

Phase 2 Ground
Investigation

Client: Lidl Great Britain
Ltd

Penmaen Road,
Blackwood

Report No: 1271.03.01

December 2024





Executive Summary

Lidl Great Britain Ltd commissioned Remada Ltd to conduct a Phase 2 Ground Investigation at the site of a proposed store at Penmaen Road, Pontllanfraith, Blackwood, NP12 2DY. This report follows a Phase 1 Preliminary Risk Assessment (Remada report reference 1271.01.02 dated June 2024). This report should be read in conjunction with Remada's Coal Mining Risk Assessment 1271.02.02.

Summary of Phase 1 Desk Study

The earliest available historical mapping of 1879 shows the site to be divided into two fields until 1953 when a 'Furniture Factory' occupied the northern central areas of the site. By 1971, the present-day electricity substation had been installed in the north-western corner of the site. Between 1975 and 1986, the site became occupied by a 'Council Depot', with the southern area of the site being redeveloped from a heathland to hardstanding around this time.

Published geological maps record that the site is underlain by superficial Devensian Till, designated as a Secondary Undifferentiated Aquifer, and bedrock of the Grovesend Formation, designated as a Secondary (A) Aquifer. The site is not located within a groundwater Source Protection Zone (SPZ)

The Coal Authority Consultants Mining Report identifies the Mynyddislwyn Top Leaf coal seam being present 49m deep to the northeast of the site and 90m deep beneath the site, with an extraction thickness of 0.76m and last worked between 1873 and 1876. The Report states that probable unrecorded shallow mining is 'none' and there are no mine entries within 100m of the site. However, there are five claims for coal mining subsidence within 50m of the site boundary

Intrusive Investigation

The investigation comprised drilling thirteen (13 No) window sample holes (WS1 – WS9 and WS03A, WS06A, WS08A and WS09A) and executing four (4 No) CBR tests at locations indicated in Figure 2 between the 21st and 22nd of October 2024. Remada was also instructed to undertake three (3 No.) rotary open-holed boreholes (RBH01-03) to a target depth of 30m bgl, in order to investigate the potential coal mining legacy beneath the site. The findings of this rotary investigation, undertaken between 19th and 26th November 2024, have been incorporated into this Phase 2 report.

Made Ground was encountered within all of Remada's window sample boreholes to a maximum depth of 2.3m bgl (WS8A) in the south-western area of the site. Within the proposed Lidl store footprint, the made ground appeared to be relatively shallow and present to a maximum thickness of 1.3m (WS3A) where proven. However, this belies the shallow SPT refusals encountered within the majority of these window sample boreholes at depths ≤ 1 m bgl.

Within the three rotary boreholes, the made ground was recorded to depths of between 2.7m and 3.0m bgl and underlain by superficial SAND & GRAVEL deposits. However, due to the open-holing nature of this drilling technique, it is usually difficult to detect a change in strata, unless there is a good contrast in properties such as colour, mineral content or hardness. Consequently, there is some uncertainty as to the current thickness of made ground across the study site at the present time.

The rotary boreholes recorded MUDSTONE and SILTSTONE at depths of between 7.6m and 11.0m bgl, which were interpreted as representative of the Grovesend Formation bedrock indicated on published geological mapping.

Human Health Assessment

The results of soil chemical analysis were compared to the Human Health Generic Assessment Criteria for commercial land use. None of the analytes tested were detected at concentrations that exceeded the human health GAC protective of on-site workers.

Water Resources Assessment

The results of the soil chemical analysis undertaken have identified that concentrations of metals and inorganic contaminants are within the range of typically made ground. Detectable concentrations of TPH and PAHs were encountered in some samples. However, the contaminants identified are of low solubility and mobility and, as such, are unlikely to present a risk to groundwater beneath the site. In addition, it should be noted that the site will be predominantly covered with the building and areas of hardstanding. Therefore, the risk of leaching of contaminants



as a result of infiltration of groundwater is likely to be limited. Consequently, the risk to groundwater from contaminants within the made ground at the site is considered to be low and does not warrant further consideration.

Waste Classification

In general, the results of the chemical analysis indicate that the material would be classified as non-hazardous waste. Waste Acceptance Criteria (WAC) analysis has classified the waste as suitable for an inert landfill.

Geotechnical Assessment – Lidl Store

The thickness of the made ground beneath the proposed store footprint is anticipated to be circa. 2.5 to 3.0m based on the intrusive investigations to date. Due to buried obstructions in the made ground, (indicated in 1m refusals in five of the seven window samples targeting the proposed store footprint), made ground should be excavated and recompacted as graded fill.

Vibro-stone columns bearing in the natural SAND & GRAVEL deposits at depths of circa 3.0 – 5.0m bgl are considered a potential foundation solution, providing a minimum bearing capacity for either a raft or pad & strip foundation for a ground-bearing floor slab, as specified by the Structural Engineer. The strength, depth and composition of these SAND & GRAVEL deposits is unknown at the time of writing.

If pad foundations are selected, then a layer of compacted 6F2 capping overlying the existing but re-compacted made ground to a minimum specified bearing capacity is considered to be suitable beneath a ground bearing floor slab.

CBR values estimated from the DCP tests indicated that, near the surface, the CBR values were variable, with several values of <10% recorded. Poorly compacted Made Ground backfill resulting from the demolition works should be excavated, processed as necessary to produce a 6F2 material and replaced in compacted layers in accordance with an engineering specification.

A Design Sulphate Class D5-2 is considered appropriate for buried concrete, and an ACEC Class of AC-3s is considered appropriate for the location.

Excavation side walls may not be stable even in the short term without support or without being battered back to a safe slope gradient. A detailed inspection of the side slopes should be made during excavation and a risk assessment carried out to fully assess the support measures required.

No groundwater was observed within any of the boreholes during the intrusive investigation. During the monitoring period, water was found within WS05 at between 1.52m bgl and 1.53m bgl.

Ground Gas

The results of four rounds of gas monitoring visits placed the site into Characteristic Situation 1. Gas protection measures are not required with respect to methane or carbon dioxide. However, the site is within an Intermediate Probability Radon Area and as such, basic radon protection measures shall be required.



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Issue No	Date	Prepared By	Technical Review	Authorised
01	13.12.2024	P Searing 	P Dickinson 	G Jones 



1 INTRODUCTION

Remada Ltd was commissioned by Lidl Great Britain Ltd (hereafter 'the Client') to undertake a Phase 2 Ground Investigation of a proposed store at Penmaen Road, Pontllanfraith, Blackwood, NP12 2DY at the location indicated in **Figure 1**. This report should be read in conjunction with Remada's Coal Mining Risk Assessment 1271.02.02.

1.1 Objectives

The objectives of this assessment are as follows:

- to examine whether there have been any potentially contaminative uses on the site or nearby land;
- to develop a conceptual model of the site to identify plausible pollutant linkages;
- to assess ground conditions in relation to the proposed development in relation to construction design issues, including the presence, nature, likely severity and extent of soil and groundwater contamination, which may be present, its potential environmental impact and likely requirement for further work; and
- Provide preliminary foundation design recommendations for the proposed development.

1.2 Scope of Work

The scope and layout of this investigation and report is generally in accordance with BS10175:2011+A2 2017 and the Environment Agency's Land Contamination Risk Management guidance for land contamination reports.

The scope of work comprised:

- 5 No window sample boreholes to target depths of 7m, including SPTs;
- 4 No window sample boreholes to target depths of 5m, including SPTs;
- 3 No combined groundwater and gas monitoring standpipes installed with window sample boreholes;
- 4 No California Bearing Ratio (CBR) tests within the car park area on made ground or natural soil that will be at the development formation level. In the absence of any specific information, the pavement formation level shall be considered to be a maximum of 500mm below the existing ground level or below organic topsoil;
- Suite of geotechnical classification and strength tests as appropriate to the soils and 4 No BRE Sulphate suites in accordance with BRE SD1;
- 5 No Chemical Analysis for asbestos (quantitative), pH, Arsenic, Beryllium, Cadmium, Chromium (trivalent & hexavalent), Copper, Mercury, Nickel, Lead, Selenium, Vanadium, Zinc, Fraction of Organic Carbon, TPHCWG, PAH(16) and Phenol.
- 2 No bitumen suites on asphalt samples for waste classification
- 4 No ground gas and groundwater monitoring visits to satisfy planning requirements; and
- Combined Factual & Interpretative Geoenvironmental Report.

Remada was also instructed to undertake three (3 No.) rotary open-holed boreholes (RBH01-03) to a target depth of 30m bgl, in order to investigate the potential coal mining legacy beneath the site. The findings of this rotary investigation, undertaken between 19th and 26th November 2024, have been incorporated into this Phase 2 report.

The investigation methodology is presented in **Section 4**, Findings in **Section 5** and the Exploratory Hole Locations are indicated in **Figure 2**.



1.3 Proposed Development

It is understood that the proposed site use for the majority of the site will be a Lidl retail store with an associated car park and soft landscaping; the development will comprise a site area of 8600m². A proposed indicative site layout plan is presented in **Figure 3**, with the site accessed from a new entrance off B4254 to the north. The proposed store footprint is indicated to be in the western and south-western areas of the site, with the remaining areas being a combination of car parking, HGV access and soft landscaping. The electricity substation remains present in the northwestern corner of the site.

1.4 Previous Reports

The following Phase 1 Desk Study had been previously prepared for the site:

- Phase 1 Site Investigation & Preliminary Risk Assessment. Remada Ltd Report 1271.01.02 issued in June 2024.
- Coal Mining Risk Assessment. Remada Ltd report ref: 1271.02.02 issued in November 2024.

1.5 Limitations

The comments in this report and the opinions expressed are based on the information reviewed and observations during site work. However, there may be conditions pertaining to the site that this assessment has not disclosed and, therefore, could not be taken into account.



2 SUMMARY OF PHASE 1 DESK STUDY

The Executive Summary and Conceptual Site Model presented within the Phase 1 Desk Study are reproduced below:

Site Setting

The site occupies an approximately rectangular plot in the north-eastern area of the Penmaen Industrial Estate, situated to the west of Penmaen Road and south of the B4254 road. At the time of writing, the site comprises a Stagecoach bus depot, with associated bus stabling and servicing facilities.

The site is formed of two distinct areas. The northern half of the site is dominated by the main bus depot building, featuring a tri-pitched roof with associated flat-roofed offices along the northern and western fringes. A separate, pitched roof building is adjacent to the western boundary, whilst a flat-roofed electricity sub-station of brick construction is in the north-western corner. The majority of the southern half of the site is asphalt surfaced and used for the stabling of Stagecoach's local bus fleet. A small, rectangular patch of concrete is present adjacent to the site's southern boundary, although this appears to be flush with the surrounding surfacing.

The site boundary to the north is marked by the B4252 roadway, whilst vegetation marks most of the eastern and south-eastern boundaries. Palisade fencing appears to form the south-western boundary, although the site is open to south.

Site History

The earliest available historical mapping of 1879 shows the site to be divided into two fields extending off-site to the north, south and west. Except for the removal of one of two footpaths bisecting the site, the site remains unchanged until after the mapping of 1938. By 1953, the northern and central areas of the site have been redeveloped, with a large 'Furniture Factory' occupying these areas. By 1971, the present-day electricity substation had been installed in the north-western corner of the site. Between 1975 and 1986, the site became occupied by a 'Council Depot', with the southern area of the site being redeveloped from a heathland to hardstanding around this time.

Geology / Hydrogeology

Published geological maps record that the site is underlain by superficial Devensian Till, designated as a Secondary Undifferentiated Aquifer, and bedrock of the Grovesend Formation, designated as a Secondary (A) Aquifer. The site is not located within a groundwater Source Protection Zone (SPZ)

Mining

The Coal Authority Consultants Mining Report identifies the Mynyddislwyn Top Leaf coal seam as being present 49m deep to the northeast of the site and 90m deep beneath the site, with an extraction thickness of 0.76m and last worked between 1873 and 1876. The Report states that probable unrecorded shallow mining is 'none' and there are no mine entries within 100m of the site. However, there are five claims for coal mining subsidence within 50m of the site boundary.

Radon

The site is located in both a Lower Probability Radon Area (less than 1% of homes are estimated to be at or above the action level) and an Intermediate Probability Radon Area (5 to 10% of homes are estimated to be at or above the action level). Consequently, basic radon protective measures are considered necessary within the structural design of the proposed development.

Unexploded Ordnance (UXO) Risk

Freely available Zetica Unexploded Ordnance (UXO) risk mapping indicates the site to be located within an area where the bomb risk is 'Low'. Therefore, no UXO precaution measures are considered necessary for any subsequent intrusive investigation, based on the information available for the site to date.



Environmental Risk Assessment

The desk study has identified a number of on-site and off-site potential sources of contamination that would require further investigation. The following is recommended:

- Investigation of the lateral and vertical extent of made ground/fill beneath the proposed store footprint;
- Collection of soil and groundwater samples from the areas identified above for contaminants of concern; and
- Ground gas monitoring.

Geotechnical Assessment

It is recommended that a ground investigation be undertaken to enable preliminary foundation design. Given the records in the Coal Authority Consultant's Mining Report, it is recommended that a Coal Mining Risk Assessment is also prepared to determine the requirements for investigation and subsequent work relating to coal mining at and beneath the site.



Potential Source Areas	Potential Contaminant of Concern	Pathways	Potential Receptor	Exposure Route (Human unless otherwise stated)	Potential Identified Linkage (unmitigated)	Findings of Ground investigation	Risk (Unmitigated)	Proposed Remediation (Mitigation) Measures	Residual Risk Estimation
On-site Sources	Asbestos / Metals As, Be, Cd, Cu, Cr (VI), Cr (III) Hg, Ni, Se, Va, Zn, Boron, TPH /PAH, PCBs	Disturbance due to construction plant causing direct contact, dusts, vapours.	Occupants of the development / building fabric	• Direct Soil Ingestion	• No	N/A	N/A	N/A	N/A
General Made Ground Furniture Factory Council Depot Bus Depot & Tanks Electricity sub-station				• Indoor Dust ingestion	• Yes	(To be assessed (TBA))	Potential risk	(To be assessed (TBA))	(To be assessed (TBA))
Off-site Sources General Made Ground Electricity sub-stations Residential properties Various factories and industrial units, including Penmaen Industrial Estate. Scrap Yard & Car Breakers / Dismantlers Former railway line Old Quarry				• Skin Contact with Soils	• Yes	As above	Potential risk	TBA	TBA
		• Skin Contact with Dust	• Yes	As above	Potential risk	TBA	TBA		
		• Inhalation of Outdoor Dust	• Yes	As above	Potential risk	TBA	TBA		
		• Inhalation of Outdoor Vapours	• Yes	As above	Potential risk	TBA	TBA		
		• Inhalation of Indoor Vapours	• Yes	As above	Potential risk	TBA	TBA		
		• Inhalation of ground gas	• Yes	As above	Potential risk	TBA	TBA		
		• Inhalation of radon gas	• No	Lower & Intermediate Probability Area	Moderate risk	Basic Radon Protection Measures	Low		
		• Ingestion via permeated water supply pipework	• Yes	As above	Potential risk	TBA	TBA		
		• Direct contact with Secondary (Undifferentiated) Aquifer in Superficial Deposits	• Yes	As above	Potential risk	TBA	TBA		
		• In-direct contact with Secondary (A) Aquifer in bedrock	• Yes	As above	Potential risk	TBA	TBA		
Permeation of water supply pipework		Secondary Aquifers Sirhowy River	Leachate						

Table 1: Outline Conceptual Site Model

Direct contact with subsurface soil and/or groundwater during redevelopment works are not assessed as part of the CSM. It is considered that risks to workers will be managed as part of any the redevelopment works at the site through the application of health and safety procedures, where required.

3 SITE WALKOVER

The opportunity was taken to inspect the proposed Lidl store site on 21st October 2024 by Usamah Khan of Remada Ltd during the intrusive works, as recorded in the photographs below.



Photo 1: A view north showing the existing bus depot, taken from the centre of the proposed store.



Photo 2: A view towards the eastern boundary of the site, which is marked by the trees in the back of the photo. The sloping from the north to the south is evident from the left of the photo to the right.



Photo 3: Photograph displaying the rear of the bus depot, where a body shop is located, in the northernmost section of the site, view looking west (taken from the centre of the northern section of the site).



Photo 4: A view eastward of the bus depot, photograph taken from the entrance of the bus depot (located along the south wall of the depot).



4 ENVIRONMENTAL & GEOTECHNICAL INVESTIGATION METHODOLOGY

4.1 Investigation Strategy

In accordance with Lidl Ground Investigation standard 05.2023, five (5 No.) window sample holes were required beneath the proposed store footprint to a depth of 7m or refusal, and four (4 No) beneath the delivery bay, HGV access and car park. Four (4 No) CBR tests were conducted in the proposed car park. Four (4 No) ground gas monitoring visits were scheduled for the site to provide the minimum required by C665.

The investigation comprised drilling thirteen (13 No) window sample holes (WS1 – WS9 and WS03A, WS06A, WS08A and WS09A) and executing four (4 No) CBR tests at locations indicated in **Figure 2** between the 21st and 22nd of October 2024.

Remada was also instructed to undertake three (3 No.) rotary open-holed boreholes (RBH01-03) to a target depth of 30m bgl. in order to investigate the potential coal mining legacy beneath the site. The findings of this rotary investigation, undertaken between 19th and 26th November 2024, have been incorporated into this Phase 2 report.

All exploratory holes were logged by a suitably qualified Geo-environmental Engineer in general accordance with the recommendations of BS5930:2015+A1:2020. Detailed descriptions, together with relevant comments, are given in the **Exploratory Hole Logs**.

4.2 Intrusive Investigation

4.2.1 Window Sampling

Five of the window sample boreholes targeting the proposed store footprint were advanced to a target depth of 7m bgl and four targeting the proposed car park to a target depth of 5m bgl. However, due to shallow refusals (SPT N-value >50) encountered across the site, the boreholes were advanced to depths of between 0.42m and 3.0m bgl. Four additional boreholes (WS03A, WS06A, WS08A and WS09A) were undertaken where shallow obstructions were encountered.

4.2.2 Rotary Boreholes

All three rotary open holes (RBH1 – RBH3) were drilled to depths of 30m below existing ground level between Tuesday 19th November and Tuesday 26th November 2024, in order to investigate the potential of worked seams.

4.3 In-Situ Testing

4.3.1 Standard Penetration Tests

Standard Penetration Tests (SPTs) in the window samples were carried out at 1.0m intervals as recorded on the borehole logs to assess the relative density and consistency of soils.

SPTs were conducted in accordance with BS EN ISO 22476-3 and the recorded SPT N-values are summarised on the borehole logs.

The SPT N-values have been corrected based on the Energy Ratio of 73% for the SPT hammer on the window sampling rig. The SPT Hammer Energy Test Report, undertaken in accordance with BS EN ISO 22476-3:2005, is presented in **Appendix A**.

4.3.2 Dynamic Cone Penetrometer (DCP) Tests

Four (4 No.) DCP tests were conducted in order to determine California Bearing Ratio (CBR) values for near-surface soils at the locations in **Figure 2**. A known mass is dropped through a known distance to



drive a cone into the ground. The penetration distance per blow is recorded in order to enable the CBR value to be calculated. Test results are presented in **Appendix B**.

4.4 Soil Sampling

4.4.1 Environmental

Made ground and natural soils were selected by visual and olfactory means for subsequent analysis. Samples for chemical laboratory testing purposes were collected in amber glass jars, amber glass vials and plastic tubs and retained in a cool box for transport to the laboratory.

4.4.2 Geotechnical

Geotechnical samples were collected at depths indicated on the window sample logs, and samples were retrieved from within a sleeve line. The disturbed samples were placed in sealed and correctly labelled plastic tubs or bags as appropriate. All geotechnical samples were dispatched to the laboratory for testing with a completed chain of custody.

4.5 Gas & Groundwater

4.5.1 Installations

Combined ground gas and groundwater monitoring standpipes were installed in selected wells with a 50mm diameter slotted HDPE pipe and packed with gravel surround as recorded on the exploratory logs. Wells were completed with 0.5 - 1.5m of plain HDPE pipe and bentonite seal, with a gas bung and tap installed at the top of the pipe.

4.5.2 Monitoring

Ground gas monitoring was undertaken using a GasData GFM436 gas analyser for the parameters reported below. Groundwater levels were measured with a dip meter probe.

Permanent ground gas monitoring involved the measurement of the following in the prescribed order:

- Pressure difference between the monitoring well and the atmosphere;
- Peak and steady flow rates of gas into or out of the monitoring well;
- Peak and steady concentrations of carbon dioxide, methane, oxygen (minimum and steady recorded), carbon monoxide, hydrogen sulphide; and
- Depth to groundwater.

Four ground gas monitoring visits were undertaken as a minimum required for a commercial development in accordance with CIRIA C665. Ground gas concentrations were recorded on 30th October and 4th, 11th and 18th November 2024 at WS3a, WS5 and WS6 and the results are presented in **Table 2**.

4.6 Quality Assurance and Quality Control

All samples were submitted to a United Kingdom Accredited Laboratory (UKAS) under a completed chain of custody. The laboratory carried out its own QA/QC programme to ensure that the quality of the analytical data conformed to the appropriate test method protocols.

4.7 Laboratory Analysis & Testing

4.7.1 Chemical Analysis – Soil

Five (5 No) soil samples were scheduled for the analysis of asbestos, arsenic, barium, beryllium, cadmium, chromium (III & VI), copper, mercury, nickel, lead, selenium, zinc, fraction of organic carbon, Total Petroleum Hydrocarbons (TPHCWG), Polyaromatic Hydrocarbons (PAH), BTEX compounds



(benzene, toluene, ethylbenzene and xylene) and phenols. Three (3 No) additional samples were scheduled for TPHCWG and BTEX compounds only.

During the rotary investigation strong hydrocarbon odours were noted within RBH03, within the sands and gravels. Consequently, two (2 No) additional samples were taken from the sand and gravels and from the underlying bedrock and were scheduled for TPHCWG and BTEX compounds only.

Three (3 No) soil samples were scheduled for Waste Acceptance Criteria (WAC) testing in order to determine the appropriate landfill for any potential off-site disposal.

In addition, two samples of bituminous surfacing were analysed for PAH compounds.

The results of laboratory chemical analyses are presented in **Appendix C**.

4.7.2 Geotechnical

Samples recovered from the boreholes were submitted to an accredited laboratory for the following tests in general accordance with BS1377:1990:

- 5 No Natural Moisture Contents
- 5 No Plasticity Indices
- 3 No Particle Size Distribution tests; and
- 5 No BRE SD1 suites

The results of the geotechnical testing are presented in **Appendix D**.



5 GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION FINDINGS

5.1 Ground Conditions

A brief description of the published geology is provided together with a summary of the ground conditions encountered during the intrusive investigation. Exploratory hole logs are presented at the end of the report.

5.1.1 Published Geology

Information from the environmental report and the British Geological Survey (BGS) 1:50,000 scale map Sheet 249 (Newport) does not indicate any artificial ground either on or in the immediate vicinity of the study site. Artificial Ground is a term used by the BGS for those areas where the ground surface has been significantly modified by human activity, and includes made ground, worked ground, infilled ground, landscaped ground and disturbed ground. It is not expected to be encountered according to the mapping; however, taking consideration of the site's historic use and satellite imagery it is likely that made ground will be encountered underlying the site.

The superficial deposits underlying the site are indicated to comprise Devensian Till (Diamicton) deposits, which typically comprise '*sand and gravel with rare clay interbeds*'.

The bedrock underlying the superficial deposits is formed of the Grovesend Formation. The BGS describes the stratum as typically comprising '*predominantly argillaceous, comprising mudstones and siltstones, with well-developed coals; minor lithic ("Pennant") sandstones; locally developed red mudstones in the type area.*'

BGS map Sheet 249 dated 1986 indicates that the site is bisected by a WNW-ESE orientated fault in the northern area, which downthrows towards the south. The BGS mapping also shows a NE-SW orientated fault joining this WNW-ESE fault on-site, downthrowing towards the north-west. However, the Envirocheck report obtained for the study site as part of Remada's Phase 1 report indicates this to be present immediately to the north of the site and joining the WNW-ESE fault adjacent to the north-western corner.

5.1.2 Made Ground

Made Ground was encountered within all of Remada's window sample boreholes to a maximum depth of 2.3m bgl (WS8A) in the south-western area of the site.

Concrete hardstanding was encountered in five (5 No.) boreholes (WS1 to WS3, WS3a and WS4) ranging in depths between 0.16m (WS3) and 0.23m bgl (WS5), with an average thickness of 0.21m.

Asphalt surfacing was encountered in six (6 No.) boreholes (WS5, WS6, WS6A and WS7 to WS9) ranging in depths between 0.08m (WS5) and 0.12m bgl (WS8), with an average thickness of 0.1m.

Topsoil was encountered within one location (WS8A), comprising dark brown sandy silt with frequent rootlets to a depth of 0.16m bgl. Hardstanding was absent in one other window sample borehole (WS9A adjacent to the southern boundary) and comprised firm slightly gravelly sandy clay to a depth of 0.85m bgl.

Below the hardstanding and topsoil, the Made Ground was variably described as a gravelly, slightly clayey SAND, a slightly gravelly sandy CLAY or sandy GRAVEL. Gravel was recorded as comprising concrete, brick, plastic, mudstone, sandstone, coal and quartzite.



5.1.3 Superficial Deposits

Superficial deposits were encountered within exploratory holes WS01, WS02, WS03A, WS04, WS07, WS08A and WS09A, comprising a soft to firm sandy to very sandy locally gravelly CLAY. Gravel was recorded as comprising sandstone, mudstone and coal. Superficial deposits were encountered to a maximum depth of 2.0m bgl (WS04).

5.1.4 Bedrock

No bedrock was positively identified during Remada's window sampling investigation.

5.1.5 Rotary Findings

A summary of the rotary findings in each borehole is provided below:

RBH1

RBH1 was bored in the north-western area of the proposed store footprint. Made Ground was encountered from ground level to 2.7m bgl (140.67m AOD). Below the Made Ground, superficial SAND and GRAVEL deposits were encountered to a depth of 11m bgl (132.37m AOD). Rockhead was interpreted from the rate of drilling as intermitted bands of MUDSTONE and SILTSTONE to the base of the borehole 30m bgl (113.37m AOD). No loss of flush or evidence of coal was recorded.

RBH2

RBH2 was bored in the western area of the proposed store footprint. Made Ground was recorded from ground level to 3.0m bgl (140.69m AOD). Below the Made Ground, superficial SAND and GRAVEL deposits were encountered to a depth of 11.0m bgl (134.69m AOD). Rockhead was interpreted from the rate of drilling as intermitted bands of MUDSTONE and SILTSTONE to the base of the borehole 30m bgl (113.69m AOD). No loss of flush or evidence of coal was recorded

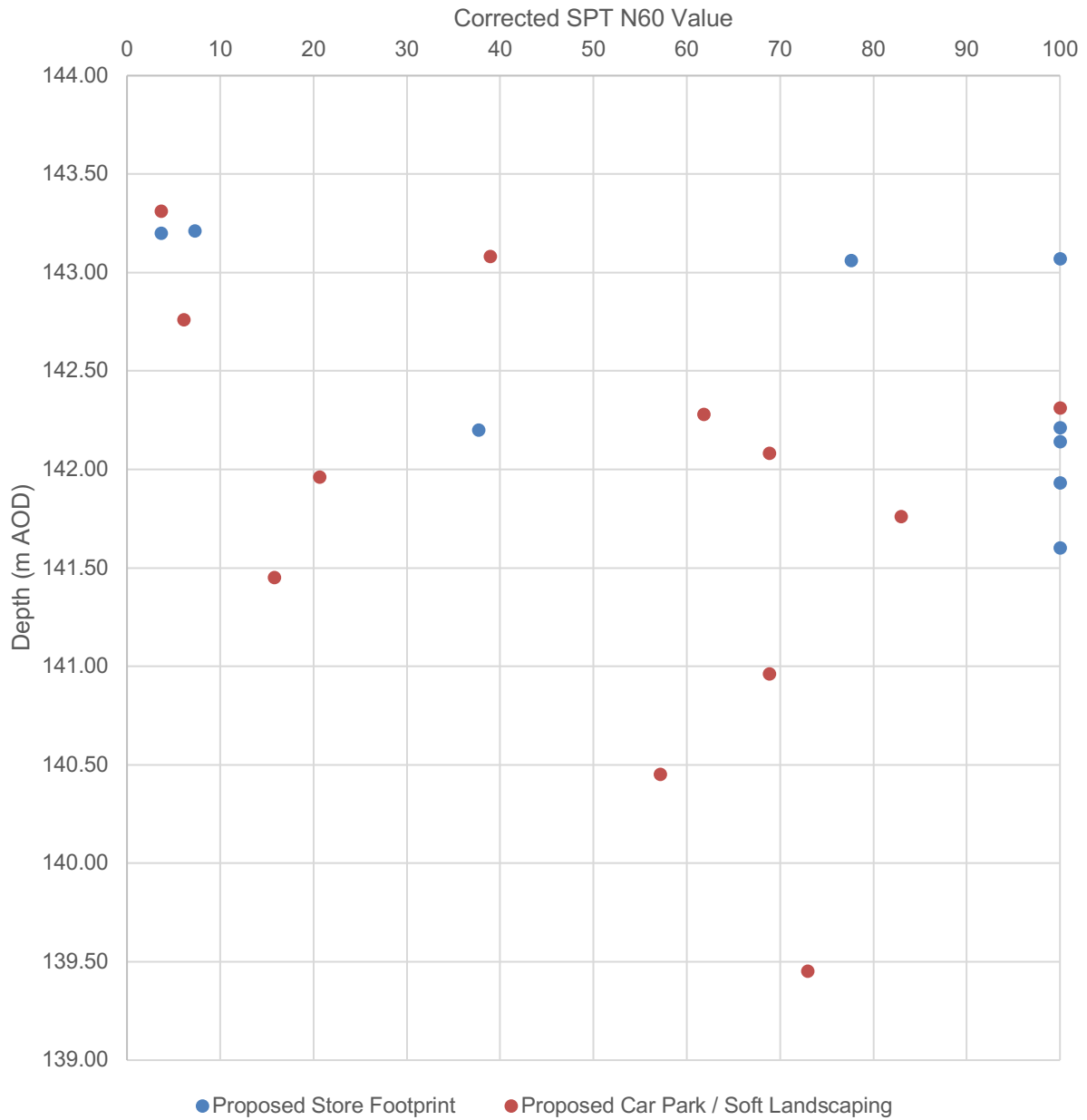
RBH3

RBH3 was bored in the southern area of the proposed store footprint. Made Ground was encountered from ground level to 3.0m bgl (137.54m AOD). Below the Made Ground, superficial SAND and GRAVEL deposits were encountered to a depth of 7.6m bgl (132.96m AOD). Rockhead was interpreted from the rate of drilling as intermitted bands of MUDSTONE and SILTSTONE to the base of the borehole 30m bgl (110.54m AOD). No loss of flush or evidence of coal was recorded.

5.2 In-situ Testing

5.2.1 Standard Penetration Tests (SPTs)

In-situ SPTs were undertaken to assist with the interpretation of the strata encountered. The results of corrected N-values versus depth are plotted in the graph below. Where the corrected N60 value >100, a value of 100 has been plotted.



Graph 1: Plot of Corrected SPT N-Values Versus Depth

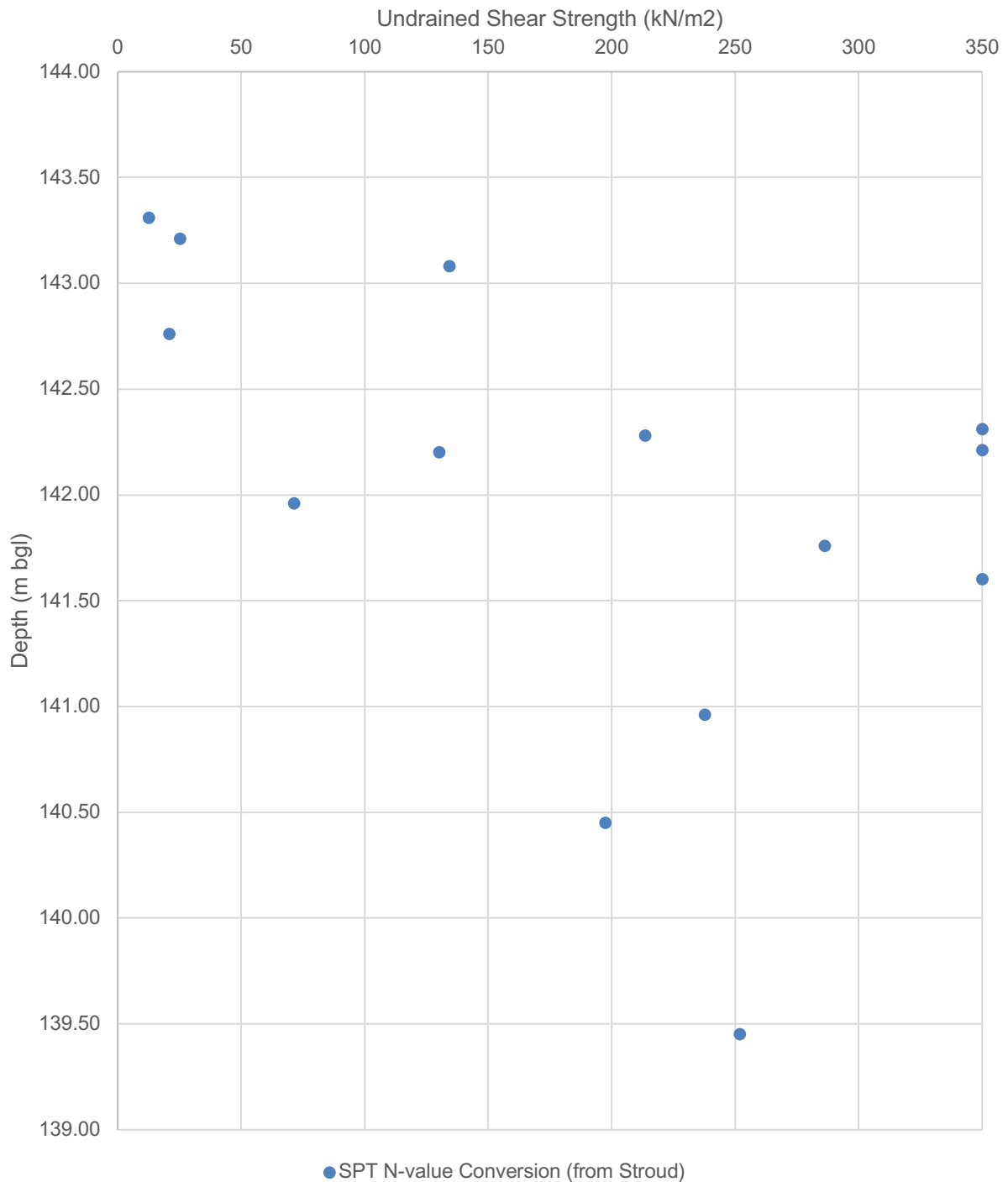
Note: Corrected N value plotted at a maximum of N = 100.

Undrained shear strengths have been estimated from SPT N values using the relationship developed by Stroud (*The standard penetration test in incentive clays and soft rocks*) and summarised in Tomlinson where:

$$\text{Mass shear strength} = f_1 \times N$$

Where f_1 is based on the plasticity index.

A Plasticity Index of 24% has been assumed (based on geotechnical laboratory testing), which equates to an f_1 factor of 5.0.



Graph 2: Plot of Mass Shear Strength Versus Depth

Note: Corrected Shear Strength plotted at a maximum of 350 KPa.

5.2.2 CBR Tests

The results of the four DCP tests within the proposed car park area produced values of between 4.1 and >100% within the upper 500mm. The results of the DCP tests are presented in **Appendix C**.



5.3 Soil Observations

Made Ground was recovered at all locations containing various man-made materials including brick, concrete, coal, mudstone, sandstone, asphalt and quartzite.

Hydrocarbon odours were noted within the recovered soils from five (5 No.) exploratory hole locations (WS5, WS6, WS6A, WS7 and RBH3), whilst a solvent odour was recorded in the shallow made ground in WS8.

5.4 Groundwater Observations

No groundwater was observed within any of the boreholes during the intrusive investigation. During the monitoring period, water was found within WS05 at 1.52m bgl (142.56m AOD) and 1.53m bgl (142.55m AOD).

5.5 Chemical Analysis

The soil chemical analysis results are presented in **Table 3** and summarised as follows.

The average Fraction of Organic Carbon (FOC) and pH were 0.01 and 8.3 respectively. Asbestos was not detected in the samples analysed. Detectable concentrations of metals were identified, although these are generally within the range that would typically be expected for made ground.

Total Petroleum Hydrocarbons (TPH) concentrations were detected above the method detection limit (MDL) in seven of the samples analysed (with the exception of RBH03 at 8.0m). The hydrocarbons were generally heavy-end hydrocarbons within the C21 to C35 range, although concentrations in the C12 to C16 range were noted in WS03A, WS05 and WS07, the C10 to C12 range in the sample from WS01, the C8 to C10 range were noted in WS01, WS04, WS06 and WS08, hydrocarbons within the C5-C10 range, as well as Ethylbenzene and M and P Xylene were noted within RBH03 at 3.00m. The maximum TPH concentration recorded was 206 mg/kg recorded within WS07 at 0.25m bgl.

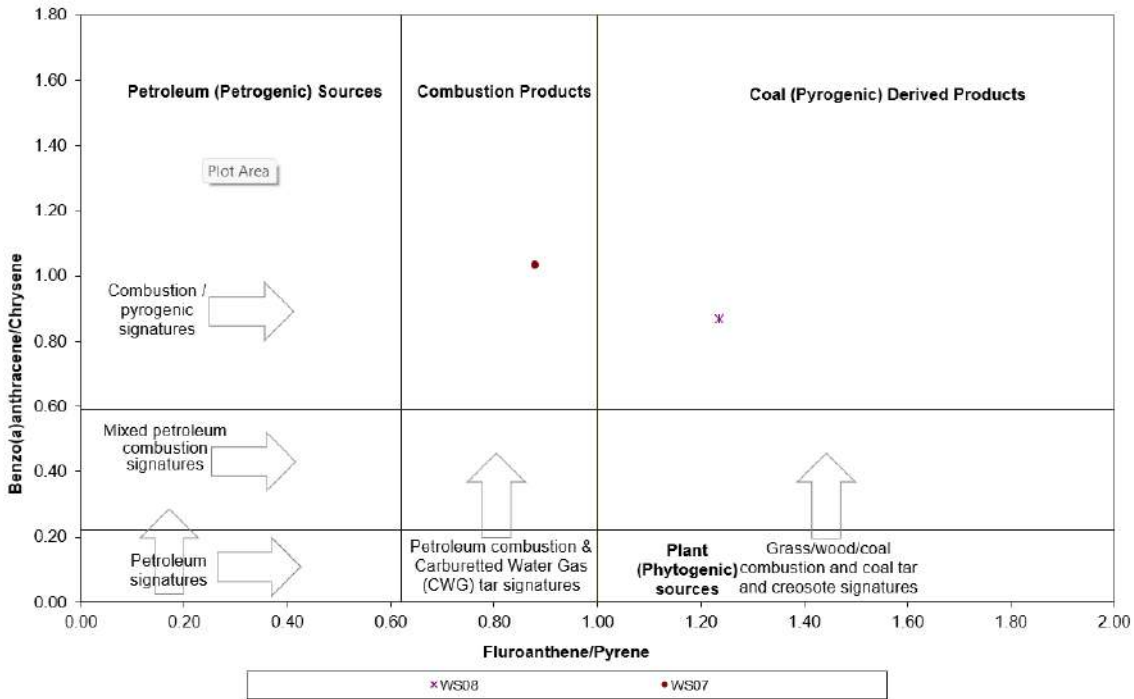
A summary of the TPH olfactory evidence and the subsequent soil analysis is presented in **Table 4** below:

Location	Depth (m bgl)	Strata Type	Olfactory Evidence	Soil Analysis	
				Sample Depth (m bgl)	TPH Concentration (mg/kg)
WS5	0.08 – 0.60	MADE GROUND	Hydrocarbon odour	0.35	23
	1.65 – 2.00	MADE GROUND	Slight hydrocarbon odour	1.80	20
WS6	0.11 – 0.40	MADE GROUND	Hydrocarbon odour	0.15	43
WS6A	0.1 – 0.35	MADE GROUND	Hydrocarbon odour	-	-
WS7	0.10 – 0.40	MADE GROUND	Hydrocarbon odour	0.25	206
WS8	0.12 – 0.32	MADE GROUND	Solvent odour	0.20	41
RBH3	3.0 – 7.60	SAND & GRAVEL	Hydrocarbon odour	3.00	<20
	7.60 – 30.0	MUDSTONE	None	8.00	<20

Table 4: Summary of TPH Soil Analysis

Concentrations of Polyaromatic Hydrocarbons (PAHs) were recorded above MDL in four of the five samples analysed, with a maximum concentration of 15.1 mg/kg recorded in WS8 at 0.2m bgl. In addition, the PAH concentrations have been plotted on a double ratio plot to provide an indication of the likely source of the PAHs. All of the samples that had detections of the four PAHs used have been

plotted, and all are indicated to be combustion or pyrogenic-related PAHs, which could be associated with urban background sources.



Graph 3: PAH Double Ratio Plot

The concentrations of PAH-17 within the asphalt samples recovered from WS05 and WS06 were recorded at 9.81 mg/kg and 30 mg/kg respectively.

5.6 Geotechnical Testing

The results of the geotechnical testing are summarised below.

5.6.1 Plasticity Testing

Plasticity testing was undertaken on five (5 No.) samples of cohesive soils recovered from the window sample boreholes, with the results ranging between 16% and 39%. These indicate the soils to be of both intermediate plasticity (CI/MI) and high (CH) plasticity, and low to medium volume change potential as summarised in **Table 5** below:

Location	Depth (m)	Plasticity Index (%)	Passing .425mm (%)	Modified Plasticity Index	Volume Change Potential
WS03A	1.30	26	100	26	Medium
WS03A	1.80	16	100	16	Low
WS04	1.10	27	100	27	Medium
WS07	0.95	13	100	13	Low
WS08A	2.50	39	75	29	Medium

Table 5: Plasticity Indices and Volume Change Potentials of the Cohesive Strata

5.6.2 Particle Size Distribution (PSD) Analysis

The PSD tests revealed the following:

- Made Ground in WS03A at 0.22 - 1.30m comprised 'brown silty/clayey sandy GRAVEL'.



- Made Ground in WS06 at 0.60 - 1.00m comprised 'brown silty/clayey sandy GRAVEL'.
- Natural deposits in WS09A at 1.10 - 1.80m comprised 'gravelly sandy SILT/CLAY'.

5.6.3 BRE SD1 Analysis

The water-soluble sulphate contents varied from 11 to 420 mg/l in the five soil samples analysed, with pH varying from 4.0 to 6.9. The total sulphur content varied from <0.01 to 0.24% and acid-soluble sulphate varied from <0.01 to 0.30%.

5.7 Ground Gas Monitoring Results

The results of the ground gas and groundwater monitoring programme are summarised below:

- The steady-state concentrations of Methane were recorded at less than the instrument detection limit of 0.1% v/v in all three standpipes throughout the monitoring programme.
- A maximum steady-state concentration of Carbon Dioxide was recorded as 5.8% v/v in WS06 on 30th October 2024. Detectable concentrations of carbon dioxide were recorded in all the monitoring wells.
- A minimum steady-state concentration of Oxygen was recorded as 12.0 % v/v in WS06 on 30th October 2024.
- Ground gas flow rates were recorded at less than the instrument detection limits (i.e. <0.1 l/hr) throughout the monitoring programme.
- Standing water was encountered within WS5 during the third and fourth monitoring visits only; recorded at depths of 1.52m and 1.53m bgl respectively.
- Atmospheric pressure at the time of sampling varied between a high of 1015 millibar (mbar) on 11 November 2024 and a low of 991 mbar on 18 November 2024. The monitoring visits were undertaken during periods of rising and falling pressure trends over the preceding forty-eight hours.



6 GENERIC QUANTITATIVE RISK ASSESSMENT

6.1 Human Health Risk Assessment

To provide an up-to-date assessment of the risks to human health, Remada has adopted the most recent Generic Assessment Criteria (GAC) published by LQM/CIEH (S4ULs) and CL:AIRE/EIC/AGS. The derivation of GAC, methodology, input parameters, and technical guidance (CLEA) may be obtained upon request.

The proposed site layout retail store and car park is presented in **Figure 3**.

Default parameters have been adopted for sandy loam of pH 7 and commercial land use. Fraction of Organic Carbon (FOC) ranged from 0.0072 to 0.017, giving a Soil Organic Matter (SOM) content between 1.24 and 2.93%, with an average result of 1.93%. In order to present a conservative assessment, the SOM content of 1% has been adopted.

The depth to potential sources of contamination for indoor air pathways has been assumed to be 0.5m below the building foundation level. The source has been conservatively assumed to be at ground level for outdoor air and direct contact pathways.

For commercial land use, the CLEA version 1.06 critical receptor is conservatively modelled as a female working adult with an exposure duration of 49 years. In accordance with the default parameters, it was assumed that employees spend most of their time indoors and that 80% of the outdoor area is covered by hardstanding. As such, the potential exposure pathways have been assumed to be:

- Direct Soil and Indoor Dust Ingestion;
- Skin contact with soils and dusts;
- Inhalation of indoor and outdoor dusts and vapours.

Where GAC values for individual TPH fractions are not exceeded, the potential additive effect has been assessed by calculating each sample's overall TPH hazard index.

6.2 Comparison of Soil Analysis Results with Human Health GAC

A comparison of soil chemical analysis with GAC is presented in **Table 3**.

TPH, PAH & BTEX

None of the analytes tested were detected at concentrations that exceeded the human health GAC protective of on-site workers.

Metals & Inorganics Excluding Asbestos

None of the analytes tested were detected at concentrations that exceeded the human health GAC protective of on-site workers.

Asbestos

No asbestos was detected in the samples selected for analysis.

6.3 Controlled Waters Risk Assessment

6.3.1 Sensitivity – Groundwater

The site is not indicated to be within a Groundwater Source Protection Zone. The superficial Devensian Till Deposits underlying the site are designated as a Secondary Undifferentiated Aquifer, where it is impossible to designate it as 'A' or 'B'. The Grovesend Formation bedrock underlying the site is designated as a Secondary 'A' Aquifer. No groundwater abstractions were recorded within 1km of the site.



6.3.2 Sensitivity – Surface Waters

The nearest surface water feature is recorded 36m east of the study site as a pond. The nearest named watercourse is the Sirhowy River, located 154m to the west at its nearest point, which flows in a generally southerly direction.

6.3.3 Risk Assessment

The results of the soil chemical analysis undertaken have identified that concentrations of metals and inorganic contaminants are within the range that would be expected for 'typical' made ground. Detectable concentrations of TPH and PAHs were encountered in some samples. However, the contaminants identified are of low solubility and mobility and, as such, are unlikely to present a risk to groundwater beneath the site.

Post-development, the site will continue to be predominantly covered by buildings and hardstanding areas. Consequently, the risk of contaminants leaching as a result of groundwater infiltration is limited. Therefore, the risk to controlled waters from contaminants within the made ground at the site is considered to be low and does not warrant further consideration at this stage.

6.4 Ground Gas Assessment

In order to understand the gassing regime at the site, a Characteristic Situation (as defined in CIRIA C665 and BS8576:2013) is determined for the site. CIRIA C665 and BS8576 provides definitions for each Characteristic Situation based on Gas Screening Values (GSV), which are calculated as follows:

- $GSV = \text{Measured Borehole Flow Rate (l/hr)} \times \text{Gas Concentration}/100 (\% \text{ v/v})$

BS8576 makes a distinction between the GSV and the Hazardous Gas Flow Rate (Q_{hg}) which is also calculated using the above calculation. BS8576 states that Q_{hg} is calculated for each individual borehole for each monitoring visit, whereas the GSV is taken as the representative value for the site or site zone.

As a worst-case assessment, the GSV for the site is therefore taken as the maximum steady-state carbon dioxide/methane concentration recorded in the boreholes, multiplied by the maximum flow rate recorded during the same monitoring event.

- Methane GSV = $(0.1\%/100) \times 0.1 \text{ l/hr} = 0.0001 \text{ l/hr}$ (methane concentration taken as equal to the instrument detection limit of 0.1% and flow taken as equal to the instrument detection limit of 0.1 l/hr).
- Carbon Dioxide GSV = $(5.8\%/100) \times 0.1 \text{ l/hr} = 0.0058 \text{ l/hr}$

The calculated GSV of less than 0.07 l/hr for methane and carbon dioxide places the site into Characteristic Situation 1. BS 8485:2015+A1:2019 states that for Characteristic Situation 1, the methane concentration would typically be less than 1% and carbon dioxide less than 5% and that if concentrations are above these limits, then consideration should be given to placing the site into Characteristic Situation 2. As the concentrations of methane and carbon dioxide were both within these typical limits, the Characteristic Situation 1 classification is appropriate for the site.

The site is located in both a Lower Probability Radon Area (less than 1% of homes are estimated to be at or above the action level) and an Intermediate Probability Radon Area (5 to 10% of homes are estimated to be at or above the action level). Consequently, basic radon protective measures are considered necessary within the structural design of the proposed development.



6.5 Revised Conceptual Site Model

A revised Conceptual Site Model is presented in **Table 6** below.

6.6 Waste Classification & Waste Acceptance

Waste classification has been undertaken following the guidance set out in WM3 EA Technical Guidance 'Guidance on the classification and assessment of waste', 1st Edition, Version 1.2GB, October 2021. The results of this assessment determine the appropriate List of Waste (LoW) Code and whether the waste should be classified as hazardous or non-hazardous. Classification is undertaken using the results of solid (total) analyses and not on the results of the WAC analyses.

Once the waste has been classified as either hazardous or non-hazardous, the WAC testing determines if the waste meets the requirements for disposal in the required landfill. Therefore, if the waste is classified as hazardous waste, it would also need to meet the hazardous waste WAC requirements to be disposed of in a hazardous waste landfill. However, if the final destination of the waste is not to landfill, then WAC analysis is not required.

The WAC testing also allows for a distinction to be made between inert and non-hazardous waste. Waste that does not fall within the hazardous waste category and meets the requirements for disposal in an inert landfill can, therefore, be disposed of in an inert landfill. However, waste that does not meet the requirements for an inert landfill will need to be disposed of in a non-hazardous landfill. In certain circumstances, hazardous waste can be disposed of in a designated cell within a non-hazardous landfill. In this case, the waste would need to meet more stringent leachate requirements for stable, non-reactive hazardous waste.

6.6.1 Waste Classification

Soils

The results of the assessment indicated that contaminant concentrations within the made ground, topsoil and natural soils were generally low and would classify the soils as non-hazardous with LoW Code 17 05 04 (soils and stones other than those mentioned in 17 05 03).

Asphalt Surfacing

Two (2 No.) asphalt samples were scheduled for PAH-17 analysis. The benzo(a)pyrene concentration was low (maximum value 5.7 mg/kg), below the 50 mg/kg limit defined in WM3. Therefore, the bituminous surfacing represented by these samples would be classified as non-hazardous waste and assigned the List of Wastes code 17 03 02 for bituminous mixtures other than those mentioned in 17 03 01.

6.6.2 Waste Acceptance

Three samples of Made Ground were analysed using Waste Acceptance Criteria (WAC). The assessment indicated that all samples met the requirements for disposal in an inert landfill.

The final disposal classification should be confirmed by the receiving site operator.

6.7 Health & Safety Considerations

To minimise the direct exposure of construction workers involved in the site redevelopment to any impacted contaminated shallow soils, the guidance stated in HSG 66, "Protection of Workers and the General Public During Redevelopment of Contaminated Land," should be followed.



Potential Source Areas	Potential Contaminant of Concern	Pathways	Potential Receptor	Exposure Route (Human unless otherwise stated)	Potential Identified Linkage (unmitigated)	Findings of Ground investigation	Risk (Unmitigated)	Proposed Remediation (Mitigation) Measures	Residual Risk Estimation		
On-site Sources				<ul style="list-style-type: none"> Direct Soil Ingestion 	N/A	N/A	N/A	N/A	N/A		
General Made Ground	Asbestos / Metals As, Be, Cd, Cu, Cr (VI), Cr (III) Hg, Ni, Se, Va, Zn, Boron, TPH /PAH, PCBs	Disturbance due to construction plant causing direct contact, dusts, vapours.	Occupants of the development / building fabric	<ul style="list-style-type: none"> Indoor Dust ingestion 	<ul style="list-style-type: none"> Yes 	No exceedance of GAC.	Very Low	Hardstanding to cover retail site minimising direct contact.	Negligible		
Furniture Factory				<ul style="list-style-type: none"> Skin Contact with Soils 	<ul style="list-style-type: none"> Yes 	As above	Very Low	As above	Negligible		
Council Depot				<ul style="list-style-type: none"> Skin Contact with Dust 	<ul style="list-style-type: none"> Yes 	As above	Very Low	As above	Negligible		
Bus Depot & Tanks				<ul style="list-style-type: none"> Inhalation of Outdoor Dust 	<ul style="list-style-type: none"> Yes 	As above	Very Low	As above	Negligible		
Electricity sub-station		Direct Contact with occupants of the proposed development	Inhalation of Outdoor Vapours	<ul style="list-style-type: none"> Inhalation of Indoor Vapours 	<ul style="list-style-type: none"> Yes 	As above	Very Low	As above	Negligible		
Off-site Sources				Inhalation of fibres / vapours / gases by occupants of proposed development	Adjacent residents during construction	<ul style="list-style-type: none"> Inhalation of ground gas 	<ul style="list-style-type: none"> Yes 	CSI	Negligible	None	Negligible
General Made Ground		<ul style="list-style-type: none"> Inhalation of radon gas 	<ul style="list-style-type: none"> Yes 			Intermediate Probability Radon Area	Low	Basic Radon Protection Membrane	Negligible		
Electricity sub-stations		Permeation of water supply pipework	Secondary Aquifers			<ul style="list-style-type: none"> Ingestion via permeated water supply pipework 	<ul style="list-style-type: none"> Yes 	No exceedance of GAC.	Low	None	Low
Residential properties						Leachate	Sirhowy Rover	<ul style="list-style-type: none"> Direct contact with Secondary (Undifferentiated) Aquifer in Superficial Deposits 	<ul style="list-style-type: none"> Yes 	Concentrations within typical range of made ground (< GAC)	Low
Various factories and industrial units, including Penmaen Industrial Estate.				<ul style="list-style-type: none"> In-direct contact with Secondary (A) Aquifer in bedrock 							
Scrap Yard & Car Breakers / Dismantlers											
Former railway line											
Old Quarry											

Table 6: Refined Conceptual Site Model

Direct contact with subsurface soil and/or groundwater during redevelopment works are not assessed as part of the CSM. It is considered that risks to workers will be managed as part of any the redevelopment works at the site through the application of health and safety procedures, where required.



7 GEOTECHNICAL SITE ASSESSMENT: LIDL STORE

7.1 Geotechnical Considerations

An indicative site layout has been made available to Remada, illustrating the proposed store footprint to be located within the western area of the site. The majority of the central and southern area of this footprint is located within existing hardstanding (bus parking), whilst the northern area is located beneath part of the existing bus depot building. The store's proposed delivery ramp would be located adjacent to the south-western boundary. The remaining areas of the site would be occupied by car parking, HGV access and soft landscaping. An electricity sub-station is indicated to be positioned in the north-western corner.

This report should be read in conjunction with Remada's Coal Mining Risk Assessment 1271.02.02.

The site gently slopes downwards from north to south, with the topographic elevation varying between approximately 144m AOD (metres above ordnance datum) on the northern boundary and 140m AOD in the south-western corner. At the time of writing, the store's finished floor level (FFL) is unknown, although it is anticipated to be similar to the existing level in the south-western area of circa. 143m AOD.

Ten (10 No.) of Remada's exploratory holes (WS3, WS3A, WS4, WS6, WS6A, WS8, WS9 and RBH1 – RBH3) were positioned in the proposed store footprint, as indicated in **Figure 2**. Within the seven (7 No.) window sample boreholes, the made ground appeared to be relatively shallow and present to a maximum thickness of 1.3m (WS3A) where proven (see rotary logs below). However, this belies the shallow SPT refusals encountered within the majority of these window sample boreholes (WS3, WS6, WS6A, WS8 and WS9) at depths ≤ 1 m bgl. In the two locations where the window sample borehole advanced into strata devoid of anthropogenic material (WS3A and WS9A), this material was recorded as soft to stiff locally gravelly sandy CLAY to the base of the boreholes at 2.6m and 2.0m bgl respectively.

Within the three rotary boreholes, the made ground was recorded to depths of between 2.7m and 3.0m bgl and underlain by superficial SAND & GRAVEL deposits. However, due to the open-holing nature of this drilling technique, it is usually difficult to detect a change in strata, unless there is a good contrast in properties such as colour, mineral content or hardness. Consequently, there is some uncertainty as to the current thickness of made ground across the study site at the present time.

The rotary boreholes recorded MUDSTONE and SILTSTONE at depths of between 7.6m and 11.0m bgl, which were interpreted as representative of the Grovesend Formation bedrock indicated on published geological mapping.

No groundwater was observed within any of the window sample boreholes during the intrusive investigation. The required use of water-flush as a rotary drilling medium masked any potential groundwater strikes within the deeper rotary boreholes on-site. Perched groundwater was encountered within the made ground at 1.52m bgl (142.56m AOD) and 1.53m bgl (142.55m AOD) in WS5, although this was only present during the third and fourth monitoring visits only.

Details of the proposed permanent and variable design loads (actions) are not currently known although an indicative column load of 400kN has been provided.

7.2 Foundations

The thickness of the made ground beneath the proposed store footprint is anticipated to be circa. 2.5 to 3.0m based on the intrusive investigations to date. Due to buried obstructions in the made ground,



(indicated in ≤ 1 m refusals in five of the seven window samples targeting the proposed store footprint), made ground should be excavated and recompacted as graded fill.

Vibro-stone columns bearing in the natural SAND & GRAVEL deposits at depths of circa 3.0 – 5.0m bgl are considered a potential foundation solution, providing a minimum bearing capacity for either a raft or pad & strip foundation for a ground-bearing floor slab, as specified by the Structural Engineer. The strength, depth and composition of these SAND & GRAVEL deposits is unknown at the time of writing.

7.3 Shrinkage and Swelling

All CLAY samples were reported as having INTERMEDIATE and HIGH plasticity, with between 75% and 100% passing a 0.425mm sieve. The modified plasticity index equates to Low to Medium Volume Change Potential.

BRE 412 states that where the natural moisture content is less than 0.4 times the Liquid Limit ($w < 0.4 w_L$) it is indicative of desiccation. Soil desiccation has potentially occurred at WS08A @ 2.50m.

The minimum foundation depths outside the zone of tree influence as specified by the NHBC have been reproduced in **Table 7** below, however:

Volume Change Potential	A) Minimum foundation depth (m) (allowing for restricted new planting)	B) Minimum foundation depth (m) (where planting is outside the zone of influence of trees)
High	1.50	1.0
Medium	1.25	0.9
Low	0.9	0.75

Table 7: NHBC 2023 Table 4 Minimum Foundation Depths

7.4 Floor Slab

If pad foundations are selected as described above, then a layer of compacted 6F₂ capping overlying the existing but re-compacted made ground to a minimum specified bearing capacity is considered to be suitable beneath a ground bearing floor slab.

7.5 Imported Fill

Any imported fill material should comply with an earthworks specification to be prepared by the engineer and not contain concentrations of contaminants greater than the Generic Assessment Criteria (GAC) presented in **Table 3**.

7.6 Excavations and Temporary Works

Excavation side walls may not be stable even in the short term without support or without being battered back to a safe slope gradient. A detailed inspection of the side slopes should be made during excavation and a risk assessment carried out to fully assess the support measures required.

No groundwater was observed within any of the boreholes during the intrusive investigation. During the monitoring period, water was found within WS05 at between 1.52m bgl and 1.53m bgl.

7.7 External Car Park Construction

CBR values estimated from the DCP tests indicated that, near the surface, the CBR values were variable, with several values of $< 10\%$ recorded. Poorly compacted Made Ground backfill resulting from the demolition works should be excavated, processed as necessary to produce a 6F₂ material and replaced



in compacted layers in accordance with an engineering specification.

7.8 Protection of Buried Concrete

In accordance with BRE SD1 for buried concrete in a brownfield site with mobile groundwater, analysis of selected samples for water-soluble sulphate returned values of up to 420 mg/l and pH <6.9. A total potential sulphate value of 0.72% was also calculated from the total sulphur results. Therefore, a Design Sulphate Class DS-2 is considered appropriate for buried concrete, and an ACEC Class of AC-3s is considered appropriate for the location.

7.9 General Construction Advice

All formations should be cleaned and inspected by a suitably qualified engineer before concrete is placed. Should any soft, compressible or otherwise unsuitable materials be encountered they should be removed and replaced by blinding concrete.

Foundation concrete, or alternatively, a blinding layer of concrete, should be placed immediately after excavation and inspection in order to protect the formation against softening and disturbance.

Generally, all formations should be placed wholly within the same material type unless specific geotechnical inspection and assessment have been undertaken.

Where applicable, ground beneath the proposed building footprint and potentially car parking may require to be stripped to reveal localised areas of made ground and structures. Excavations should be backfilled with suitably re-compacted materials to achieve formation level.

During foundation excavation works, arisings should be constantly monitored for the presence of contamination.

Remada's intrusive investigation has identified the potential for buried obstructions within the made ground underlying the site, which are of unknown size and composition at the time of writing.



8 CONCLUSIONS & RECOMMENDATIONS

8.1 Conclusions

The following conclusions have been made based on the findings of this investigation.

8.1.1 Phase 2 Site Investigation

The site occupies an approximately rectangular plot in the north-eastern area of the Penmaem Industrial Estate, situated to the west of Penmaem Road and south of the B4254 road. At the time of writing, the site comprises a Stagecoach bus depot, with associated bus stabling and servicing facilities.

The earliest available historical mapping of 1879 shows the site to be divided into two fields extending off-site to the north, south and west. Except for the removal of one of two footpaths bisecting the site, the site remains unchanged until after the mapping of 1938. By 1953, the northern and central areas of the site have been redeveloped, with a large 'Furniture Factory' occupying these areas. By 1971, the present-day electricity substation had been installed in the north-western corner of the site. Between 1975 and 1986, the site became occupied by a 'Council Depot', with the southern area of the site being redeveloped from a heathland to hardstanding around this time.

Made Ground was encountered within all of Remada's window sample boreholes to a maximum depth of 2.3m bgl (WS8A) in the south-western area of the site. Within the proposed Lidl store footprint, the made ground appeared to be relatively shallow and present to a maximum thickness of 1.3m (WS3A) where proven. However, this belies the shallow SPT refusals encountered within the majority of these window sample boreholes at depths ≤ 1 m bgl. In the two locations where the window sample borehole advanced into strata devoid of anthropogenic material (WS3A and WS9A), this material was recorded as soft to stiff locally gravelly sandy CLAY to the base of the boreholes at 2.6m and 2.0m bgl respectively.

Within the three rotary boreholes, the made ground was recorded to depths of between 2.7m and 3.0m bgl and underlain by superficial SAND & GRAVEL deposits. However, due to the open-holing nature of this drilling technique, it is usually difficult to detect a change in strata, unless there is a good contrast in properties such as colour, mineral content or hardness. Consequently, there is some uncertainty as to the current thickness of made ground across the study site at the present time.

The rotary boreholes recorded MUDSTONE and SILTSTONE at depths of between 7.6m and 11.0m bgl, which were interpreted as representative of the Grovesend Formation bedrock indicated on published geological mapping.

8.1.2 Human Health Risk Assessment

The results of soil chemical analysis were compared to the Human Health Generic Assessment Criteria for commercial land use. None of the analytes tested were detected at concentrations that exceeded the human health GAC protective of on-site workers.

8.1.3 Water Resources Risk Assessment

The results of the soil chemical analysis undertaken have identified that concentrations of metals and inorganic contaminants are within the range of typical made ground. Detectable concentrations of TPH and PAHs were encountered in some samples. However, the contaminants identified are of low solubility and mobility and, as such, are unlikely to present a risk to groundwater beneath the site. In addition, it should be noted that the site will be predominantly covered with the building and areas of hardstanding. Therefore, the risk of leaching of contaminants as a result of infiltration of groundwater is likely to be limited. Therefore, the risk to groundwater from contaminants within the made ground at the site is considered to be low and does not warrant further consideration.



8.1.4 Waste Classification

In general, the results of the chemical analysis indicate that the material would be classified as non-hazardous waste. Waste Acceptance Criteria (WAC) analysis has classified the waste as suitable for an inert landfill.

8.2 Recommendations

The thickness of the made ground beneath the proposed store footprint is anticipated to be circa. 2.5 to 3.0m based on the intrusive investigations to date. Due to buried obstructions in the made ground, (indicated in ≤ 1 m refusals in five of the seven window samples targeting the proposed store footprint), made ground should be excavated and recompacted as graded fill.

Vibro-stone columns bearing in the natural SAND & GRAVEL deposits at depths of circa 3.0 – 5.0m bgl are considered a potential foundation solution, providing a minimum bearing capacity for either a raft or pad & strip foundation for a ground-bearing floor slab, as specified by the Structural Engineer. The strength, depth and composition of these SAND & GRAVEL deposits is unknown at the time of writing.

If pad foundations are selected, then a layer of compacted 6F₂ capping overlying the existing but re-compacted made ground to a minimum specified bearing capacity is considered to be suitable beneath a ground bearing floor slab.

CBR values estimated from the DCP tests indicated that, near the surface, the CBR values were variable, with several values of <10% recorded. Poorly compacted Made Ground backfill resulting from the demolition works should be excavated, processed as necessary to produce a 6F₂ material and replaced in compacted layers in accordance with an engineering specification.

A Design Sulphate Class DS-2 is considered appropriate for buried concrete, and an ACEC Class of AC-3s is considered appropriate for the location.

Excavation side walls may not be stable even in the short term without support or without being battered back to a safe slope gradient. A detailed inspection of the side slopes should be made during excavation and a risk assessment carried out to fully assess the support measures required.

No groundwater was observed within any of the boreholes during the intrusive investigation. During the monitoring period, water was found within WS05 at between 1.52m bgl and 1.53m bgl.

8.3 Ground Gas

The results of four rounds of gas monitoring visits placed the site into Characteristic Situation 1. Gas protection measures are not required with respect to methane or carbon dioxide. However, the site is within an Intermediate Probability Radon Area and as such, basic radon protection measures shall be required.



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STUDY LIMITATIONS

IMPORTANT. This section should be read before reliance is placed on any of the information, opinions, advice, recommendations or conclusions contained in this report.

1. This report has been prepared by Remada, Ltd with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with (the 'Client'). Remada does not accept responsibility for any matters outside the agreed scope.

2. This report has been prepared for the sole benefit of the Client unless agreed otherwise in writing.

3. Unless stated otherwise, no consultations with authorities or funders or other interested third parties have been carried out. Remada is unable to give categorical assurance that the findings will be accepted by these third parties as such bodies may have published, more stringent objectives. Further work may be required by these parties.

4. All work carried out in preparing this report has used, and is based on, Remada' professional knowledge and understanding of current relevant legislation. Changes in legislation or regulatory guidance may cause the opinion or advice contained in this report to become inappropriate or incorrect. In giving opinions and advice pending changes in legislation, of which Remada is aware, have been considered. Following delivery of the report Remada has no obligation to advise the Client or any other party of such changes or their repercussions.

5. This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report.

6. Whilst this report and the opinions made are to the best of Remada' belief, Remada cannot guarantee the accuracy or completeness of any information provided by third parties.

7. This report has been prepared based on the information reasonably available during the project programme. All information relevant to the scope may not have received.

8. This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of changes in the condition of the site since the time of the investigation.

9. The content of this report represents the professional opinion of experienced environmental consultants. Remada does not provide specialist legal or other professional advice. The advice of other professionals may be required.

10. Where intrusive investigation techniques have been employed they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. In some cases the investigation is further limited by site operations, underground obstructions and above ground structures. Unless otherwise stated, areas beyond the boundary of the site have not been investigated.

11. If below ground intrusive investigations have been conducted as part of the scope, service tracing for safe location of exploratory holes has been carried out. The location of underground services shown on any drawing in this report has been determined by visual observations and electromagnetic techniques. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on site.

12. Unless otherwise stated the report provides no comment on the nature of building materials, operational integrity of the facility or on any regulatory compliance issues.

13. Unless otherwise stated, samples from the site (soil, groundwater, building fabric or other samples) have NOT been analysed or assessed for waste classification purposes.



TABLES (not presented within text).

Table 2: Gas Groundwater Monitoring Data

GAS & GROUNDWATER MONITORING DATA																	REMADA GEO CONSULTANTS						
SITE		Lidl Blackwood, Penmaen Road																					
PROJECT No.		1271.03																					
Visit 1 of 4		Atmospheric Pressure Variations During Visit										Ground Surface Conditions											
Carried Out by:		Peter Searing										1008 - 1009 mb					Damp						
Date:		30.10.24										Atmospheric Pressure Trend Over Previous 48hrs					Weather Conditions						
Instrument Details		GFM436 14048										Rising					Overcast						
Well No.	Cover Height (m AOD)	Well Diameter (mm)	CH ₄ (% v/v)		CH ₄ Steady LEL (%)	CO ₂ (% v/v)		O ₂ (% v/v)		H ₂ S (ppm)		CO (ppm)		Duration (secs) [^]	Flow Rate (l/hr)	Relative Pressure (mb)	PID (ppm)		Atmospheric Pressure (mb)	Water Level (m bgl)	Water Level (m AoD)	Depth of Pipe (m bgl)	Comments
			Peak	Steady		Peak	Steady	Minimum	Steady	Minimum	Steady	Minimum	Steady				Peak	Steady					
WS03A	144.200	50	0.0	0.0	0.0	2.3	2.3	17.2	17.2	0.0	0.0	0.0	0.0	180	0.0	0.00	-	-	1009	DRY	DRY	2.600	
WS05	144.080	50	0.0	0.0	0.0	2.0	2.0	17.7	17.7	0.0	0.0	0.0	0.0	180	0.0	0.00	-	-	1008	DRY	DRY	2.000	
WS06	144.060	50	0.0	0.0	0.0	5.8	5.8	12.0	12.0	0.0	0.0	0.0	0.0	180	0.0	0.0	-	-	1008	DRY	DRY	1.000	

NR = Not Recorded ^ For measurement of gas concentrations > = Above LEL WST = Water Sample Taken GL = Ground Level

GAS & GROUNDWATER MONITORING DATA																	REMADA GEO CONSULTANTS						
SITE		Lidl Blackwood, Penmaen Road																					
PROJECT No.		1271.03																					
Visit 2 of 4		Atmospheric Pressure Variations During Visit										Ground Surface Conditions											
Carried Out by:		Usamah Khan										1006mb					Dry						
Date:		04.11.24										Atmospheric Pressure Trend Over Previous 48hrs					Weather Conditions						
Instrument Details		GFM436 14048										Falling					Clear						
Well No.	Cover Height (m AOD)	Well Diameter (mm)	CH ₄ (% v/v)		CH ₄ Steady LEL (%)	CO ₂ (% v/v)		O ₂ (% v/v)		H ₂ S (ppm)		CO (ppm)		Duration (secs) [^]	Flow Rate (l/hr)	Relative Pressure (mb)	PID (ppm)		Atmospheric Pressure (mb)	Water Level (m bgl)	Water Level (m AoD)	Depth of Pipe (m bgl)	Comments
			Peak	Steady		Peak	Steady	Minimum	Steady	Minimum	Steady	Minimum	Steady				Peak	Steady					
WS03A	144.200	50	1.7	0.0	0.0	1.8	1.8	15.4	17.4	NR	NR	NR	NR	60	0.0	0.00	-	-	1006	DRY	DRY	2.600	
WS05	144.080	50	0.3	0.0	0.0	0.7	0.7	19.0	19.0	NR	NR	NR	NR	60	0.0	0.00	-	-	1006	DRY	DRY	2.000	
WS06	144.060	50	0.6	0.0	0.0	3.7	3.7	15.2	15.2	NR	NR	NR	NR	60	0.0	0.00	-	-	1006	DRY	DRY	1.000	

Notes: NR = Not Recorded ^ For measurement of gas concentrations > = Above LEL WST = Water Sample Taken GL = Ground Level

GAS & GROUNDWATER MONITORING DATA																	REMADA GEO CONSULTANTS						
SITE		Lidl Blackwood, Penmaen Road																					
PROJECT No.		1271.03																					
Visit 3 of 4		Atmospheric Pressure Variations During Visit										Ground Surface Conditions											
Carried Out by:		Kryslia Szybut										1015mb					Dry						
Date:		11.11.2024										Atmospheric Pressure Trend Over Previous 48hrs					Weather Conditions						
Instrument Details		GFM436 14048										Rising					Clear, sunny						
Well No.	Cover Height (m AOD)	Well Diameter (mm)	CH ₄ (% v/v)		CH ₄ Steady LEL (%)	CO ₂ (% v/v)		O ₂ (% v/v)		H ₂ S (ppm)		CO (ppm)		Duration (secs) [^]	Flow Rate (l/hr)	Relative Pressure (mb)	PID (ppm)		Atmospheric Pressure (mb)	Water Level (m bgl)	Water Level (m AoD)	Depth of Pipe (m bgl)	Comments
			Peak	Steady		Peak	Steady	Minimum	Steady	Minimum	Steady	Minimum	Steady				Peak	Steady					
WS03A	144.200	50	0.0	0.0	0.0	1.8	1.7	17.3	17.3	NR	NR	NR	NR	60	0.0	0.00	-	-	1015	DRY	DRY	2.000	
WS05	144.080	50	0.0	0.0	0.0	0.7	0.6	18.9	18.9	NR	NR	NR	NR	60	0.0	0.00	-	-	1015	1.520	142.560	1.700	
WS06	144.060	50	0.0	0.0	0.0	5.5	5.5	13.0	13.0	NR	NR	NR	NR	60	0.0	0.00	-	-	1015	DRY	DRY	0.600	

Notes: NR = Not Recorded ^ For measurement of gas concentrations > = Above LEL WST = Water Sample Taken GL = Ground Level

GAS & GROUNDWATER MONITORING DATA																	REMADA GEO CONSULTANTS						
SITE		Lidl Blackwood, Penmaen Road																					
PROJECT No.		1271.03																					
Visit 4 of 4		Atmospheric Pressure Variations During Visit										Ground Surface Conditions											
Carried Out by:		Peter Searing										991 - 992 mb					Damp						
Date:		18-Nov-24										Atmospheric Pressure Trend Over Previous 48hrs					Weather Conditions						
Instrument Details		GFM436 14048										Falling					Overcast and drizzling						
Well No.	Cover Height (m AOD)	Well Diameter (mm)	CH ₄ (% v/v)		CH ₄ Steady LEL (%)	CO ₂ (% v/v)		O ₂ (% v/v)		H ₂ S (ppm)		CO (ppm)		Duration (secs) [^]	Flow Rate (l/hr)	Relative Pressure (mb)	PID (ppm)		Atmospheric Pressure (mb)	Water Level (m bgl)	Water Level (m AoD)	Depth of Pipe (m bgl)	Comments
			Peak	Steady		Peak	Steady	Minimum	Steady	Minimum	Steady	Minimum	Steady				Peak	Steady					
WS03A	144.200	50	0.0	0.0	0.0	5.1	4.7	12.9	13.0	0.0	0.0	0.0	0.0	180	0.0	0.00	-	-	992	DRY	DRY	2.400	
WS05	144.080	50	0.0	0.0	0.0	1.9	1.9	14.8	14.8	0.0	0.0	0.0	0.0	180	0.0	0.00	-	-	991	1.530	142.550	1.750	
WS06	144.060	50	0.0	0.0	0.0	5.2	5.2	13.7	13.7	0.0	0.0	0.0	0.0	180	0.0	0.00	-	-	991	DRY	DRY	0.600	

Notes: NR = Not Recorded ^ For measurement of gas concentrations > = Above LEL WST = Water Sample Taken GL = Ground Level

Table 2: Gas and Groundwater Monitoring Data

Table 3: Comparison of Soil Chemical Analyses with GAC

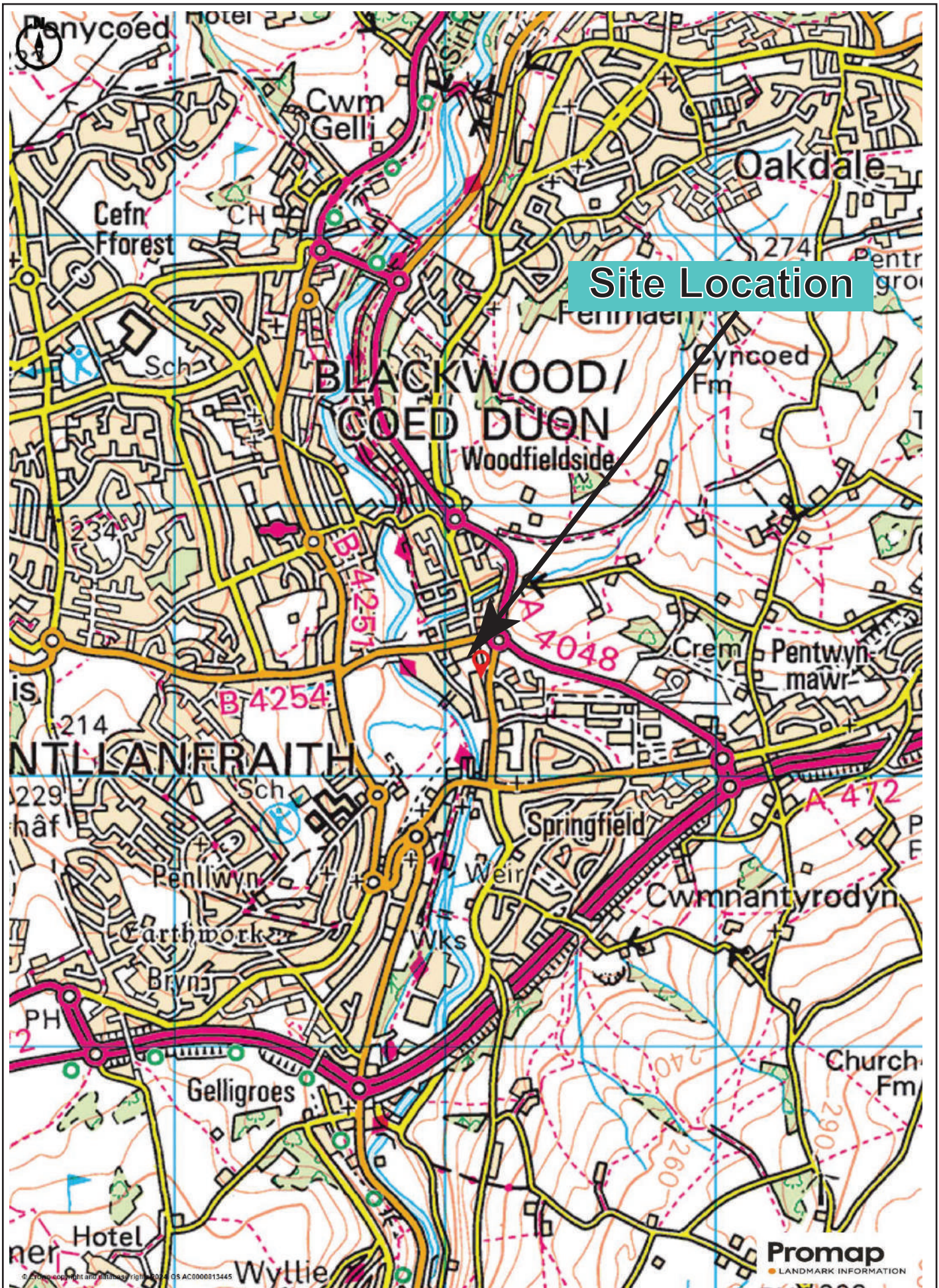
Lab Sample Number:				357887	357888	357889	357893	357894	357890	357891	357892
Sample Reference:				WS01	WS03A	WS04	WS07	WS08	WS05	WS05	WS06
Borehole:				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Top Depth (m):				0.3	0.5	0.6	0.25	0.2	0.35	1.80	0.15
Basal Depth (m):				22/10/2024	22/10/2024	22/10/2024	22/10/2024	22/10/2024	22/10/2024	22/10/2025	22/10/2024
Date Sampled:				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Determination											
Units	Limit of detection	Accreditation Status	[mg/kg unless stated]								
Molsture	%	0.01	NONE	4.7	6.7	9.7	3.7	5.3	4.3	5.3	4.9
Asbestos in Soil	Type	NIA	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected			
Asbestos Analyst ID	N/A	N/A	N/A								
pH	pH Units	N/A	MCERTS	7.8	7.6	8.2	9.3	8.6	-	-	-
Magnesium (Water Soluble)											
Sulphate (2:1 Water Soluble) as SO4											
Total Sulphur											
Chloride (Water Soluble)											
Nitrate (Water Soluble)											
Ammonium (Water Soluble)											
Sulphate (Acid Soluble)											
Arsenic	mg/kg	1.00	MCERTS	640	13	51	11	3.5	10	-	-
Beryllium	mg/kg	0.06	MCERTS	12	0.92	1.9	0.77	0.14	0.48	-	-
Boron	mg/kg	0.20	MCERTS	240000	0.8	1.1	0.7	0.5	0.7	-	-
Cadmium	mg/kg	0.20	MCERTS	190	0.3	< 0.2	0.3	1.8	61	-	-
Chromium (Hexavalent)	mg/kg	1.80	MCERTS	33	< 1.8	< 1.8	< 1.8	< 1.8	-	-	-
Chromium (Trivalent)	mg/kg	1.00	NONE	8600	19	26	16	9	37	-	-
Chromium (aquea regia extractable)	mg/kg	1.00	MCERTS	20	26	16	9	37	-	-	
Copper	mg/kg	1.00	MCERTS	68000	14	31	14	14	710	-	-
Lead	mg/kg	1.00	MCERTS	NC	13	33	15	43	160	-	-
Mercury	mg/kg	0.30	MCERTS	58 TM (25.8)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	-	-
Nickel	mg/kg	1.00	MCERTS	980	38	36	26	3.7	16	-	-
Selenium	mg/kg	1.00	MCERTS	12000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-
Vanadium	mg/kg	1.00	MCERTS	9000	23	40	21	5.4	14	-	-
Zinc	mg/kg	1.00	MCERTS	730000	71	62	61	89	360	-	-
Total Cyanide	mg/kg	1.00	MCERTS		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS		0.017	0.012	0.0077	0.012	0.0072	-	-
Calculated TOC from FOC					1.70	1.20	0.77	1.20	0.72	-	-
Calculated SOM from FOC					2.93	2.07	1.33	2.07	1.24	-	-
Aliphatic TPH >C5-C6	mg/kg	0.01	NONE	3200 TM (264)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	mg/kg	0.01	NONE	7800 TM (144)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	mg/kg	0.01	NONE	2000 TM (78)	0.17	< 0.010	0.029	0.15	0.45	< 0.010	< 0.010
Aliphatic TPH >C10-C12	mg/kg	1.00	MCERTS	9700 TM (48)	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	mg/kg	2.00	MCERTS	59000 TM (24)	< 2.0	2.2	< 2.0	2.9	< 2.0	2.5	< 2.0
Aliphatic TPH >C16-C21	mg/kg	8.00	MCERTS	160000	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Aliphatic TPH >C21-C35	mg/kg	8.00	MCERTS		25	12	< 8.0	73	24	11	9
Total Aliphatic Hydrocarbons:	mg/kg	10.00	NONE		26	14	10	76	24	13	10
Aromatic TPH >C5-C7	mg/kg	0.01	NONE	28000 TM (1220)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	mg/kg	0.01	NONE	56000 TM (859)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	mg/kg	0.02	NONE	3300 TM (813)	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Aromatic TPH >C10-C12	mg/kg	1.00	MCERTS	18000 TM (584)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	mg/kg	2.00	MCERTS	38000 TM (159)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aromatic TPH >C16-C21	mg/kg	10.00	MCERTS	28000	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic TPH >C21-C35	mg/kg	10.00	MCERTS	28000	< 10	< 10	< 10	130	17	< 10	< 10
Total Aromatic Hydrocarbons	mg/kg	10.00	NONE		10	10	10	130	17	10	17
Calculated Sum TPH (sum Aliphatic + sum Aromatic)					36	24	20	206	41	23	20
Naphthalene	mg/kg	0.05	MCERTS	190 TM (76.4)	0.39	< 0.05	< 0.05	< 0.05	0.08	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	83000 TM (88.1)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	84000 TM (57)	< 0.05	< 0.05	< 0.05	0.15	0.16	-	-
Fluorene	mg/kg	0.05	MCERTS	63000 TM (30.9)	< 0.05	< 0.05	< 0.05	0.06	0.08	-	-
Phenanthrene	mg/kg	0.05	MCERTS	22000	0.46	0.14	< 0.05	0.35	0.75	-	-
Anthracene	mg/kg	0.05	MCERTS	53000	< 0.05	< 0.05	< 0.05	< 0.05	0.17	-	-
Fluoranthene	mg/kg	0.05	MCERTS	23000	< 0.05	< 0.05	< 0.05	0.59	2.1	-	-
Pyrene	mg/kg	0.05	MCERTS	94000	< 0.05	< 0.05	< 0.05	0.67	1.7	-	-
Benzo[a]anthracene	mg/kg	0.05	MCERTS	170	< 0.05	< 0.05	< 0.05	0.32	1.3	-	-
Chrysene	mg/kg	0.05	MCERTS	350	< 0.05	< 0.05	< 0.05	0.31	1.5	-	-
Benzo[b]fluoranthene	mg/kg	0.05	ISO 17025	44	< 0.05	< 0.05	< 0.05	0.36	2.4	-	-
Benzo[k]fluoranthene	mg/kg	0.05	ISO 17025	1200	< 0.05	< 0.05	< 0.05	0.17	0.75	-	-
Benzo[a]pyrene	mg/kg	0.05	MCERTS	35	< 0.05	< 0.05	< 0.05	0.29	1.7	-	-
Indeno[1,2,3-c,d]pyrene	mg/kg	0.05	MCERTS	500	< 0.05	< 0.05	< 0.05	0.14	1.1	-	-
Dibenz[a,h]anthracene	mg/kg	0.05	MCERTS	3.5	< 0.05	< 0.05	< 0.05	< 0.05	0.26	-	-
Benzo[ghi]perylene	mg/kg	0.05	MCERTS	3500	< 0.05	< 0.05	< 0.05	0.17	1.2	-	-
Total Of 16 PAHs	mg/kg	0.8	ISO 17025		0.86	< 0.80	< 0.80	3.59	16.1	-	-
Benzene	µg/kg	5.00	MCERTS	27	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5.00	MCERTS	59000 TM (899)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5.00	MCERTS	6700 TM (518)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	8.00	MCERTS	5900 TM (578)	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
o-xylene	µg/kg	5.00	MCERTS	6600 TM (478)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5.00	NONE		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Phenols	mg/kg	1.00	MCERTS	440 TM (2620)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	-	-

Determinand concentration below the GAC
 Determinand concentration in exceedance of GAC
 Determinand concentration in exceedance of the vapour/solubility saturation limit.

NC: No published criteria, U/S: Unsuitable sample
 vsp: Screening criteria presented exceed the solubility saturation limit, which is presented in brackets.
 sll: Screening criteria presented exceed the solubility saturation limit, which is presented in brackets.
 sll: Screening criteria based on theoretical protective of direct skin contact (solubility in brackets based on health effects following long term exposure provided for illustration only).
 (1): For assessment based on the use of the surrogate marker approach the GAC for Coal Tar must be used instead of benzo[a]pyrene.
 * Value presented in mg/kg



FIGURES





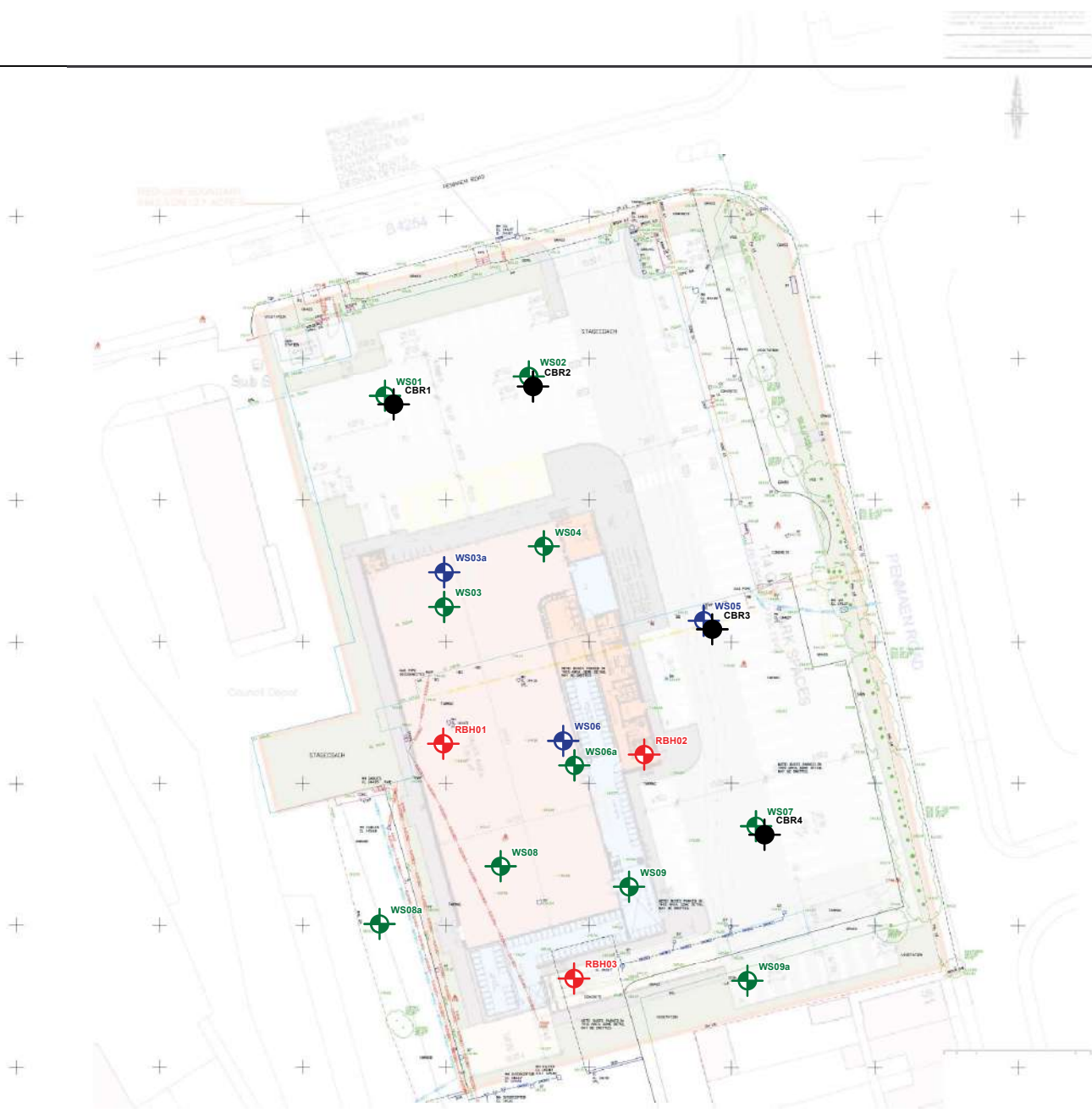
Site Location

**BLACKWOOD/
COED DUON**
Woodfieldside





PENLLANRAITH

Promap
LANDMARK INFORMATION

Notes	Revision	Approved	Date	Project Title	Scale	Drawn	Size
				Penmaen Road, Blackwood	as shown	PD	A4
				Drawing Title	Date	Job No.	Figure No.
				Figure 1: Site Location Plan	26.11.24	1271.03	01
			Client	 			
			Lidl Great Britain Ltd				



KEY TO BOREHOLES

-  **WS01** Window Sample & Installation
-  **WS02** Window Sample
-  **CBR1** CBR Test
-  **RBH01** Rotary Borehole

Notes
 Proposed store outline (dashed) reproduced from HTC Architects Ltd 'Proposed Site Plan - Option 11', drawing ref: F422, Revision A dated February 2024.

Topographical survey reproduced from EMP Surveys Ltd 'Topographical and buried utilities survey', drawing ref: 1028/T&U/01-02 dated July 2022.

Revision	Approved	Date

Project Title
 Penmaen Road, Blackwood

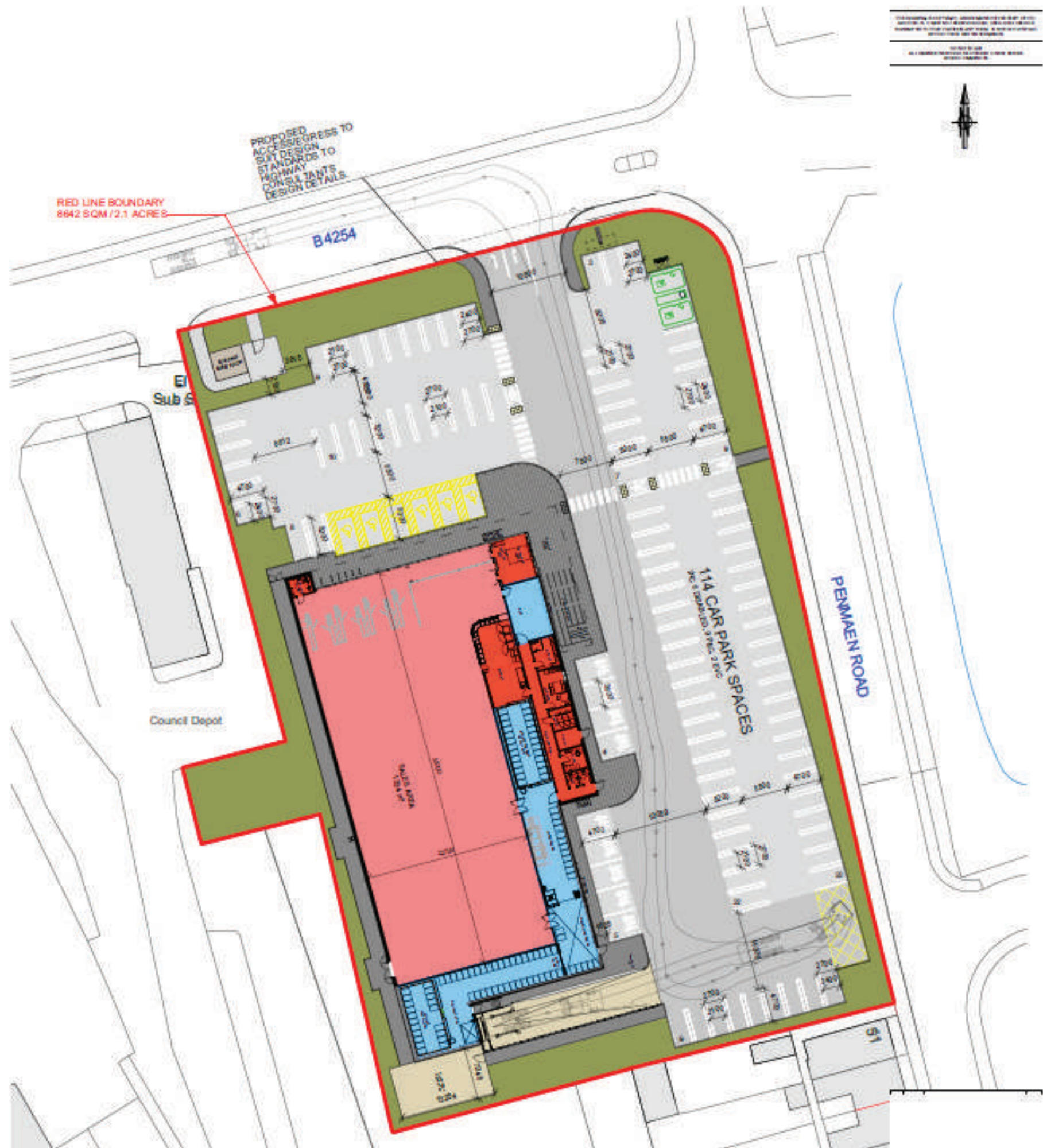
Drawing Title
 Figure 2: Exploratory Hole Location Plan

Client
 Lidl Great Britain Ltd 

Scale	Drawn	Size
as shown	UK	A4

Date	Job No.	Figure No.
27.11.24	1271.03	05





THIS DRAWING IS A PRELIMINARY DESIGN AND SHOULD NOT BE USED FOR CONSTRUCTION OR AS A BASIS FOR ANY OTHER DESIGN OR CONTRACT. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE WITHOUT NOTICE. THE CLIENT ACCEPTS RESPONSIBILITY FOR THE ACCURACY OF THE INFORMATION PROVIDED.



Legend

Notes
 Proposed site layout plan reproduced from HTC Architects Ltd 'Proposed Site Plan - Option 11', drawing ref: F422, Revision A dated February 2024.

The proposed site layout plan presented here is indicative only and may be subject to change following publication of Remada's Phase 1 report.

Revision	Approved	Date

Project Title
 Stagecoach Depot, Penmaen Road, Blackwood

Drawing Title
 Figure 3: Proposed Indicative Site Layout

Client
 Lidl Great Britain Ltd 

Scale	Drawn	Size
as shown	JR	A4
Date	Job No.	Figure No.
06.06.24	1271.01	03





EXPLORATORY HOLE LOGS

Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 22/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318052.00 N196480.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS01	Hole Type WS	Level 143.76m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	143.56		MADE GROUND: Brownish grey concrete. Aggregate sizes ranging from 5 to 45mm of quartzite and mudstone. Less than 5% voids present. Rebar founded at 0.045 to 0.050m, 0.047 to 0.052m and 0.050 to 0.059m.	
		0.30	ES		0.70	143.06		MADE GROUND: Dark grey sandy gravel. Gravel is angular to subangular fine to coarse of brick fragments, concrete and sandstone.	
		0.80	ES		0.84	142.92		MADE GROUND: Reddish brown sandy gravel. Gravel is angular to subangular fine to coarse of mudstone and concrete.	
		1.00	SPT	N=5 (1,1/2,1,1,1)	1.30	142.41		Soft brown mottled grey orange slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse of sandstone, mudstone and coal.	1
		1.30	D		1.35	142.41		Firm brown mottled orange grey slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse of mudstone, sandstone and rare coal.	
		2.00	SPT	50 (9,10/50 for 220mm)	2.00	141.76		End of Borehole at 2.000m	2
									3

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	2.00	90	0

Remarks
 1) Location CAT scanned prior to drilling.
 2) No groundwater encountered.
 3) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 22/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318073.00 N196482.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS02	Hole Type WS	Level 144.31m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.23	144.08		MADE GROUND: Brownish grey concrete. Aggregate sizes ranging from 5 to 55mm consisting of mudstone and quartzite. Rebar founded at 0.195 to 0.200m and 0.199 to 0.204m. Less than 5% voids present.	
		0.40	ES		0.35	143.96		MADE GROUND: Dark grey sandy gravel subbase. Gravel is angular to subangular fine to coarse of brick fragments, concrete and sandstone.	
		0.90	D					Firm grey and orangeish brown slightly gravelly sandy CLAY. Gravel is subangular medium to coarse of sandstone.	1
		1.00	SPT	N=3 (1,0/0,1,1,1)					
		1.50	D		1.45	142.86		Firm brown mottled orangeish grey slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse of mudstone, sandstone and rare coal.	
		2.00	SPT	50 (25 for 115mm/50 for 115mm)	2.00	142.31		End of Borehole at 2.000m	2
									3

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	2.00	90	0

Remarks

- 1) Location CAT scanned prior to drilling.
- 2) No groundwater encountered.
- 3) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd			Date: 22/10/2024	
Location: Penmaen Road		Contractor:			Co-ords: E318061.00 N196450.00	
Project No. : 1271.03		Crew Name:			Drilling Equipment: Tracked Rig	
Borehole Number WS03	Hole Type WS	Level 144.20m AoD		Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.16	144.04		MADE GROUND: Brownish grey concrete with less than 1% voids. Aggregate sizes ranging from 10 to 25mm. No rebar.
					0.45	143.75		MADE GROUND: Grey and brown sand and gravel. Gravel is angular to subangular fine to coarse of concrete and sandstone.
								End of Borehole at 0.450m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	0.45	90	0

Remarks

- 1) Location CAT scanned prior to drilling.
- 2) No groundwater encountered.
- 3) Borehole terminated at 0.45m bgl due to sampler refusal.
- 4) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 22/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318061.00 N196456.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS03a	Hole Type WS	Level 144.20m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.22 - 1.30	B		0.22	143.98		MADE GROUND: Brownish grey concrete with less than 1% voids. Aggregate size ranging from 10 to 25mm. Rebar founded at 0.1 to 0.11m.	
		0.50	ES					MADE GROUND: Reddish brown gravelly slightly clayey sand. Gravel is angular to subangular fine to coarse of brick fragments, mudstone and coal.	
		1.00	SPT	N=3 (1,1/1,0,1,1)				<i>Very loose below 1m.</i>	1
		1.30 1.30 - 2.00	D B		1.30	142.90		Very soft grey very sandy CLAY.	
								<i>Firm below 1.45m.</i>	
		1.80	D		1.70	142.50		Firm to stiff orangeish brown mottled orange and grey slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse of sandstone.	
		2.00	SPT	N=31 (4,5/7,7,8,9)					2
	2.50	D							
	2.60	SPT	N=50 (25 for 75mm/50 for 115mm)	2.60	141.60			End of Borehole at 2.600m	
									3

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	2.60	90	0

Remarks

- 1) Location CAT scanned prior to drilling.
- 2) No groundwater encountered.
- 3) Installation to 2.6m bgl; 1.5m plain pipe, 1.1m slotted pipe.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 22/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318076.00 N196458.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS04	Hole Type WS	Level 144.21m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.22	143.99		MADE GROUND: Brownish grey concrete with less than 5% voids. Aggregate sizes ranging from 5 to 40mm of quartzite and mudstone. Rebar founded at 0.120 to 0.125m, 0.125 to 0.130m and 0.128 to 0.133m.	
					0.50	143.71		MADE GROUND: Reddish brown gravelly slightly clayey sand. Gravel is angular to subangular fine to coarse of brick fragments, mudstone and coal.	
		0.60	ES					MADE GROUND: Soft dark brown slightly gravelly sandy clay. Gravel is angular to subangular fine to coarse of brick fragments, mudstone and sandstone.	
		1.00	SPT	N=6 (1,1/1,1,2,2)	1.00	143.21		Soft grey mottled orangeish brown very sandy CLAY. Sandstone cobble at 1.15m bgl preventing further recovery.	1
		1.10	D		1.15	143.06		No Recovery	
		2.00	SPT	50 (11,11/50 for 180mm)	2.00	142.21		End of Borehole at 2.000m	2
									3

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	2.00	90	0

Remarks
 1) Location CAT scanned prior to drilling.
 2) No groundwater encountered.
 3) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 21/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318100.00 N196446.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS05	Hole Type WS	Level 144.08m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.08	144.00		MADE GROUND: Asphalt	1
		0.35	ES		0.60	143.48		MADE GROUND: Reddish brown sandy gravel with a hydrocarbon odour. Gravel is angular to subangular fine to coarse of mudstone and concrete.	
		0.90	D		1.20	142.88		MADE GROUND: Firm orangeish brown mottled grey slightly sandy slightly gravelly clay. Gravel is subangular to subrounded fine to coarse of sandstone and mudstone.	
		1.00	SPT	N=32 (2,5/6,8,8,10)	1.65	142.43		MADE GROUND: Dense greyish brown sandy slightly clayey gravel. Gravel is subangular to subrounded fine to coarse of sandstone and mudstone.	
		1.80	ES		2.00	142.08		MADE GROUND: Dark grey sandy gravel with a slight hydrocarbon odour. Gravel is subangular to subrounded fine to coarse of mudstone and quartzite.	
		2.00	SPT	N=50 (9,12/50 for 265mm)	End of Borehole at 2.000m			2	
3									

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	2.00	90	0

Remarks

- 1) Location CAT scanned prior to drilling.
- 2) No groundwater encountered.
- 3) Installation to 2.0m bgl; 1.0m plain pipe, 1.0m slotted pipe.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 21/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318078.00 N196428.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS06	Hole Type WS	Level 144.06m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15	ES		0.11	143.95		MADE GROUND: Asphalt.	
					0.40	143.66		MADE GROUND: Reddish brown sandy gravel with a hydrocarbon odour. Gravel is angular to subangular fine to coarse of mudstone and concrete.	
		0.60 - 1.00	B		0.60	143.46		MADE GROUND: Dark grey gravelly slightly clayey sand. Gravel is angular to subangular fine to coarse of mudstone, sandstone and brick fragments.	
		1.00	SPT	N=50 (10,14/50 for 235mm)	1.00	143.06		MADE GROUND: Grey slightly gravelly sand. Gravel is angular to subangular fine to coarse of sandstone.	
								End of Borehole at 1.000m	1
									2
									3

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	1.00	90	0


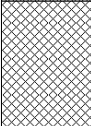

Remarks

- 1) Location CAT scanned prior to drilling.
- 2) No groundwater encountered.
- 3) Installation to 1.0m bgl; 0.5m plain pipe, 0.5m slotted pipe.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 21/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318078.00 N196425.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS06a	Hole Type WS	Level 143.57m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10	143.47		MADE GROUND: Asphalt.
		0.20	ES		0.35	143.22		MADE GROUND: Reddish brown sandy gravel with a hydrocarbon odour. Gravel is angular to subangular fine to coarse of mudstone and concrete.
		0.50	SPT	50 (25 for 70mm/50 for 10mm)	0.50	143.07		MADE GROUND: Dark reddish brown and dark grey gravelly sand. Gravel is angular to subangular fine to coarse of mudstone and sandstone.
								End of Borehole at 0.500m

1
2
3

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	0.50	90	0

Remarks
 1) Location CAT scanned prior to drilling.
 2) No groundwater encountered.
 3) Borehole terminated at 0.5m bgl due to sampler refusal.
 4) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 21/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318105.00 N196413.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS07	Hole Type WS	Level 143.28m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10	143.18		MADE GROUND: Asphalt	
		0.25	ES		0.40	142.88		MADE GROUND: Reddish brown sandy gravel with a hydrocarbon odour. Gravel is angular to subangular fine to coarse of mudstone and concrete.	
		0.55	ES		0.85	142.43		MADE GROUND: Dark brown gravelly slightly clayey sand. Gravel is angular to subrounded fine to coarse of asphalt, concrete, brick fragments, mudstone and sandstone.	
		0.95	D		1.00	142.28		Firm orangeish brown mottled orangeish grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to coarse of sandstone and mudstone.	1
		1.00	SPT	N=50 (3,3/50 for 295mm)				End of Borehole at 1.000m	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	1.00	90	0

Remarks
 1) Location CAT scanned prior to drilling.
 2) No groundwater encountered.
 3) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 21/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318069.00 N196407.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS08	Hole Type WS	Level 142.56m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
							MADE GROUND: Asphalt.	
		0.20	ES	50 (25 for 10mm/50 for 20mm)	0.12	142.44	MADE GROUND: Dark reddish brown sandy gravel with a solvent odour. Gravel is angular to subangular fine to coarse of brick fragments, mudstone, sandstone, plastic and asphalt.	
		0.35	D		0.32	142.24		
		0.40	SPT		0.42	142.14		
End of Borehole at 0.420m								

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	0.42	90	0

Remarks

- 1) Location CAT scanned prior to drilling.
- 2) No groundwater encountered.
- 3) Borehole terminated at 0.42m bgl due to sampler refusal. Borehole relocated to WS08A 20m west.
- 4) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 21/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318052.00 N196402.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS08a	Hole Type WS	Level 142.45m AoD	Logged By UK	Scale 1:18	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Pattern]					0.16	142.29		Dark brown sandy silt with frequent rootlets (TOPSOIL).	
		0.35	ES				[Pattern]	<u>Geotextile membrane between 0.15 and 0.16m.</u> MADE GROUND: Brownish grey gravelly slightly clayey sand with a high cobble content. Gravel is angular to subangular fine to coarse of sandstone, mudstone and brick fragments. Cobbles of subangular sandstone.	1
		1.00	SPT	N=13 (3,3/3,3,3,4)	1.15	141.30	[Pattern]	MADE GROUND: Very soft brown slightly sandy gravelly clay with occasional cobbles. Gravel is angular to subangular fine to coarse of brick fragments, sandstone and mudstone. Cobbles are angular sandstone.	
		2.00	SPT	N=47 (8,12/13,14,14,6)	2.30	140.15	[Pattern]	<u>Stiff below 2m.</u>	2
		2.50	D		2.50		[Pattern]	Stiff brown mottled orangeish brown slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone. <u>Very soft below 2.45m</u>	
	3.00	SPT	N=50 (8,10/50 for 250mm)	3.00	139.45	[Pattern]	End of Borehole at 3.000m	3	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	3.00	90	0


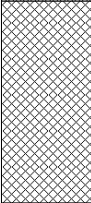
Remarks

- 1) Location CAT scanned prior to drilling.
- 2) No groundwater encountered.
- 3) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 21/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318087.00 N196407.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS09	Hole Type WS	Level 142.43m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10	142.33		MADE GROUND: Asphalt.
					0.50	141.93		MADE GROUND: Reddish brown sandy gravel with a hydrocarbon odour. Gravel is angular to subangular fine to coarse of mudstone and concrete.
		0.50	SPT	50 (25 for 115mm/50 for 60mm)	0.50	141.93		End of Borehole at 0.500m

1
2
3

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	0.50	90	0

Remarks
 1) Location CAT scanned prior to drilling.
 2) No groundwater encountered.
 3) Borehole terminated at 0.5m bgl due to sampler refusal. Relocated to WS09A 10m south.
 4) Backfilled with arisings.



Percussion Drilling Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 21/10/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318105.00 N196395.00	
Project No. : 1271.03		Crew Name:		Drilling Equipment: Tracked Rig	
Borehole Number WS09a	Hole Type WS	Level 142.96m AoD	Logged By UK	Scale 1:15	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
Well					0.85	142.11		MADE GROUND: Firm brown occasionally mottled orangeish brown slightly gravelly sandy clay. Gravel is subangular fine to coarse of mudstone, sandstone, brick fragments and plastic.	
		0.90	D					Firm brownish grey occasionally mottled brown sandy CLAY.	1
		1.00	SPT	N=17 (2,2/4,4,4,5)				<u>Very soft below 1m.</u>	
		1.10 - 1.80	B		1.10	141.86		Firm orangeish brown mottled light grey slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse of sandstone and coal.	
		2.00	SPT	N=50 (8,9/50 for 265mm)	2.00	140.96		End of Borehole at 2.000m	2
									3

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	2.00	90	0

Remarks
 1) Location CAT scanned prior to drilling.
 2) No groundwater encountered.
 3) Backfilled with arisings.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 20/11/2024 - 22/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318063.00 N196425.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH01	Hole Type RO	Level 143.37m AoD	Logged By PS	Scale 1:50	Page Number Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
[Redacted]										[Cross-hatch pattern]	MADE GROUND (Drillers description)	1
								2.70	140.67	[Dotted pattern]	SAND and GRAVEL (Drillers Description)	2
												3
												4
												5
												6
												7
												8
												9
												10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 20/11/2024 - 22/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318063.00 N196425.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH01	Hole Type RO	Level 143.37m AoD	Logged By PS	Scale 1:50	Page Number Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
								11.00	132.37		SAND and GRAVEL (Drillers Description)	11
											Interbedded SILTSTONE and MUDSTONE (Drillers description)	12
												13
												14
												15
												16
												17
												18
												19
												20

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 20/11/2024 - 22/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318063.00 N196425.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH01	Hole Type RO	Level 143.37m AoD	Logged By PS	Scale 1:50	Page Number Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
											Interbedded SILTSTONE and MUDSTONE (Drillers description)	21
												22
												23
												24
												25
												26
												27
												28
												29
								30.00	113.37		End of Borehole at 30.000m	30

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 22/11/2024 - 25/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318097.00 N196424.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH02	Hole Type RO	Level 143.69m AoD	Logged By PS	Scale 1:50	Page Number Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD							
[Redacted]										[Cross-hatch pattern]	MADE GROUND (Drillers Description)	1	
								3.00	140.69			2	
										[Dotted pattern]	SAND and GRAVEL (Drillers Description)	3	
												4	
												5	
												6	
												7	
												8	
									9.00	134.69	[Horizontal lines pattern]	Interbedded SILTSTONE and MUDSTONE (Drillers description)	9
												10	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 22/11/2024 - 25/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318097.00 N196424.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH02	Hole Type RO	Level 143.69m AoD	Logged By PS	Scale 1:50	Page Number Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
											Interbedded SILTSTONE and MUDSTONE (Drillers description)	11
												12
												13
												14
												15
												16
												17
												18
												19
												20

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 22/11/2024 - 25/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318097.00 N196424.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH02	Hole Type RO	Level 143.69m AoD	Logged By PS	Scale 1:50	Page Number Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
											Interbedded SILTSTONE and MUDSTONE (Drillers description)	21
												22
												23
												24
												25
												26
												27
												28
												29
								30.00	113.69		End of Borehole at 30.000m	30

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 25/11/2024 - 26/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318079.00 N196384.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH03	Hole Type RO	Level 140.54m AoD	Logged By PS	Scale 1:50	Page Number Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD							
[Redacted]		3.00	ES					3.00	137.54	[Cross-hatched pattern]	MADE GROUND with a strong hydrocarbon odour (Drillers description)	1	
												2	
												3	
										[Dotted pattern]	SAND and GRAVEL with hydrocarbon odour (Drillers description)	4	
												5	
												6	
												7	
			8.00	ES					7.60	132.94	[Horizontal lined pattern]	Interbedded SILTSTONE and MUDSTONE (Drillers description)	8
													9
													10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 25/11/2024 - 26/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318079.00 N196384.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH03	Hole Type RO	Level 140.54m AoD	Logged By PS	Scale 1:50	Page Number Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
											Interbedded SILTSTONE and MUDSTONE (Drillers description)	11
												12
												13
												14
												15
												16
												17
												18
												19
												20

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.



Rotary Core Log

Project Name: Blackwood		Client: Lidl Great Britain Ltd		Date: 25/11/2024 - 26/11/2024	
Location: Penmaen Road		Contractor:		Co-ords: E318079.00 N196384.00	
Project No. : 1271.02		Crew Name:		Drilling Equipment: Commachio GEO205	
Borehole Number RBH03	Hole Type RO	Level 140.54m AoD	Logged By PS	Scale 1:50	Page Number Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
											Interbedded SILTSTONE and MUDSTONE (Drillers description)	21
												22
												23
												24
												25
												26
												27
												28
												29
								30.00	110.54		End of Borehole at 30.000m	30

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

- 1) Rotary open-holed from Ground Level to 30.00m bgl.
- 2) Any groundwater strikes were masked by drilling flush.
- 3) No loss of flush recorded.
- 4) Backfilled with bentonite and cement upon completion.





APPENDIX A

SPT Hammer Energy Test Certificate

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

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

SPT Hammer Ref: 110.20
Test Date: 01/09/2023
Report Date: 01/09/2023
File Name: 110.20.spt
Test Operator: CM

Instrumented Rod Data

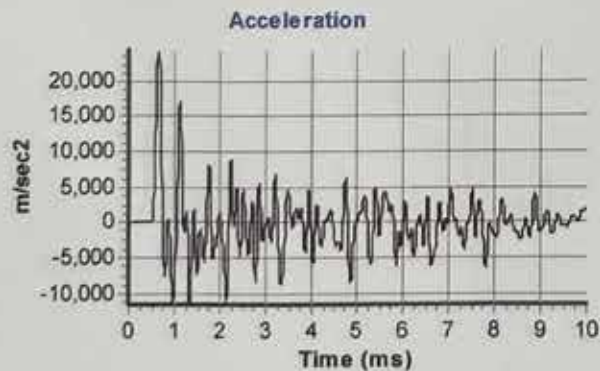
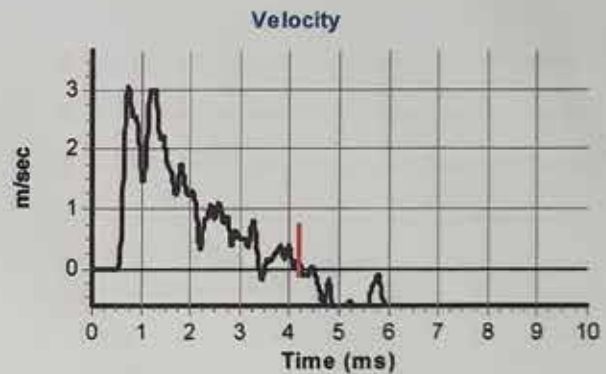
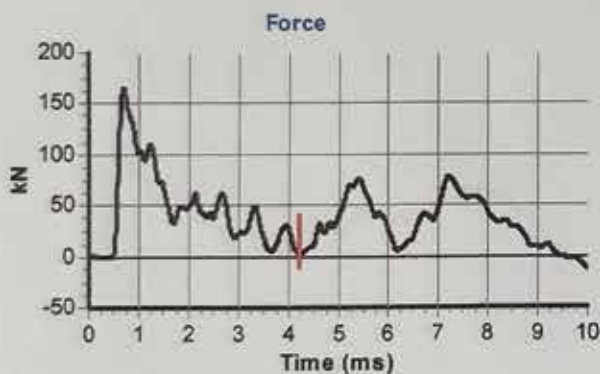
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.5
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 72572
Accelerometer No.2: 72757

SPT Hammer Information

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

Comments / Location

REGIONAL DRILLING LTD - 86346



Calculations

Area of Rod A (mm²): 970
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 346

Energy Ratio E_r (%): **73**

Signed: C. McCLUSKEY
Title: FITTER

The recommended calibration interval is 12 months



APPENDIX B

Dynamic Cone Penetrometer (DCP) Test Results

TRL Dynamic Cone Penetrometer Test Results

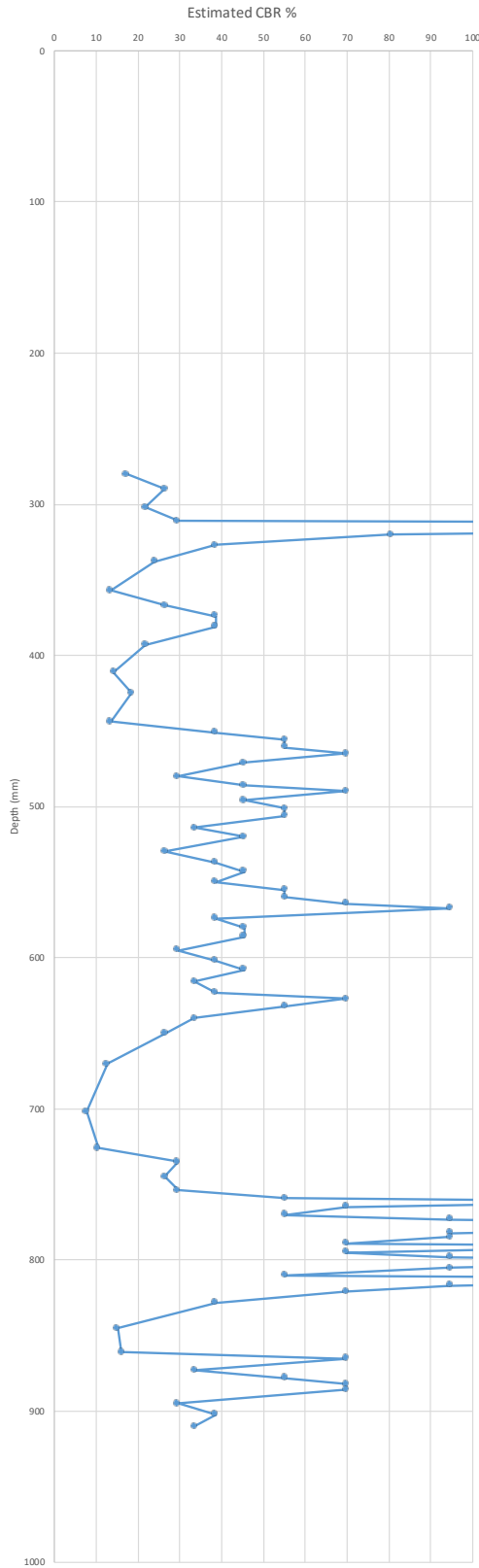


Client:	Lidl Great Britain Ltd	Site Location:	Blackwood	Test No:	CBR1	Location:	318052 196480
Project No:	1271.03	Date:	21.10.24	Start Depth:	Surface	Test Strata:	Sandy gravel

$Log10(CBR) = 2.480 - 1.057 \times Log10(mm/blow)$

Weather: Dry Sunny

No of Blows	Depth Reading mm	Penetration/ Blow mm	CBR %
0	265	0	
1	280	15.0	17.3
2	290	10.0	26.5
3	302	12.0	21.8
4	311	9.0	29.6
6	313	1.0	302.0
8	320	3.5	80.3
9	327	7.0	38.6
10	338	11.0	23.9
11	357	19.0	13.4
12	367	10.0	26.5
13	374	7.0	38.6
14	381	7.0	38.6
15	393	12.0	21.8
16	411	18.0	14.2
17	425	14.0	18.6
18	444	19.0	13.4
19	451	7.0	38.6
20	456	5.0	55.1
21	461	5.0	55.1
22	465	4.0	69.8
23	471	6.0	45.4
24	480	9.0	29.6
25	486	6.0	45.4
26	490	4.0	69.8
27	496	6.0	45.4
28	501	5.0	55.1
29	506	5.0	55.1
30	514	8.0	33.5
31	520	6.0	45.4
32	530	10.0	26.5
33	537	7.0	38.6
34	543	6.0	45.4
35	550	7.0	38.6
36	555	5.0	55.1
37	560	5.0	55.1
38	564	4.0	69.8
39	567	3.0	94.6
40	574	7.0	38.6
41	580	6.0	45.4
42	586	6.0	45.4
43	595	9.0	29.6
44	602	7.0	38.6
45	608	6.0	45.4
46	616	8.0	33.5
47	623	7.0	38.6
48	627	4.0	69.8
49	632	5.0	55.1
50	640	8.0	33.5
51	650	10.0	26.5
52	670	20.0	12.7
53	702	32.0	7.7
54	726	24.0	10.5
55	735	9.0	29.6
56	745	10.0	26.5
57	754	9.0	29.6
58	759	5.0	55.1
59	761	2.0	145.1
60	765	4.0	69.8
61	770	5.0	55.1
62	773	3.0	94.6
63	775	2.0	145.1
64	777	2.0	145.1
65	779	2.0	145.1
66	782	3.0	94.6
67	785	3.0	94.6
68	789	4.0	69.8
69	791	2.0	145.1
70	795	4.0	69.8
71	798	3.0	94.6
72	800	2.0	145.1
73	802	2.0	145.1
74	805	3.0	94.6
75	810	5.0	55.1
76	812	2.0	145.1
77	814	2.0	145.1
78	817	3.0	94.6
79	821	4.0	69.8
80	828	7.0	38.6
81	845	17.0	15.1
82	861	16.0	16.1
83	865	4.0	69.8
84	873	8.0	33.5
85	878	5.0	55.1
86	882	4.0	69.8
87	886	4.0	69.8
88	895	9.0	29.6
89	902	7.0	38.6
90	910	8.0	33.5



Notes: DCP test undertaken within location of WS1 once existing surfacing had been cored out.

Tested by U Khan
Date: 21.10.2024

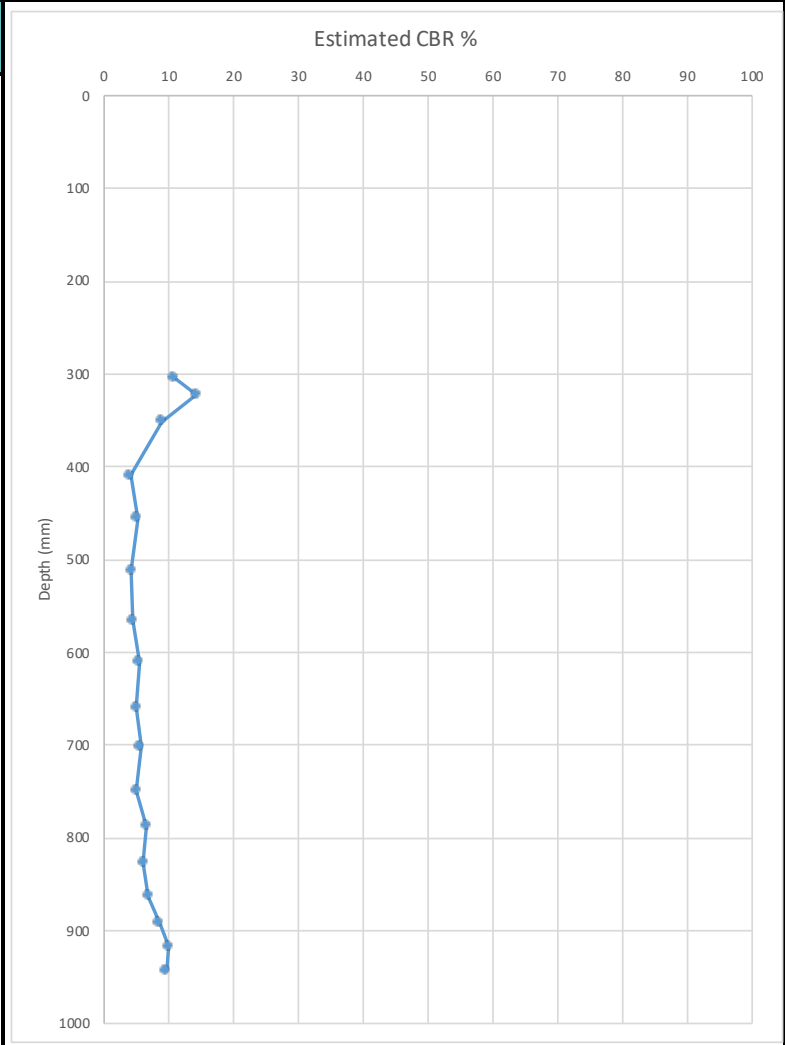
Checked by: P Dickinson
Date: 26.11.2024

TRL Dynamic Cone Penetrometer Test Results



Client:	Lidl Great Britain Ltd	Site Location:	Blackwood	Test No:	CBR2	Location:	318073 196482
Project No:	1271.03	Date:	21.10.24	Start Depth:	Surface	Test Strata:	Sandy gravel
$\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$						Weather:	Dry Sunny

No of Blows	Depth Reading mm	Penetration/ Blow mm	CBR %
0	282	0	
1	305	23.0	11.0
2	323	18.0	14.2
3	351	28.0	8.9
4	409	58.0	4.1
5	456	47.0	5.2
6	512	56.0	4.3
7	566	54.0	4.5
8	611	45.0	5.4
9	659	48.0	5.0
10	702	43.0	5.7
11	750	48.0	5.0
12	787	37.0	6.6
13	827	40.0	6.1
14	863	36.0	6.8
15	892	29.0	8.6
16	917	25.0	10.1
17	943	26.0	9.6



Notes: DCP test undertaken within location of WS2 once existing surfacing had been cored out.

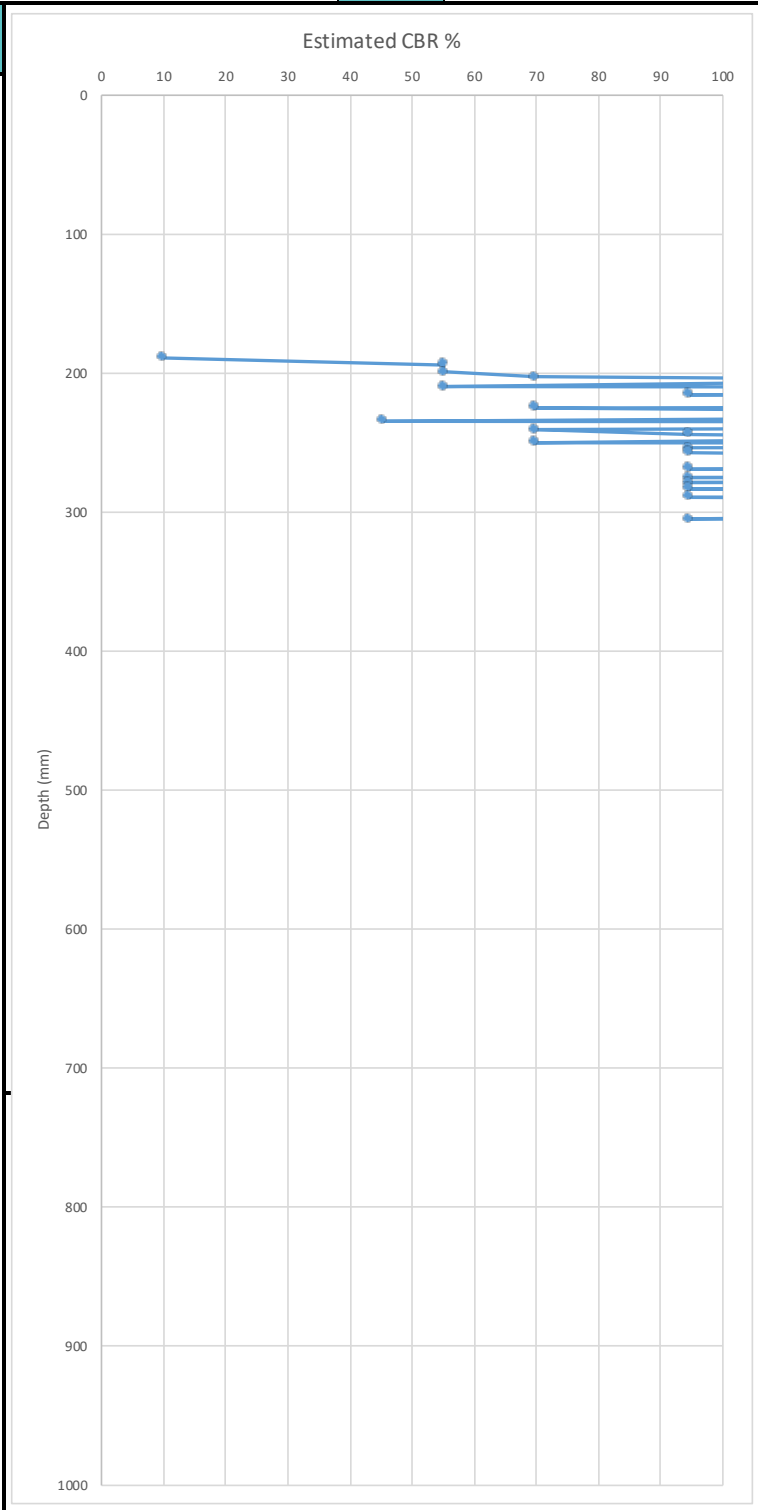
Tested by U Khan Date: 21.10.2024	Checked by: P Dickinson Date: 26.11.2024
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TRL Dynamic Cone Penetrometer Test Results



Client:	Lidl Great Britain Ltd	Site Location:	Blackwood	Test No:	CBR3	Location:	318100 196446
Project No:	1271.03	Date:	21.10.24	Start Depth:	Surface	Test Strata:	Sandy gravel
$Log_{10}(CBR) = 2.480 - 1.057 \times Log_{10}(mm/blow)$						Weather:	Dry Sunny

No of Blows	Depth Reading mm	Penetration/ Blow mm	CBR %
0	164	0	
1	189	25.0	10.1
2	194	5.0	55.1
3	199	5.0	55.1
4	203	4.0	69.8
5	205	2.0	145.1
6	210	5.0	55.1
7	211	1.0	302.0
8	212	1.0	302.0
9	215	3.0	94.6
10	216	1.0	302.0
11	218	2.0	145.1
13	219	0.5	628.3
16	221	0.7	463.6
17	225	4.0	69.8
18	227	2.0	145.1
19	228	1.0	302.0
20	234	6.0	45.4
22	236	1.0	302.0
23	237	1.0	302.0
24	241	4.0	69.8
25	244	3.0	94.6
26	246	2.0	145.1
27	250	4.0	69.8
29	251	0.5	628.3
30	254	3.0	94.6
31	257	3.0	94.6
32	259	2.0	145.1
33	261	2.0	145.1
34	263	2.0	145.1
35	265	2.0	145.1
36	266	1.0	302.0
37	269	3.0	94.6
39	270	0.5	628.3
42	272	0.7	463.6
43	275	3.0	94.6
44	276	1.0	302.0
45	279	3.0	94.6
47	280	0.5	628.3
48	283	3.0	94.6
49	284	1.0	302.0
51	286	1.0	302.0
52	289	3.0	94.6
53	291	2.0	145.1
54	293	2.0	145.1
55	294	1.0	302.0
56	295	1.0	302.0
58	297	1.0	302.0
59	299	2.0	145.1
60	300	1.0	302.0
61	302	2.0	145.1
62	305	3.0	94.6
63	306	1.0	302.0
64	307	1.0	302.0
65	308	1.0	302.0
68	309	0.3	964.5
70	310	0.5	628.3



Notes: DCP test undertaken within location of WS5 once existing surfacing had been cored out.

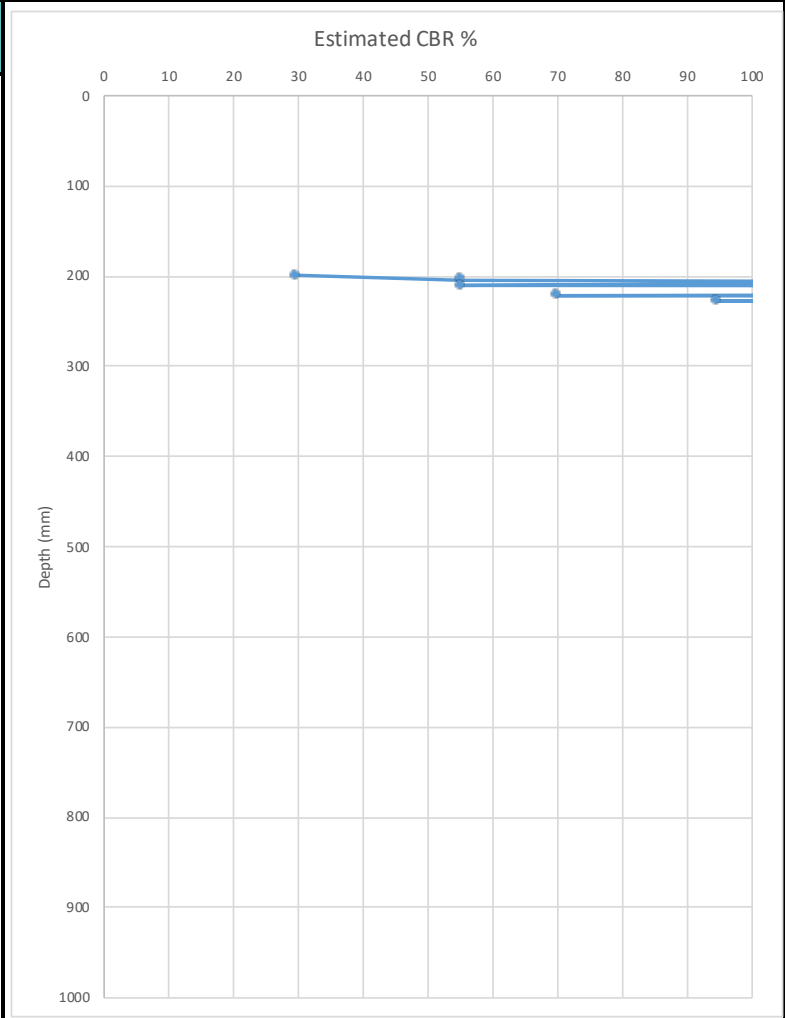
Tested by U Khan	Checked by: P Dickinson
Date: 21.10.2024	Date: 26.11.2024

TRL Dynamic Cone Penetrometer Test Results



Client:	Lidl Great Britain Ltd	Site Location:	Blackwood	Test No:	CBR4	Location:	318105 196413
Project No:	1271.03	Date:	21.10.24	Start Depth:	Surface	Test Strata:	Sandy gravel
$Log_{10}(CBR) = 2.480 - 1.057 \times Log_{10}(mm/blow)$						Weather:	Dry Sunny

No of Blows	Depth Reading mm	Penetration/ Blow mm	CBR %
0	190	0	
1	199	9.0	29.6
2	204	5.0	55.1
3	206	2.0	145.1
4	211	5.0	55.1
7	213	0.7	463.6
8	214	1.0	302.0
9	216	2.0	145.1
10	217	1.0	302.0
11	221	4.0	69.8
19	225	0.5	628.3
20	228	3.0	94.6
25	232	0.8	382.3
26	233	1.0	302.0



Notes: DCP test undertaken within location of WS7 once existing surfacing had been cored out.

Tested by U Khan Date: 21.10.2024	Checked by: P Dickinson Date: 26.11.2024
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APPENDIX C

Laboratory Chemical Analysis



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Analytical Report Number : 24-049681

Project / Site name:	Blackwood	Samples received on:	23/10/2024
Your job number:	1271.03	Samples instructed on/ Analysis started on:	24/10/2024
Your order number:	1271.03	Analysis completed by:	31/10/2024
Report Issue Number:	1	Report issued on:	31/10/2024
Samples Analysed:	8 soil samples		

Signed:

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

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

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

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

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

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

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

Analytical Report Number: 24-049681
 Project / Site name: Blackwood
 Your Order No: 1271.03

Lab Sample Number	357887	357888	357889	357890	357891			
Sample Reference	WS01	WS03A	WS04	WS05	WS05			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	0.30	0.50	0.60	0.35	1.80			
Date Sampled	22/10/2024	22/10/2024	22/10/2024	22/10/2024	22/10/2024			
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					

Stone Content	%	0.1	NONE	47.6	44.7	29.5	53.9	89.5
Moisture Content	%	0.01	NONE	4.7	6.7	9.7	4.3	5.1
Total mass of sample received	kg	0.1	NONE	0.8	1.3	0.8	0.8	1.1

Asbestos

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

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.8	7.6	8.2	-	-
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.017	0.012	0.0077	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.39	< 0.05	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	0.46	0.14	< 0.05	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	0.86	< 0.80	< 0.80	-	-
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Analytical Report Number: 24-049681
 Project / Site name: Blackwood
 Your Order No: 1271.03

Lab Sample Number	357887				357888				357889				357890				357891			
Sample Reference	WS01				WS03A				WS04				WS05				WS05			
Sample Number	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Depth (m)	0.30				0.50				0.60				0.35				1.80			
Date Sampled	22/10/2024				22/10/2024				22/10/2024				22/10/2024				22/10/2024			
Time Taken	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status																	

Heavy Metals / Metalloids

Element	Units	Test Limit of detection	Test Accreditation Status	357887	357888	357889	357890	357891
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	51	11	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.92	1.9	0.77	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	1.1	0.7	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0.2	0.3	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	-	-
Chromium (III)	mg/kg	1	NONE	19	26	16	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	26	16	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	14	31	14	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	13	33	15	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	38	36	26	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	23	40	21	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	71	62	61	-	-

Petroleum Hydrocarbons

Parameter	Units	Test Limit of detection	Test Accreditation Status	357887	357888	357889	357890	357891
TPHCWG - Aliphatic >EC5 - EC6 _{HS_ID_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 _{HS_ID_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 _{HS_ID_AL}	mg/kg	0.01	MCERTS	0.17	< 0.010	0.029	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_ID_AL}	mg/kg	1	MCERTS	1	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_ID_AL}	mg/kg	2	MCERTS	< 2.0	2.2	< 2.0	2.5	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	25	12	< 8.0	11	9.1
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	26	14	< 10	13	< 10

Parameter	Units	Test Limit of detection	Test Accreditation Status	357887	357888	357889	357890	357891
TPHCWG - Aromatic >EC5 - EC7 _{HS_ID_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 _{HS_ID_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 _{HS_ID_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_ID_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_ID_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

VOCs

Parameter	Units	Test Limit of detection	Test Accreditation Status	357887	357888	357889	357890	357891
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

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

Analytical Report Number: 24-049681
 Project / Site name: Blackwood
 Your Order No: 1271.03

Lab Sample Number	357892	357893	357894
Sample Reference	WS06	WS07	WS08
Sample Number	None Supplied	None Supplied	None Supplied
Depth (m)	0.15	0.25	0.20
Date Sampled	22/10/2024	22/10/2024	22/10/2024
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status

Stone Content	%	0.1	NONE	39.9	39.8	47.4
Moisture Content	%	0.01	NONE	4.9	3.7	5.3
Total mass of sample received	kg	0.1	NONE	1.1	1.3	1.1

Asbestos

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

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	-	9.3	8.6
Total Cyanide	mg/kg	1	MCERTS	-	< 1.0	1.4
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	-	0.012	0.0072

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	0.08
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	0.15	0.16
Fluorene	mg/kg	0.05	MCERTS	-	0.06	0.08
Phenanthrene	mg/kg	0.05	MCERTS	-	0.35	0.75
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	0.17
Fluoranthene	mg/kg	0.05	MCERTS	-	0.59	2.1
Pyrene	mg/kg	0.05	MCERTS	-	0.67	1.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.32	1.3
Chrysene	mg/kg	0.05	MCERTS	-	0.31	1.5
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	0.36	2.4
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	0.17	0.75
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	0.29	1.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.14	1.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	0.26
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.17	1.2

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	3.59	15.1
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Analytical Report Number: 24-049681
 Project / Site name: Blackwood
 Your Order No: 1271.03

Lab Sample Number				357892	357893	357894
Sample Reference				WS06	WS07	WS08
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.15	0.25	0.20
Date Sampled				22/10/2024	22/10/2024	22/10/2024
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status			

Heavy Metals / Metalloids

Element	Unit	Test Limit of detection	Accreditation Status	357892	357893	357894
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	3.5	10
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	0.14	0.48
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.5	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	1.8	61
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	-	9	37
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	9	37
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	14	710
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	43	160
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	3.7	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	5.4	14
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	89	360

Petroleum Hydrocarbons

Parameter	Unit	Test Limit of detection	Accreditation Status	357892	357893	357894
TPHCWG - Aliphatic >EC5 - EC6 _{HS_ID_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 _{HS_ID_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 _{HS_ID_AL}	mg/kg	0.01	MCERTS	0.075	0.15	0.45
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_ID_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_ID_AL}	mg/kg	2	MCERTS	< 2.0	2.9	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	26	73	24
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	26	76	24

Parameter	Unit	Test Limit of detection	Accreditation Status	357892	357893	357894
TPHCWG - Aromatic >EC5 - EC7 _{HS_ID_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 _{HS_ID_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 _{HS_ID_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_ID_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_ID_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	17	130	17
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	17	130	17

VOCs

Parameter	Unit	Test Limit of detection	Accreditation Status	357892	357893	357894
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0

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

Analytical Report Number : 24-049681

Project / Site name: Blackwood

* 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 *
357887	WS01	None Supplied	0.3	Brown sand with clinker and stones
357888	WS03A	None Supplied	0.5	Brown clay and sand with gravel and stones
357889	WS04	None Supplied	0.6	Brown clay and sand with gravel and stones
357890	WS05	None Supplied	0.35	Brown sand with gravel and stones
357891	WS05	None Supplied	1.8	Non Soil. ⁹
357892	WS06	None Supplied	0.15	Brown clay and sand with gravel and stones
357893	WS07	None Supplied	0.25	Brown sand with gravel and stones
357894	WS08	None Supplied	0.2	Brown clay and sand with gravel and stones

Analytical Report Number : 24-049681

Project / Site name: Blackwood

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
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
TPH Chromatogram in soil	TPH Chromatogram in soil	In-house method	L064B	D	NONE
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

Analytical Report Number : 24-049681
 Project / Site name: Blackwood

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
Fraction Organic Carbon FOC Automated	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate	In-house method	L009B	D	MCERTS

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

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

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

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

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

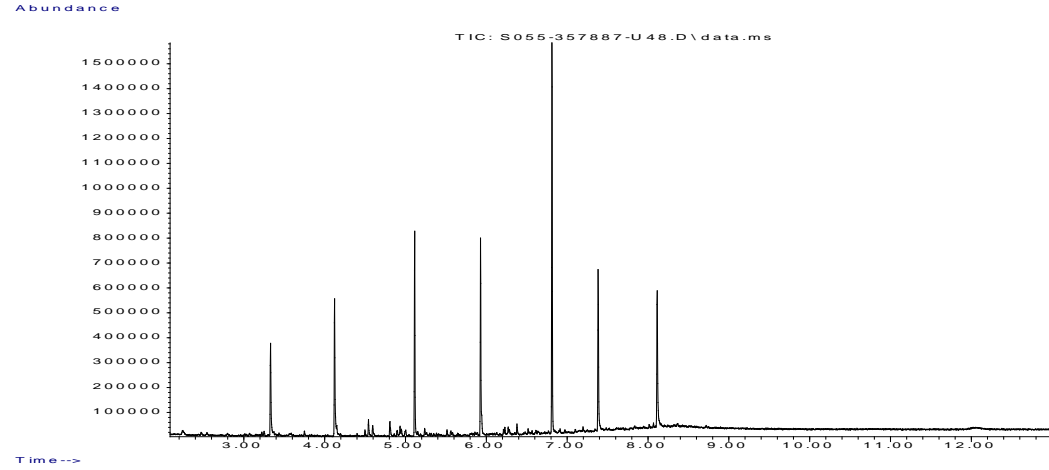
Information in Support of Analytical Results

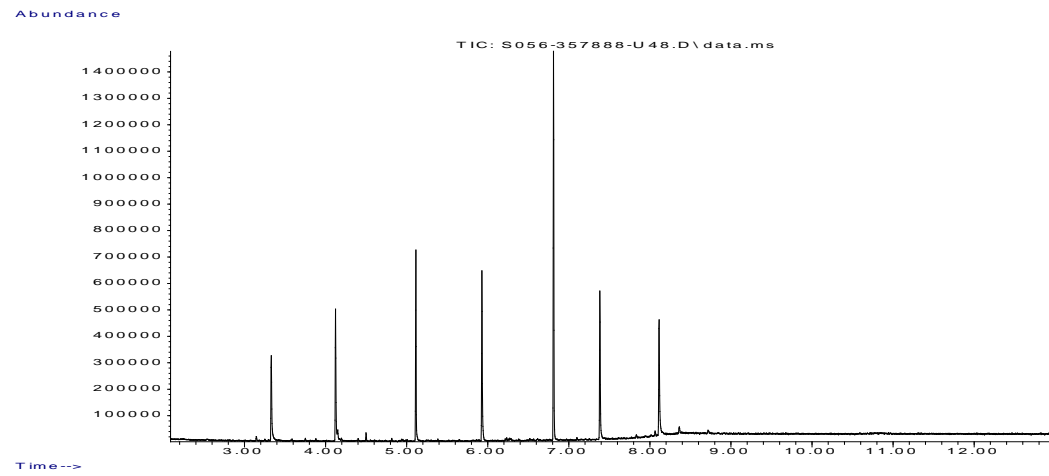
List of HWOL Acronyms and Operators

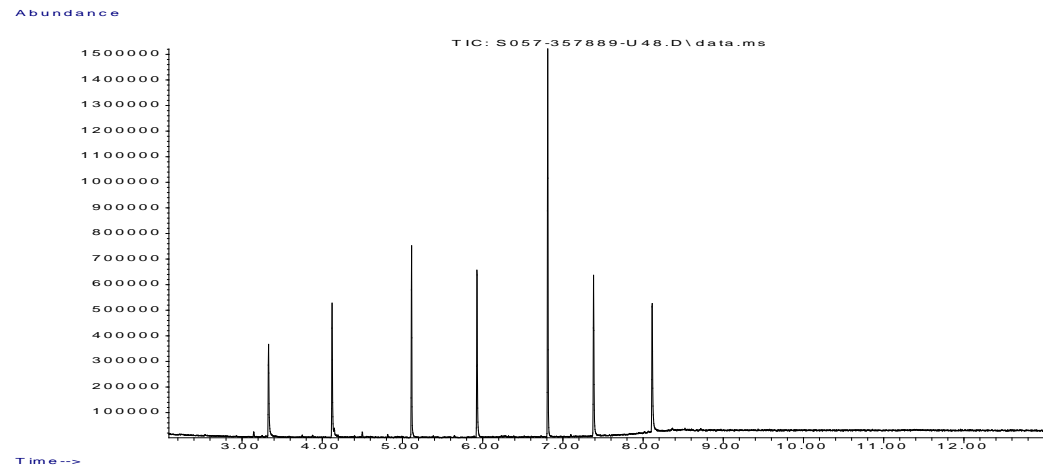
Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column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

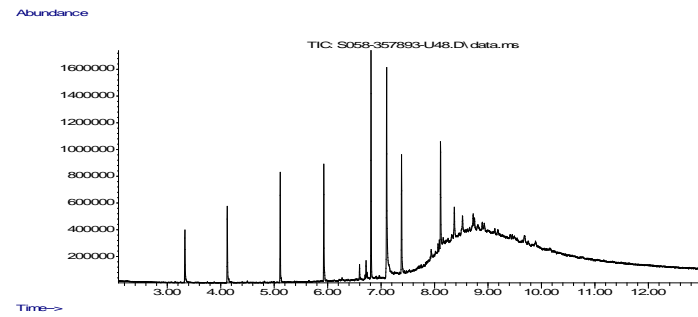
Quality control parameter failure associated with individual result applies to calculated sum of individuals.
 The result for sum should be interpreted with caution

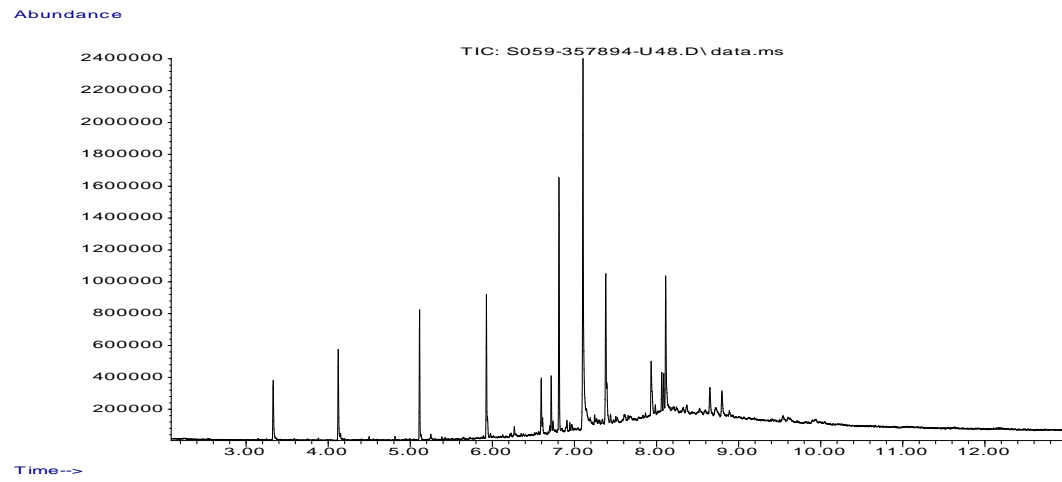
*g - Unaccredited sample matrix.













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Analytical Report Number : 24-049684

Project / Site name:	Blackwood	Samples received on:	23/10/2024
Your job number:	1271.03	Samples instructed on/ Analysis started on:	24/10/2024
Your order number:	1271.03	Analysis completed by:	04/11/2024
Report Issue Number:	1	Report issued on:	04/11/2024
Samples Analysed:	3 10:1 WAC samples		

Signed: _____

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

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

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

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

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

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

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

Analytical Report Number: 24-049684

Project / Site name: Blackwood

Your Order No: 1271.03

Lab Sample Number	357895	357896	357897
Sample Reference	WS03A	WS04	WS07
Sample Number	None Supplied	None Supplied	None Supplied
Depth (m)	0.50	0.60	0.25
Date Sampled	22/10/2024	22/10/2024	22/10/2024
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status

Stone Content	%	0.1	NONE	44.7	29.5	39.8
Moisture Content	%	0.01	NONE	6.7	9.7	3.7
Total mass of sample received	kg	0.1	NONE	1.5	1	1.3

General Inorganics

pH (L005B)	pH Units	N/A	MCERTS	7.2	8	8
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1.2	0.8	1.2
Loss on Ignition @ 450°C	%	0.2	MCERTS	4.3	2.1	2
Acid Neutralisation Capacity	mmol/kg	-9999	NONE	1.2	7.3	4.1

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.15
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.06
Phenanthrene	mg/kg	0.05	MCERTS	0.14	< 0.05	0.35
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.59
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.67
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.32
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.31
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.36
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.17
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.29
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.14
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.17
Coronene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	< 0.85	< 0.85	3.59
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Petroleum Hydrocarbons

Mineral Oil (EC10 - EC40) _{EH,CU,10,AL}	mg/kg	10	NONE	19	< 10	170
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VOCs

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0

Total BTEX	µg/kg	10	MCERTS	< 10	< 10	< 10
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Analytical Report Number: 24-049684

Project / Site name: Blackwood

Your Order No: 1271.03

Lab Sample Number	357895	357896	357897
Sample Reference	WS03A	WS04	WS07
Sample Number	None Supplied	None Supplied	None Supplied
Depth (m)	0.50	0.60	0.25
Date Sampled	22/10/2024	22/10/2024	22/10/2024
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.003
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.006
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.012
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.016
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007	0.037

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



4041

**i2 Analytical**7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YSTelephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com**Waste Acceptance Criteria Analytical Results**

Report No:	24-049684							
	Client: REMADALT							
Location	Blackwood							
Lab Reference (Sample Number)	357895							
Sampling Date	22/10/2024							
Sample ID	WS03A							
Depth (m)	0.50							
					Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	
Solid Waste Analysis								
TOC (%)**	1.2				3%	5%	6%	
Loss on Ignition (%) **	4.3				--	--	10%	
BTEX (µg/kg) **	< 10				6000	--	--	
Sum of PCBs (mg/kg) **	< 0.007				1	--	--	
Mineral Oil (mg/kg) <small>EH, LD, CU, AL</small>	19				500	--	--	
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--	
pH (units)**	7.2				--	>6	--	
Acid Neutralisation Capacity (mmol / kg)	1.2				--	To be evaluated	To be evaluated	
Eluate Analysis								
	10:1			10:1	Limit values for compliance leaching test			
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg		using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00366			0.0366	0.5	2	25	
Barium *	0.0284			0.284	20	100	300	
Cadmium *	< 0.000100			< 0.00100	0.04	1	5	
Chromium *	0.0011			0.011	0.5	10	70	
Copper *	0.0042			0.042	2	50	100	
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2	
Molybdenum *	0.00364			0.0364	0.5	10	30	
Nickel *	0.0016			0.016	0.4	10	40	
Lead *	0.0015			0.015	0.5	10	50	
Antimony *	< 0.0017			< 0.017	0.06	0.7	5	
Selenium *	< 0.0040			< 0.040	0.1	0.5	7	
Zinc *	0.011			0.11	4	50	200	
Chloride *	1.5			15	800	15000	25000	
Fluoride*	0.14			1.4	10	150	500	
Sulphate *	30			300	1000	20000	50000	
TDS*	73			730	4000	60000	100000	
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-	
DOC	3.36			33.6	500	800	1000	
Leach Test Information								
Stone Content (%)	44.7							
Sample Mass (kg)	1.5							
Dry Matter (%)	93							
Moisture (%)	6.7							
Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)								
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation ** = MCERTS accredited								
Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.								
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.								



4041



Environmental Science

i2 Analytical7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YSTelephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com**Waste Acceptance Criteria Analytical Results**

Report No:	24-049684					
Client:	REMADALT					
Location	Blackwood					
Lab Reference (Sample Number)	357896					
Sampling Date	22/10/2024					
Sample ID	WS04					
Depth (m)	0.60					
Landfill Waste Acceptance Criteria Limits						
	Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill			
Solid Waste Analysis						
TOC (%)**	0.8			3%	5%	6%
Loss on Ignition (%) **	2.1			--	--	10%
BTEX (µg/kg) **	< 10			6000	--	--
Sum of PCBs (mg/kg) **	< 0.007			1	--	--
Mineral Oil (mg/kg) <small>EH, LD, CU, AL</small>	< 10			500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85			100	--	--
pH (units)**	8.0			--	>6	--
Acid Neutralisation Capacity (mmol / kg)	7.3			--	To be evaluated	To be evaluated
Eluate Analysis						
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1			10:1	Limit values for compliance leaching test	
	mg/l			mg/kg		using BS EN 12457-2 at L/S 10 l/kg (mg/kg)
Arsenic *	0.00233			0.0233	0.5	2
Barium *	0.0130			0.130	20	100
Cadmium *	< 0.000100			< 0.00100	0.04	1
Chromium *	0.0017			0.017	0.5	10
Copper *	0.013			0.13	2	50
Mercury *	< 0.000500			< 0.00500	0.01	0.2
Molybdenum *	0.00161			0.0161	0.5	10
Nickel *	0.0011			0.011	0.4	10
Lead *	0.0011			0.011	0.5	10
Antimony *	< 0.0017			< 0.017	0.06	0.7
Selenium *	< 0.0040			< 0.040	0.1	0.5
Zinc *	0.0063			0.063	4	50
Chloride *	2.3			23	800	15000
Fluoride*	0.27			2.7	10	150
Sulphate *	17			170	1000	20000
TDS*	68			680	4000	60000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-
DOC	7.83			78.3	500	800
Leach Test Information						
Stone Content (%)	29.5					
Sample Mass (kg)	1.0					
Dry Matter (%)	90					
Moisture (%)	9.7					
Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)						
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation ** = MCERTS accredited						

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.



4041

**i2 Analytical**7 Woodshots Meadow
Croxley Green Business Park
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Fax: 01923 237404
email:reception@i2analytical.com**Waste Acceptance Criteria Analytical Results**

Report No:	24-049684						
Client:	REMADALT						
Location	Blackwood						
Lab Reference (Sample Number)	357897						
Sampling Date	22/10/2024						
Sample ID	WS07						
Depth (m)	0.25						
Solid Waste Analysis							
TOC (%)**	1.2				3%	5%	6%
Loss on Ignition (%) **	2.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	0.037				1	--	--
Mineral Oil (mg/kg) <small>EH, LD, CU, AL</small>	170				500	--	--
Total PAH (WAC-17) (mg/kg)	3.59				100	--	--
pH (units)**	8.0				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	4.1				--	To be evaluated	To be evaluated
Eluate Analysis							
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1			10:1	Limit values for compliance leaching test		
	mg/l			mg/kg		using BS EN 12457-2 at L/S 10 l/kg (mg/kg)	
Arsenic *	< 0.00100			< 0.0100	0.5	2	25
Barium *	0.327			3.27	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0016			0.016	0.5	10	70
Copper *	0.0046			0.046	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00104			0.0104	0.5	10	30
Nickel *	< 0.00030			< 0.0030	0.4	10	40
Lead *	0.0042			0.042	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.010			0.10	4	50	200
Chloride *	2.1			21	800	15000	25000
Fluoride*	0.22			2.2	10	150	500
Sulphate *	4.3			43	1000	20000	50000
TDS*	36			360	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	3.50			35.0	500	800	1000
Leach Test Information							
Stone Content (%)	39.8						
Sample Mass (kg)	1.3						
Dry Matter (%)	96						
Moisture (%)	3.7						
Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation ** = MCERTS accredited							

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 24-049684

Project / Site name: Blackwood

* 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 *
357895	WS03A	None Supplied	0.5	Brown clay and sand with gravel and stones
357896	WS04	None Supplied	0.6	Brown clay and sand with gravel and stones
357897	WS07	None Supplied	0.25	Brown sand with gravel and stones

Analytical Report Number : 24-049684

Project / Site name: Blackwood

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
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1 ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025

Analytical Report Number : 24-049684

Project / Site name: Blackwood

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
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025

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

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

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

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

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

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

Remada Ltd
Forward House
17 High Street
Henley-in-Arden
Warwickshire
B955AA

e: peter.searing@remada.co.uk

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 : 24-051143

Project / Site name:	Blackwood	Samples received on:	31/10/2024
Your job number:	1271.03	Samples instructed on/ Analysis started on:	31/10/2024
Your order number:	1271.03	Analysis completed by:	06/11/2024
Report Issue Number:	1	Report issued on:	06/11/2024
Samples Analysed:	2 non soil samples		



Signed: _____

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

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

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

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

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

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

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

Analytical Report Number: 24-051143

Project / Site name: Blackwood

Your Order No: 1271.03

Lab Sample Number	365569	365570			
Sample Reference	WS05	WS06			
Sample Number	None Supplied	None Supplied			
Depth (m)	0.05	0.05			
Date Sampled	30/10/2024	30/10/2024			
Time Taken	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	24.6
Moisture Content	%	0.01	NONE	< 0.01	5.3
Total mass of sample received	kg	0.1	NONE	0.3	0.3

Speciated PAHs

Naphthalene	mg/kg	0.05	NONE	< 0.05	0.15
Acenaphthylene	mg/kg	0.05	NONE	< 0.05	0.19
Acenaphthene	mg/kg	0.05	NONE	0.29	< 0.05
Fluorene	mg/kg	0.05	NONE	0.14	< 0.05
Phenanthrene	mg/kg	0.05	NONE	0.4	0.37
Anthracene	mg/kg	0.05	NONE	0.17	0.25
Fluoranthene	mg/kg	0.05	NONE	2.2	0.67
Pyrene	mg/kg	0.05	NONE	2.9	1.3
Benzo(a)anthracene	mg/kg	0.05	NONE	0.69	0.7
Chrysene	mg/kg	0.05	NONE	0.8	1.9
Benzo(b)fluoranthene	mg/kg	0.05	NONE	1.1	6.9
Benzo(k)fluoranthene	mg/kg	0.05	NONE	0.34	1.9
Benzo(a)pyrene	mg/kg	0.05	NONE	0.78	5.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	< 0.05	4.1
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	< 0.05	0.87
Benzo(ghi)perylene	mg/kg	0.05	NONE	< 0.05	4.7
Coronene	mg/kg	0.05	NONE	< 0.05	0.32

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	9.81	30
-------------------	-------	------	------	------	----

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

Analytical Report Number : 24-051143

Project / Site name: Blackwood

* 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 *
365569	WS05	None Supplied	0.05	Non Soil. ^g
365570	WS06	None Supplied	0.05	Non Soil. ^g

Analytical Report Number : 24-051143

Project / Site name: Blackwood

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
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	NONE

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

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

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

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

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.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

*g - Unaccredited sample matrix.



APPENDIX D

Laboratory Geotechnical Tests



Laboratory Report



Contract Number: 75525

Client Ref: 1271.03

Client PO: 1271.03

Date Received: 24-10-2024

Date Completed: 08-11-2024

Report Date: 08-11-2024

Client: **Remada Limited**

This report has been checked and approved by:

Contract Title: **Blackwood**

For the attention of: **Info**

B. Evans

Brendan Evans
Office Administrator

Description	Qty
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	5
1 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.4 & 5.3 - * UKAS	5
Particle Size Distribution BS EN ISO 17892-4 : 5.1 - * UKAS	3
BRE Reduced Suite includes pH, water & acid soluble sulphate and total sulphur Sub-contracted Test	5
Disposal of samples for job	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

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 test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:

Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (HR & HSE Manager)



**NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND
PLASTICITY INDEX
(BS 1377:1990 - Part 2 : 4.4 & 5.3)**

Contract Number	75525
Project Name	Blackwood
Date Tested	04/11/2024
	DESCRIPTIONS

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
WS03A		D	1.30	-		Brown silty CLAY
WS03A		D	1.80	-		Brown clayey SILT
WS04		D	1.10	-		Brown silty CLAY
WS07		D	0.95	-		Brown clayey SILT
WS08A		D	2.50	-		Brown fine to coarse gravelly silty CLAY
				-		
				-		
				-		
				-		
				-		
				-		
				-		
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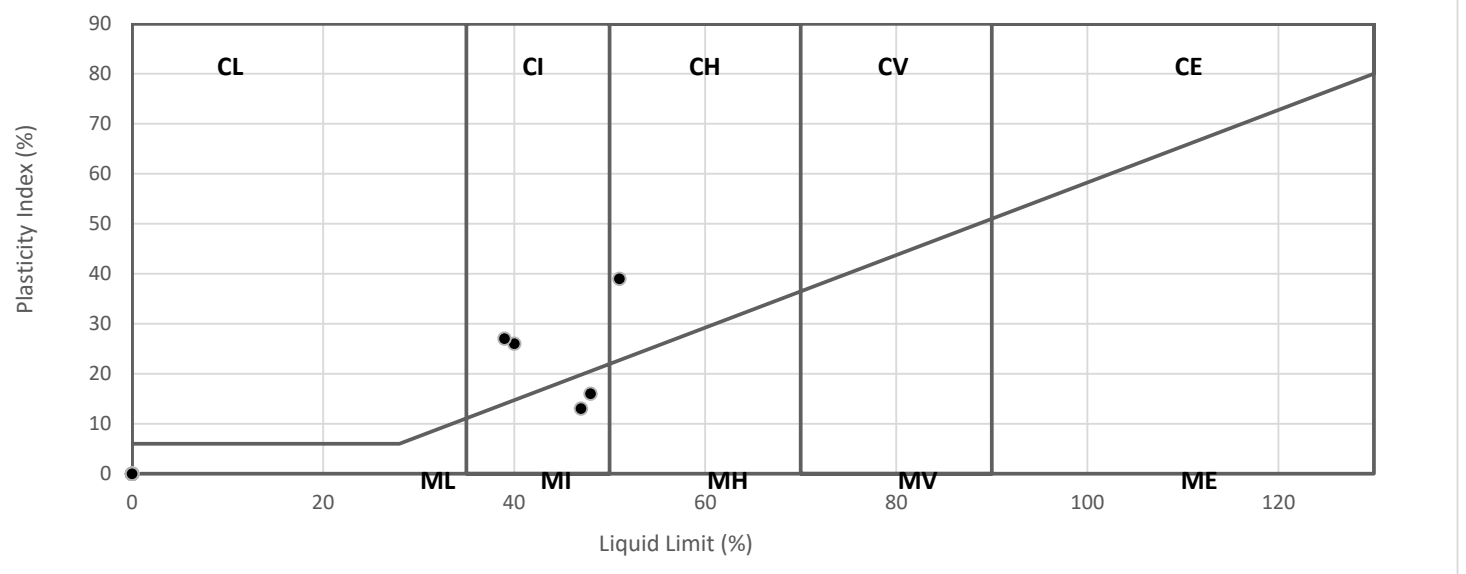
Operator
Jordan Williams

Contract Number	75525
Project Name	Blackwood
Date Tested	04/11/2024

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
WS03A		D	1.30	-		28	40	14	26	100	CI Intermediate Plasticity
WS03A		D	1.80	-		26	48	32	16	100	MI Intermediate Plasticity
WS04		D	1.10	-		26	39	12	27	100	CI Intermediate Plasticity
WS07		D	0.95	-		26	47	34	13	100	MI Intermediate Plasticity
WS08A		D	2.50	-		15	51	12	39	75	CH High Plasticity
				-							
				-							
				-							
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Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:2015+A1:2020



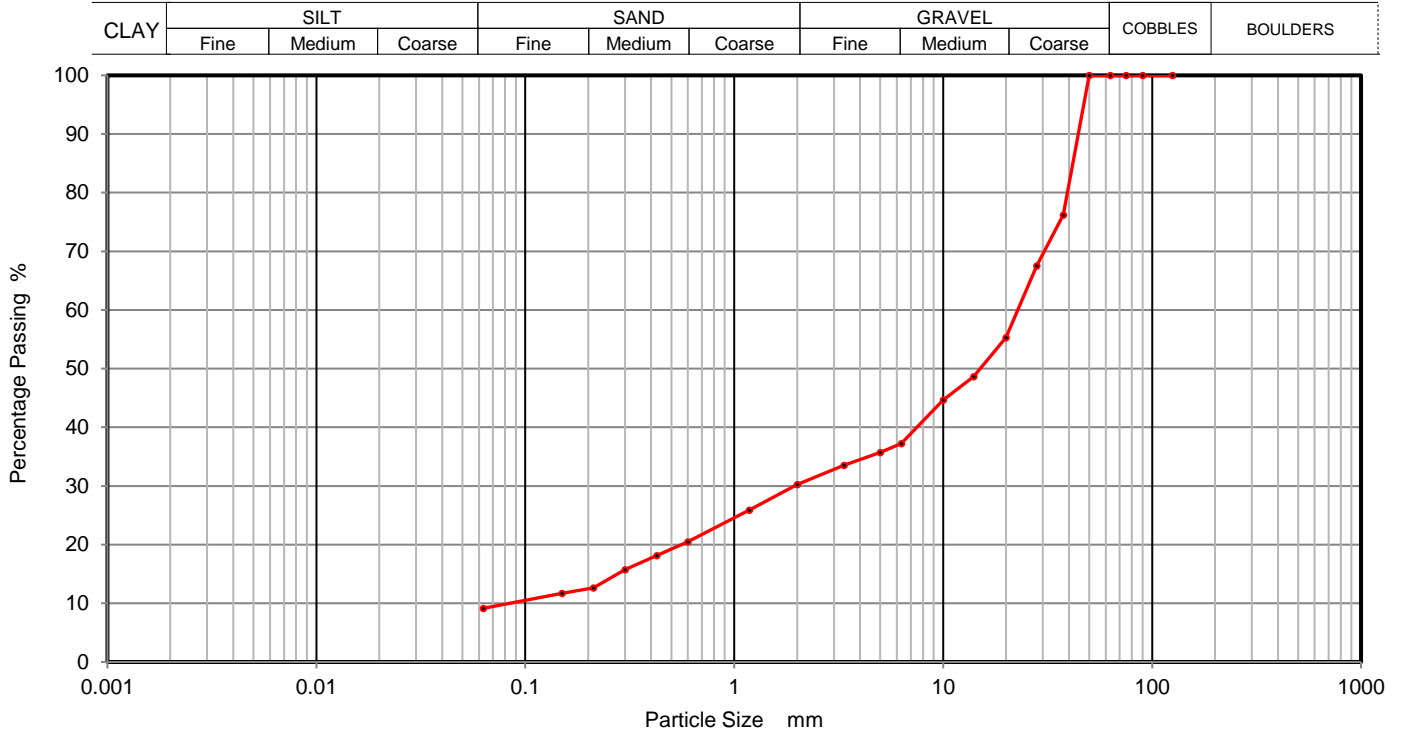
Operator
Jordan Williams



PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number	75525
Borehole/Pit No.	WS03A
Sample No.	
Depth Top	0.22
Depth Base	1.30
Sample Type	B

Project Name	Blackwood
Sample Description	Brown slightly silty/ clayey fine to coarse sandy fine to coarse GRAVEL
Date Tested	28/10/2024



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	76		
28	68		
20	55		
14	49		
10	45		
6.3	37		
5	36		
3.35	34		
2	30		
1.18	26		
0.63	21		
0.425	18		
0.30	16		
0.20	13		
0.15	12		
0.063	9		

Sample Proportions	% dry mass
Cobbles	0
Gravel	70
Sand	21
Silt and Clay	9

Remarks
 Preparation and testing in accordance with BS17892 unless noted below

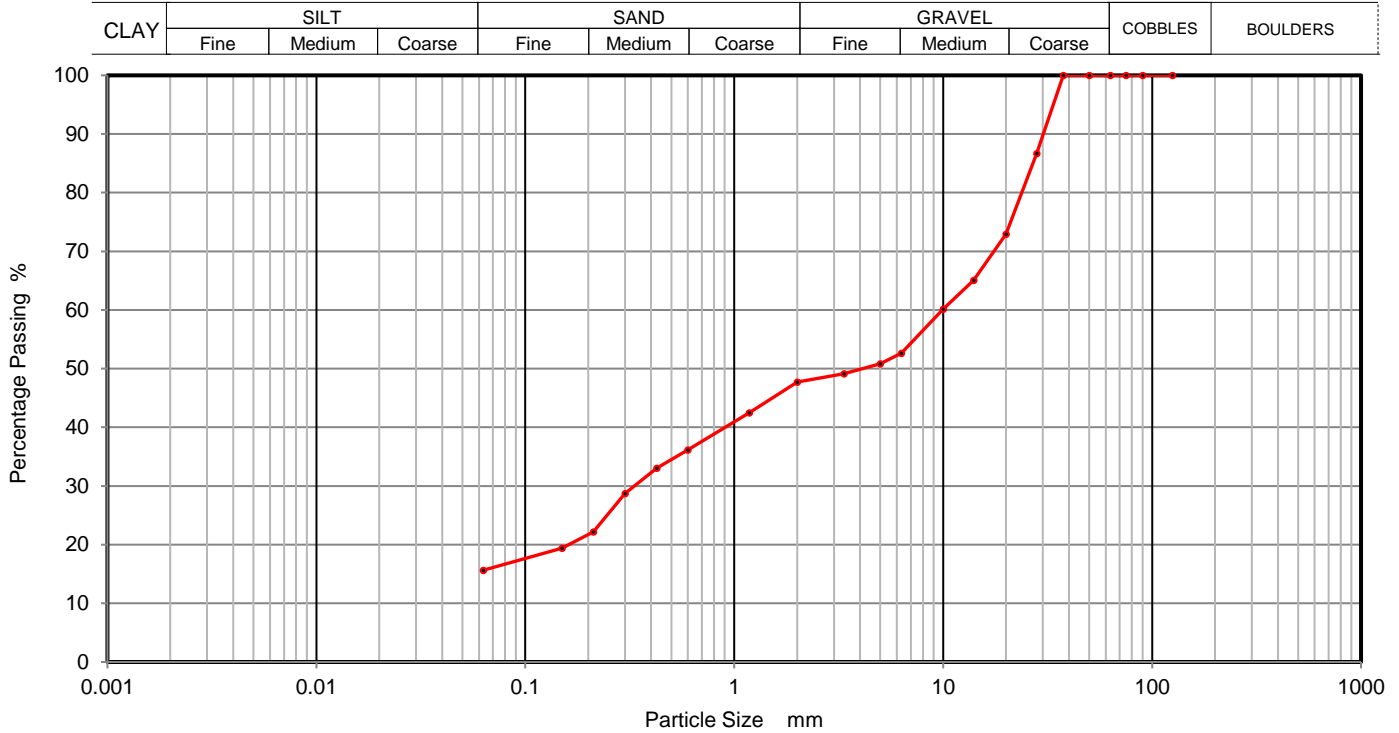
Operator
Emyr



PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number	75525
Borehole/Pit No.	WS06
Sample No.	
Depth Top	0.60
Depth Base	1.00
Sample Type	B

Project Name	Blackwood
Sample Description	Brown silty/ clayey fine to coarse sandy fine to coarse GRAVEL
Date Tested	28/10/2024



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	87		
20	73		
14	65		
10	60		
6.3	53		
5	51		
3.35	49		
2	48		
1.18	42		
0.63	36		
0.425	33		
0.30	29		
0.20	22		
0.15	19		
0.063	16		

Sample Proportions	% dry mass
Cobbles	0
Gravel	52
Sand	32
Silt and Clay	16

Remarks
 Preparation and testing in accordance with BS17892 unless noted below

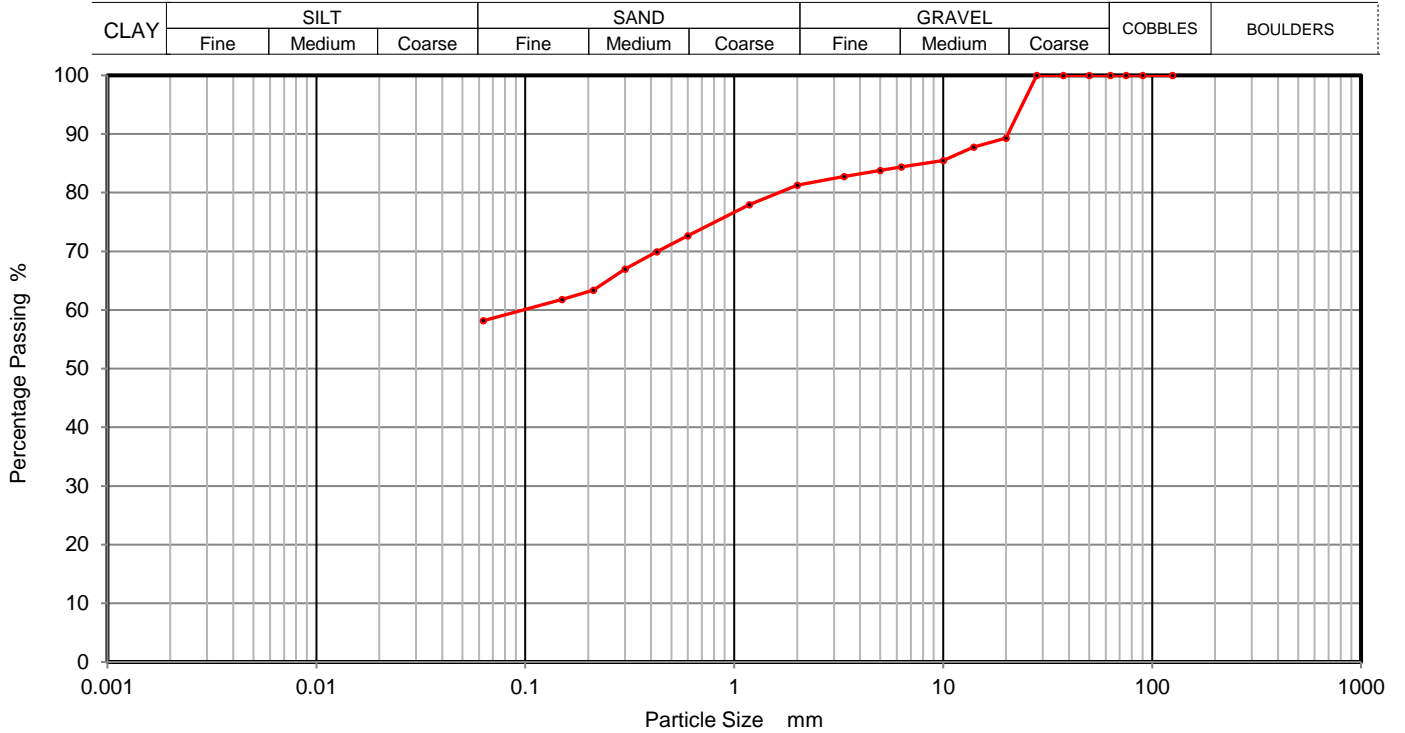
Operator
Emyr



PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number	75525
Borehole/Pit No.	WS09A
Sample No.	
Depth Top	1.10
Depth Base	1.80
Sample Type	B

Project Name	Blackwood
Sample Description	Brown fine to coarse gravelly fine to coarse sandy SILT/ CLAY
Date Tested	28/10/2024



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	89		
14	88		
10	85		
6.3	84		
5	84		
3.35	83		
2	81		
1.18	78		
0.63	73		
0.425	70		
0.30	67		
0.20	63		
0.15	62		
0.063	58		

Sample Proportions	% dry mass
Cobbles	0
Gravel	19
Sand	23
Silt and Clay	58

Remarks
 Preparation and testing in accordance with BS17892 unless noted below

Operator
Emyr



4161



A PHENNA GROUP COMPANY

7 - 11 Harding Street
Leicester
LE1 4DH

GSTL

Unit 3-4 Heol Aur
Dafen Ind Estate
Dafen
SA14 8QN

Analytical Test Report: E24/00368/GSL - 24-51954

Your Project Reference:	BLACKWOOD 1271.03		
Your Order Number:	75525	Samples Received / Instructed:	31/10/2024 / 31/10/2024
Report Issue Number:	1	Sample Tested:	31/10 to 07/11/2024
Samples Analysed:	5 sample(s)	Report issued:	07/11/2024

Signed

Emily Blissett
Report Manager
CTS Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Moisture Content was determined in accordance with CTS method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited, subUKAS - Subcontracted to a laboratory UKAS accredited for this test, subMCERTS - Subcontracted to a laboratory MCERTS accredited for this test

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

UKAS accreditation on waters only covers the Ground water and Surface water matrices

Date of Issue: 23.10.2024

Issued by: J. Gane

Issue No: 4

Rev No: 17



4161



E24/00368/GSL - 24-51954

Project Reference - BLACKWOOD 1271.03

Analytical Test Results - Chemical Analysis

Lab Reference	414178	414179	414180	414181	414182		
Client Sample ID	-	-	-	-	-		
Client Sample Location	WS03A	WS08A	WS01	WS02	WS03A		
Client Sample Type	D	D	D	D	D		
Client Sample Number	-	-	-	-	-		
Depth - Top (m)	1.30	2.50	1.30	1.50	2.50		
Depth - Bottom (m)	1.30	2.50	1.30	1.50	2.50		
Date of Sampling	-	-	-	-	-		
Time of Sampling	-	-	-	-	-		
Sample Matrix	Clay	Clay	Clay	Clay	Clay		
Determinant	Units	Accreditation					
Water soluble sulphate (as SO ₄)	(mg/l)	u	420	69	33	21	11
Acid Soluble Sulphate	(%)	u	0.30	0.06	0.04	0.03	< 0.01
Total Sulphur	(%)	UKAS	0.24	0.05	0.02	0.02	< 0.01
pH Value	pH Units	MCERTS	4.0	6.9	6.5	6.9	6.7



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A PHENNA GROUP COMPANY

E24/00368/GSL - 24-51954

7 - 11 Harding Street
Leicester
LE1 4DH

Project Reference - BLACKWOOD 1271.03

Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
414178	-	WS03A	D	-	Greyish brown gravelly sandy silty clay	-	-	100
414179	-	WS08A	D	-	Greyish brown gravelly sandy silty clay with rare organic matter	-	-	100
414180	-	WS01	D	-	Greyish brown gravelly sandy silty clay	-	-	100
414181	-	WS02	D	-	Greyish brown gravelly sandy silty clay	-	-	100
414182	-	WS03A	D	-	Greyish brown gravelly sandy silty clay	-	-	100



4161



A PHENNA GROUP COMPANY

E24/00368/GSL - 24-51954

7 - 11 Harding Street
Leicester
LE1 4DH

Project Reference - BLACKWOOD 1271.03

Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
414178	-	WS03A	D	-	
414179	-	WS08A	D	-	
414180	-	WS01	D	-	
414181	-	WS02	D	-	
414182	-	WS03A	D	-	



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A PHENNA GROUP COMPANY

7 - 11 Harding Street
Leicester
LE1 4DH

E24/00368/GSL - 24-51954

Project Reference - BLACKWOOD 1271.03

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
1377TS-ELT	BS1377 Total Sulphur Content by HTC	Oven dried	BS1377 : Part 1 : 2016	Total Sulphur Content testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 7.10 (using Eltra CS-800 Analyser)



4161



E24/00368/GSL - 24-51954

Project Reference - BLACKWOOD 1271.03

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Observations on receipt

A - No date of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Sample(s) received with less than 96 hours for testing to commence/complete, any result formally classed as deviating will be marked with an X against the applicable test (i.e. RX)

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
414178	-	WS03A	D	-		A
414179	-	WS08A	D	-		A
414180	-	WS01	D	-		A
414181	-	WS02	D	-		A
414182	-	WS03A	D	-		A

