigation Photos



TP101



TP101 Spoil



TP102



TP102 Spoil

DO NOT SCALE
NOTES:



G&J Geoenvironmental Consultants Ltd
35-37 High Street, Barrow Upon Soar,
Loughborough, Leicestershire
Tel: 01509 410372

CLIENT:

Knowsley Redevelopments Ltd

PROJECT:

Contract Chemicals Knowsley

TITLE:

Exploratory Hole Photographs

SCALE@SIZE :

NTS

ISSUE:

FINAL

DESIGN/DRAWN by :

AW

DATE:

January 2022

PROJECT No:

GJ224

DRAWING No:

01

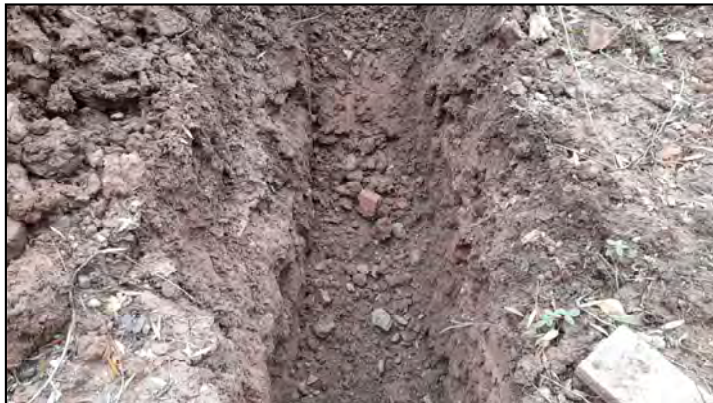
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TP103



TP103 Spoil



TP104



TP104 Spoil

DO NOT SCALE
NOTES:



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CLIENT:

Knowsley Redevelopments Ltd

PROJECT:

Contract Chemicals Knowsley

TITLE:

Exploratory Hole Photographs

SCALE@SIZE :

NTS

ISSUE:

FINAL

DESIGN/DRAWN by :

AW

DATE:

January 2022

PROJECT No:

GJ224

DRAWING No:

02

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TP105



TP105 Spoil



TP106



TP106 Spoil

DO NOT SCALE
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CLIENT:

Knowsley Redevelopments Ltd

PROJECT:

Contract Chemicals Knowsley

TITLE:

Exploratory Hole Photographs

SCALE@SIZE :

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DESIGN/DRAWN by :

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PROJECT No:

GJ224

DRAWING No:

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TP107



TP107 Spoil



TP108



TP108 Spoil

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CLIENT:

Knowsley Redevelopments Ltd

PROJECT:

Contract Chemicals Knowsley

TITLE:

Exploratory Hole Photographs

SCALE@SIZE :

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ISSUE:

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DESIGN/DRAWN by :

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PROJECT No:

GJ224

DRAWING No:

04

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TP019



TP109 Spoil



TP110



TP110 Spoil

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CLIENT:

Knowsley Redevelopments Ltd

PROJECT:

Contract Chemicals Knowsley

TITLE:

Exploratory Hole Photographs

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PROJECT No:

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TP111



TP111 Spoil



TP112



TP112 Spoil

DO NOT SCALE
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CLIENT:

Knowsley Redevelopments Ltd

PROJECT:

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TITLE:

Exploratory Hole Photographs

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PROJECT No:

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TP113



TP113 Spoil



TP114



TP114 Spoil

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CLIENT:

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PROJECT:

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TITLE:

Exploratory Hole Photographs

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WS101



WS102



WS103

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TITLE:

Exploratory Hole Photographs

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WS104



WS105



WS106

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PROJECT:

Contract Chemicals Knowsley

TITLE:

Exploratory Hole Photographs

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GJ224

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09

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WS107



WS108



WS109

DO NOT SCALE
NOTES:



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CLIENT:
Knowsley Redevelopments Ltd

PROJECT:
Contract Chemicals Knowsley

TITLE:
Exploratory Hole Photographs

SCALE@SIZE : NTS	ISSUE: FINAL
DESIGN/DRAWN by : AW	DATE: January 2022
PROJECT No: GJ224	DRAWING No: 10

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WS110



WS111

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CLIENT:

Knowsley Redevelopments Ltd

PROJECT:

Contract Chemicals Knowsley

TITLE:

Exploratory Hole Photographs

SCALE@SIZE :

NTS

ISSUE:

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DATE:

January 2022

PROJECT No:

GJ224

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Appendix D – Gas and Groundwater Monitoring Results

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Email: info@gjgeoenvironmental.com



GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	Knowsley Redevelopments Ltd		Job No:	GJ224	Instruments:	GA5000				
Project Name:	Contract Chemicals, Knowsley		Date:	06/12/2021	Monitored By:	RCW (Enital)				
Weather:	Overcast, rain				GA Serial No:	G500669				
Exploratory Hole No.	Peak ¹		Steady ²			Flow Rate	Atmospheric Pressure	Water Depth	Base Depth	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂					
	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)					
BH101	0.1	0.6	0.1	0.6	18.3	0.00	1003	2.32	8.38	0,0
BH103	0.0	1.0	0.0	0.8	20.8	0.00	1002	1.85	6.30	0,0
BH104	0.3	0.1	0.3	0.1	20.9	0.00	1003	0.66	3.02	0,0
BH105	0.3	0.2	0.3	0.1	17.4	0.50	1002	0.95	3.10	0,10
WS101	0.1	1.6	0.1	1.6	20.1	-0.40	1003	0.99	3.46	0,0
WS102	0.0	1.1	0.0	1.1	20.0	0.00	1002	1.01	2.56	0,0
WS106	0.0	0.5	0.0	0.5	6.9	0.00	1003	1.33	2.04	0,0
WS107	2.3	5.5	2.3	5.5	14.2	1.20	1003	2.00	3.55	0,0
WS108	12.3	3.1	12.3	3.1	9.7	0.10	1002	2.79	3.10	0,0
WS109	0.2	1.2	0.0	1.2	18.2	0.70	1002	2.18	3.21	0,0
WS110	0.0	0.2	0.0	0.2	20.3	0.00	1002	1.39	2.08	0,0
GRM-BH04	0.0	3.2	0.0	1.9	18.3	0.00	1003	2.40	2.99	0,0

Background Gas Levels:

	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Atmos (mbar)
Before Monitoring	0.0	0.1	20.9	1003
After Monitoring	0.0	0.1	20.9	1002

- 1 The peak reading is the maximum recorded level during a monitoring event.
- 2 The steady reading is the level which remained constant after approximately 1 minute.

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GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	Knowsley Redevelopments Ltd		Job No:	GJ224	Instruments:	GA5000				
Project Name:	Contract Chemicals, Knowsley		Date:	16/12/2021	Monitored By:	RCW (Enitial)				
Weather:	Overcast, dry, 14°C				GA Serial No:	G507573				
Exploratory Hole No.	Peak ¹		Steady ²			Flow Rate	Atmospheric Pressure	Water Depth	Base Depth	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂					
	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)					
WS101	0	1.5	0	1.4	19.9	0	1035	0.36	2.71	
WS102	0	0.8	0	0.8	19.9	-0.1	1035	1.43	2.02	
WS106	0	0.1	0	0.1	18.3	0	1035	0.79	1.46	
WS107	2.5	6.9	2.5	6.9	14.3	0.3	1035	1.32	2.92	Peak flow 4.8l/hr
WS108										Unable to locate - suspect chamber may be destroyed
WS109	0	1.2	0	1.2	18.3	-0.1	1035	1.33	2.36	Peak flow -0.5l/hr
WS110	0	0.2	0	0.2	19.1	-0.1	1035	0.99	1.57	
BH101										Unable to locate - suspect chamber may be destroyed
BH103	13.7	6.5	13.7	6.5	3.4	-0.1	1035	1.33	5.78	Peak flow -0.6l/hr
BH104	0.9	0.1	0.9	0	20	-0.2	1035	0.29	2.61	Peak flow -2.9l/hr
BH105	0.3	0.2	0.3	0.2	16.4	0.2	1035	0.67	2.78	Peak flow 1.7l/hr
GRM-BH04	0	0.1	0	0.1	21	0	1036	1.35	2.52	

Background Gas Levels:

	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Atmos (mbar)
Before Monitoring	0.0	0.1	20.9	1035
After Monitoring	0.0	0.1	21.0	1035

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

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GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	Knowsley Redevelopments Ltd		Job No:	GJ224	Instruments:	GA5000				
Project Name:	Contract Chemicals, Knowsley		Date:	23/12/2021	Monitored By:	RCW (Enital)				
Weather:	Overcast, dry, 12°C				GA Serial No:	G507573				
Exploratory Hole No.	Peak ¹		Steady ²			Flow Rate	Atmospheric Pressure	Water Depth	Base Depth	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂					
	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)					
WS101	0	1.3	0	1.2	20.3	0	1001	0.31	2.69	
WS102	0	1.7	0	1.7	19.5	0	1000	1.88	2.02	
WS106	0	0.1	0	0.1	18.5	0	1000	0.89	1.48	
WS107	3.9	8.6	3.9	8.6	9.7	0.2	1000	1.56	2.90	Peak flow 3.2l/hr
WS108										Borehole buried
WS109	0	1.7	0	1.7	16.9	0.2	1000	1.39	2.34	Peak flow 2.2l/hr
WS110	0	0.3	0	0.3	20.1	0	1001	1.15	1.56	
BH101										Borehole buried
BH103	14.1	8.1	14.1	8.1	2.8	0.1	1001	1.29	5.80	Peak flow 2.3l/hr
BH104	0.7	0.2	0.7	0.1	19	0.3	1000	0.39	2.62	Peak flow 8.8l/hr. Peak VOC 174ppm
BH105	0.1	0.2	0.1	0.1	18	0.1	1000	0.44	2.78	
GRM-BH04	0	6.6	0	5.4	12.3	0	1001	1.42	2.52	

Background Gas Levels:

	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Atmos (mbar)
Before Monitoring	0.0	0.1	21.0	1001
After Monitoring	0.0	0.1	21.0	1000

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

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GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	Knowsley Redevelopments Ltd		Job No:	GJ224	Instruments:	GA5000				
Project Name:	Contract Chemicals, Knowsley		Date:	29/12/2021	Monitored By:	RCW (Enital)				
Weather:	Overcast, dry, 11°C				GA Serial No:	G507573				
Exploratory Hole No.	Peak ¹		Steady ²			Flow Rate	Atmospheric Pressure	Water Depth	Base Depth	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂					
	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)					
WS101	0	1.6	0	1.6	20.1	0.1	991	0.28	2.70	Peak flow 1.0l/hr
WS102	0	1	0	1	19.8	0.1	991	0.44	2.02	
WS106	0	0.1	0	0.1	18.6	0	991	0.64	1.50	
WS107	3.5	8.7	3.5	8.7	10.3	0.3	992	0.33	2.91	Peak flow 11.9l/hr
WS108										Borehole buried
WS109	0.2	1.5	0.2	1.5	15.2	0.2	990	1.34	2.34	Peak flow 2.6l/hr
WS110	0	0.2	0	0.2	19.9	0	991	0.77	1.58	
BH101										Borehole buried
BH103	3.7	2.6	3.6	2.6	16.6	0.1	991	1.34	5.80	Peak flow 2.4l/hr
BH104	0.9	0.2	0.9	0.1	19	0.2	991	0.34	2.62	Peak flow 2.8l/hr. Peak VOC 308ppm
BH105	0.1	0.2	0.1	0.1	18.2	0.1	990	0.44	2.79	Peak flow 0.9l/hr
GRM-BH04	0	4	0	1.7	18.6	0	992	1.22	2.52	

Background Gas Levels:

	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Atmos (mbar)
Before Monitoring	0.0	0.1	20.9	991
After Monitoring	0.0	0.1	21.1	992

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

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GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	Knowsley Redevelopments Ltd		Job No:	GJ224	Instruments:	GA5000				
Project Name:	Contract Chemicals, Knowsley		Date:	06/01/2022	Monitored By:	RCW (Enitial)				
Weather:	Overcast, snow				GA Serial No:	G502053				
Exploratory Hole No.	Peak ¹		Steady ²			Flow Rate	Atmospheric Pressure	Water Depth	Base Depth	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂					
	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)					
BH101										Borehole lost/destroyed
BH103	4.8	3.1	4.8	3.1	17	0	1007	1.82	6.30	0,0
BH104	0.7	0.1	0.7	0.1	20.1	0	1007	0.70	3.03	0,24
BH105	0.1	0.1	0.1	0.1	19.5	-0.1	1006	0.74	3.10	0,6
WS101	0	0.8	0	0.7	21.1	0	1006	1.07	3.43	0,0
WS102	0	0.4	0	0.4	21.3	0	1006	1.66	2.55	0,0
WS106	0	0.2	0	0.1	17.4	0	1007	1.35	2.03	0,0
WS107	3.6	9.5	3.4	9.4	11.5	0.3	1007	1.89	3.56	0,1
WS108										Borehole lost/destroyed
WS109	0	1.5	0	1.5	12.8	0	1005	2.17	3.17	0,0
WS110	0	0.2	0	0.2	20.2	0	1006	1.58	2.08	0,0
GRM-BH04	0	2	0	1.2	19.2	0	1007	2.03	3.07	0,0

Background Gas Levels:

	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Atmos (mbar)
Before Monitoring	0.0	0.1	20.9	1007
After Monitoring	0.0	0.1	21.6	1006

- 1 The peak reading is the maximum recorded level during a monitoring event.
2 The steady reading is the level which remained constant after approximately 1 minute.

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GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	Knowsley Redevelopments Ltd				Job No:	GJ224	Instruments:	GA5000		
Project Name:	Contract Chemicals, Knowsley				Date:	14/01/2022	Monitored By:	Ian Sidgwick		
Weather:	Overcast, dry, 5°C						GA Serial No:	G507573		
Exploratory Hole No.	Peak ¹		Steady ²			Flow Rate	Atmospheric Pressure	Base Depth	Remarks	CO
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂					
	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)					
BH101	NR	NR	NR	NR	NR	NR	NR	NR	NR	Borehole buried
BH103	ND	0.1	ND	0.1	20.8	0.00	1010	1.39	5.81	Peak flow -0.6l/hr. CO: ND; H2S: ND; VOC: 0.1ppm
BH104	0.7	0.2	0.7	0.1	20.2	-0.10	1011	0.36	2.60	Peak flow -1.0l/hr. Peak VOC 98ppm. CO: 12ppm; H2S: ND; VOC: 54ppm
BH105	0.1	0.1	0.1	0.1	19.1	-0.20	1011	0.45	2.78	Peak flow -3.0l/hr. CO: 4ppm; H2S: ND; VOC: 0.1ppm
WS101	ND	1.3	ND	1.2	20.4	0.00	1011	0.32	2.69	CO: ND; H2S: ND; VOC: ND
WS102	ND	0.5	ND	0.5	20.5	0.00	1011	0.45	2.02	CO: 1ppm; H2S: ND; VOC: 0.2ppm
WS106	ND	0.1	ND	0.1	13.4	0.00	1011	0.62	1.50	Peak flow -0.4l/hr. CO: ND; H2S: ND; VOC: 15.3ppm
WS107	3.3	8.2	3.3	8.2	12.5	0.20	1011	1.21	2.87	Peak flow 2.6l/hr. CO: 1ppm; H2S: ND; VOC: 1.2ppm
WS108	NR	NR	NR	NR	NR	NR	NR	NR	NR	Borehole buried
WS109	ND	1.6	ND	1.6	11.9	0.00	1011	1.30	2.34	CO: ND; H2S: ND; VOC: 0.1ppm
WS110	ND	0.3	ND	0.3	19.6	0.00	1011	0.78	1.57	CO: ND; H2S: ND; VOC: 0.7ppm
GRM-BH04	ND	0.1	ND	0.1	20.7	0.00	1011	1.26	2.52	CO: ND; H2S: ND; VOC: 0.3ppm

Background Gas Levels:

	CH ₄	CO ₂	O ₂	Atmos
	(%)	(%)	(%)	(mbar)
Before Monitoring	0.0	0.1	20.7	1010
After Monitoring	0.0	0.1	20.9	1011

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.



Appendix E – Soil and Groundwater Chemical Analysis Certificates



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G & J Geoenvironmental Consultants Ltd
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Barrow-upon-Soar
Loughborough
Leicestershire
LE12 8PY

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 21-13971

Site Reference: Penrhyn Road, Knowsley

Project / Job Ref: GJ224

Order No: GJ224

Sample Receipt Date: 23/11/2021

Sample Scheduled Date: 23/11/2021

Report Issue Number: 1

Reporting Date: 29/11/2021

Authorised by:

Ela Mysiara
Quality Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



DETS Ltd
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Soil Analysis Certificate						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	15/11/21	15/11/21	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP101	TP101	TP103	TP105	TP106
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	1.30 - 1.40	0.50 - 0.60	0.90 - 1.00	0.30 - 0.40
Reporting Date: 29/11/2021	DETS Sample No	576213	576214	576216	576219	576220

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	8.9	7.9	10.5	8.1	8.2
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	255	33	155	28	62
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.25	0.03	0.16	0.03	0.06
Total Sulphur	%	< 0.02	NONE	0.07	< 0.02	0.07	0.02	< 0.02
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Organic Matter (SOM)	%	< 0.1	MCERTS	1.2	0.7	1.5	3.3	0.9
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.7	0.4	0.9	1.9	0.5
Arsenic (As)	mg/kg	< 2	MCERTS	5	7	6	5	7
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	12	40	26	19	32
Copper (Cu)	mg/kg	< 4	MCERTS	12	12	15	38	14
Lead (Pb)	mg/kg	< 3	MCERTS	18	6	16	78	7
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	9	36	20	16	33
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	163	38	136	119	36
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	33	< 6	60	69	7

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	16/11/21	16/11/21	16/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP107	TP108	WS101	WS102	WS103
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40	0.40 - 0.50
Reporting Date: 29/11/2021	DETS Sample No	576221	576222	576223	576224	576225

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					Amosite present as fibre bundle
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					Amosite
pH	pH Units	N/a	MCERTS	8.7	9.4	7.6	7.9	8.6
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	50	25	< 10	17	389
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.05	0.02	< 0.01	0.02	0.39
Total Sulphur	%	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	0.14
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Organic Matter (SOM)	%	< 0.1	MCERTS	0.4	0.6	1.1	1.1	1.2
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.2	0.3	0.7	0.6	0.7
Arsenic (As)	mg/kg	< 2	MCERTS	5	6	5	5	4
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	11	14	22	20	16
Copper (Cu)	mg/kg	< 4	MCERTS	8	8	16	12	15
Lead (Pb)	mg/kg	< 3	MCERTS	3	13	24	12	21
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	10	12	13	16	11
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	26	30	48	49	57
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	< 6	331	39	< 6	18

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 21-13971	Date Sampled	16/11/21	16/11/21	16/11/21	17/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS104	WS105	WS106	WS107	WS108
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.40 - 0.50	0.30 - 0.40	1.00 - 1.10
Reporting Date: 29/11/2021	DETS Sample No	576226	576227	576228	576229	576230

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	8.6	8.3	7.7	7.5	7.3
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	82	411	58	43	56
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.08	0.41	0.06	0.04	0.06
Total Sulphur	%	< 0.02	NONE	0.04	0.24	< 0.02	0.07	0.02
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Organic Matter (SOM)	%	< 0.1	MCERTS	1.3	2.2	1.7	2.5	2.5
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.8	1.3	1	1.5	1.5
Arsenic (As)	mg/kg	< 2	MCERTS	6	8	2	9	4
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.8	2.3	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	27	15	11	8	13
Copper (Cu)	mg/kg	< 4	MCERTS	16	20	7	11	10
Lead (Pb)	mg/kg	< 3	MCERTS	8	56	13	26	14
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	28	86	7	5	8
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	129	102	30	23	25
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	9	< 6	16	39	27

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 21-13971	Date Sampled	17/11/21	17/11/21	16/11/21	16/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS109	WS110	BH101	BH102	WS111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.50	0.20	1.10 - 1.50
Reporting Date: 29/11/2021	DETS Sample No	576231	576232	576233	576234	576235

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	7.6	7.8	10.2	7.4	7.5
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	14	13	178	1670	55
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.01	0.01	0.18	1.67	0.06
Total Sulphur	%	< 0.02	NONE	< 0.02	< 0.02	0.06	0.32	0.02
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Organic Matter (SOM)	%	< 0.1	MCERTS	1.2	0.5	0.9	2	2.9
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.7	0.3	0.5	1.2	1.7
Arsenic (As)	mg/kg	< 2	MCERTS	4	2	5	3	3
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	13	11	17	10	8
Copper (Cu)	mg/kg	< 4	MCERTS	9	< 4	11	7	11
Lead (Pb)	mg/kg	< 3	MCERTS	12	5	29	9	24
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	8	4	10	5	5
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	23	16	39	14	31
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	64

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 21-13971	Date Sampled	16/11/21	18/11/21	18/11/21	18/11/21	18/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH103	TP109	TP109	TP110	TP111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50	0.20 - 0.30	1.20 - 1.30	0.20 - 0.30	0.40 - 0.45
Reporting Date: 29/11/2021	DETS Sample No	576236	576237	576238	576239	576240

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE					
Asbestos Type ^(S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	7.7	8.1	8.6	8.4	8.9
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	60	264	158	31	42
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.06	0.26	0.16	0.03	0.04
Total Sulphur	%	< 0.02	NONE	< 0.02	0.07	0.07	0.03	0.03
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Organic Matter (SOM)	%	< 0.1	MCERTS	1.8	1.9	2.1	3.5	4.5
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1.1	1.1	1.2	1.6	2.6
Arsenic (As)	mg/kg	< 2	MCERTS	6	5	< 2	3	< 2
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	0.2	0.4	0.3
Chromium (Cr)	mg/kg	< 2	MCERTS	18	10	10	9	9
Copper (Cu)	mg/kg	< 4	MCERTS	23	12	14	33	7
Lead (Pb)	mg/kg	< 3	MCERTS	38	35	40	63	10
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	14	6	8	10	4
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	55	63	62	98	37
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	75	68	29	309	< 6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 21-13971	Date Sampled	18/11/21	18/11/21	17/11/21	18/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP112	TP114	BH104	BH105	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.30 - 0.40	0.20	0.20	
Reporting Date: 29/11/2021	DETS Sample No	576241	576242	576243	576244	

Determinand	Unit	RL	Accreditation	(n)			
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE				
Asbestos Type ^(S)	PLM Result	N/a	ISO17025				
pH	pH Units	N/a	MCERTS	8.8	8.1	10.9	9.6
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	19	99	97	82
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.02	0.10	0.10	0.08
Total Sulphur	%	< 0.02	NONE	< 0.02	0.03	0.03	0.07
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	65
Organic Matter (SOM)	%	< 0.1	MCERTS	1.8	1.7	0.6	0.6
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1.1	1	0.3	0.4
Arsenic (As)	mg/kg	< 2	MCERTS	< 2	22	< 2	< 2
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.3	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	7	53	26	16
Copper (Cu)	mg/kg	< 4	MCERTS	< 4	56	16	6
Lead (Pb)	mg/kg	< 3	MCERTS	6	49	8	8
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	5	14	33	10
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	21	204	134	44
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	< 6	19	216	368

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	15/11/21	15/11/21	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP101	TP101	TP103	TP105	TP106
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	1.30 - 1.40	0.50 - 0.60	0.90 - 1.00	0.30 - 0.40
Reporting Date: 29/11/2021	DETS Sample No	576213	576214	576216	576219	576220

Determinand	Unit	RL	Accreditation	(n)				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.66	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.15	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.68	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.77	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.06	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.17	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	2.58	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.70	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	2.09	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.76	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.20	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.59	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	15.4	< 1.6

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	16/11/21	16/11/21	16/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP107	TP108	WS101	WS102	WS103
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40	0.40 - 0.50
Reporting Date: 29/11/2021	DETS Sample No	576221	576222	576223	576224	576225

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.12
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.16
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.15
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-13971	Date Sampled	16/11/21	16/11/21	16/11/21	17/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS104	WS105	WS106	WS107	WS108
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.40 - 0.50	0.30 - 0.40	1.00 - 1.10
Reporting Date: 29/11/2021	DETS Sample No	576226	576227	576228	576229	576230

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.11	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	1.10	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.32	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.14	0.13	1.77	0.30
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.14	0.12	1.44	0.30
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.57	0.13
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.59	0.19
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.69	0.22
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.25	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.59	0.18
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.44	0.14
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.41	0.14
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	8.3	1.6



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-13971	Date Sampled	17/11/21	17/11/21	16/11/21	16/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS109	WS110	BH101	BH102	WS111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.50	0.20	1.10 - 1.50
Reporting Date: 29/11/2021	DETS Sample No	576231	576232	576233	576234	576235

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.12
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.74
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.21
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.13	1.92
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.13	1.69
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.71
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.88
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.98
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.35
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.81
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.56
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.54
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	9.5



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-13971	Date Sampled	16/11/21	18/11/21	18/11/21	18/11/21	18/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH103	TP109	TP109	TP110	TP111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50	0.20 - 0.30	1.20 - 1.30	0.20 - 0.30	0.40 - 0.45
Reporting Date: 29/11/2021	DETS Sample No	576236	576237	576238	576239	576240

Determinand	Unit	RL	Accreditation	(n)		(n)	
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.27	< 0.1	0.22
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.41
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.25
Phenanthrene	mg/kg	< 0.1	MCERTS	0.34	0.44	0.17	2.82
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.54
Fluoranthene	mg/kg	< 0.1	MCERTS	1.36	0.52	0.16	4.27
Pyrene	mg/kg	< 0.1	MCERTS	1.50	0.51	0.16	4.13
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.64	< 0.1	< 0.1	2.10
Chrysene	mg/kg	< 0.1	MCERTS	0.81	0.25	< 0.1	2.10
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	1.05	0.26	< 0.1	3.41
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.35	< 0.1	< 0.1	1.19
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.85	0.21	< 0.1	3.26
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.57	0.15	< 0.1	2.82
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.39
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.56	0.15	< 0.1	3.01
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	8	2.7	< 1.6	30.9



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-13971	Date Sampled	18/11/21	18/11/21	17/11/21	18/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP112	TP114	BH104	BH105	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.30 - 0.40	0.20	0.20	
Reporting Date: 29/11/2021	DETS Sample No	576241	576242	576243	576244	

Determinand	Unit	RL	Accreditation	(n)			
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.22	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.16	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.67	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.23	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.17	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6



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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	15/11/21	15/11/21	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP101	TP101	TP103	TP105	TP106
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	1.30 - 1.40	0.50 - 0.60	0.90 - 1.00	0.30 - 0.40
Reporting Date: 29/11/2021	DETS Sample No	576213	576214	576216	576219	576220

Determinand	Unit	RL	Accreditation	(n)				
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	4	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	14	< 3	10	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	24	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	38	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	4	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	11	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	5	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	18	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	24	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	42	< 42	< 42

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	16/11/21	16/11/21	16/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP107	TP108	WS101	WS102	WS103
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40	0.40 - 0.50
Reporting Date: 29/11/2021	DETS Sample No	576221	576222	576223	576224	576225

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	6	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	8	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	16	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	12	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	14	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	55	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	17	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	16	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	26	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	9	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	26	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	93	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	149	< 42	< 42	< 42



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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 21-13971	Date Sampled	16/11/21	16/11/21	16/11/21	17/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS104	WS105	WS106	WS107	WS108
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.40 - 0.50	0.30 - 0.40	1.00 - 1.10
Reporting Date: 29/11/2021	DETS Sample No	576226	576227	576228	576229	576230

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	8	4
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42



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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 21-13971	Date Sampled	17/11/21	17/11/21	16/11/21	16/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS109	WS110	BH101	BH102	WS111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.50	0.20	1.10 - 1.50
Reporting Date: 29/11/2021	DETS Sample No	576231	576232	576233	576234	576235

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	9
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	17
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	26
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42



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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 21-13971	Date Sampled	16/11/21	18/11/21	18/11/21	18/11/21	18/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH103	TP109	TP109	TP110	TP111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50	0.20 - 0.30	1.20 - 1.30	0.20 - 0.30	0.40 - 0.45
Reporting Date: 29/11/2021	DETS Sample No	576236	576237	576238	576239	576240

Determinand	Unit	RL	Accreditation	(n)		(n)	
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	5	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	0.02	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	0.06	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	6	5	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	3	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	4	2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	7	4	< 3	27
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	92
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	127
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	127



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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 21-13971	Date Sampled	18/11/21	18/11/21	17/11/21	18/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP112	TP114	BH104	BH105	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.30 - 0.40	0.20	0.20	
Reporting Date: 29/11/2021	DETS Sample No	576241	576242	576243	576244	

Determinand	Unit	RL	Accreditation	(n)			
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	0.17
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	17	62
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	25	38
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	13	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	54	101
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	0.09	0.11
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	6	2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	14	21
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	66	12
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	41	3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	18	16
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	144	54
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	199	154



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	15/11/21	15/11/21	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP101	TP101	TP103	TP105	TP106
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	1.30 - 1.40	0.50 - 0.60	0.90 - 1.00	0.30 - 0.40
Reporting Date: 29/11/2021	DETS Sample No	576213	576214	576216	576219	576220

Determinand	Unit	RL	Accreditation	(n)				
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	7	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	4	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	26	4	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	9	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	16/11/21	16/11/21	16/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP107	TP108	WS101	WS102	WS103
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40	0.40 - 0.50
Reporting Date: 29/11/2021	DETS Sample No	576221	576222	576223	576224	576225

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	10	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	59	25	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	494	86	11	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	296	28	8	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-13971	Date Sampled	16/11/21	16/11/21	16/11/21	17/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS104	WS105	WS106	WS107	WS108
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.40 - 0.50	0.30 - 0.40	1.00 - 1.10
Reporting Date: 29/11/2021	DETS Sample No	576226	576227	576228	576229	576230

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	16	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	5	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-13971	Date Sampled	17/11/21	17/11/21	16/11/21	16/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS109	WS110	BH101	BH102	WS111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	0.50	0.20	1.10 - 1.50
Reporting Date: 29/11/2021	DETS Sample No	576231	576232	576233	576234	576235

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	3	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-13971	Date Sampled	16/11/21	18/11/21	18/11/21	18/11/21	18/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH103	TP109	TP109	TP110	TP111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50	0.20 - 0.30	1.20 - 1.30	0.20 - 0.30	0.40 - 0.45
Reporting Date: 29/11/2021	DETS Sample No	576236	576237	576238	576239	576240

Determinand	Unit	RL	Accreditation	(n)		(n)	
Benzene	ug/kg	< 2	MCERTS	< 2	7	17	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	6	56	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	16	246	< 2
p & m-xylene	ug/kg	< 2	MCERTS	2	56	78	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	22	34	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-13971	Date Sampled	18/11/21	18/11/21	17/11/21	18/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP112	TP114	BH104	BH105	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.30 - 0.40	0.20	0.20	
Reporting Date: 29/11/2021	DETS Sample No	576241	576242	576243	576244	

Determinand	Unit	RL	Accreditation	(n)				
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	89	111	
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	25	160	
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	112	305	
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	63	71	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	



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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	15/11/21	15/11/21	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP101	TP101	TP103	TP105	TP106
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	1.30 - 1.40	0.50 - 0.60	0.90 - 1.00	0.30 - 0.40
Reporting Date: 29/11/2021	DETS Sample No	576213	576214	576216	576219	576220

Determinand	Unit	RL	Accreditation	(n)		
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2
m,p-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2
o-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	22	12	4444
1,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



DETS Ltd
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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 21-13971	Date Sampled	15/11/21	16/11/21	16/11/21	17/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP108	WS102	WS104	WS107	WS108
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	0.30 - 0.40	0.20 - 0.30	0.30 - 0.40	1.00 - 1.10
Reporting Date: 29/11/2021	DETS Sample No	576222	576224	576226	576229	576230

Determinand	Unit	RL	Accreditation					
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Toluene	ug/kg	< 5	MCERTS	10	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	ug/kg	< 5	MCERTS	44	< 5	10	< 5	< 5
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethyl Benzene	ug/kg	< 2	MCERTS	25	< 2	< 2	< 2	< 2
m,p-Xylene	ug/kg	< 2	MCERTS	86	< 2	16	< 2	< 2
o-Xylene	ug/kg	< 2	MCERTS	28	< 2	5	< 2	< 2
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromobenzene	ug/kg	< 5	MCERTS	6	< 5	< 5	< 5	< 5
2-Chlorotoluene	ug/kg	< 5	MCERTS	101	< 5	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
4-Chlorotoluene	ug/kg	< 5	MCERTS	104	< 5	< 5	< 5	< 5
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	932	26	2398	50	50
1,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 21-13971	Date Sampled	17/11/21	17/11/21	17/11/21	18/11/21	18/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS109	WS110	WS111	TP109	TP111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	1.10 - 1.50	1.20 - 1.30	0.40 - 0.45
Reporting Date: 29/11/2021	DETS Sample No	576231	576232	576235	576238	576240

Determinand	Unit	RL	Accreditation	(n)		(n)
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	17
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	56
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	100
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	< 2	246
m,p-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	78
o-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	34
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	13
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	11
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	8
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	9
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	6	< 5	57
1,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5



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Soil Analysis Certificate - Volatile Organic Compounds (VOC)					
DETS Report No: 21-13971	Date Sampled	18/11/21	17/11/21	18/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP112	BH104	BH105	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20	0.20	
Reporting Date: 29/11/2021	DETS Sample No	576241	576243	576244	

Determinand	Unit	RL	Accreditation				
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	136	
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10	
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	29	
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Toluene	ug/kg	< 5	MCERTS	< 5	89	111	
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	68	78	
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	25	160	
m,p-Xylene	ug/kg	< 2	MCERTS	< 2	112	305	
o-Xylene	ug/kg	< 2	MCERTS	< 2	63	71	
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	168	
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	14	
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	17	
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	10	6	
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	7	
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	39	11	
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	8	< 5	
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	634	
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	54	41460	512400	
1,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP101
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.50 - 0.60
Reporting Date: 29/11/2021		DETS Sample No	576213

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	1-Bromo-2,3-dichlorobenzene	99	µg/kg	< 10	2070
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP101
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	1.30 - 1.40
Reporting Date: 29/11/2021		DETS Sample No	576214

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	1-Bromo-2,3-dichlorobenzene	99	µg/kg	< 10	54
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP103
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.50 - 0.60
Reporting Date: 29/11/2021		DETS Sample No	576216

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Benzene, 1,2-diethyl-	98	µg/kg	< 10	104
2	1-Bromo-2,3-dichlorobenzene	98	µg/kg	< 10	88
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP105
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.90 - 1.00
Reporting Date: 29/11/2021		DETS Sample No	576219

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP106
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.30 - 0.40
Reporting Date: 29/11/2021		DETS Sample No	576220

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP108
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.50 - 0.60
Reporting Date: 29/11/2021		DETS Sample No	576222

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	16/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS102
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.30 - 0.40
Reporting Date: 29/11/2021		DETS Sample No	576224

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	16/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS104
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20 - 0.30
Reporting Date: 29/11/2021		DETS Sample No	576226

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS107
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.30 - 0.40
Reporting Date: 29/11/2021		DETS Sample No	576229

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-13971	Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS108
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	1.00 - 1.10
Reporting Date: 29/11/2021	DETS Sample No	576230

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS109
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20 - 0.30
Reporting Date: 29/11/2021		DETS Sample No	576231

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS110
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20 - 0.30
Reporting Date: 29/11/2021		DETS Sample No	576232

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-13971	Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS111
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	1.10 - 1.50
Reporting Date: 29/11/2021	DETS Sample No	576235

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	18/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP109
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	1.20 - 1.30
Reporting Date: 29/11/2021		DETS Sample No	576238

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	18/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP111
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.40 - 0.45
Reporting Date: 29/11/2021		DETS Sample No	576240

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	18/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP112
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20 - 0.30
Reporting Date: 29/11/2021		DETS Sample No	576241

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)			
DETS Report No: 21-13971		Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	BH104
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20
Reporting Date: 29/11/2021		DETS Sample No	576243

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	1-Bromo-2,4-dichlorobenzene	97	µg/kg	< 10	1750
2	Hexane, 1,6-dibromo-	97	µg/kg	< 10	75
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-13971	Date Sampled	18/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH105
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.20
Reporting Date: 29/11/2021	DETS Sample No	576244

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	1-Bromo-2,3-dichlorobenzene	99	µg/kg	< 10	1990
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)						
DETS Report No: 21-13971	Date Sampled	15/11/21	15/11/21	15/11/21	15/11/21	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP101	TP101	TP103	TP105	TP106
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	1.30 - 1.40	0.50 - 0.60	0.90 - 1.00	0.30 - 0.40
Reporting Date: 29/11/2021	DETS Sample No	576213	576214	576216	576219	576220

Determinand	Unit	RL	Accreditation	(n)					
Phenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
0-Cresol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethoxy)methane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethyl)ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dichlorobenzene	mg/kg	< 0.1	ISO17025	0.3	< 0.1	3.6	0.4	< 0.1	< 0.1
2,4-Dimethylphenol	mg/kg	< 0.15	ISO17025	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Isophorone	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachloroethane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p-Cresol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	0.33	< 0.15	< 0.15
2,4,6-Trichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.4	< 0.1	0.3
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloroaniline	mg/kg	< 0.15	NONE	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibutyl phthalate	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Benzyl butyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)						
DETS Report No: 21-13971	Date Sampled	15/11/21	16/11/21	16/11/21	17/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP108	WS102	WS104	WS107	WS108
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.50 - 0.60	0.30 - 0.40	0.20 - 0.30	0.30 - 0.40	1.00 - 1.10
Reporting Date: 29/11/2021	DETS Sample No	576222	576224	576226	576229	576230

Determinand	Unit	RL	Accreditation					
Phenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
0-Cresol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethoxy)methane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethyl)ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dichlorobenzene	mg/kg	< 0.1	ISO17025	2.0	< 0.1	2.1	< 0.1	< 0.1
2,4-Dimethylphenol	mg/kg	< 0.15	ISO17025	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Isophorone	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachloroethane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p-Cresol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
2,4,6-Trichlorophenol	mg/kg	< 0.1	MCERTS	0.7	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.3	< 0.1
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloroaniline	mg/kg	< 0.15	NONE	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibutyl phthalate	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Benzyl butyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1



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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)						
DETS Report No: 21-13971	Date Sampled	17/11/21	17/11/21	17/11/21	18/11/21	18/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS109	WS110	WS111	TP109	TP111
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20 - 0.30	1.10 - 1.50	1.20 - 1.30	0.40 - 0.45
Reporting Date: 29/11/2021	DETS Sample No	576231	576232	576235	576238	576240

Determinand	Unit	RL	Accreditation	(n)		(n)	
Phenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Nitrobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
0-Cresol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethoxy)methane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethyl)ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	5.0	< 0.1
2,4-Dimethylphenol	mg/kg	< 0.15	ISO17025	< 0.15	< 0.15	< 0.15	< 0.15
Isophorone	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Hexachloroethane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
p-Cresol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15
2,4,6-Trichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.3	< 0.1	< 0.1
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloroaniline	mg/kg	< 0.15	NONE	< 0.15	< 0.15	< 0.15	< 0.15
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Diethyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Dibutyl phthalate	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15
Benzyl butyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1



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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)						
DETS Report No: 21-13971	Date Sampled	18/11/21	17/11/21	18/11/21		
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP112	BH104	BH105		
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: GJ224	Depth (m)	0.20 - 0.30	0.20	0.20		
Reporting Date: 29/11/2021	DETS Sample No	576241	576243	576244		

Determinand	Unit	RL	Accreditation				
Phenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
1,2,4-Trichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	2.1	
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
Nitrobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
0-Cresol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
bis(2-chloroethoxy)methane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
bis(2-chloroethyl)ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
2,4-Dichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
2-Chlorophenol	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	
1,3-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	
1,4-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	
1,2-Dichlorobenzene	mg/kg	< 0.1	ISO17025	0.2	13.0	98.1	
2,4-Dimethylphenol	mg/kg	< 0.15	ISO17025	< 0.15	< 0.15	< 0.15	
Isophorone	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
Hexachloroethane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
p-Cresol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	
2,4,6-Trichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
2,4,5-Trichlorophenol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
2-Methylnaphthalene	mg/kg	< 0.1	MCERTS	0.3	< 0.1	< 0.1	
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
Hexachlorobutadiene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	
2,6-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
2-Chloronaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
4-Chloroaniline	mg/kg	< 0.15	NONE	< 0.15	< 0.15	< 0.15	
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
4-Bromophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Hexachlorobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
2,4-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Diethyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Dibenzofuran	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Azobenzene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	
Dibutyl phthalate	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	
Carbazole	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	
Benzyl butyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Di-n-octyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP101
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.50 - 0.60
Reporting Date: 29/11/2021		DETS Sample No	576213

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP101
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	1.30 - 1.40
Reporting Date: 29/11/2021		DETS Sample No	576214

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP103
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.50 - 0.60
Reporting Date: 29/11/2021		DETS Sample No	576216

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP105
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.90 - 1.00
Reporting Date: 29/11/2021		DETS Sample No	576219

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP106
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.30 - 0.40
Reporting Date: 29/11/2021		DETS Sample No	576220

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP108
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.50 - 0.60
Reporting Date: 29/11/2021		DETS Sample No	576222

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Cyclic octaatomic sulfur	99	mg/kg	< 0.1	30.4
2	1,4-Benzenediamine, N-(1,3-dimethylbutyl)-N'-phenyl-	93	mg/kg	< 0.1	449
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	16/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS102
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.30 - 0.40
Reporting Date: 29/11/2021		DETS Sample No	576224

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	16/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS104
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20 - 0.30
Reporting Date: 29/11/2021		DETS Sample No	576226

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS107
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.30 - 0.40
Reporting Date: 29/11/2021		DETS Sample No	576229

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Tel : 01622 850410

Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS108
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	1.00 - 1.10
Reporting Date: 29/11/2021		DETS Sample No	576230

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS109
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20 - 0.30
Reporting Date: 29/11/2021		DETS Sample No	576231

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	WS110
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20 - 0.30
Reporting Date: 29/11/2021		DETS Sample No	576232

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-13971	Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS111
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	1.10 - 1.50
Reporting Date: 29/11/2021	DETS Sample No	576235

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	18/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP109
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	1.20 - 1.30
Reporting Date: 29/11/2021		DETS Sample No	576238

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	18/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP111
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.40 - 0.45
Reporting Date: 29/11/2021		DETS Sample No	576240

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	18/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	TP112
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20 - 0.30
Reporting Date: 29/11/2021		DETS Sample No	576241

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-13971	Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH104
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.20
Reporting Date: 29/11/2021	DETS Sample No	576243

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)			
DETS Report No: 21-13971		Date Sampled	18/11/21
G & J Geoenvironmental Consultants Ltd		Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley		TP / BH No	BH105
Project / Job Ref: GJ224		Additional Refs	None Supplied
Order No: GJ224		Depth (m)	0.20
Reporting Date: 29/11/2021		DETS Sample No	576244

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Cyclic octaatomic sulfur	98	mg/kg	< 0.1	2.9
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - PCB (7 Congeners)						
DETS Report No: 21-13971	Date Sampled	17/11/21	18/11/21	18/11/21		
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS110	TP111	TP112		
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: GJ224	Depth (m)	0.20 - 0.30	0.40 - 0.45	0.20 - 0.30		
Reporting Date: 29/11/2021	DETS Sample No	576232	576240	576241		

Determinand	Unit	RL	Accreditation	(n)			
PCB Congener 28	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 52	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 101	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 118	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 138	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 153	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
PCB Congener 180	mg/kg	0.008	NONE	< 0.008	< 0.008	< 0.008	
Total PCB (7 Congeners)	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 21-13971
G & J Geoenvironmental Consultants Ltd
Site Reference: Penrhyn Road, Knowsley
Project / Job Ref: GJ224
Order No: GJ224
Reporting Date: 29/11/2021

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
576213	TP101	None Supplied	0.50 - 0.60	8	Brown sandy gravel with stones and concrete
576214	TP101	None Supplied	1.30 - 1.40	10.5	Light brown sandy clay with stones
576216	TP103	None Supplied	0.50 - 0.60	11.8	Light brown sandy clay with stones
576219	TP105	None Supplied	0.90 - 1.00	14.7	Brown sandy clay with vegetation
576220	TP106	None Supplied	0.30 - 0.40	12.6	Light brown sandy clay
576221	TP107	None Supplied	0.50 - 0.60	12.8	Light brown sandy clay with stones
576222	TP108	None Supplied	0.50 - 0.60	11.6	Light brown sandy clay
576223	WS101	None Supplied	0.30 - 0.40	11.1	Brown sandy clay with stones
576224	WS102	None Supplied	0.30 - 0.40	11.8	Light brown sandy clay with stones
576225	WS103	None Supplied	0.40 - 0.50	7.7	Brown sandy clay with stones and concrete
576226	WS104	None Supplied	0.20 - 0.30	10.4	Light brown sandy clay with stones
576227	WS105	None Supplied	0.20 - 0.30	11.5	Brown sandy clay with stones and concrete
576228	WS106	None Supplied	0.40 - 0.50	10.2	Brown sandy clay with stones and brick
576229	WS107	None Supplied	0.30 - 0.40	8.9	Brown sandy clay with stones and brick
576230	WS108	None Supplied	1.00 - 1.10	9.6	Black sandy clay
576231	WS109	None Supplied	0.20 - 0.30	6.7	Brown sandy clay with stones and concrete
576232	WS110	None Supplied	0.20 - 0.30	7.6	Red sandy clay with stones and concrete
576233	BH101	None Supplied	0.50	12.6	Brown sandy clay with stones
576234	BH102	None Supplied	0.20	11	Brown sandy clay with stones
576235	WS111	None Supplied	1.10 - 1.50	7.9	Black sandy clay with stones
576236	BH103	None Supplied	0.50	11.3	Brown sandy clay with stones and brick
576237	TP109	None Supplied	0.20 - 0.30	11	Brown sandy clay with stones and brick
576238	TP109	None Supplied	1.20 - 1.30	9.8	Brown sandy gravel with stones and concrete
576239	TP110	None Supplied	0.20 - 0.30	7.3	Brown gravelly sand with stones and concrete
576240	TP111	None Supplied	0.40 - 0.45	4.1	Brown sandy gravel with stones
576241	TP112	None Supplied	0.20 - 0.30	5	Brown gravelly sand with stones and concrete
576242	TP114	None Supplied	0.30 - 0.40	7.2	Brown sandy gravel with stones and concrete
576243	BH104	None Supplied	0.20	11.7	Light brown sandy clay with stones
576244	BH105	None Supplied	0.20	10	Red sandy clay with stones

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

Insufficient Sample ^{I/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 21-13971	
G & J Geoenvironmental Consultants Ltd	
Site Reference: Penrhyn Road, Knowsley	
Project / Job Ref: GJ224	
Order No: GJ224	
Reporting Date: 29/11/2021	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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Derwentside Environmental Testing Services Ltd
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DETS Report No: 21-14033

Site Reference: Penrhyn Road, Knowsley

Project / Job Ref: GJ224

Order No: GJ224

Sample Receipt Date: 23/11/2021

Sample Scheduled Date: 24/11/2021

Report Issue Number: 1

Reporting Date: 30/11/2021

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 21-14033	Date Sampled	15/11/21	15/11/21	15/11/21	17/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP102	TP104	TP105	WS101	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.50	0.70 - 0.80	0.80 - 0.90	
Reporting Date: 30/11/2021	DETS Sample No	576474	576475	576476	576477	

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	
pH	pH Units	N/a	MCERTS	7.6	10.1	7.9	7.2	
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	87	174	40	12	
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.09	0.17	0.04	0.01	
Total Sulphur	%	< 0.02	NONE	0.03	0.08	< 0.02	< 0.02	
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	
Organic Matter (SOM)	%	< 0.1	MCERTS	1.1	1.2	0.8	0.7	
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.7	0.7	0.4	0.4	
Arsenic (As)	mg/kg	< 2	MCERTS	4	6	7	6	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.2	0.3	0.2	< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	19	26	32	36	
Copper (Cu)	mg/kg	< 4	MCERTS	14	24	17	15	
Lead (Pb)	mg/kg	< 3	MCERTS	14	23	12	7	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	15	32	34	37	
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	
Zinc (Zn)	mg/kg	< 3	MCERTS	38	125	39	33	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
EPH (C10 - C40)	mg/kg	< 6	MCERTS	30	69	14	< 6	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-14033	Date Sampled	15/11/21	15/11/21	15/11/21	17/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP102	TP104	TP105	WS101	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.50	0.70 - 0.80	0.80 - 0.90	
Reporting Date: 30/11/2021	DETS Sample No	576474	576475	576476	576477	

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



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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 21-14033	Date Sampled	15/11/21	15/11/21	15/11/21	17/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP102	TP104	TP105	WS101	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.50	0.70 - 0.80	0.80 - 0.90	
Reporting Date: 30/11/2021	DETS Sample No	576474	576475	576476	576477	

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	0.07	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	7	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-14033	Date Sampled	15/11/21	15/11/21	15/11/21	17/11/21	
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP102	TP104	TP105	WS101	
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: GJ224	Depth (m)	0.20 - 0.30	0.50	0.70 - 0.80	0.80 - 0.90	
Reporting Date: 30/11/2021	DETS Sample No	576474	576475	576476	576477	

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
p & m-xylene	ug/kg	< 2	MCERTS	< 2	7	6	< 2	
o-xylene	ug/kg	< 2	MCERTS	< 2	4	< 2	< 2	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	



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Soil Analysis Certificate - Volatile Organic Compounds (VOC)					
DETS Report No: 21-14033	Date Sampled	15/11/21	15/11/21	15/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP102	TP104	TP105	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.50	0.70 - 0.80	0.80 - 0.90
Reporting Date: 30/11/2021	DETS Sample No	576474	576475	576476	576477

Determinand	Unit	RL	Accreditation				
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Chloroform	ug/kg	< 5	MCERTS	70	14	< 5	< 5
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	33
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
m,p-Xylene	ug/kg	< 2	MCERTS	< 2	7	6	< 2
o-Xylene	ug/kg	< 2	MCERTS	< 2	4	< 2	< 2
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	35	119	775	75
1,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14033	Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP102
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30
Reporting Date: 30/11/2021	DETS Sample No	576474

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14033	Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP104
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.50
Reporting Date: 30/11/2021	DETS Sample No	576475

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	1-Bromo-2,4-dichlorobenzene	97	µg/kg	< 10	55
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14033	Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP105
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.70 - 0.80
Reporting Date: 30/11/2021	DETS Sample No	576476

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14033	Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.80 - 0.90
Reporting Date: 30/11/2021	DETS Sample No	576477

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)					
DETS Report No: 21-14033	Date Sampled	15/11/21	15/11/21	15/11/21	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP102	TP104	TP105	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30	0.50	0.70 - 0.80	0.80 - 0.90
Reporting Date: 30/11/2021	DETS Sample No	576474	576475	576476	576477

Determinand	Unit	RL	Accreditation					
Phenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
1,2,4-Trichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
O-Cresol	mg/kg	< 0.1	NONE	< 0.1	0.1	< 0.1	< 0.1	
bis(2-chloroethoxy)methane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
bis(2-chloroethyl)ether	mg/kg	< 0.1	MCERTS	< 0.1	0.2	< 0.1	< 0.1	
2,4-Dichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
2-Chlorophenol	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	
1,3-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	
1,4-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	
1,2-Dichlorobenzene	mg/kg	< 0.1	ISO17025	0.3	0.4	1.5	0.3	
2,4-Dimethylphenol	mg/kg	< 0.15	ISO17025	< 0.15	< 0.15	< 0.15	< 0.15	
Isophorone	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Hexachloroethane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
p-Cresol	mg/kg	< 0.15	MCERTS	< 0.15	0.29	< 0.15	< 0.15	
2,4,6-Trichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
2,4,5-Trichlorophenol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15	
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
2-Methylnaphthalene	mg/kg	< 0.1	MCERTS	0.4	0.3	0.3	< 0.1	
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Hexachlorobutadiene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	
2,6-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1	0.2	< 0.1	< 0.1	
2-Chloronaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
4-Chloroaniline	mg/kg	< 0.15	NONE	< 0.15	< 0.15	< 0.15	< 0.15	
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	0.2	< 0.1	< 0.1	
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
4-Bromophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Hexachlorobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
2,4-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Diethyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Dibenzofuran	mg/kg	< 0.1	MCERTS	< 0.1	0.4	< 0.1	< 0.1	
Azobenzene	mg/kg	< 0.1	NONE	< 0.1	0.5	< 0.1	< 0.1	
Dibutyl phthalate	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	
Carbazole	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1	< 0.1	
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15	< 0.15	
Benzyl butyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Di-n-octyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14033	Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP102
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.20 - 0.30
Reporting Date: 30/11/2021	DETS Sample No	576474

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14033	Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP104
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.50
Reporting Date: 30/11/2021	DETS Sample No	576475

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14033	Date Sampled	15/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	TP105
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.70 - 0.80
Reporting Date: 30/11/2021	DETS Sample No	576476

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14033	Date Sampled	17/11/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: GJ224	Depth (m)	0.80 - 0.90
Reporting Date: 30/11/2021	DETS Sample No	576477

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 21-14033	
G & J Geoenvironmental Consultants Ltd	
Site Reference: Penrhyn Road, Knowsley	
Project / Job Ref: GJ224	
Order No: GJ224	
Reporting Date: 30/11/2021	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
576474	TP102	None Supplied	0.20 - 0.30	9.9	Brown sandy clay with stones
576475	TP104	None Supplied	0.50	10	Brown sandy clay with stones and concrete
576476	TP105	None Supplied	0.70 - 0.80	11.4	Brown sandy clay with stones
576477	WS101	None Supplied	0.80 - 0.90	12.3	Light brown sandy clay

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

Insufficient Sample ^{I/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-14033

G & J Geoenvironmental Consultants Ltd

Site Reference: Penrhyn Road, Knowsley

Project / Job Ref: GJ224

Order No: GJ224

Reporting Date: 30/11/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



Chris Hepworth
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LE12 8PY

Derwentside Environmental Testing Services Ltd
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t: 01622 850410

DETS Report No: 21-14871

Site Reference: Penrhyn Road, Knowsley

Project / Job Ref: GJ224

Order No: None Supplied

Sample Receipt Date: 20/12/2021

Sample Scheduled Date: 20/12/2021

Report Issue Number: 1

Reporting Date: 23/12/2021

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Water Analysis Certificate						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	GRM-BH4	BH103	BH104	BH105	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.30 - 1.40	0.20 - 0.30	0.50 - 0.60	0.50	0.70 - 0.80
Reporting Date: 23/12/2021	DETS Sample No	580066	580067	580068	580069	580070

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	6.9	7.3	7.3	12.3	8.9
Total Cyanide	ug/l	< 5	NONE	< 5	< 5	169	215	< 5
Sulphate as SO ₄	mg/l	< 1	ISO17025	107	273	18	151	13
Sulphide	mg/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ammoniacal Nitrogen as NH ₄	ug/l	< 50	ISO17025	95	559	20000	18400	1350
Total Organic Carbon (TOC)	mg/l	< 0.1	NONE	15.2	21.2	370	141	147
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	63	17	7
Boron (dissolved)	ug/l	< 5	ISO17025	96	387	62	56	96
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4	0.4	< 0.4	< 0.4	< 0.4
Chromium (dissolved)	ug/l	< 5	ISO17025	10	< 5	40	< 5	< 5
Copper (dissolved)	ug/l	< 5	ISO17025	5	10	70	< 5	< 5
Lead (dissolved)	ug/l	< 5	ISO17025	< 5	5	22	10	6
Mercury (dissolved)	ug/l	< 0.05	ISO17025	< 0.05	< 0.05	1.14	0.31	0.25
Nickel (dissolved)	ug/l	< 5	ISO17025	9	10	97	18	8
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	12	21	< 5
Zinc (dissolved)	ug/l	< 2	ISO17025	124	84	314	110	67
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10	40	694	294	146
EPH (C10 - C40)	ug/l	< 10	NONE	11	1590	3428	2967	5277

Subcontracted analysis ^(S)

Insufficient sample ^{I/S}

Unsuitable Sample ^{U/S}

(hs) Please note deviating sample due to head space in container



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Water Analysis Certificate						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS102	WS106	WS107	WS109	WS110
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.90 - 1.00	0.30 - 0.40	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580071	580072	580073	580075	580076

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)	(hs)
pH	pH Units	N/a	ISO17025	7.3	7.6	6.9	7.3	7.9
Total Cyanide	ug/l	< 5	NONE	< 5	5	< 5	< 5	215
Sulphate as SO ₄	mg/l	< 1	ISO17025	82	114	20	164	68
Sulphide	mg/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ammoniacal Nitrogen as NH ₄	ug/l	< 50	ISO17025	183	186	9740	1060	100
Total Organic Carbon (TOC)	mg/l	< 0.1	NONE	12.9	44.3	43.9	22.2	13.6
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5	27	< 5	< 5	< 5
Boron (dissolved)	ug/l	< 5	ISO17025	125	100	98	72	82
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4	1.8	< 0.4	< 0.4	< 0.4
Chromium (dissolved)	ug/l	< 5	ISO17025	20	15	< 5	< 5	< 5
Copper (dissolved)	ug/l	< 5	ISO17025	5	160	8	7	16
Lead (dissolved)	ug/l	< 5	ISO17025	< 5	197	8	< 5	< 5
Mercury (dissolved)	ug/l	< 0.05	ISO17025	< 0.05	0.63	0.79	0.29	0.23
Nickel (dissolved)	ug/l	< 5	ISO17025	< 5	137	58	< 5	< 5
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5	13	< 5	< 5	< 5
Zinc (dissolved)	ug/l	< 2	ISO17025	47	1500	26	12	16
Total Phenols (monohydric)	ug/l	< 10	NONE	19	10	< 10	< 10	265
EPH (C10 - C40)	ug/l	< 10	NONE	27	24	21	< 10	29

Subcontracted analysis ^(S)
Insufficient sample ^{I/S}
Unsuitable Sample ^{U/S}



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Water Analysis Certificate - Speciated PAH						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	GRM-BH4	BH103	BH104	BH105	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.30 - 1.40	0.20 - 0.30	0.50 - 0.60	0.50	0.70 - 0.80
Reporting Date: 23/12/2021	DETS Sample No	580066	580067	580068	580069	580070

Determinand	Unit	RL	Accreditation					
Naphthalene	ug/l	< 0.01	NONE	0.04	0.04	1.80	0.15	0.14
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.13	0.03	< 0.01
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01	0.15	0.02	< 0.01
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	0.02	< 0.01	0.05	< 0.01
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	0.01	0.03	0.02	< 0.01
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Total EPA-16 PAHs	ug/l	< 0.16	NONE	< 0.16	< 0.16	2.11	0.28	< 0.16



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Water Analysis Certificate - Speciated PAH						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS102	WS106	WS107	WS109	WS110
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.90 - 1.00	0.30 - 0.40	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580071	580072	580073	580075	580076

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)	(hs)
Naphthalene	ug/l	< 0.01	NONE	0.03	0.02	0.06	0.01	0.01
Acenaphthylene	ug/l	< 0.01	NONE	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	ug/l	< 0.01	NONE	0.01	< 0.01	0.05	< 0.01	< 0.01
Fluorene	ug/l	< 0.01	NONE	0.04	< 0.01	0.02	< 0.01	< 0.01
Phenanthrene	ug/l	< 0.01	NONE	0.04	0.03	0.03	< 0.01	< 0.01
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	< 0.01	NONE	0.21	0.13	0.03	< 0.01	< 0.01
Pyrene	ug/l	< 0.01	NONE	0.14	0.14	0.02	< 0.01	< 0.01
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	0.07	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	< 0.01	NONE	< 0.01	0.07	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	0.14	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	0.06	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	0.09	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Total EPA-16 PAHs	ug/l	< 0.16	NONE	0.48	0.75	0.21	< 0.16	< 0.16



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Water Analysis Certificate - TPH CWG Banded

DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	GRM-BH4	BH103	BH104	BH105	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.30 - 1.40	0.20 - 0.30	0.50 - 0.60	0.50	0.70 - 0.80
Reporting Date: 23/12/2021	DETS Sample No	580066	580067	580068	580069	580070

Determinand	Unit	RL	Accreditation						
Aliphatic >C5 - C6	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10	< 10
Aliphatic >C6 - C8	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	161	< 10
Aliphatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	12	37
Aliphatic >C10 - C12	ug/l	< 10	NONE	< 10	515	389	701	1183	
Aliphatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10	58	20	< 10
Aliphatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10	< 10
Aliphatic >C21 - C34	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	ug/l	< 70	NONE	< 70	515	446	895	1219	
Aromatic >C5 - C7	ug/l	< 10	NONE	< 10	< 10	< 10	33	< 10	< 10
Aromatic >C7 - C8	ug/l	< 10	NONE	< 10	< 10	< 10	582	31	61
Aromatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	< 10	1088	338	166
Aromatic >C10 - C12	ug/l	< 10	NONE	< 10	301	1315	166	1046	
Aromatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10	306	15	18
Aromatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic >C21 - C35	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	ug/l	< 70	NONE	< 70	301	3324	549	1290	
Total >C5 - C35	ug/l	< 140	NONE	< 140	816	3770	1444	2510	

(hs) Please note deviating sample due to head space in container



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Water Analysis Certificate - TPH CWG Banded

DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS102	WS106	WS107	WS109	WS110
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.90 - 1.00	0.30 - 0.40	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580071	580072	580073	580075	580076

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)	(hs)
Aliphatic >C5 - C6	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C6 - C8	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C21 - C34	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	ug/l	< 70	NONE	< 70	< 70	< 70	< 70	< 70
Aromatic >C5 - C7	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C7 - C8	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C21 - C35	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	ug/l	< 70	NONE	< 70	< 70	< 70	< 70	< 70
Total >C5 - C35	ug/l	< 140	NONE	< 140	< 140	< 140	< 140	< 140



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Water Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	GRM-BH4	BH103	BH104	BH105	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.30 - 1.40	0.20 - 0.30	0.50 - 0.60	0.50	0.70 - 0.80
Reporting Date: 23/12/2021	DETS Sample No	580066	580067	580068	580069	580070

Determinand	Unit	RL	Accreditation					
Benzene	ug/l	< 1	ISO17025	< 1	< 1	33	< 1	< 1
Toluene	ug/l	< 5	ISO17025	< 5	< 5	582	31	61
Ethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	38	7	15
p & m-xylene	ug/l	< 10	ISO17025	< 10	< 10	127	16	86
o-xylene	ug/l	< 5	ISO17025	< 5	< 5	70	6	53
MTBE	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10

(hs) Please note deviating sample due to head space in container



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Water Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS102	WS106	WS107	WS109	WS110
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.90 - 1.00	0.30 - 0.40	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580071	580072	580073	580075	580076

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)	(hs)
Benzene	ug/l	< 1	ISO17025	< 1	< 1	< 1	< 1	< 1
Toluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
p & m-xylene	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
o-xylene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
MTBE	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10



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Water Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	GRM-BH4	BH103	BH104	BH105	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.30 - 1.40	0.20 - 0.30	0.50 - 0.60	0.50	0.70 - 0.80
Reporting Date: 23/12/2021	DETS Sample No	580066	580067	580068	580069	580070

Determinand	Unit	RL	Accreditation					
Dichlorodifluoromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromomethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Trichlorofluoromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
MTBE	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
trans-1,2-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
2,2-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chloroform	ug/l	< 5	ISO17025	< 5	< 5	< 5	161	< 5
Bromochloromethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
1,1,1-Trichloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
Benzene	ug/l	< 1	ISO17025	< 1	< 1	33	< 1	< 1
1,2-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Trichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromodichloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Dibromomethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
TAME	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Toluene	ug/l	< 5	ISO17025	< 5	< 5	582	31	61
trans-1,3-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
1,3-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	229	60	493
1,1,1,2-Tetrachloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Ethyl Benzene	ug/l	< 5	ISO17025	< 5	< 5	38	7	15
m,p-Xylene	ug/l	< 10	ISO17025	< 10	< 10	127	16	86
o-Xylene	ug/l	< 5	ISO17025	< 5	< 5	70	6	53
Styrene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromoform	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
Isopropylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
1,2,3-Trichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
n-Propylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
2-Chlorotoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	167
4-Chlorotoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
tert-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
sec-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
p-Isopropyltoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
n-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/l	< 5	ISO17025	< 5	2380	8151	3619	8357
1,2-Dibromo-3-chloropropane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
Hexachlorobutadiene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5

(hs) Please note deviating sample due to head space in container



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Water Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS102	WS106	WS107	WS109	WS110
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.90 - 1.00	0.30 - 0.40	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580071	580072	580073	580075	580076

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)	(hs)
Dichlorodifluoromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromomethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Trichlorofluoromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
MTBE	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
trans-1,2-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
2,2-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chloroform	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromochloromethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
1,1,1-Trichloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
Benzene	ug/l	< 1	ISO17025	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Trichloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromodichloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Dibromomethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
TAME	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Toluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
1,3-Dichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Ethyl Benzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
m,p-Xylene	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
o-Xylene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Styrene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromoform	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
Isopropylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
1,2,3-Trichloropropane	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
n-Propylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Bromobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
2-Chlorotoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
4-Chlorotoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
tert-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
sec-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
p-Isopropyltoluene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
n-Butylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/l	< 5	ISO17025	25	11	6	< 5	< 5
1,2-Dibromo-3-chloropropane	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
Hexachlorobutadiene	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	GRM-BH4
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	1.30 - 1.40
Reporting Date: 23/12/2021	DETS Sample No	580066

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 5	< 5
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH103
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.20 - 0.30
Reporting Date: 23/12/2021	DETS Sample No	580067

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 5	< 5
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH104
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.50 - 0.60
Reporting Date: 23/12/2021	DETS Sample No	580068

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Propyl sulfide	94	µg/l	< 5	787
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



DETS Ltd
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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH105
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.50
Reporting Date: 23/12/2021	DETS Sample No	580069

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Propyl Sulfide	94	µg/l	< 5	184
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.70 - 0.80
Reporting Date: 23/12/2021	DETS Sample No	580070

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 5	< 5
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS102
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.90 - 1.00
Reporting Date: 23/12/2021	DETS Sample No	580071

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 5	< 5
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS106
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580072

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 5	< 5
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS107
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.50 - 0.60
Reporting Date: 23/12/2021	DETS Sample No	580073

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 5	< 5
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS109
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580075

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 5	< 5
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS110
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580076

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 5	< 5
2	N/a	N/a	µg/l	< 5	< 5
3	N/a	N/a	µg/l	< 5	< 5
4	N/a	N/a	µg/l	< 5	< 5
5	N/a	N/a	µg/l	< 5	< 5

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Semi Volatile Organic Compounds (SVOC)						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	GRM-BH4	BH103	BH104	BH105	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	1.30 - 1.40	0.20 - 0.30	0.50 - 0.60	0.50	0.70 - 0.80
Reporting Date: 23/12/2021	DETS Sample No	580066	580067	580068	580069	580070

Determinand	Unit	RL	Accreditation					
Phenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	0.5	0.6
2-Nitrophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
0-Cresol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethoxy)methane	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethyl)ether	ug/l	< 0.1	NONE	< 0.1	< 0.1	8.1	15.5	< 0.1
2,4-Dichlorophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	0.5	< 0.1
2-Chlorophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dichlorobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	0.3	< 0.1	0.2
1,4-Dichlorobenzene	ug/l	< 0.1	NONE	< 0.1	1.1	0.5	0.2	1
1,2-Dichlorobenzene	ug/l	< 0.1	NONE	0.8	950	1160	843	1050
2,4-Dimethylphenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Isophorone	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachloroethane	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p-Cresol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	0.2	< 0.1
2,4,5-Trichlorophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloroaniline	ug/l	< 0.1	NONE	< 0.1	< 0.1	0.7	1.6	< 0.1
4-Nitrophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenyl phenyl ether	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenyl phenyl ether	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibutyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-ethylhexyl)phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl butyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

(hs) Please note deviating sample due to head space in container



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Water Analysis Certificate - Semi Volatile Organic Compounds (SVOC)						
DETS Report No: 21-14871	Date Sampled	16/12/21	16/12/21	16/12/21	16/12/21	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS102	WS106	WS107	WS109	WS110
Project / Job Ref: GJ224	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	Depth (m)	0.90 - 1.00	0.30 - 0.40	0.50 - 0.60	0.30 - 0.40	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580071	580072	580073	580075	580076

Determinand	Unit	RL	Accreditation	(hs)	(hs)	(hs)	(hs)	(hs)
Phenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitrophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
0-Cresol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethoxy)methane	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-chloroethyl)ether	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dichlorobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dichlorobenzene	ug/l	< 0.1	NONE	2.8	1	1.2	1.1	0.6
2,4-Dimethylphenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Isophorone	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachloroethane	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p-Cresol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloroaniline	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenyl phenyl ether	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenyl phenyl ether	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibutyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-ethylhexyl)phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl butyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octyl phthalate	ug/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1



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Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	GRM-BH4
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	1.30 - 1.40
Reporting Date: 23/12/2021	DETS Sample No	580066

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 0.1	< 0.1
2	N/a	N/a	µg/l	< 0.1	< 0.1
3	N/a	N/a	µg/l	< 0.1	< 0.1
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH103
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.20 - 0.30
Reporting Date: 23/12/2021	DETS Sample No	580067

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 0.1	< 0.1
2	N/a	N/a	µg/l	< 0.1	< 0.1
3	N/a	N/a	µg/l	< 0.1	< 0.1
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH104
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.50 - 0.60
Reporting Date: 23/12/2021	DETS Sample No	580068

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Propyl sulfide	93	µg/l	< 0.1	476
2	Flutriafol	97	µg/l	< 0.1	104
3	N/a	N/a	µg/l	< 0.1	< 0.1
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	BH105
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.50
Reporting Date: 23/12/2021	DETS Sample No	580069

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Propyl sulfide	95	µg/l	< 0.1	222
2	1,4-Benzenediamine, N-(1-methylethyl)-N'-phenyl-	91	µg/l	< 0.1	777
3	1,4-Benzenediamine, N-(1,3-dimethylbutyl)-N'-phenyl-	98	µg/l	< 0.1	189
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS101
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.70 - 0.80
Reporting Date: 23/12/2021	DETS Sample No	580070

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Chlorobenzene	98	µg/l	< 0.1	223
2	N/a	N/a	µg/l	< 0.1	< 0.1
3	N/a	N/a	µg/l	< 0.1	< 0.1
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



DETS Ltd
 it 1, Rose Lane Industrial Estate
 Rose Lane
 Lenham Heath
 Maidstone
 Kent ME17 2JN
 Tel : 01622 850410

Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS102
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.90 - 1.00
Reporting Date: 23/12/2021	DETS Sample No	580071

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 0.1	< 0.1
2	N/a	N/a	µg/l	< 0.1	< 0.1
3	N/a	N/a	µg/l	< 0.1	< 0.1
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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 Maidstone
 Kent ME17 2JN
 Tel : 01622 850410

Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS106
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580072

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 0.1	< 0.1
2	N/a	N/a	µg/l	< 0.1	< 0.1
3	N/a	N/a	µg/l	< 0.1	< 0.1
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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 Lenham Heath
 Maidstone
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Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS107
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.50 - 0.60
Reporting Date: 23/12/2021	DETS Sample No	580073

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 0.1	< 0.1
2	N/a	N/a	µg/l	< 0.1	< 0.1
3	N/a	N/a	µg/l	< 0.1	< 0.1
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS109
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580075

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	Trietazine	91	µg/l	< 0.1	1.5
2	Flutriafol	93	µg/l	< 0.1	0.8
3	Tributyl acetylcitrate	93	µg/l	< 0.1	1.5
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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 Rose Lane
 Lenham Heath
 Maidstone
 Kent ME17 2JN
 Tel : 01622 850410

Water Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 21-14871	Date Sampled	16/12/21
G & J Geoenvironmental Consultants Ltd	Time Sampled	None Supplied
Site Reference: Penrhyn Road, Knowsley	TP / BH No	WS110
Project / Job Ref: GJ224	Additional Refs	None Supplied
Order No: None Supplied	Depth (m)	0.30 - 0.40
Reporting Date: 23/12/2021	DETS Sample No	580076

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/l	< 0.1	< 0.1
2	N/a	N/a	µg/l	< 0.1	< 0.1
3	N/a	N/a	µg/l	< 0.1	< 0.1
4	N/a	N/a	µg/l	< 0.1	< 0.1
5	N/a	N/a	µg/l	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%



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Rose Lane
Lenham Heath
Maidstone
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Tel : 01622 850410



Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-14871

G & J Geoenvironmental Consultants Ltd

Site Reference: Penrhyn Road, Knowsley

Project / Job Ref: GJ224

Order No: None Supplied

Reporting Date: 23/12/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazine followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detection	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO ₄)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered



Appendix F – Geotechnical Laboratory Test Results

4041

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

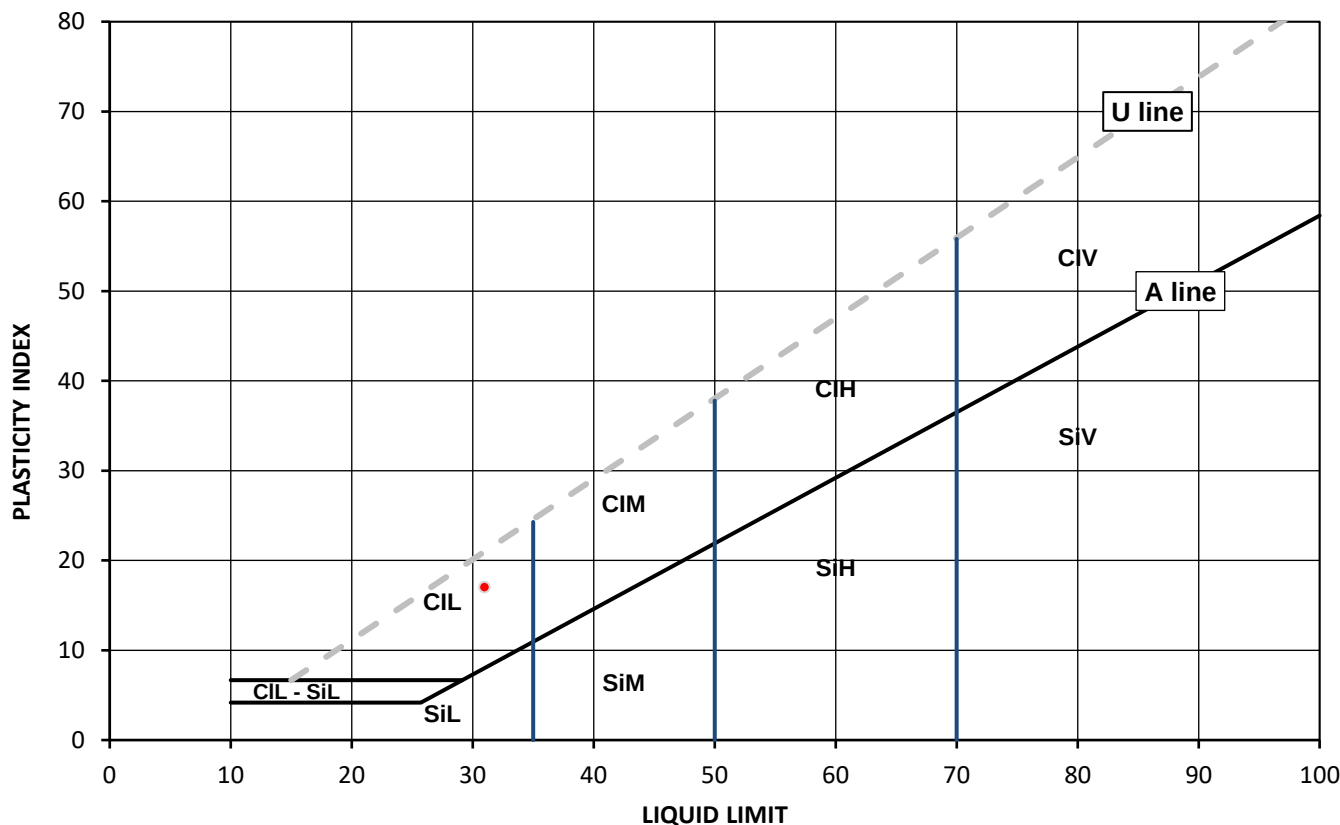
Test Results:

Laboratory Reference: 2100138
Hole No.: TP105
Sample Reference: Not Given
Sample Description: Brown slightly gravelly very sandy CLAY

Depth Top [m]: 1.50
Depth Base [m]: 1.60
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	31	14	17	84



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

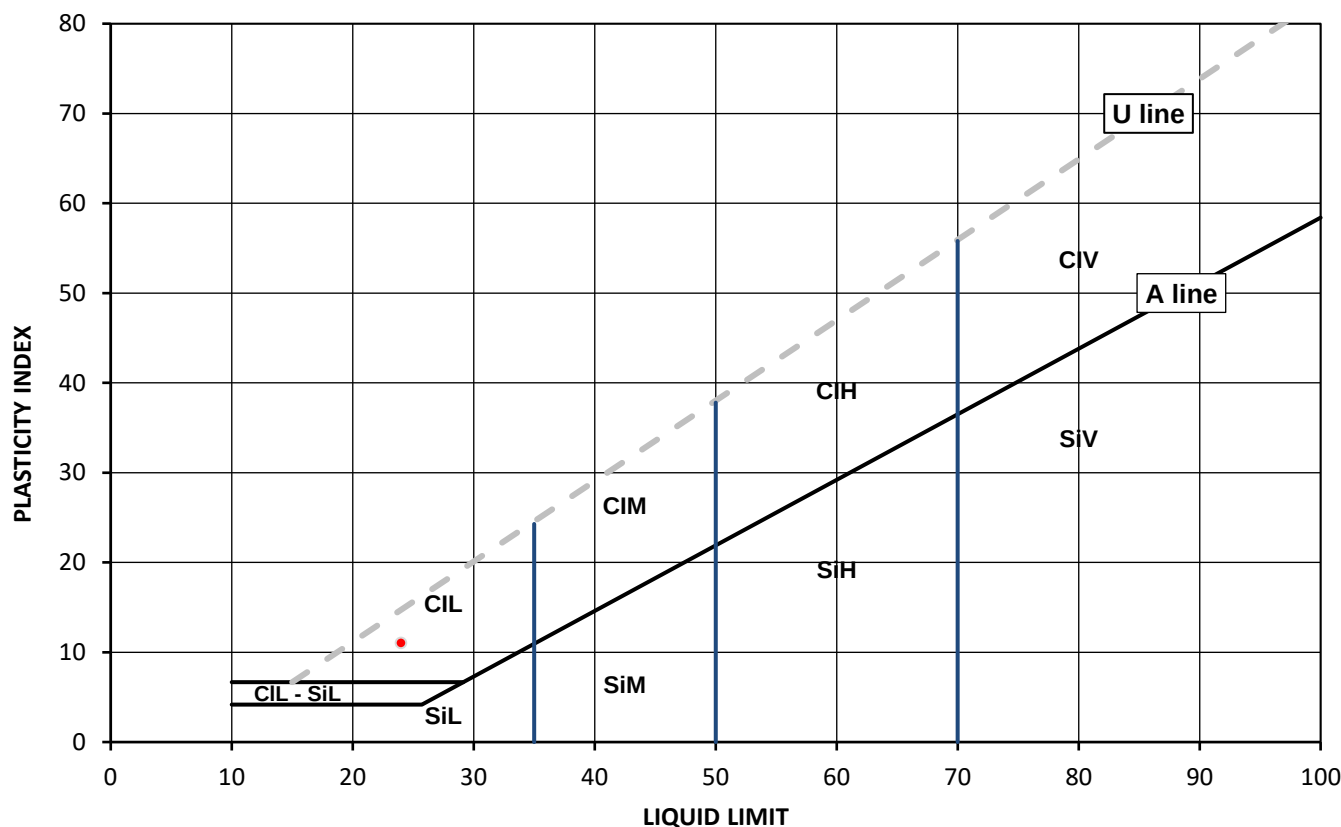
Test Results:

Laboratory Reference: 2100142
Hole No.: TP108
Sample Reference: Not Given
Sample Description: Brown gravelly CLAY and SAND

Depth Top [m]: 0.20
Depth Base [m]: 0.30
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
14	24	13	11	90



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

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Technical Reviewer
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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 18/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

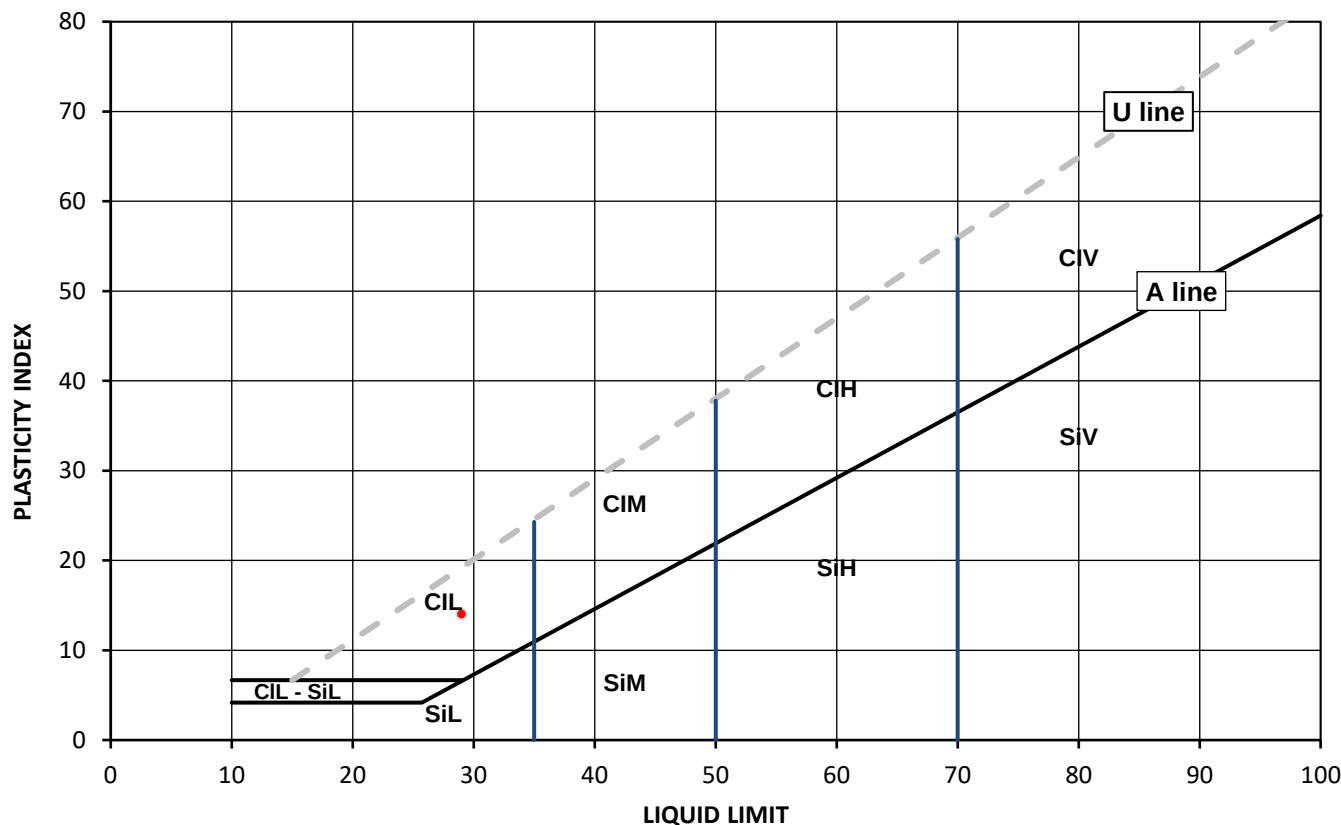
Test Results:

Laboratory Reference: 2100145
Hole No.: TP110
Sample Reference: Not Given
Sample Description: Brown slightly gravelly very sandy CLAY

Depth Top [m]: 0.50
Depth Base [m]: 0.60
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
14	29	15	14	88



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

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Technical Reviewer
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4041

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 18/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

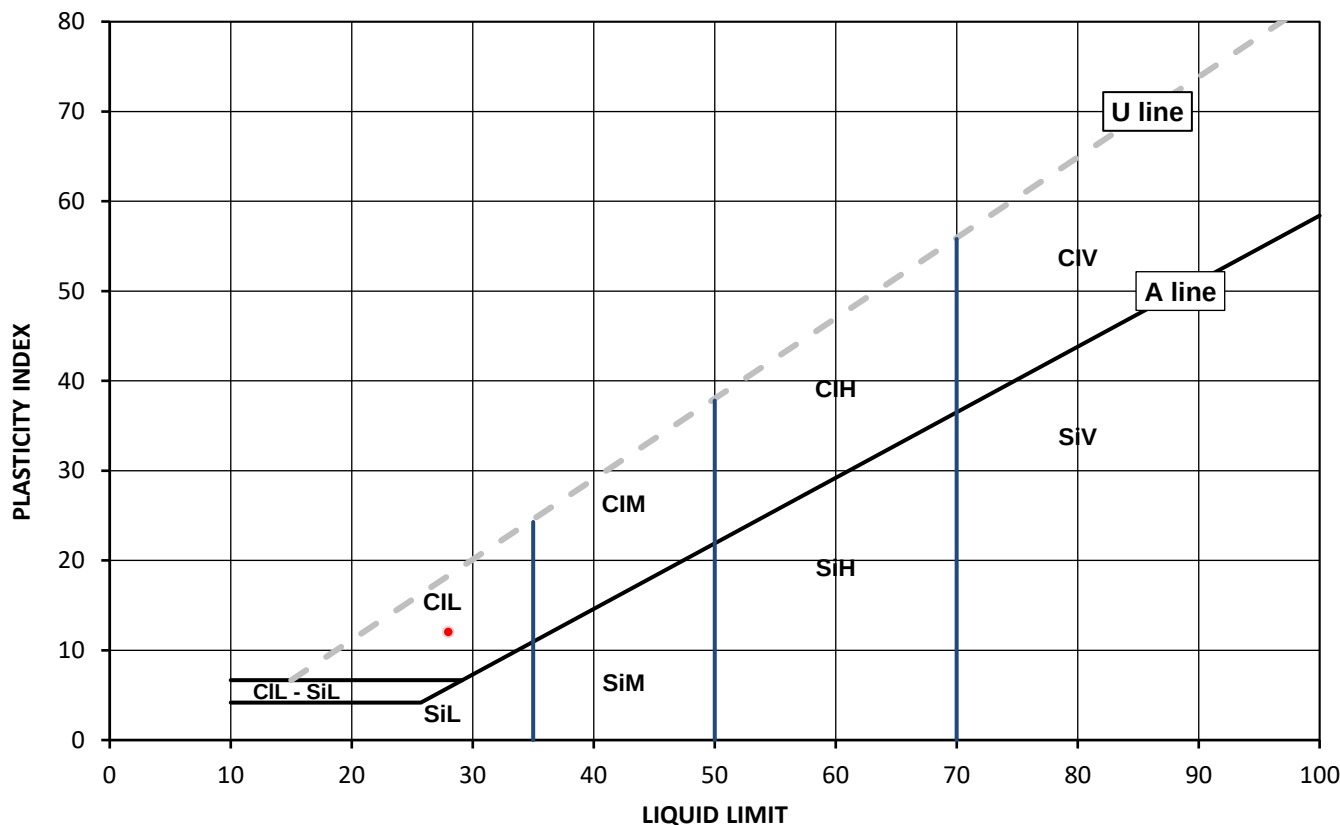
Test Results:

Laboratory Reference: 2100148
Hole No.: TP112
Sample Reference: Not Given
Sample Description: Brown slightly gravelly very sandy CLAY

Depth Top [m]: 0.50
Depth Base [m]: 0.60
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
13	28	16	12	94



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: G & J Geoenvironmental Consultants Ltd

Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 16/11/2021

Date Received: 24/11/2021

Date Tested: 08/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100149

Hole No.: WS101

Sample Reference: Not Given

Sample Description: Reddish brown slightly gravelly sandy CLAY

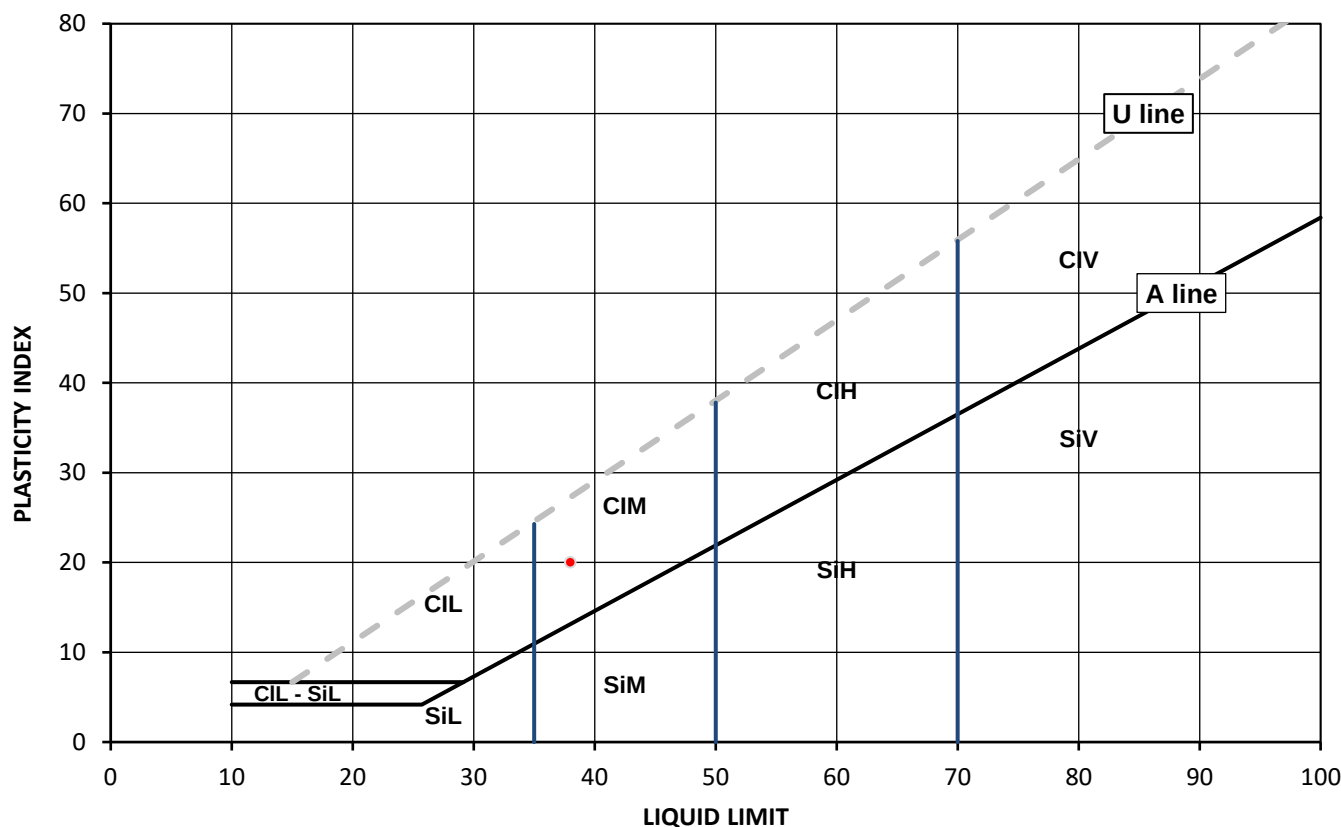
Depth Top [m]: 0.80

Depth Base [m]: 0.90

Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
17	38	18	20	88



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

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i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: G & J Geoenvironmental Consultants Ltd

Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 16/11/2021

Date Received: 24/11/2021

Date Tested: 08/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100150

Hole No.: WS103

Sample Reference: Not Given

Sample Description: Reddish brown slightly gravelly clayey SAND

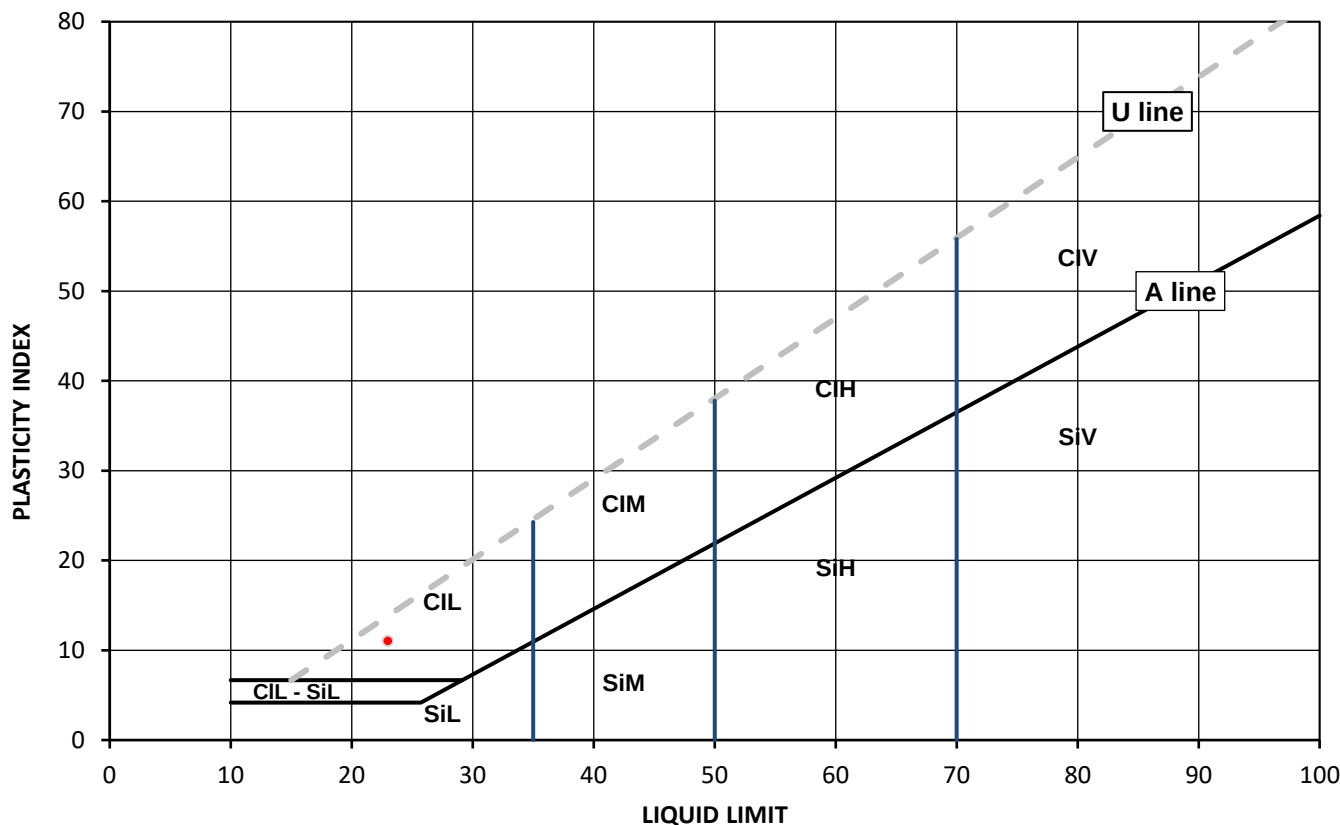
Depth Top [m]: 2.30

Depth Base [m]: 2.40

Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
7.9	23	12	11	83



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: G & J Geoenvironmental Consultants Ltd

Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 16/11/2021

Date Received: 24/11/2021

Date Tested: 08/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100151

Hole No.: WS105

Sample Reference: Not Given

Sample Description: Dark brown slightly gravelly very sandy CLAY

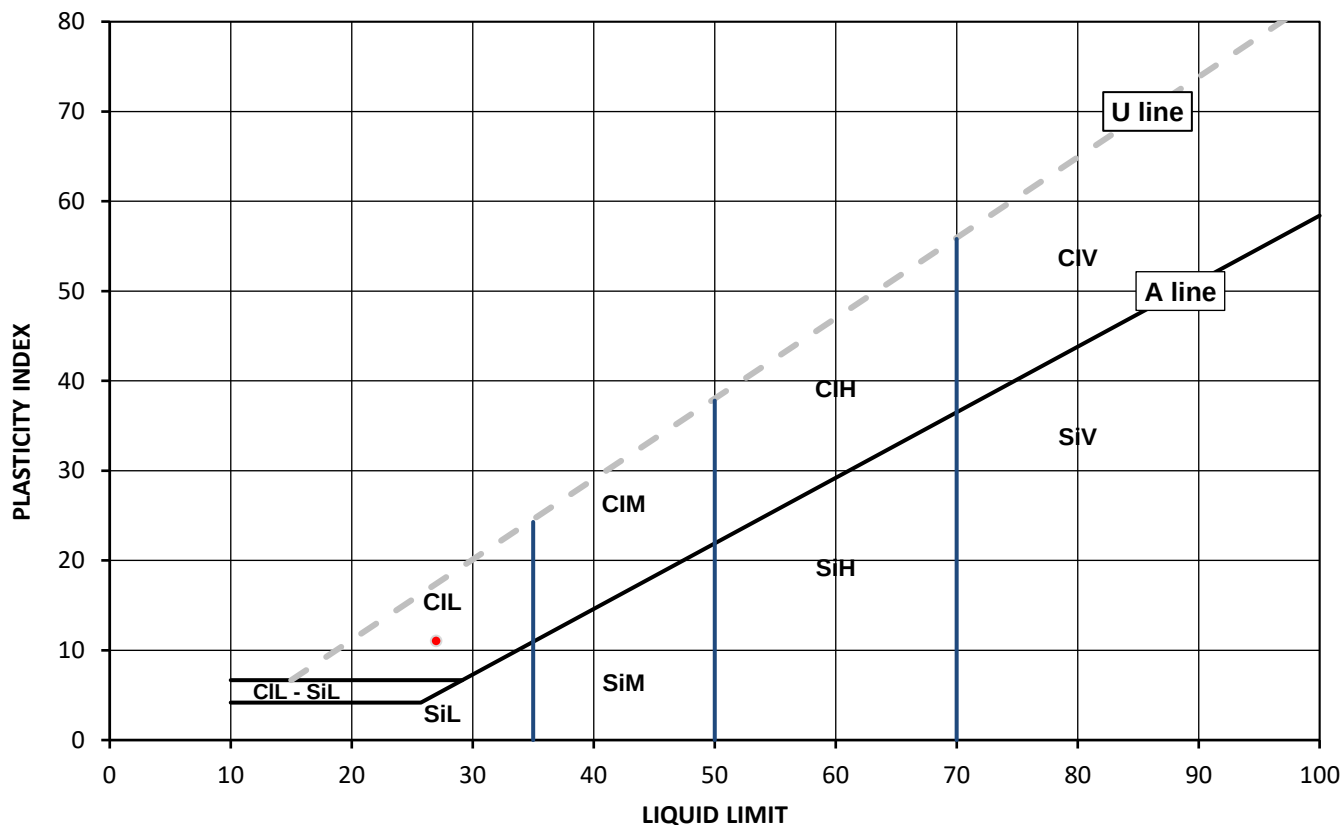
Depth Top [m]: 1.30

Depth Base [m]: 1.40

Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	27	16	11	88



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: G & J Geoenvironmental Consultants Ltd

Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 16/11/2021

Date Received: 24/11/2021

Date Tested: 08/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100152

Hole No.: WS106

Sample Reference: Not Given

Sample Description: Reddish brown slightly gravelly clayey SAND

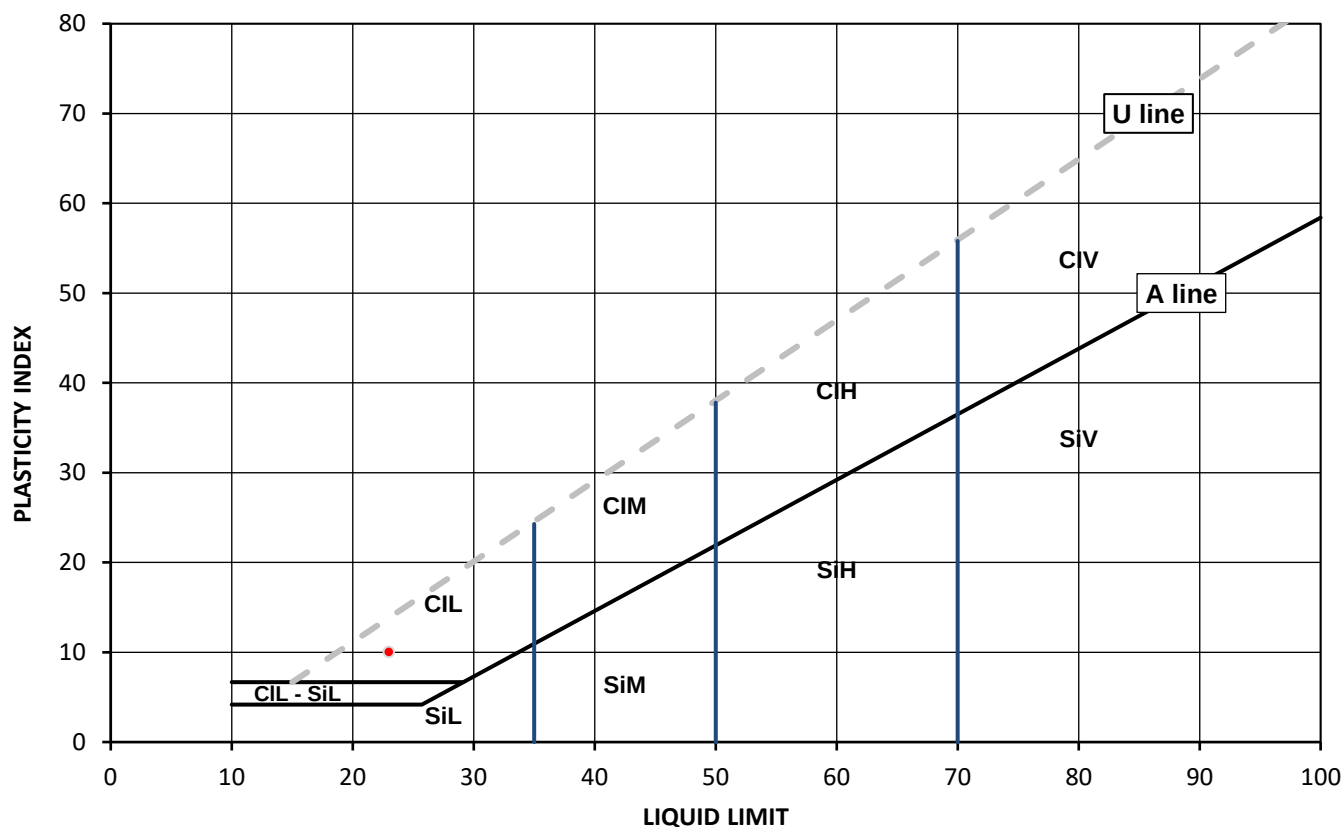
Depth Top [m]: 1.70

Depth Base [m]: 1.80

Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
15	23	13	10	86



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

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Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 17/11/2021

Date Received: 24/11/2021

Date Tested: 08/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100153

Hole No.: WS107

Sample Reference: Not Given

Sample Description: Orangish brown sandy CLAY

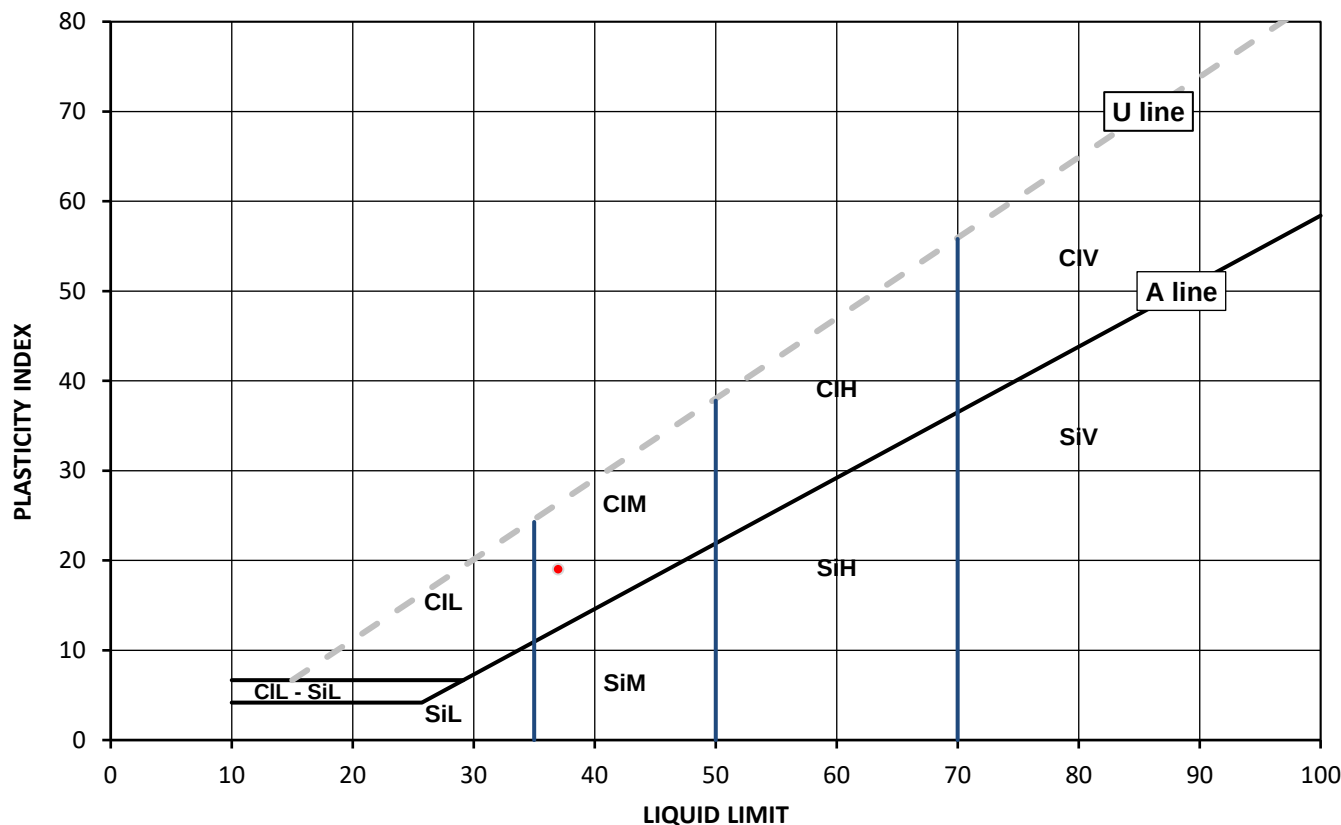
Depth Top [m]: 1.40

Depth Base [m]: 1.50

Sample Type: D

Sample Preparation: Tested in natural condition

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	37	18	19	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

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Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 17/11/2021

Date Received: 24/11/2021

Date Tested: 08/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100154

Hole No.: WS108

Sample Reference: Not Given

Sample Description: Reddish brown slightly gravelly very sandy CLAY

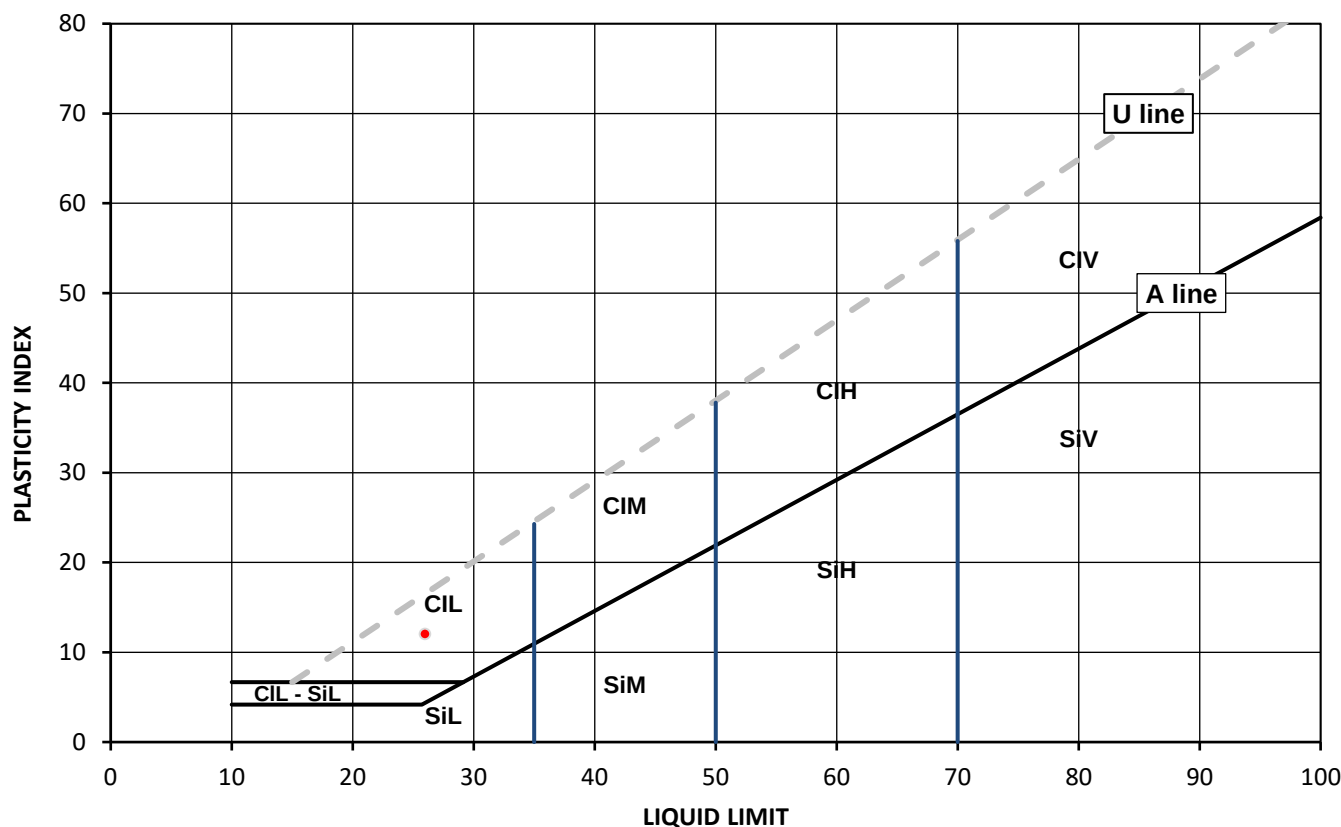
Depth Top [m]: 1.00

Depth Base [m]: 1.10

Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
13	26	14	12	80



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

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DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
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Brackmills Industrial Estate
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Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
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Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 17/11/2021
Date Received: 24/11/2021
Date Tested: 08/12/2021
Sampled By: i2- AW

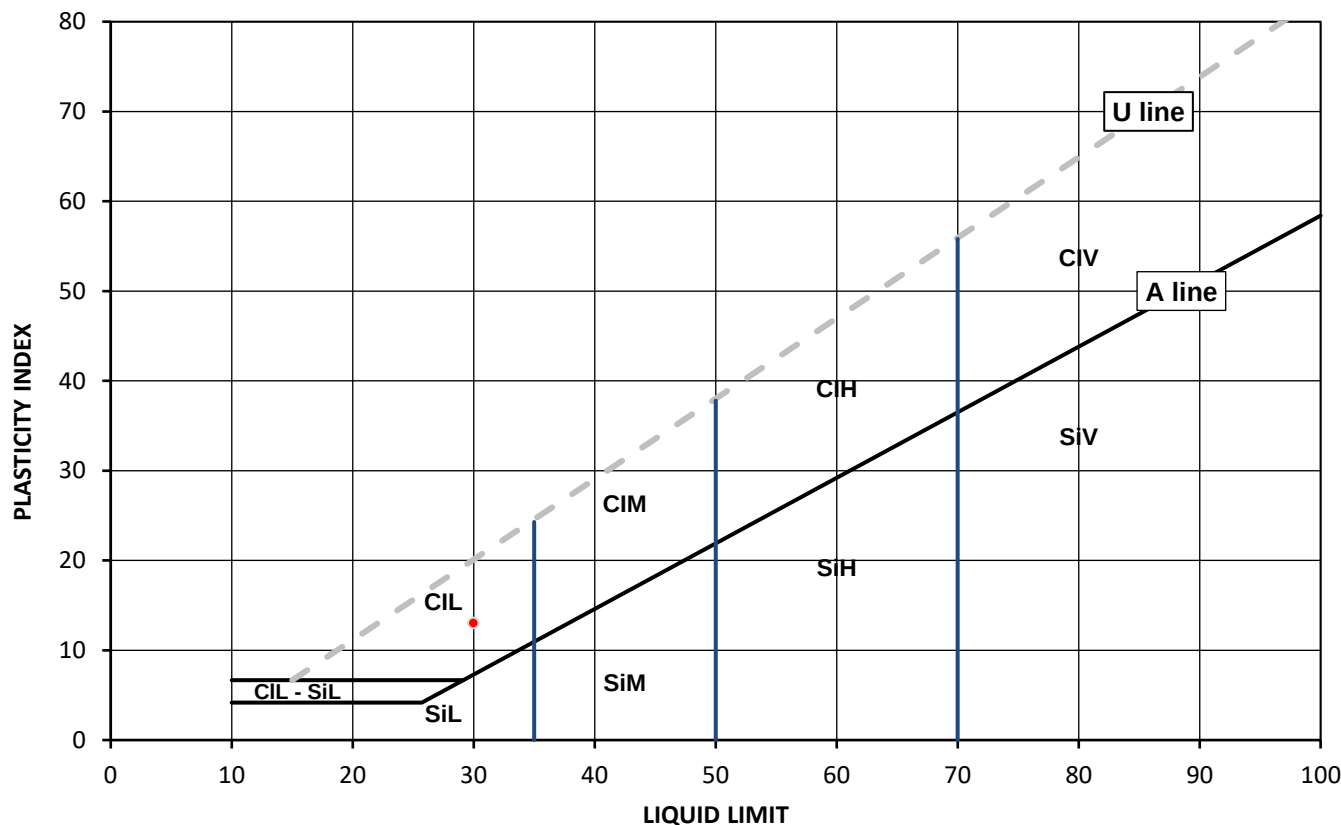
Test Results:

Laboratory Reference: 2100155
Hole No.: WS109
Sample Reference: Not Given
Sample Description: Brown slightly gravelly very sandy CLAY

Depth Top [m]: 1.60
Depth Base [m]: 1.70
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	30	17	13	94



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

Signed:

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 17/11/2021
Date Received: 24/11/2021
Date Tested: 08/12/2021
Sampled By: i2- AW

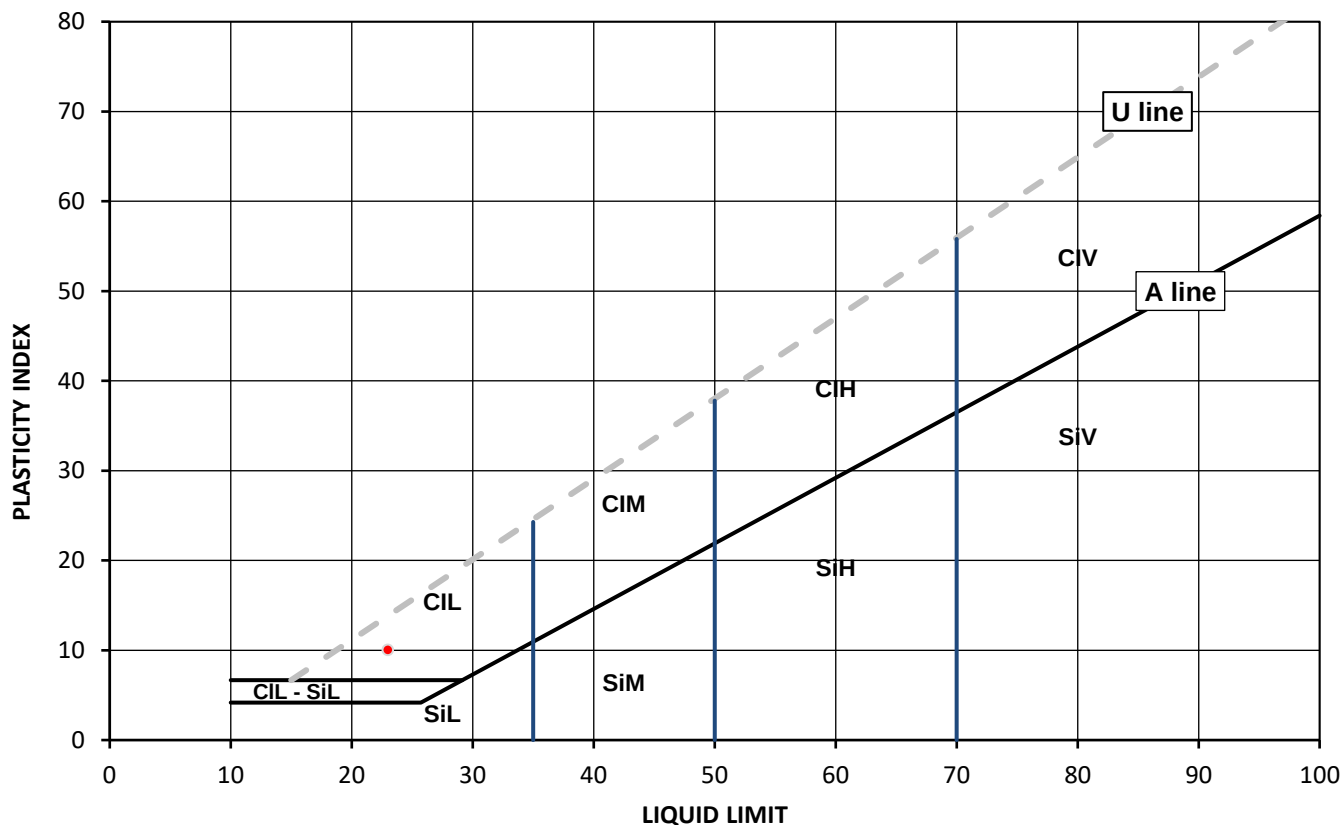
Test Results:

Laboratory Reference: 2100156
Hole No.: WS111
Sample Reference: Not Given
Sample Description: Brown slightly gravelly clayey SAND

Depth Top [m]: 2.30
Depth Base [m]: 2.40
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
12	23	13	10	81



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

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4041

Client: G & J Geoenvironmental Consultants Ltd

Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 16/11/2021

Date Received: 24/11/2021

Date Tested: 08/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100159

Hole No.: BH101

Sample Reference: Not Given

Sample Description: Reddish brown slightly gravelly very sandy CLAY

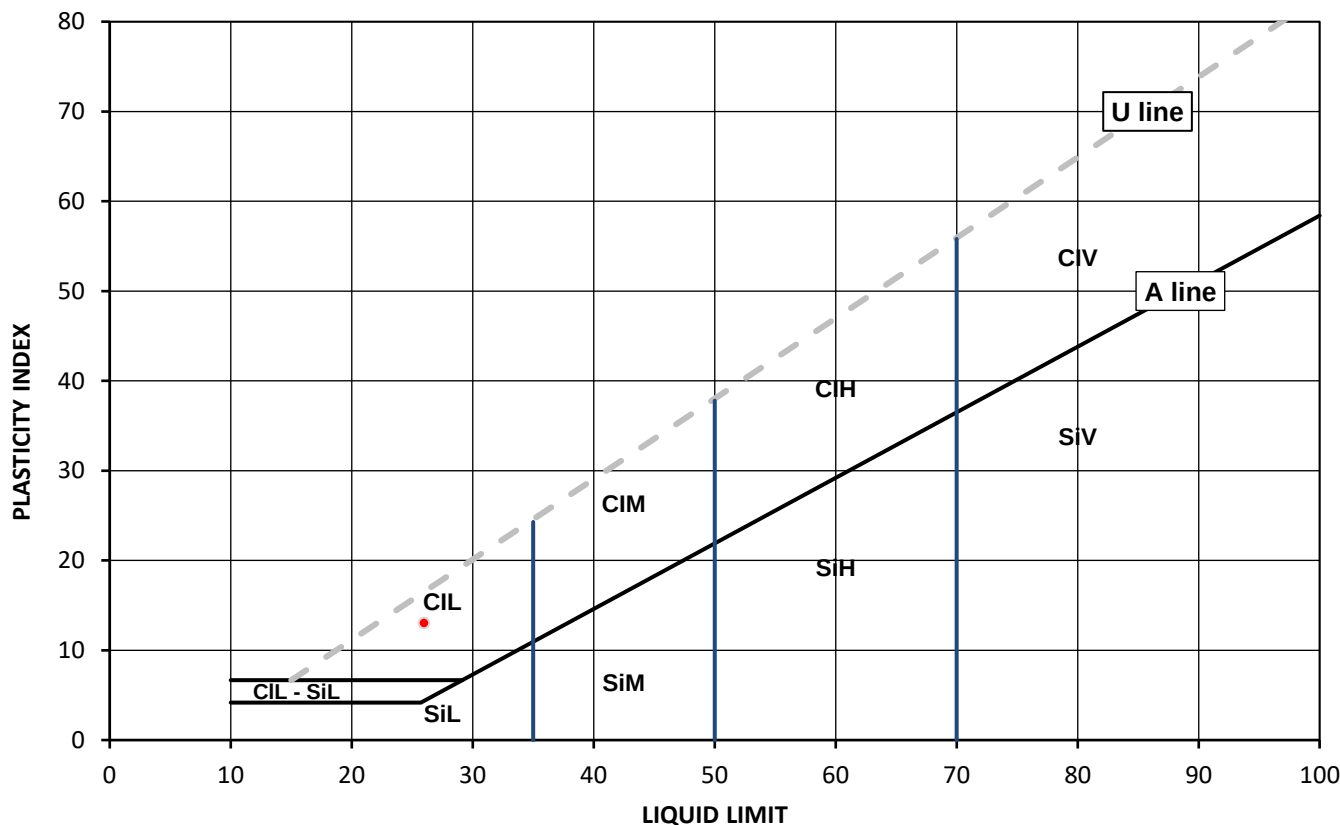
Depth Top [m]: 4.50

Depth Base [m]: Not Given

Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
9.3	26	13	13	87



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: Preliminary report

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Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

SUMMARY REPORT**SUMMARY OF CLASSIFICATION TEST RESULTS**

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN
17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test),
Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 15/11 - 18/11/2021

Date Received: 24/11/2021

Date Tested: 08/12 - 13/12/2021

Sampled By: i2- AW

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m															
2100159	BH101	Not Given	4.50	Not Given	D	Reddish brown slightly gravelly very sandy CLAY	Atterberg 1 Point	9.3		87	26	13	13						
2100138	TP105	Not Given	1.50	1.60	B	Brown slightly gravelly very sandy CLAY	Atterberg 1 Point	16		84	31	14	17						
2100142	TP108	Not Given	0.20	0.30	B	Brown gravelly CLAY and SAND	Atterberg 1 Point	14		90	24	13	11						
2100145	TP110	Not Given	0.50	0.60	B	Brown slightly gravelly very sandy CLAY	Atterberg 1 Point	14		88	29	15	14						
2100148	TP112	Not Given	0.50	0.60	B	Brown slightly gravelly very sandy CLAY	Atterberg 1 Point	13		94	28	16	12						
2100149	WS101	Not Given	0.80	0.90	D	Reddish brown slightly gravelly sandy CLAY	Atterberg 1 Point	17		88	38	18	20						
2100150	WS103	Not Given	2.30	2.40	D	Reddish brown slightly gravelly clayey SAND	Atterberg 1 Point	7.9		83	23	12	11						
2100151	WS105	Not Given	1.30	1.40	D	Dark brown slightly gravelly very sandy CLAY	Atterberg 1 Point	18		88	27	16	11						
2100152	WS106	Not Given	1.70	1.80	D	Reddish brown slightly gravelly clayey SAND	Atterberg 1 Point	15		86	23	13	10						
2100153	WS107	Not Given	1.40	1.50	D	Orangish brown sandy CLAY	Atterberg 1 Point	18		100	37	18	19						

Note: # Non accredited; NP - Non plastic

Comments: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
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4041

Client: G & J Geoenvironmental Consultants Ltd

Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

SUMMARY REPORT**SUMMARY OF CLASSIFICATION TEST RESULTS**

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN
17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test),
Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 17/11/2021

Date Received: 24/11/2021

Date Tested: 08/12/2021

Sampled By: i2- AW

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2100154	WS108	Not Given	1.00	1.10	D	Reddish brown slightly gravelly very sandy CLAY	Atterberg 1 Point	13		80	26	14	12						
2100155	WS109	Not Given	1.60	1.70	D	Brown slightly gravelly very sandy CLAY	Atterberg 1 Point	18		94	30	17	13						
2100156	WS111	Not Given	2.30	2.40	D	Brown slightly gravelly clayey SAND	Atterberg 1 Point	12		81	23	13	10						

Note: # Non accredited; NP - Non plastic

Comments: Preliminary report

Signed:

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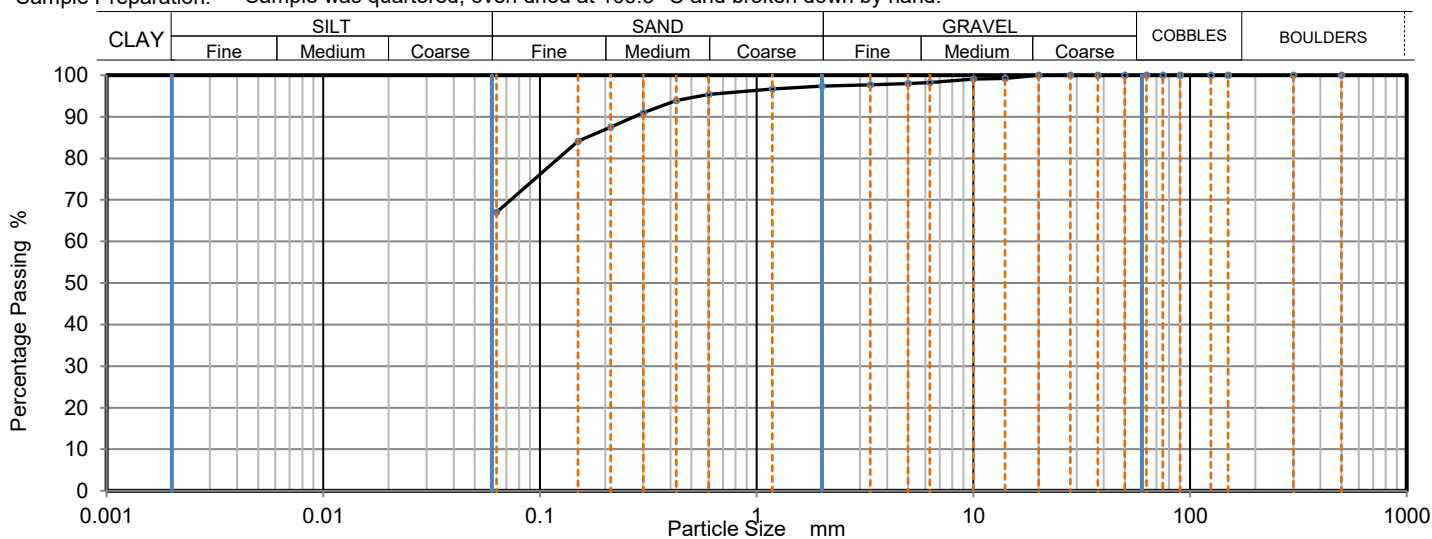
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100135
Hole No.: TP101
Sample Reference: Not Given
Sample Description: Brown slightly gravelly sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 106.3 °C and broken down by hand.

Depth Top [m]: 1.20
Depth Base [m]: 1.30
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	98		
5	98		
3.35	98		
2	97		
1.18	97		
0.6	95		
0.425	94		
0.3	91		
0.212	88		
0.15	84		
0.063	67		

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	30
Fines <0.063mm	67

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	N/A
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:

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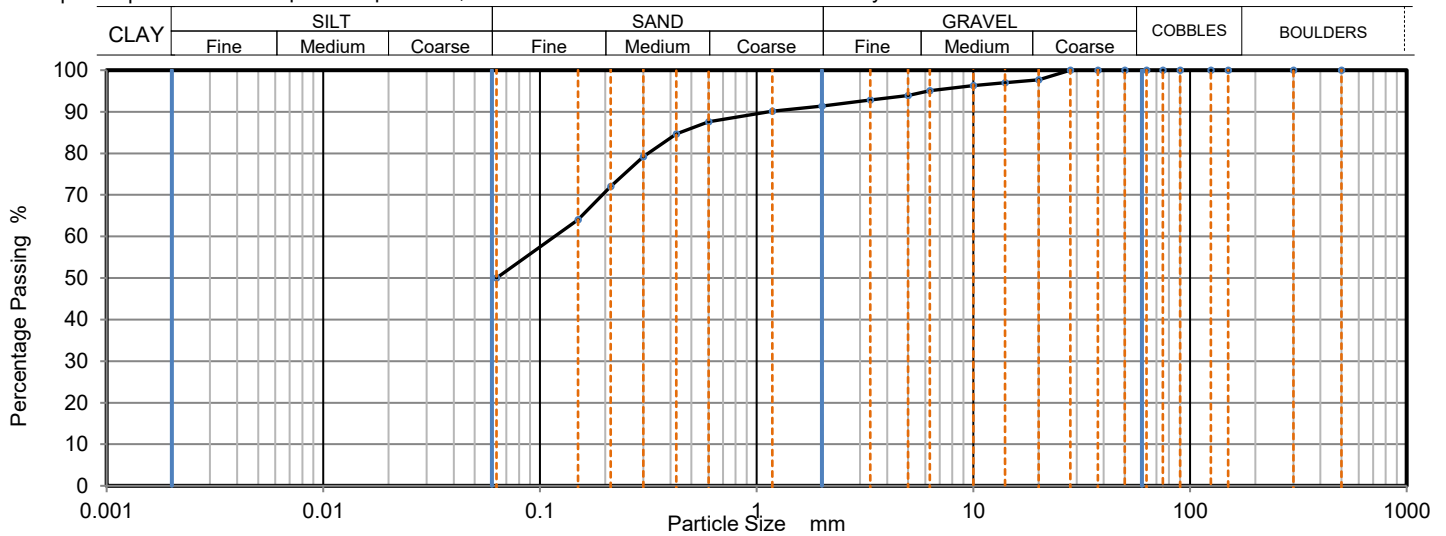
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100136
Hole No.: TP102
Sample Reference: Not Given
Sample Description: Brown gravelly very sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 1.40
Depth Base [m]: 1.50
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	98		
14	97		
10	96		
6.3	95		
5	94		
3.35	93		
2	91		
1.18	90		
0.6	88		
0.425	85		
0.3	79		
0.212	72		
0.15	64		
0.063	50		

Sample Proportions	% dry mass
Very coarse	0
Gravel	9
Sand	41
Fines <0.063mm	50

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 1.9
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:



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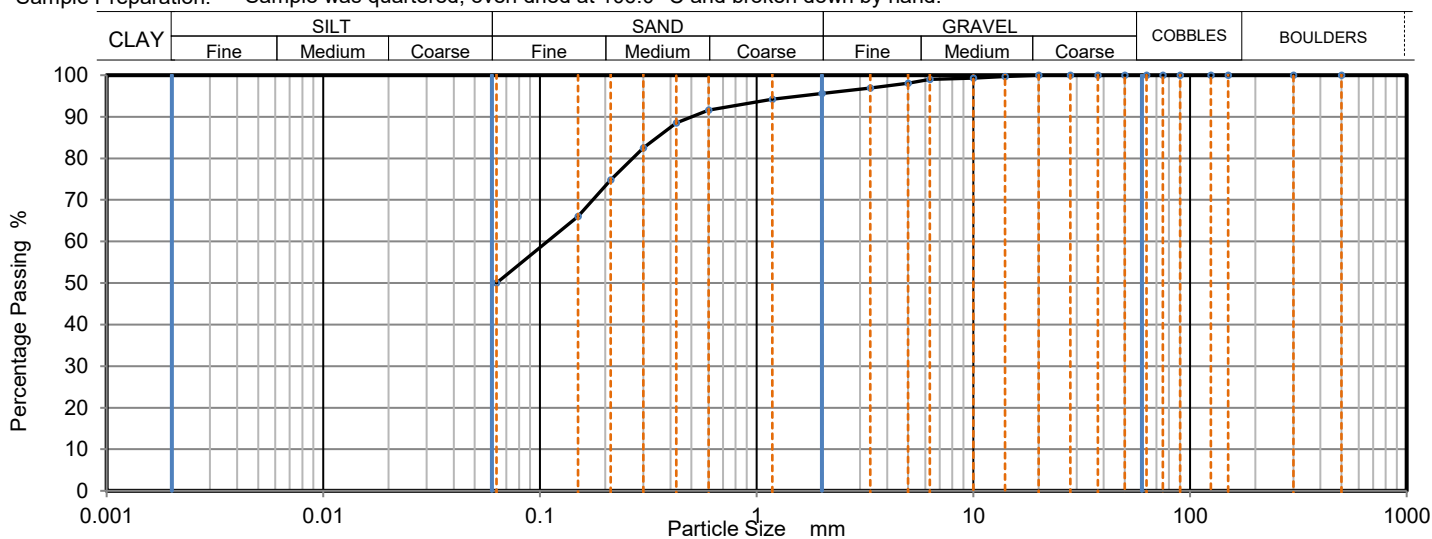
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100138
Hole No.: TP105
Sample Reference: Not Given
Sample Description: Brown slightly gravelly very sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 1.50
Depth Base [m]: 1.60
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	98		
3.35	97		
2	96		
1.18	94		
0.6	92		
0.425	89		
0.3	83		
0.212	75		
0.15	66		
0.063	50		

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	45
Fines <0.063mm	50

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 1.7
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:



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for and on behalf of i2 Analytical Ltd

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Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 15/11/2021

Date Received: 24/11/2021

Date Tested: 09/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100139

Hole No.: TP106

Sample Reference: Not Given

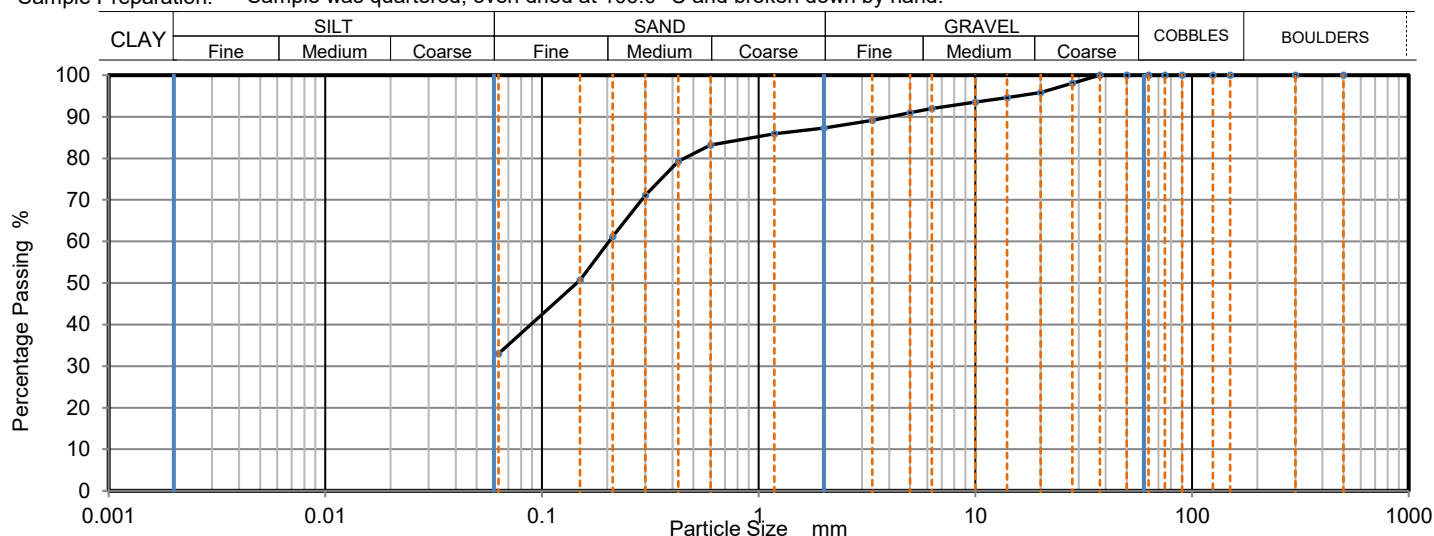
Sample Description: Brown gravelly very clayey SAND

Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 1.80

Depth Base [m]: 1.90

Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	96		
14	95		
10	94		
6.3	92		
5	91		
3.35	89		
2	87		
1.18	86		
0.6	83		
0.425	79		
0.3	71		
0.212	61		
0.15	51		
0.063	34		

Sample Proportions	% dry mass
Very coarse	0
Gravel	13
Sand	54
Fines <0.063mm	34

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 3.2
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

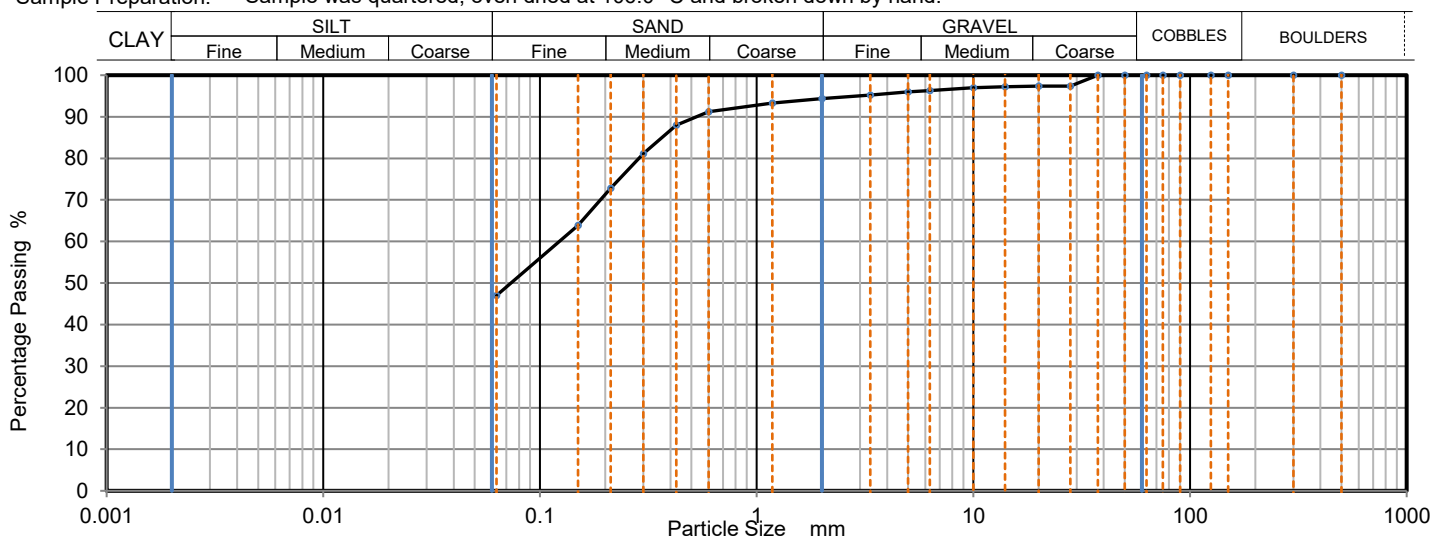
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100142
Hole No.: TP108
Sample Reference: Not Given
Sample Description: Brown gravelly CLAY and SAND
Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 0.20
Depth Base [m]: 0.30
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	97		
20	97		
14	97		
10	97		
6.3	96		
5	96		
3.35	95		
2	94		
1.18	93		
0.6	91		
0.425	88		
0.3	81		
0.212	73		
0.15	64		
0.063	47		

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	47
Fines <0.063mm	47

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 2
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:



Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

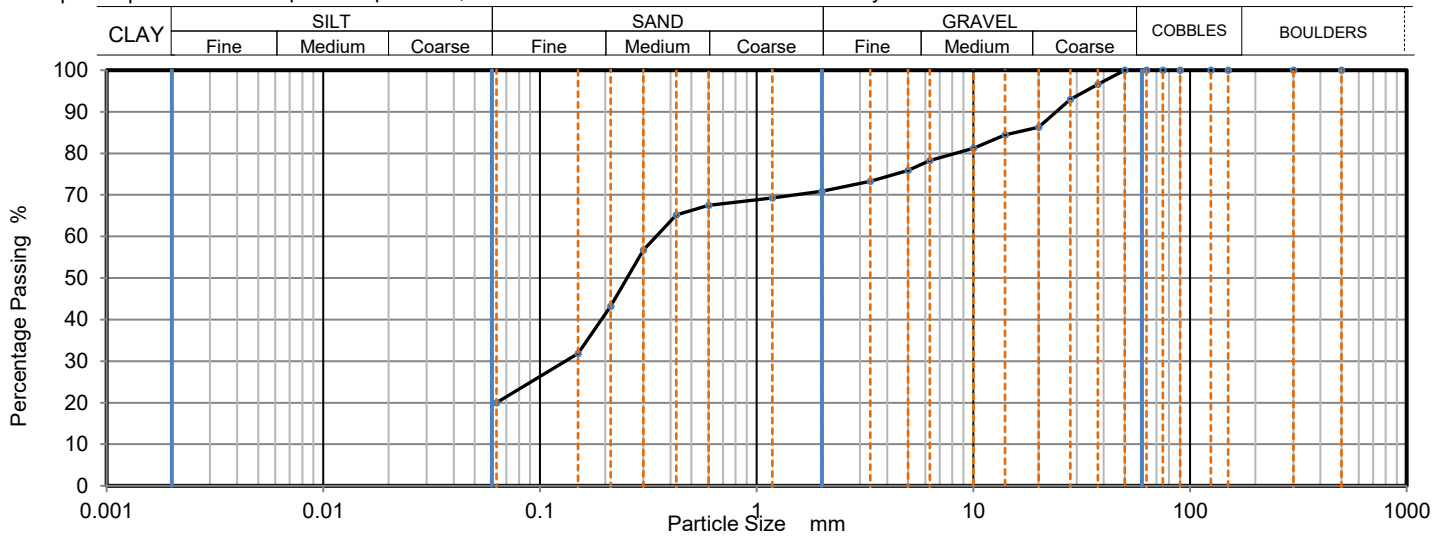
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 18/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100144
Hole No.: TP109
Sample Reference: Not Given
Sample Description: Dark brown clayey very gravelly SAND
Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 1.20
Depth Base [m]: 1.30
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	97		
28	93		
20	86		
14	84		
10	81		
6.3	78		
5	76		
3.35	73		
2	71		
1.18	69		
0.6	68		
0.425	65		
0.3	57		
0.212	43		
0.15	32		
0.063	20		

Sample Proportions	% dry mass
Very coarse	0
Gravel	29
Sand	51
Fines <0.063mm	20

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 5.4
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

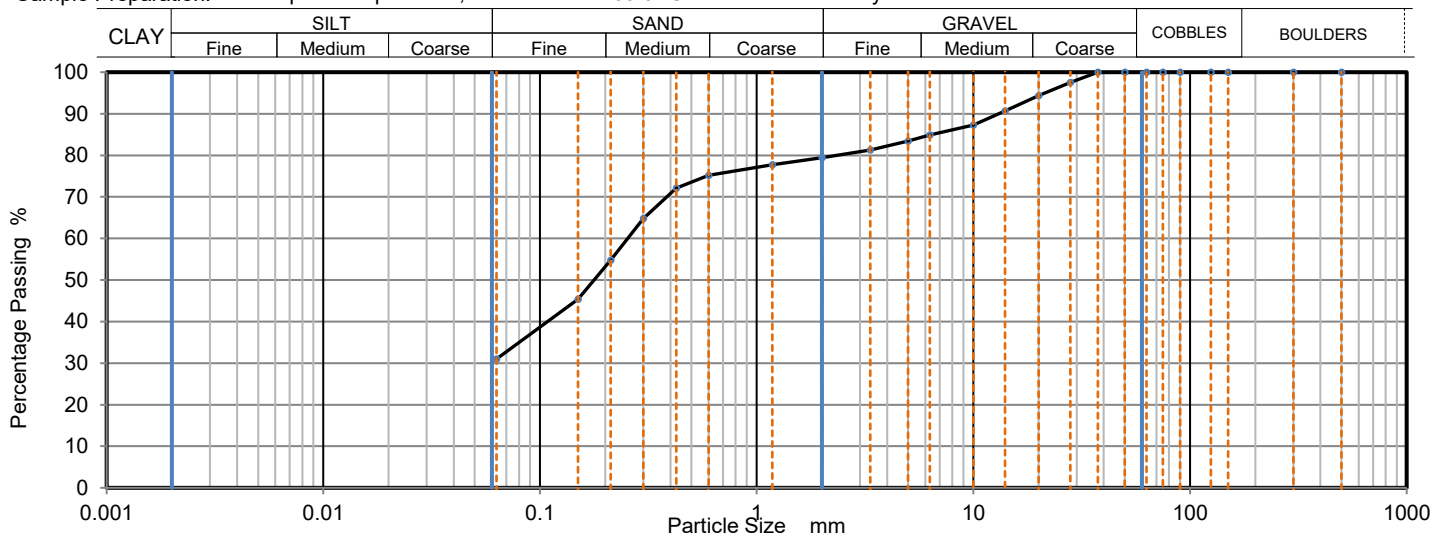
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 16/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100157
Hole No.: BH101
Sample Reference: Not Given
Sample Description: Brown gravelly very clayey SAND
Sample Preparation: Sample was quartered, oven dried at 109.0 °C and broken down by hand.

Depth Top [m]: 0.00
Depth Base [m]: 0.50
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	94		
14	91		
10	87		
6.3	85		
5	83		
3.35	81		
2	79		
1.18	78		
0.6	75		
0.425	72		
0.3	65		
0.212	55		
0.15	45		
0.063	31		

Sample Proportions	% dry mass
Very coarse	0
Gravel	21
Sand	48
Fines <0.063mm	31

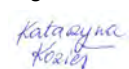
Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 4
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:



Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

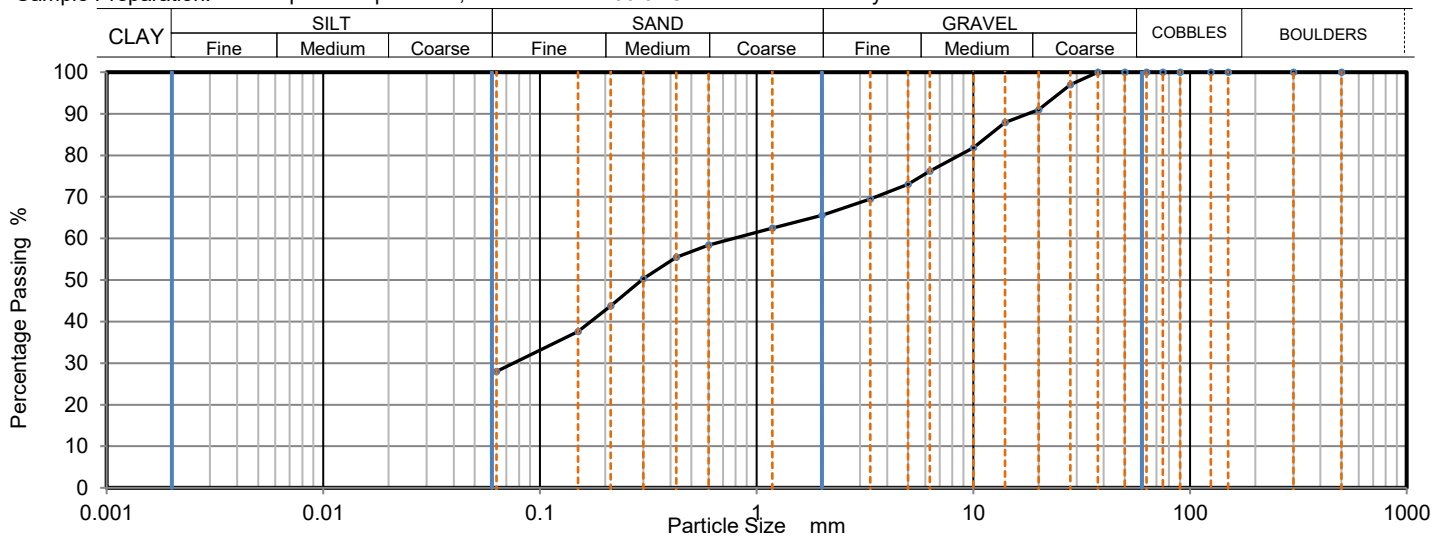
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 17/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100161
Hole No.: BH104
Sample Reference: Not Given
Sample Description: Brown very clayey very gravelly SAND
Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 0.50
Depth Base [m]: 1.00
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	97		
20	91		
14	88		
10	82		
6.3	76		
5	73		
3.35	70		
2	66		
1.18	63		
0.6	58		
0.425	56		
0.3	50		
0.212	44		
0.15	38		
0.063	28		

Sample Proportions	% dry mass
Very coarse	0
Gravel	34
Sand	37
Fines <0.063mm	28

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 12
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:



Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

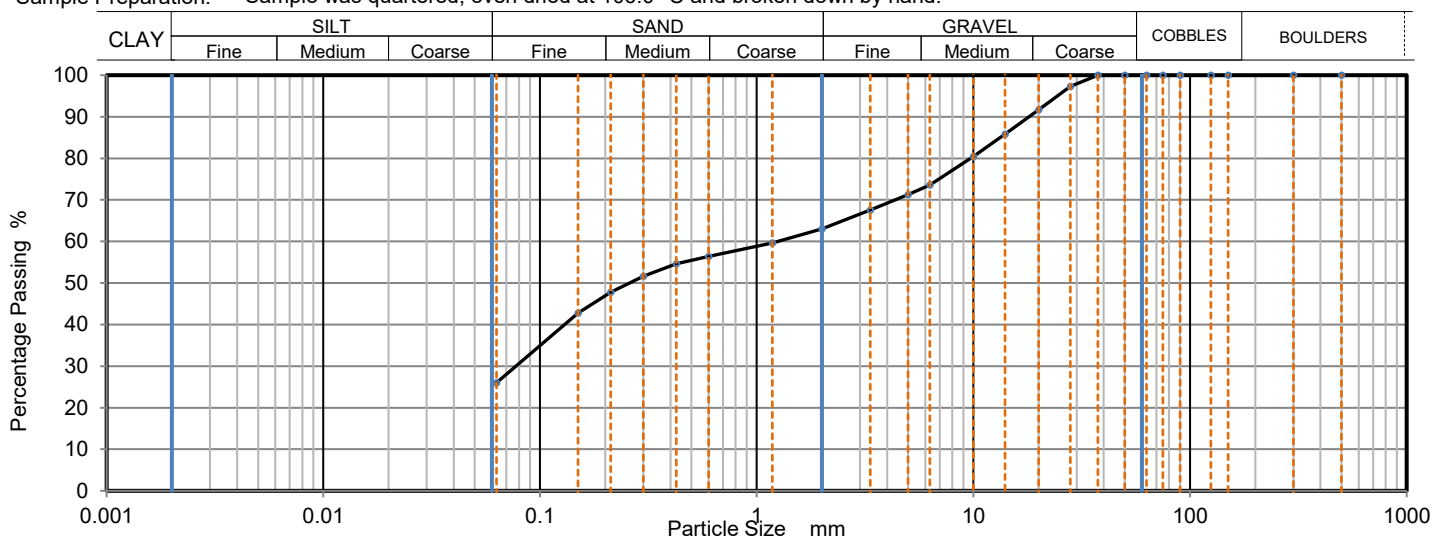
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 18/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100162
Hole No.: BH105
Sample Reference: Not Given
Sample Description: Brown very clayey SAND and GRAVEL
Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 0.50
Depth Base [m]: 1.00
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	97		
20	92		
14	86		
10	80		
6.3	74		
5	71		
3.35	68		
2	63		
1.18	60		
0.6	56		
0.425	55		
0.3	52		
0.212	48		
0.15	43		
0.063	26		

Sample Proportions	% dry mass
Very coarse	0
Gravel	37
Sand	37
Fines <0.063mm	26

Grading Analysis	
D100	mm 37.5
D60	mm 1.26
D30	mm 0.0767
D10	mm
Uniformity Coefficient	> 20
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:



Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

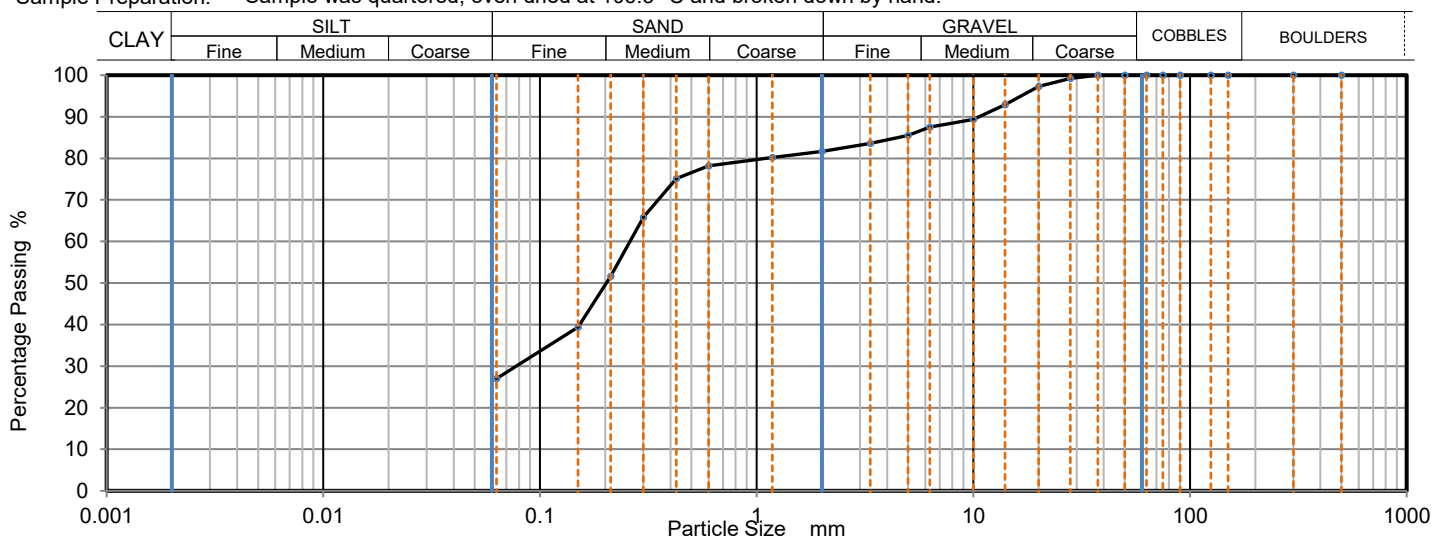
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 16/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100163
Hole No.: BH102
Sample Reference: Not Given
Sample Description: Greyish brown gravelly very clayey SAND
Sample Preparation: Sample was quartered, oven dried at 106.3 °C and broken down by hand.

Depth Top [m]: 0.50
Depth Base [m]: 1.00
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	99		
20	97		
14	93		
10	89		
6.3	88		
5	86		
3.35	84		
2	82		
1.18	80		
0.6	78		
0.425	75		
0.3	66		
0.212	52		
0.15	39		
0.063	27		

Sample Proportions	% dry mass
Very coarse	0
Gravel	18
Sand	55
Fines <0.063mm	27

Grading Analysis	
D100	mm 37.5
D60	mm 0.26
D30	mm 0.0777
D10	mm
Uniformity Coefficient	> 4.1
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Dry Density / Moisture Content

Relationship Light Compaction

Tested in Accordance with:
BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: G & J Geoenvironmental Consultants Ltd

Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers

Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224

Job Number: 21-26080

Date Sampled: 15/11/2021

Date Received: 24/11/2021

Date Tested: 13/12/2021

Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100137

Hole No.: TP105

Sample Reference: Not Given

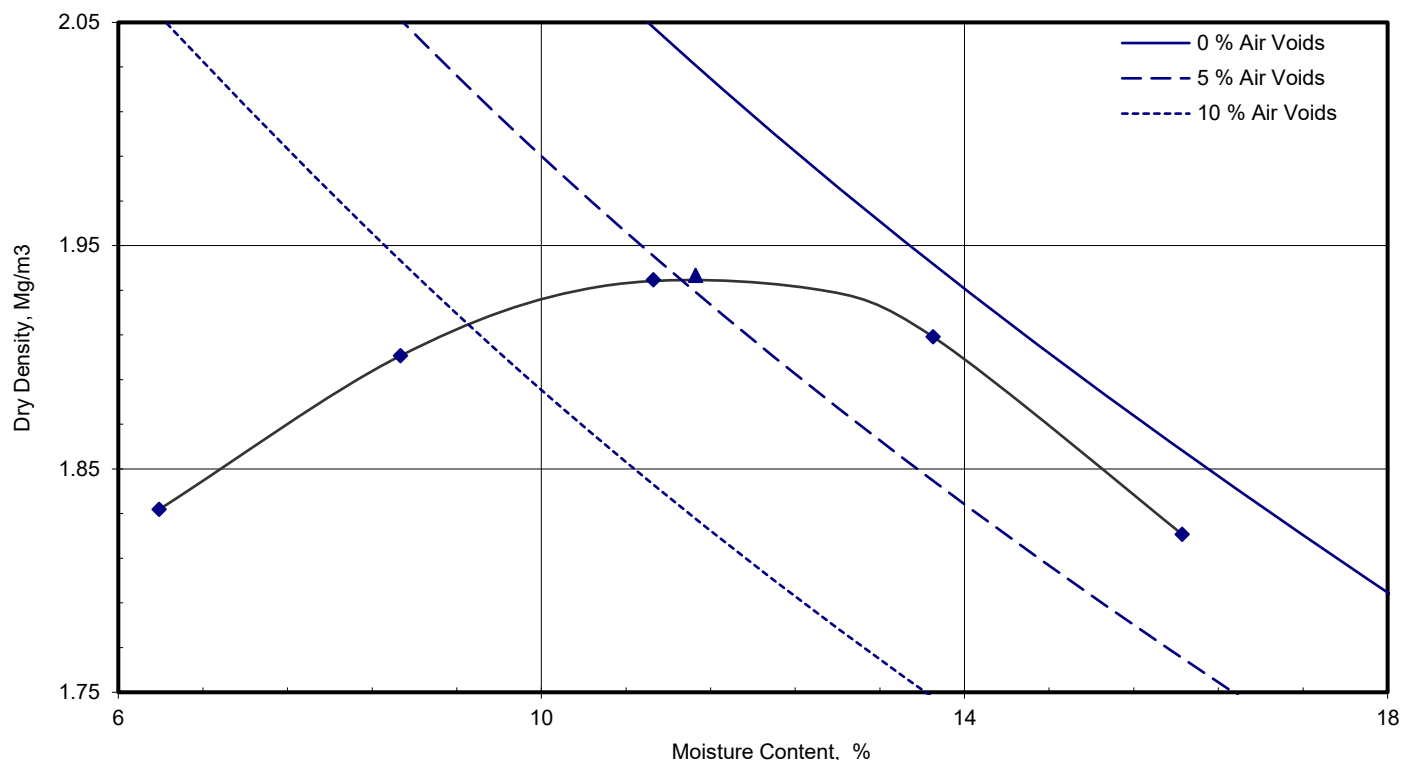
Sample Description: Dark brown slightly gravelly slightly sandy CLAY

Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 0.70

Depth Base [m]: 0.80

Sample Type: B



Compaction Point No.		1	2	3	4	5
Moisture Content	%	6.4	8.7	11	14	16
Dry Density	Mg/m³	1.83	1.90	1.93	1.91	1.82

Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	2
Particle Density - Assumed	Mg/m³	2.65
As received Moisture Content	%	14
Maximum Dry Density	Mg/m³	1.94

Optimum Moisture Content	%	11
--------------------------	---	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks: Preliminary report

Signed:

Katarzyna Koziel

Katarzyna Koziel

Technical Reviewer

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Light Compaction

Tested in Accordance with:
BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

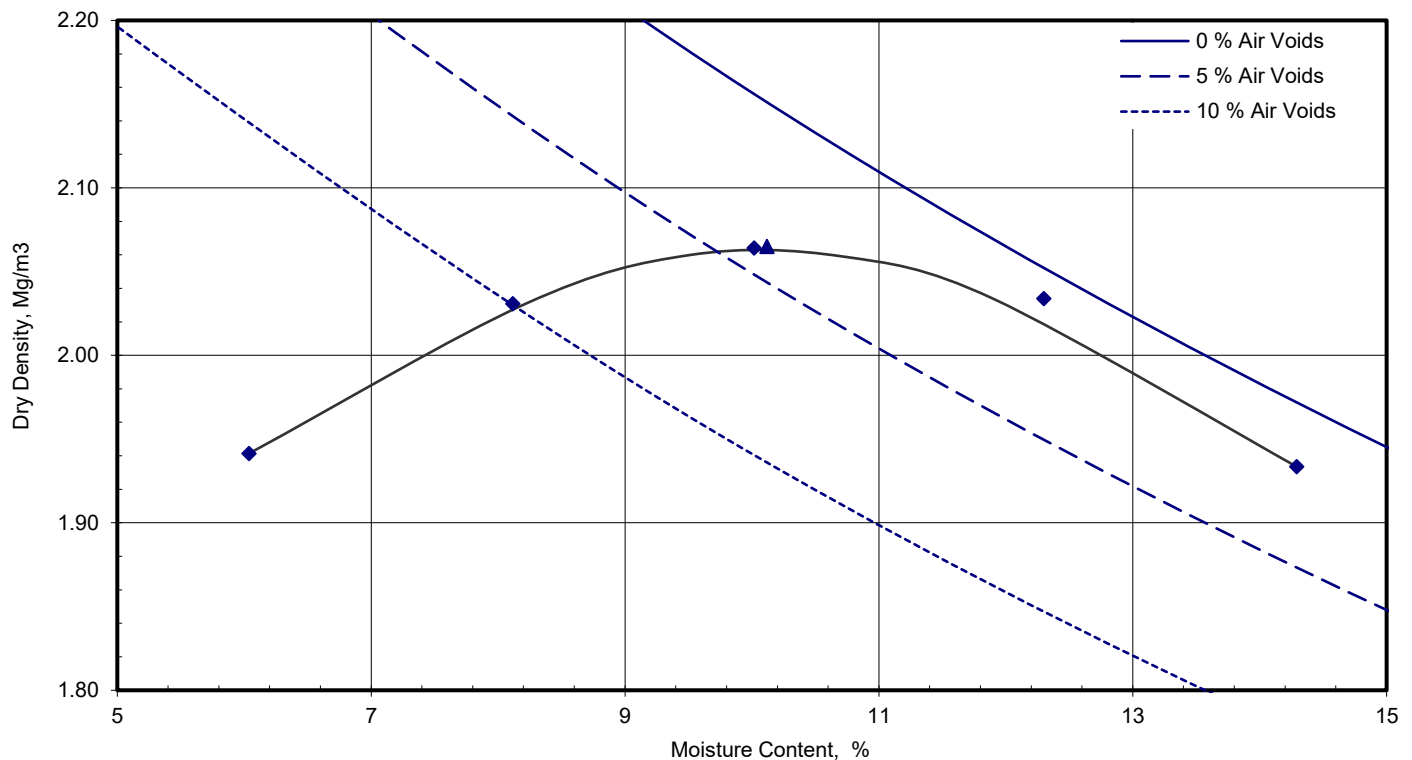
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100141
Hole No.: TP107
Sample Reference: Not Given
Sample Description: Brown slightly gravelly slightly sandy CLAY
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 1.20
Depth Base [m]: 1.30
Sample Type: B



Compaction Point No.	1	2	3	4	5	
Moisture Content	%	6.0	8.1	10	12	14
Dry Density	Mg/m³	1.94	2.03	2.06	2.03	1.93

Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	3
Particle Density - Assumed	Mg/m³	2.75
As received Moisture Content	%	12
Maximum Dry Density	Mg/m³	2.06

Optimum Moisture Content	%	10
--------------------------	---	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks: Preliminary report

Signed:

Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Light Compaction

Tested in Accordance with:
BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

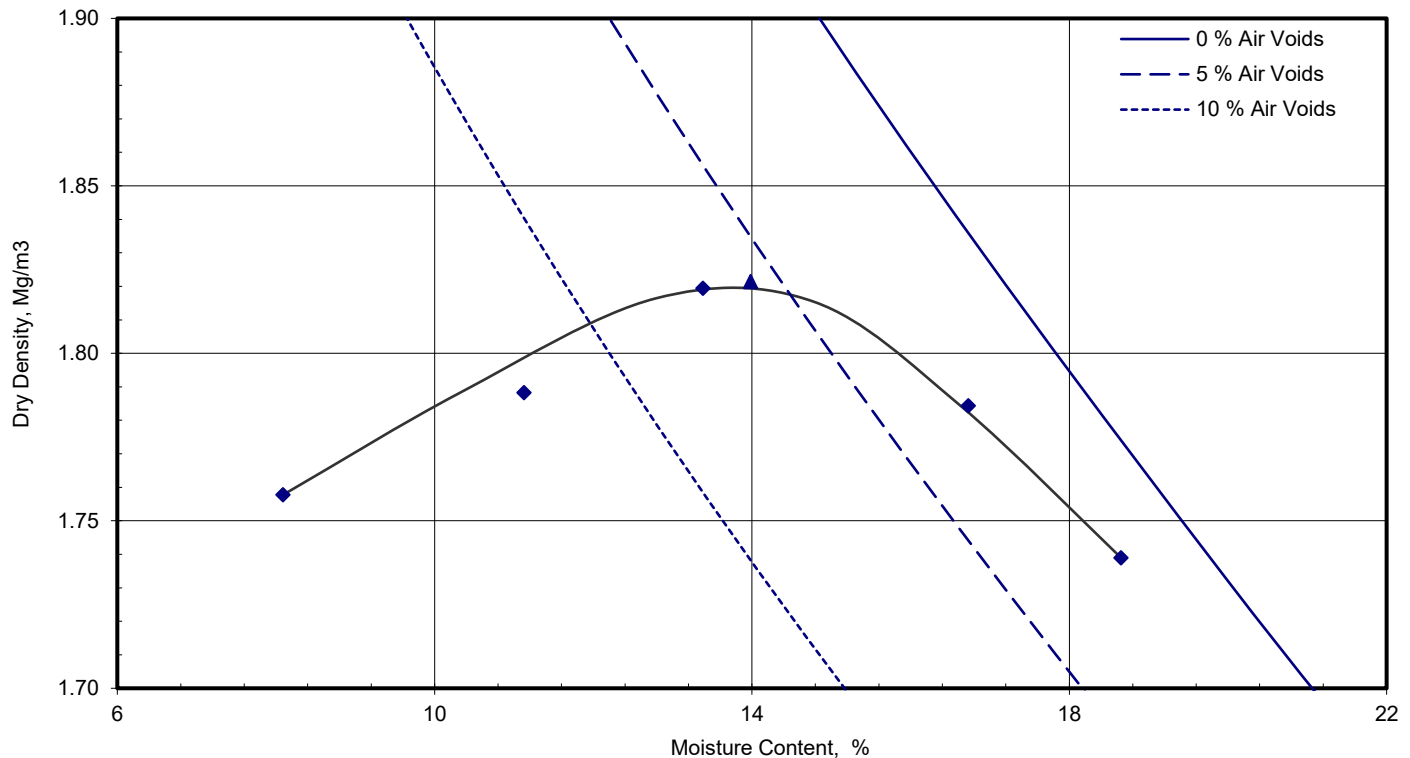
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 18/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100143
Hole No.: TP109
Sample Reference: Not Given
Sample Description: Brown gravelly CLAY
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 0.40
Depth Base [m]: 0.50
Sample Type: B



Compaction Point No.		1	2	3	4	5
Moisture Content	%	8.1	11	13	17	19
Dry Density	Mg/m³	1.76	1.79	1.82	1.78	1.74

Mould Type		CBR
Samples Used		Separate specimens tested
Material Retained on 37.5 mm Sieve	%	11
Material Retained on 20.0 mm Sieve	%	16
Particle Density - Assumed	Mg/m³	2.65
As received Moisture Content	%	19
Maximum Dry Density	Mg/m³	1.82

Optimum Moisture Content	%	14
--------------------------	---	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.4 using 2.5kg [light] Rammer

Remarks: Zone X - test carried out as per client request
Preliminary report

Signed:

Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Light Compaction

Tested in Accordance with:
BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

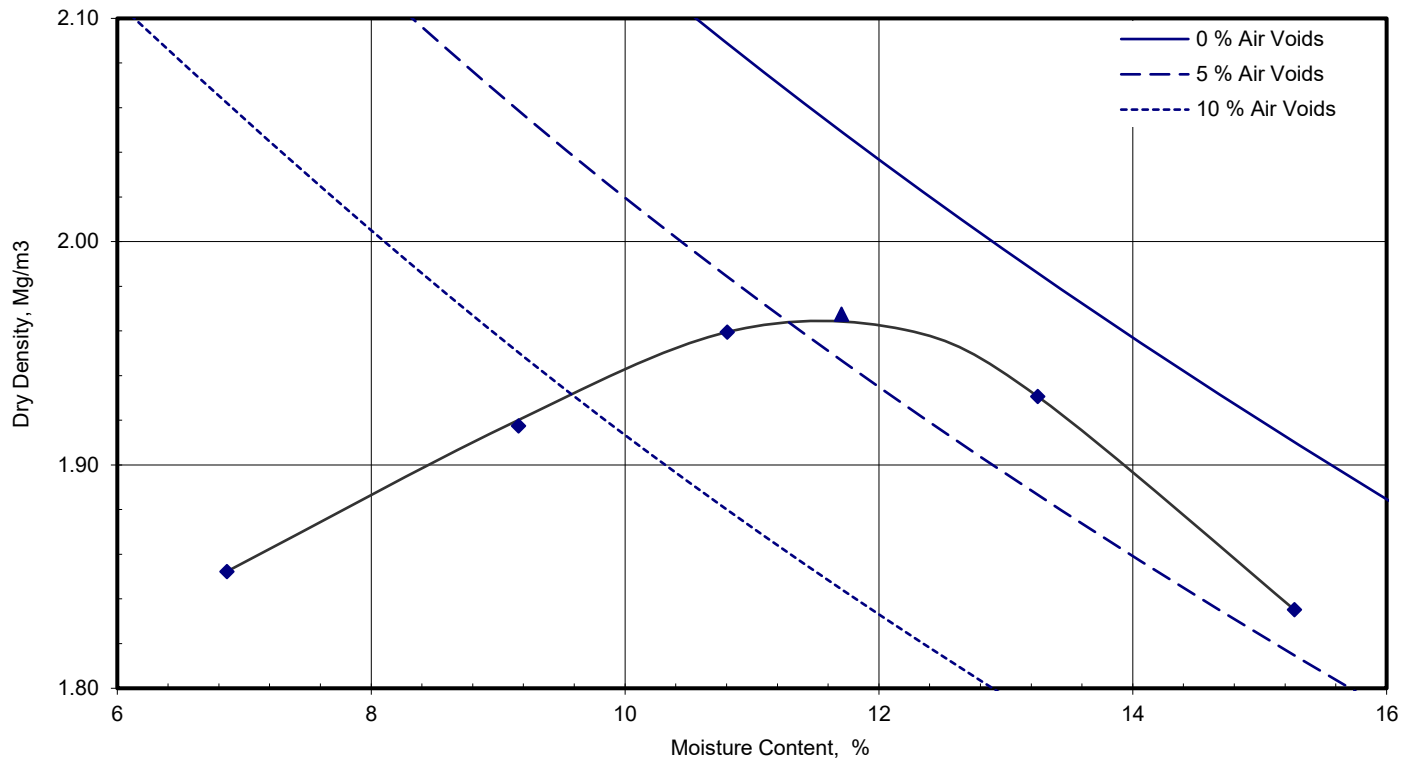
Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 18/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 2100145
Hole No.: TP110
Sample Reference: Not Given
Sample Description: Brown slightly gravelly very sandy CLAY
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 0.50
Depth Base [m]: 0.60
Sample Type: B



Compaction Point No.	1	2	3	4	5	
Moisture Content	%	6.9	9.2	11	13	15
Dry Density	Mg/m³	1.85	1.92	1.96	1.93	1.84

Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	2
Particle Density - Assumed	Mg/m³	2.70
As received Moisture Content	%	13
Maximum Dry Density	Mg/m³	1.97

Optimum Moisture Content	%	12
--------------------------	---	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks: Preliminary report

Signed:

Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Light Compaction

Tested in Accordance with:
BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

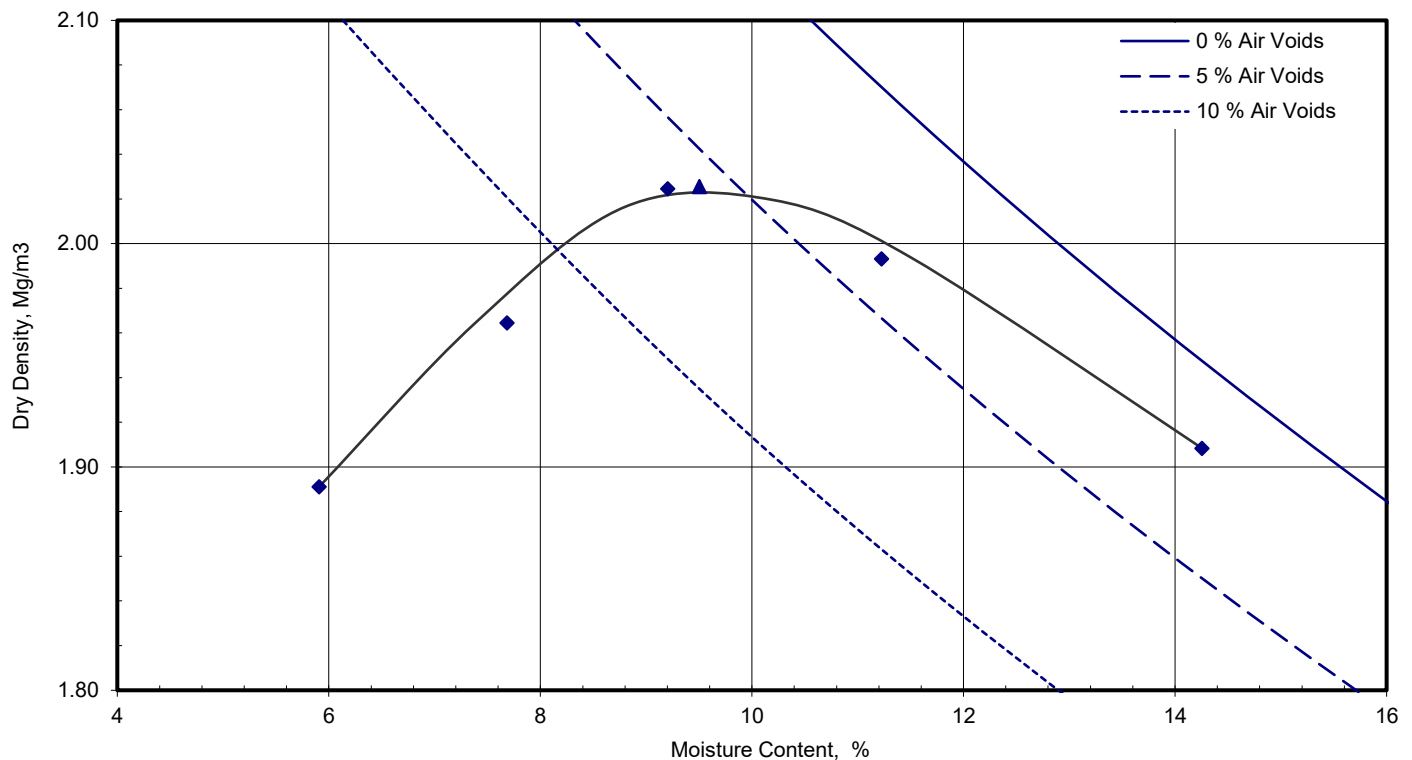
Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 16/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 2100163
Hole No.: BH102
Sample Reference: Not Given
Sample Description: Greyish brown gravelly very clayey SAND
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 0.50
Depth Base [m]: 1.00
Sample Type: B



Compaction Point No.	1	2	3	4	5	
Moisture Content	%	5.9	7.7	9.2	11	14
Dry Density	Mg/m³	1.89	1.96	2.02	1.99	1.91

Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	3
Particle Density - Assumed	Mg/m³	2.70
As received Moisture Content	%	15
Maximum Dry Density	Mg/m³	2.03

Optimum Moisture Content	%	9.5
--------------------------	---	-----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of California Bearing Ratio

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

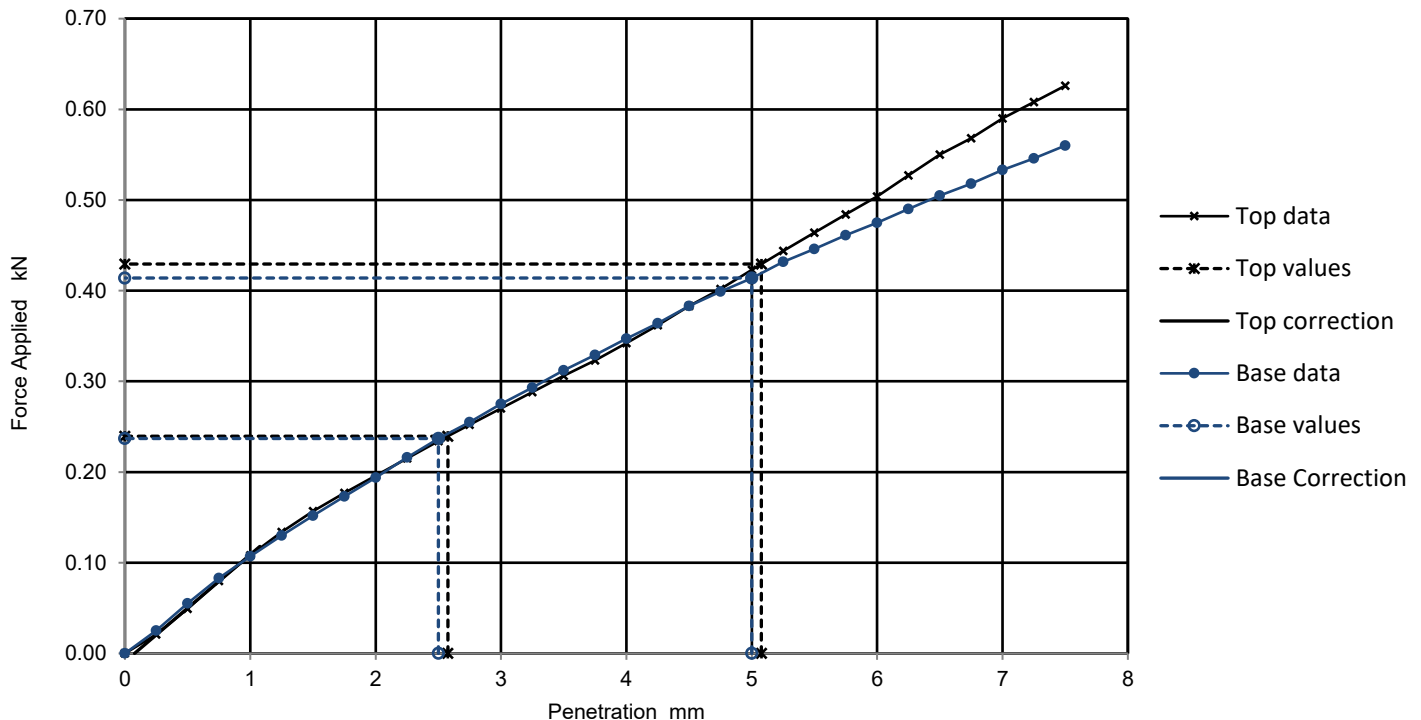
Laboratory Reference: 2100135
Hole No.: TP101
Sample Reference: Not Given
Sample Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 1.20
Depth Base [m]: 1.30
Sample Type: B

Specimen Preparation:

Condition	Remoulded			Soaking details		Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days	
				Time to surface		days	
				Amount of swell recorded		mm	
Material retained on 20mm sieve removed	0	%		Dry density after soaking		Mg/m3	
Initial Specimen details	Bulk density	2.09	Mg/m3	Surcharge applied		8	kg
	Dry density	1.77	Mg/m3			4.8	kPa
	Moisture content	18	%				

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
Yes	1.8	2.1	2.1	2.1
No	1.8	2.1	2.1	

Moisture Content %
18
18

Remarks: Preliminary report

Test/ Specimen specific remarks:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of California Bearing Ratio

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

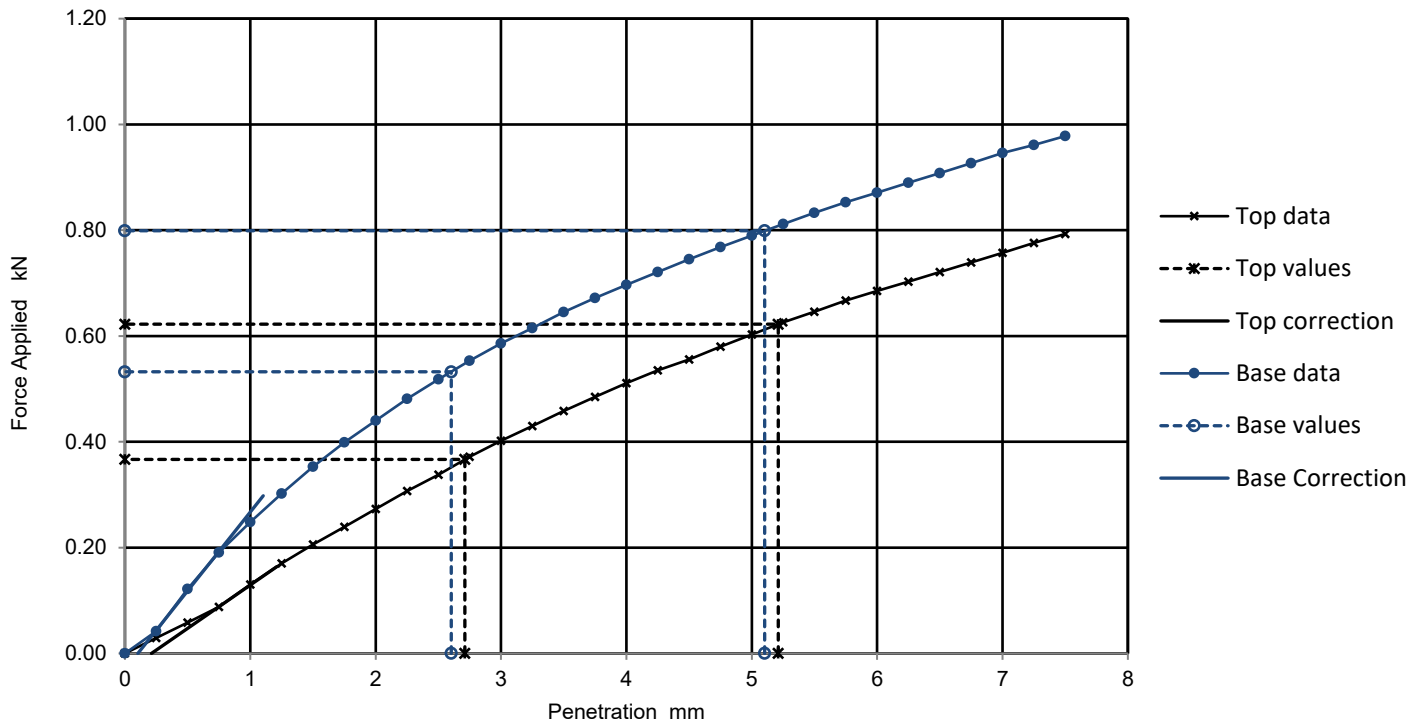
Laboratory Reference: 2100137
Hole No.: TP105
Sample Reference: Not Given
Sample Description: Dark brown slightly gravelly slightly sandy CLAY

Depth Top [m]: 0.70
Depth Base [m]: 0.80
Sample Type: B

Specimen Preparation:

Condition	Remoulded			Soaking details		Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days	
				Time to surface		days	
				Amount of swell recorded		mm	
Material retained on 20mm sieve removed	2	%		Dry density after soaking		Mg/m3	
Initial Specimen details	Bulk density	2.18	Mg/m3	Surcharge applied		8	kg
	Dry density	1.92	Mg/m3			4.8	kPa
	Moisture content	14	%				

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
Yes	2.8	3.1	3.1	
Yes	4.0	4.0	4.0	

Moisture Content %
14
14

Remarks: Preliminary report

Test/ Specimen specific remarks:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of California Bearing Ratio

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 15/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 2100140
Hole No.: TP107
Sample Reference: Not Given
Sample Description: Orangish brown slightly gravelly slightly sandy CLAY

Depth Top [m]: 0.40
Depth Base [m]: 0.50
Sample Type: B

Specimen Preparation:

Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

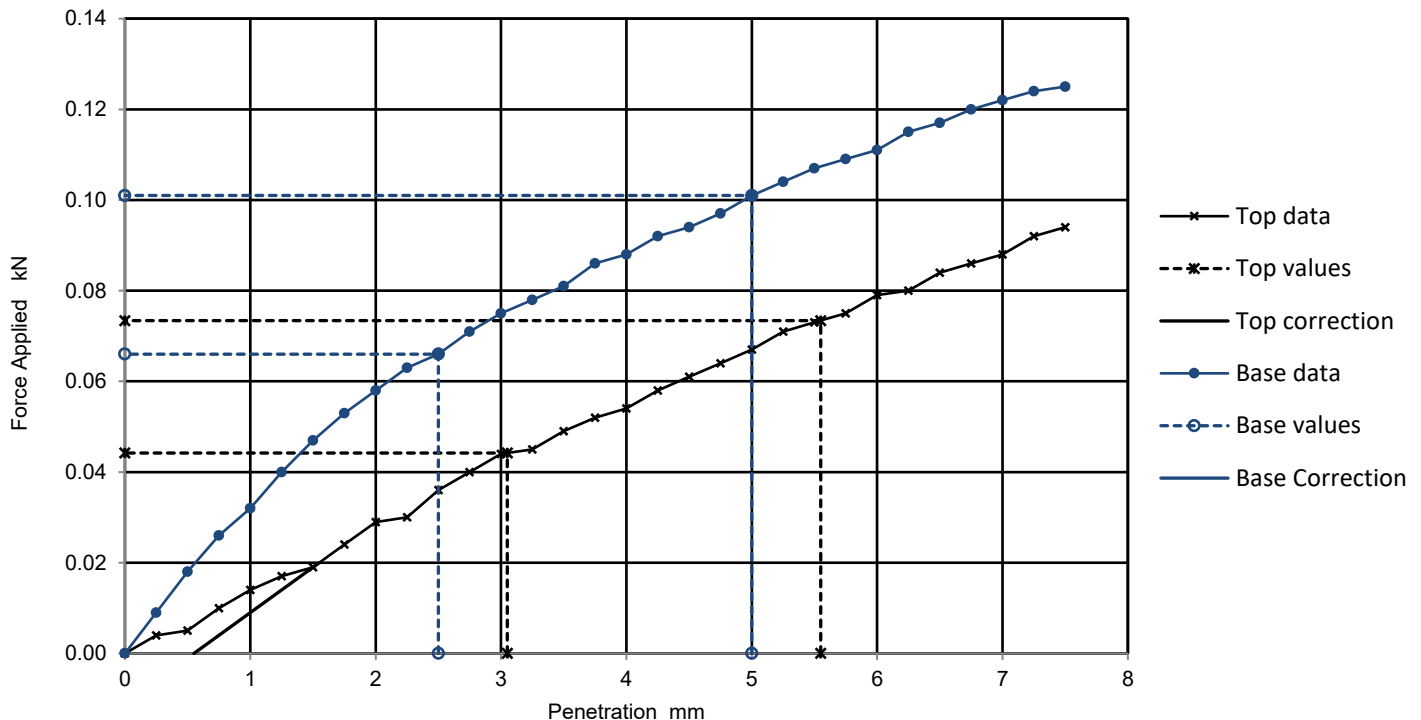
Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m³

Material retained on 20mm sieve removed 12 %

Initial Specimen details Bulk density 2.16 Mg/m³
Dry density 1.87 Mg/m³
Moisture content 15 %

Surcharge applied 8 kg
4.8 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
Yes	0.3	0.4	0.4	
No	0.5	0.5	0.5	

Moisture Content %
15
15

Remarks: Preliminary report

Test/ Specimen specific remarks:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of California Bearing Ratio

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 18/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

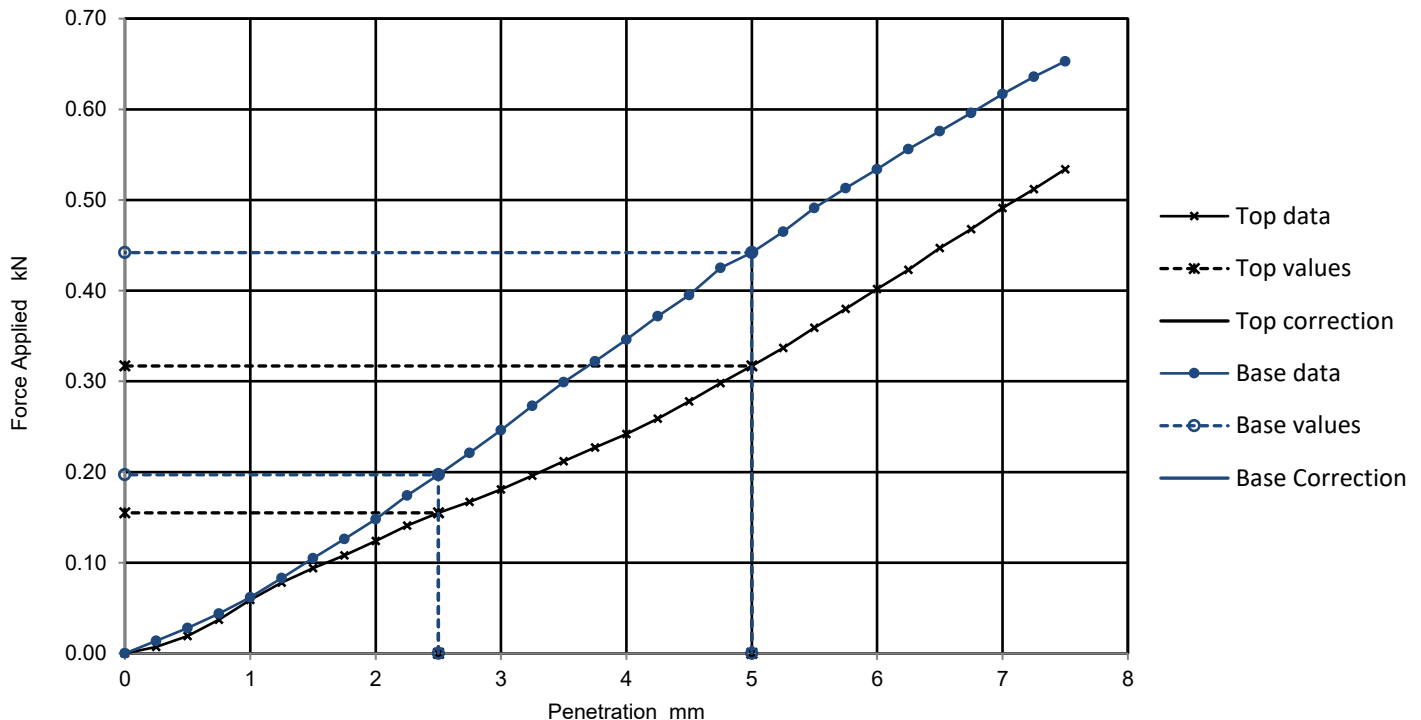
Laboratory Reference: 2100143
Hole No.: TP109
Sample Reference: Not Given
Sample Description: Brown gravelly CLAY

Depth Top [m]: 0.40
Depth Base [m]: 0.50
Sample Type: B

Specimen Preparation:

Condition	Remoulded			Soaking details		Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days	
				Time to surface		days	
				Amount of swell recorded		mm	
Material retained on 20mm sieve removed	5	%		Dry density after soaking		Mg/m3	
Initial Specimen details	Bulk density	2.06	Mg/m3	Surcharge applied		8	kg
	Dry density	1.74	Mg/m3			4.8	kPa
	Moisture content	19	%				

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	1.2	1.6	1.6	
No	1.5	2.2	2.2	

Moisture Content %
18
19

Remarks: Preliminary report

Test/ Specimen specific remarks:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of California Bearing Ratio

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 18/11/2021
Date Received: 24/11/2021
Date Tested: 13/12/2021
Sampled By: i2- AW

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 2100162
Hole No.: BH105
Sample Reference: Not Given
Sample Description: Brown very clayey SAND and GRAVEL

Depth Top [m]: 0.50
Depth Base [m]: 1.00
Sample Type: B

Specimen Preparation:

Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

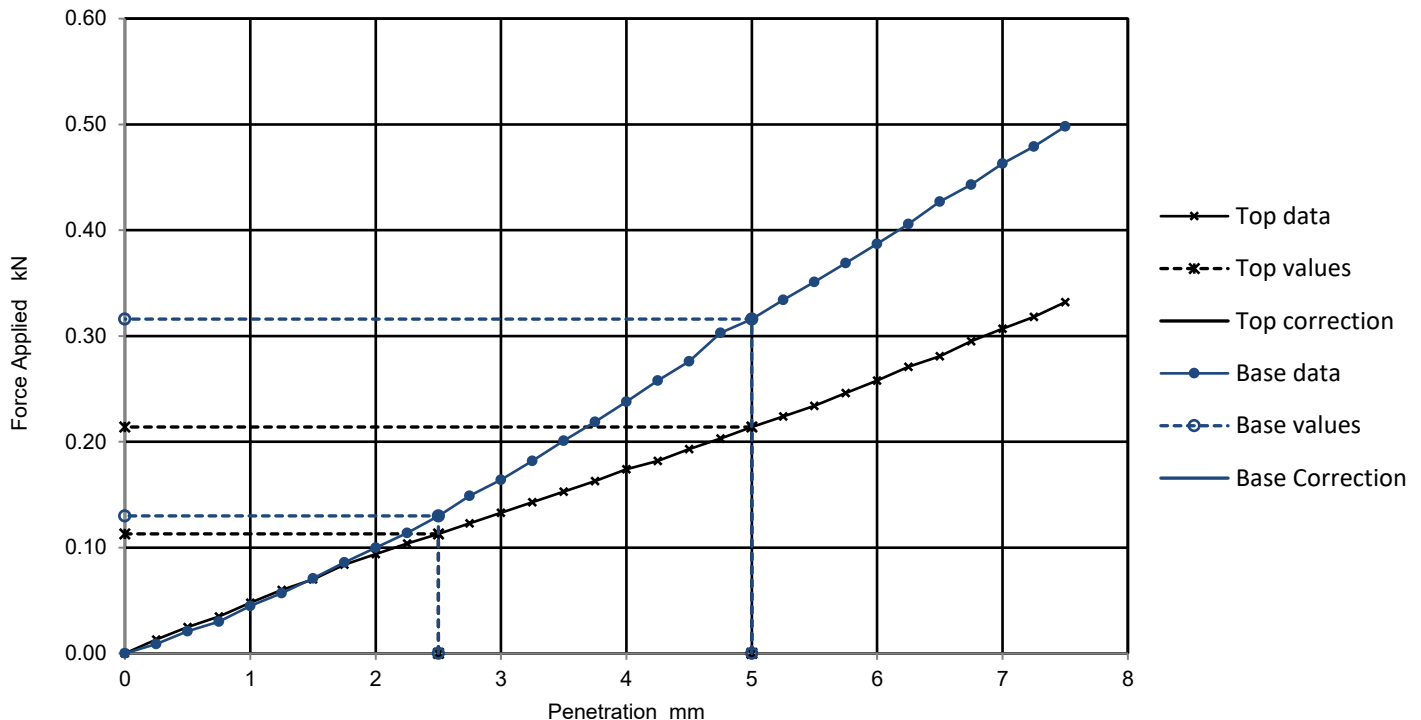
Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m³

Material retained on 20mm sieve removed 9 %

Initial Specimen details Bulk density 2.02 Mg/m³
Dry density 1.77 Mg/m³
Moisture content 14 %

Surcharge applied 8 kg
4.8 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	0.9	1.1	1.1	
No	1.0	1.6	1.6	

Moisture Content %
15
14

Remarks: Preliminary report

Test/ Specimen specific remarks:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE Unconsolidated Undrained

Triaxial Compression

Tested in Accordance with:
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 16/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

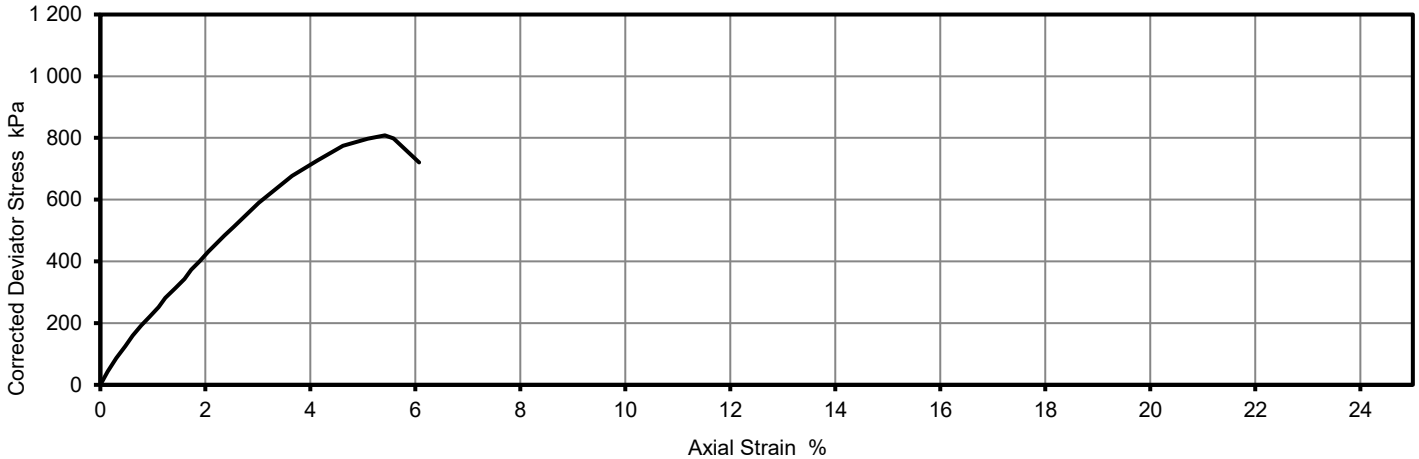
Laboratory Reference: 2100158
Hole No.: BH101
Sample Reference: Not Given
Sample Description: Reddish brown slightly gravelly sandy CLAY

Depth Top [m]: 4.00
Depth Base [m]: 4.45
Sample Type: U

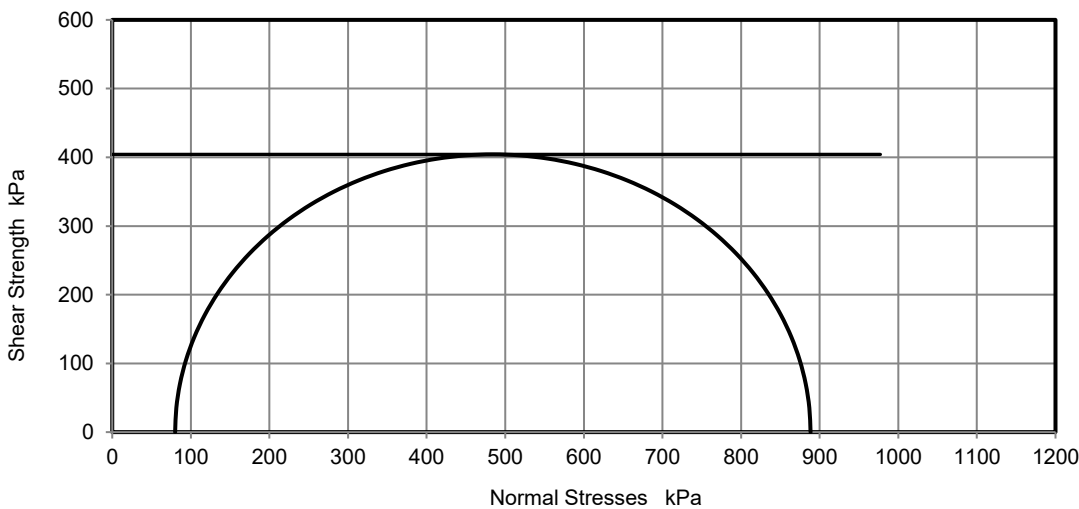
Test Number	1
Length	101.12 mm
Diameter	49.84 mm
Bulk Density	2.26 Mg/m ³
Moisture Content	9.8 %
Dry Density	2.06 Mg/m ³
Membrane Correction	0.69 kPa

Rate of Strain	2.00 %/min
Cell Pressure	80 kPa
Axial Strain at failure	5.4 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	808 kPa
Undrained Shear Strength, c_u	404 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Brittle
Membrane thickness	0.23 mm

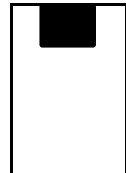
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Unconsolidated Undrained

Triaxial Compression

Tested in Accordance with:
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 17/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

Laboratory Reference: 2100160
Hole No.: BH103
Sample Reference: Not Given
Sample Description: Reddish brown slightly gravelly sandy CLAY

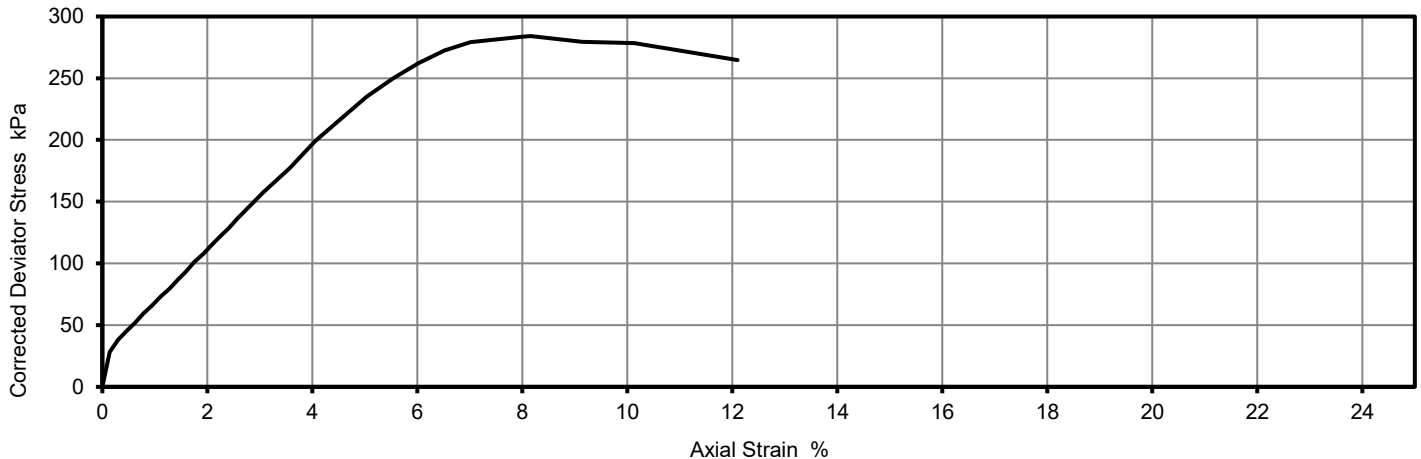
Depth Top [m]: 2.00
Depth Base [m]: 2.45
Sample Type: U

Test Number	1
Length	140.75 mm
Diameter	69.34 mm
Bulk Density	2.28 Mg/m ³
Moisture Content	10 %
Dry Density	2.07 Mg/m ³
Membrane Correction	0.67 kPa

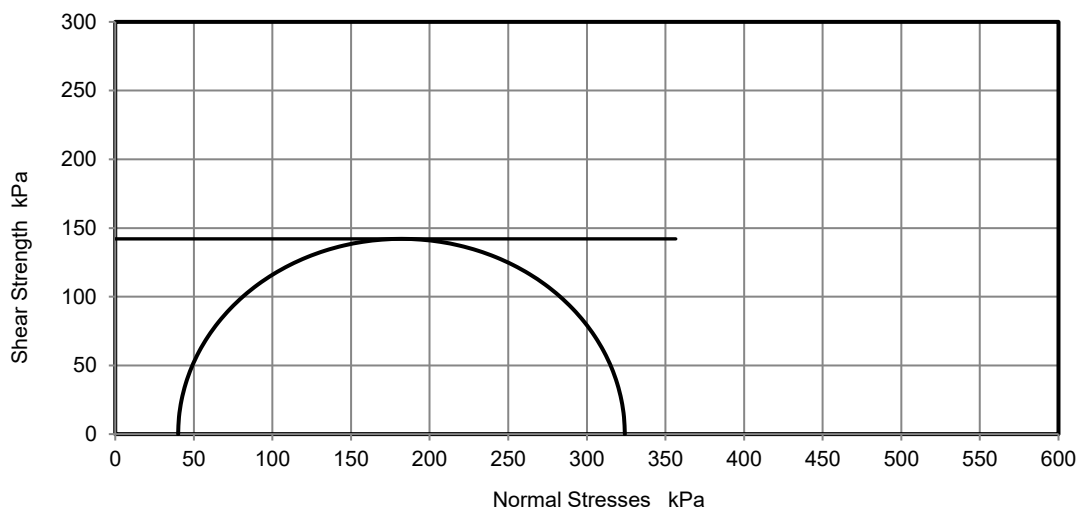
Rate of Strain
Cell Pressure
Axial Strain at failure
Deviator Stress, ($\sigma_1 - \sigma_3$)_f
Undrained Shear Strength, c_u
Mode of Failure
Membrane thickness

2.00	%/min
40	kPa
8.2	%
284	kPa
142	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Compound	
0.24	mm

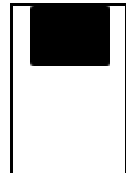
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE Unconsolidated Undrained

Triaxial Compression

Tested in Accordance with:
BS 1377-7: 1990: Clause 8

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: G & J Geoenvironmental Consultants Ltd
Client Address: 35-37 High Street, Barrow upon Soar,
Loughborough, LE12 8PY

Contact: Tim Rogers
Site Address: Penrhyn Road Knowsley

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: GJ224
Job Number: 21-26080
Date Sampled: 16/11/2021
Date Received: 24/11/2021
Date Tested: 09/12/2021
Sampled By: i2- AW

Test Results:

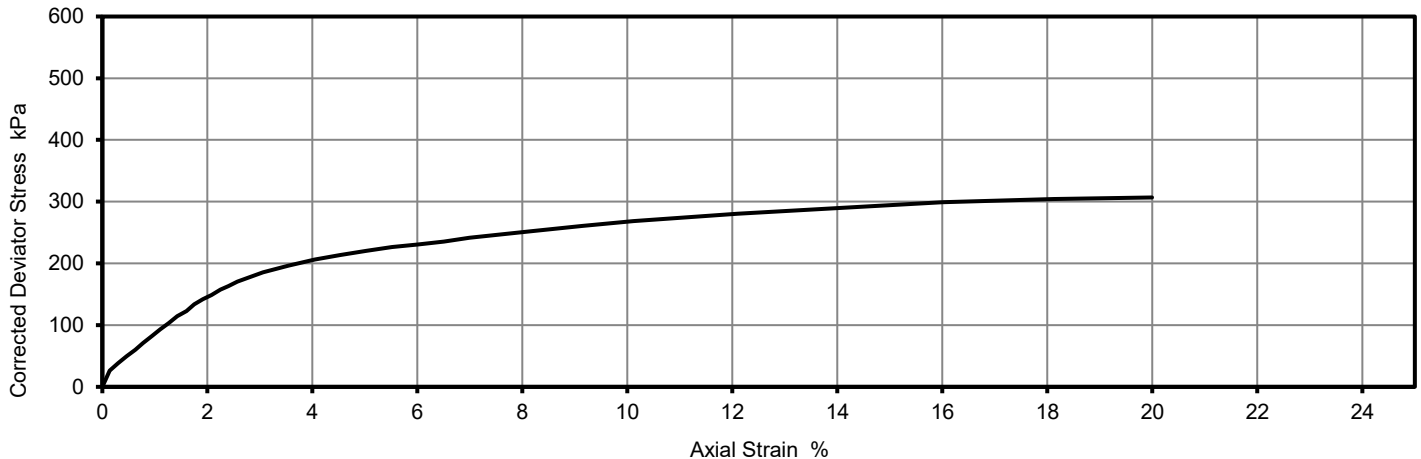
Laboratory Reference: 2100164
Hole No.: BH102
Sample Reference: Not Given
Sample Description: Reddish brown sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: 2.45
Sample Type: U

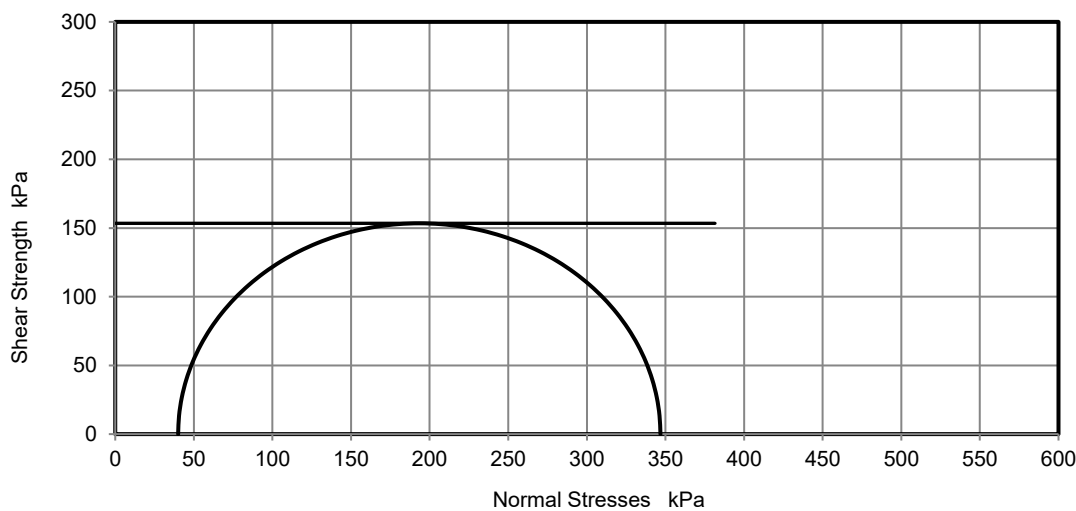
Test Number	1
Length	140.40 mm
Diameter	69.06 mm
Bulk Density	2.19 Mg/m ³
Moisture Content	14 %
Dry Density	1.92 Mg/m ³
Membrane Correction	1.45 kPa

Rate of Strain	2.00 %/min
Cell Pressure	40 kPa
Axial Strain at failure	20.0 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	307 kPa
Undrained Shear Strength, c_u	153 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound
Membrane thickness	0.26 mm

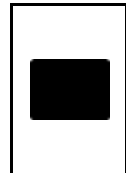
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks: Preliminary report

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

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**Tim Rogers**

G & J Geoenvironmental Consultants Ltd
35-37 High Street
Barrow upon Soar
Loughborough
LE12 8PY

t: 01509 410372

e: trogers@gjgeoenvironmental.com

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

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 21-26086

Project / Site name:	Penrhyn Road Knowsley	Samples received on:	24/11/2021
Your job number:	GJ224	Samples instructed on/ Analysis started on:	24/11/2021
Your order number:	GJ228	Analysis completed by:	08/12/2021
Report Issue Number:	1	Report issued on:	08/12/2021
Samples Analysed:	6 soil samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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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: 21-26086
Project / Site name: Penrhyn Road Knowsley
Your Order No: GJ228

Lab Sample Number				2100188	2100189	2100190	2100191	2100192
Sample Reference				TP107	TP109	WS101	WS107	BH104
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20-1.30	1.90-2.00	0.80-0.90	1.40-1.50	2.50-3.00
Date Sampled				15/11/2021	18/11/2021	16/11/2021	17/11/2021	18/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	10	18	14	14	31
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.0	7.4	7.3	5.6	10.3
Water Soluble SO ₄ 16ml extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.039	0.025	0.17	0.014	0.10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-26086
Project / Site name: Penrhyn Road Knowsley
Your Order No: GJ228

Lab Sample Number				2100193
Sample Reference				BH105
Sample Number				None Supplied
Depth (m)				3.00-3.45
Date Sampled				18/11/2021
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	8.5
Total mass of sample received	kg	0.001	NONE	0.50

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.0
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.062

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-26086

Project / Site name: Penrhyn Road Knowsley

* 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 *
2100188	TP107	None Supplied	1.20-1.30	Brown clay and sand.
2100189	TP109	None Supplied	1.90-2.00	Brown clay and sand.
2100190	WS101	None Supplied	0.80-0.90	Brown clay and sand with gravel.
2100191	WS107	None Supplied	1.40-1.50	Brown clay and sand with gravel.
2100192	BH104	None Supplied	2.50-3.00	Brown silt.**
2100193	BH105	None Supplied	3.00-3.45	Brown clay and loam.

** Non MCERTS Matrix

Analytical Report Number : 21-26086

Project / Site name: Penrhyn Road Knowsley

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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	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	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

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

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

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.