Phase II
Geo-Environmental Site Assessment

Proposed HQ Facility, Whiteley Road, Ripley (DE5 8AP)

Prepared for:
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January 2023

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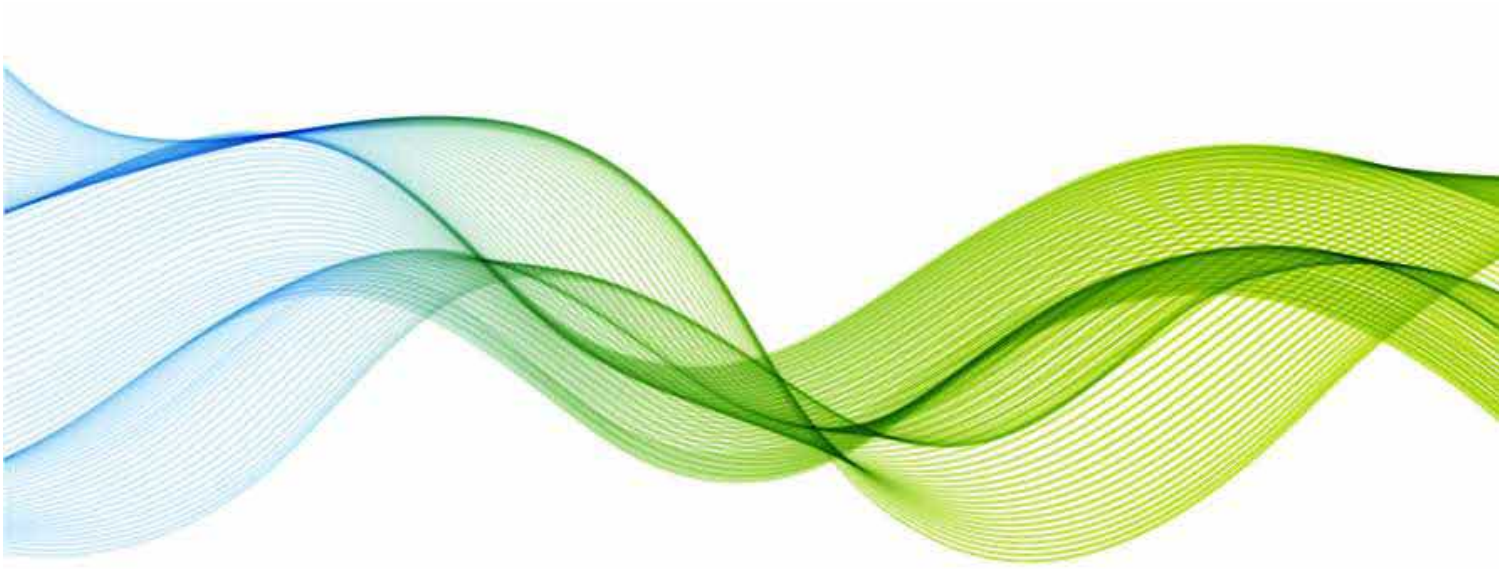

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January 2023

Phase I-II Geo-Environmental Assessment

Geo-Environmental

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Executive Summary	
Site Address	Collins Site, Whiteley Road, Ripley, DE5 8AP
National Grid Reference	440475 , 349186
Site Area	4.82ha
Current Site U	Plant Yard
Geology & Hydrogeology	Superficial: None Recorded Bedrock: Pennine Coal Measures Formation. Mudstone, siltstone and sandstone.

Revised Conceptual Site Model

Following completion of the Tier 1 risk assessment and all phases of monitoring works it is considered that active pollution linkages are present for human health (ground gas) and controlled waters (PAHs & TPHs) at the site based on a commercial end use.

Ground Gas Classification

Given that the typical permissible concentrations of CO2 and the guidance GSV values for CO2 have been exceeded it is recommended that at this stage a **Characteristic Situation 2 (CS-2)** classification is adopted for the site. Classification as CS-2 would require the installation of ground gas protection measures within any new buildings constructed.

Given the identified CS-2 classification, and the Type C building classification a minimum presumed gas protection score of **2.5** will be required as presented within Tables 3 & 4 within BS8485(2015)+A1(2019).

Ground gas protection measures are required for a CS-2 classification and should be selected as appropriate for a protection score level of 2.5 and comprise elements as presented within Section 7, Tables 5, 6 & 7 of BS8485(2015)+A1(2019).

Concrete Classificati

Utilising Table C2 within BRE Special Digest (2005) and pH-sulphate results the ground has been classed as indicative of a Design Sulphate Class DS-3 and an Aggressive Chemical Environment for Concrete of AC-3.

Geotechnical Assessment

Shallow Foundations

It is considered that a traditional strip foundation of 1.00m width at a depth of approximately 1.00mbgl, 2.00mbgl and 3.00mbgl all provide a presumed bearing capacity of approximately 100-200kN/m2.

The area around WS102 may be less suitable for traditional foundations due to low SPT N values at 1.20mbgl, 2.00mbgl and 3,00mbgl of N=6, N=8 and N=7 respectively. These values may lower the bearing capacity below acceptable levels for the requirements of the development.

WS106 is not considered to be suitable for traditional foundations and may require some additional measures due to SPT N Values of N=3 at 1.20mbgl and 2.00mbgl respectively. These values give presumed bearing capacities below 50kN/m^2.

Ground Floor Slabs

Due to Made Ground in excess of 600mm being encountered across the entire site, it is considered that ground bearing floor slabs are not suitable for adoption and therefore a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2.

Recommendations

Environmental

Following the Tier 1 controlled waters risk assessment potential risk to controlled waters have been identified at the site. It is recommended that further investigation of the shallow groundwater at the site is carried out to provide a more complete characterisation of controlled water conditions.

It is recommended that further groundwater monitoring and sampling is undertaken at the site to further assess the risks posed to controlled waters. Further groundwater sampling should be carried out using the EA preferred low-flow sampling methodology to mitigate the potential impact of suspended solids.

Following the Tier 1 Human Health Risk assessment on-going risks to human health have been identified at the site. The measured elevated concentrations of Ground Gas will require remedial measures before the site can be considered suitable for the proposed commercial end use.

Details of required remedial works should be set out in a stand-alone Remediation Method Statement.

If during the development stage any evidence of contamination is identified, works should be halted, and contact made with a suitably qualified Environmental Consultant. As determined appropriate by the Consultant, further investigation and sampling may be required to determine the appropriate actions. Upon completion contact should be made with the regulator to achieve sign off of the works.

Geotechnical

Indicative bearing capacities within shallow soils on the site between 1.20mbgl and 3.00mbgl may offer sufficient bearing capacity for the proposed development but this cannot be confirmed without indicative line loads for the proposed structure.

Should piled foundations be selected, additional ground investigation is recommended in order to confirm the geology inferred from the rotary open holes and provide strength testing at depth to calculate pile bearing capacities.

If shallow foundations are selected, delineation of the soft zones identified in this investigation is recommended to allow for targeted remediation as required.

Subject to NHBC, regulatory and/or design requirements, the potential need exists to calculate bearing capacities and settlement for foundations in accordance with EC7 through production of a Geotechnical Design Report (GDR) which would include detailed design parameters used in structural design.

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1 INTRODUCTION

1.1 Background

Omnia have been commissioned by Millward Consulting Engineers to undertake a Phase II Geo-Environmental Site Assessment at the site of the Proposed HQ Facility, Whiteley Road, Ripley, DE5 8AP.

The investigation was required to assess the potential for contaminated land at the site as well as the risk of shallow coal workings as highlighted by an existing CMRA produced for the site by a third party. A Phase 1 Desk Top Study has also been completed for the site by others, and has highlighted a series of potentially active pollution linkages, of which further assessment was required. The scope of works for which this report has been produced is presented in Omnia fee proposal reference B10925/220623/L3.

A site location plan is presented as Figure 1.0 within Appendix III.

1.2 Proposed Development

We understand that the Client is proposing to develop the site at Whiteley Road to provide approximately 48,000 square feet of commercial/industrial units comprising offices and workshops with associated parking and vehicle yard. Planning Permission for the scheme has been granted by the Local Authority with a number of conditions including those related to contaminated land and coal mining (Amber Valley Borough Council Ref: AVA/2021/0601).

The outline proposed site layout is presented as Figure 2.0 (Appendix III).

1.3 Objectives

The objectives of the Phase II Geo-Environmental Site Assessment are to:

- Undertake an assessment of the near surface through intrusive site investigation;
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors; and,
- Provide a factual and interpretative report relating to the site and provide recommendations on any potential development issues with consideration of residential and environmental receptors.

1.4 Sources of Information

Background information was sought from the following sources:

- The British Geological Survey (BGS) map for the site (Derby, Sheet 125, Bedrock and Superficial Edition at a scale of 1: 50,000, 2014);
- British Standard BS10175:2011+A2:2017 –Investigation of Potentially Contaminated Sites – Code of Practice;
- British Standard BS5930:2015+A1:2020 – *Code of Practice for Ground Investigations;*
- British Standard BS1377-9:1990 Incorporating Amendment No. 1 – *Methods of Test for Soils*

for Civil Engineering Purposes – Part 9: In-situ Tests;

- British Standard BS8485:2015+A1:2019 – *Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings;*
- CIRIA Publication C665 (2007). *Assessing Risks Posed by Hazardous Ground Gases to Buildings;*
- BRE Special Digest 1 (2005). *Concrete in Aggressive Ground*;
- Tomlinson, M.J. (2001). *Foundation Design and Construction*. 7th Edition. Pearson Prentice;
- NHBC Standards (2019). Chapter 4.2 – *Building Near Trees* (2020); and,
- British Standard BS8004:2015 - *Code of Practice for Foundations.*
- GeoDyne Phase I Site Assessment ref:37244, September 2017
- GeoDyne Coal Mining Risk Assessment ref: 41011, July 2021

1.5 Limitations

The limitations of this report are presented in Appendix I.

1.6 Confidentiality

Omnia has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Omnia; a charge may be levied against such approval.

2 SITE SETTING

2.1 Site Details

Table 2-1 Site Details

Site Address	Proposed Headquarters Facility, Whiteley Road, Ripley, DE5 8AP
National Grid Reference	440508 , 349171
Site Area	7.9ha

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location plan is presented as Figure 1.0 (Appendix III).

2.2 Current Site Use

2.2.1 Site Description

The area of investigation is located 1.40km southeast of Ripley Hospital and was irregularly shaped covering an area of 7.9ha. with an access route from the north which exited onto Whiteley Road to the north.

At the time of the site walkover the site was accessed via a compacted aggregate road which was noted from superficial visual inspection to be in good condition. The site was secured by a metal palisade security gate at the access from Whiteley Road. A public footpath ran around the northern and eastern boundaries of the site.

During the site walkover the site was in operational use as a plant depot, with temporary office cabins at the northern end of the site, adjacent to the access.

The general topography of the site sits on two levels both of which are generally flat, with a brick retaining wall running northwest to southeast in the centre of the site. The raised area occupied the centre and east of the site and was predominantly surfaced with concrete hardstanding. The southern area consisted of hardstanding, with disused rail lines aligned west-east running through the site.

During the site walkover it was noted that the site was predominantly occupied with fleet vehicles and construction plant, with associated tooling across the whole central area of the site. To the southeast, large stockpiles of aggregate were sat approximately 4.0m high. A culvert ran roughly north to south through the eastern portion of the site and this was marked out by the client at the time of the walkover.

A brick structure was noted in the centre east portion of the site, used as a maintenance shed for the plant. A large spoil heap approximately 10-15m high and approximately 7-10m in diameter composed of crushed aggregate waste was noted to the southeast of the site. The site was bounded on all sides by metal fencing.

2.2.2 Hazardous Materials Storage

Multiple bunded fuel bowsers, oil bunkers and assorted IBCs of varying sizes were noted immediately south of the site offices, stretching across approximately 40m of the site.

2.2.3 Potential Asbestos Containing Material (PACM)

The exact age of the brick shed is unknown, but it is considered to pre-date the year 2000 and as such it is considered to have the potential to contain Asbestos Containing Materials (ACMs) within the building fabric. It is therefore recommended that an asbestos survey is undertaken in accordance with the Control of Asbestos Regulations (2012) prior to the commencement of any refurbishment or demolition works if required for the proposed development.

2.2.4 Waste Storage

A large spoil heap approximately 10-15m high and approximately 7-10m in diameter composed of crushed aggregate waste was noted to the southeast of the site.

2.2.5 Tree Species

At the time of the site walkover the site had been cleared of any vegetation.

2.2.6 Potential Invasive Species

During the site walkover no obvious signs of potential invasive species were identified.

2.3 Surrounding Area

The surrounding land uses are summarised in Table 2-2 below:

Table 2-2 Land Use

Direction	Land Use
North	Amber Rise Residential Development
East	Waingroves Woodland and Residential Properties
South	Infilled Gravel Pits, Woodland and Agricultural Land
West	Residential Properties

2.4 Review of Pertinent Reports

2.4.1 Phase I Desk Study –Site off Whiteley Road, Ripley –GeoDyne ref:37244 September 2017

A Phase 1 Desk Study was commissioned from GeoDyne to support the proposal to acquire the land as a plant yard, with the potential to redevelop the site with an office building.

The Desk Study notes that the site formerly comprised a brick works, including brick pits, across the central and northern half of the site. The southern and western areas of the site formerly hosted rail lines associated with mineral railways, with associated embankments and cuttings. The report notes numerous historical landfill sites and areas of infilled land are identified in the northern extent of the site and immediate surroundings. Stockpile soils and slag heaps are noted to the south of the site and locally encroaching the east of the site.

The Desk Study notes a coal seam is indicated to outcrop in the northern half of the site, predominantly along the northern site boundary but locally encroaching further into the site. The report notes there is the potential for further unrecorded shallow coal seams to be present below the remainder of the site and the Coal Authority states that the site was also within a former opencast license area and may be affected by historical mining activities.

The Desk Study also notes that ground gas risks have been identified at the site, including potential underground coal mine workings, landfill sites, potentially backfilled former brick pits and a pond within the site.

Potential sources of contamination on site noted in the report include metals associated with Made Ground of natural strata, contamination associated with the historical railways, asbestos fibres associated with Made Ground and current or former structures, herbicides and pesticides associated with the historic railway, hydrocarbon/oil contamination associated with the historical use of the site and localised fuel storage, acid & sulphate contamination and ground gases associated with former landfill sites, embankments, backfilled brick pits and railway land.

The Desk Study notes the site represents a potential medium to high risk and recommends a Phase II Investigation to confirm the findings of the desk study.

2.4.2 Coal Mining Risk Assessment –Site off Whiteley Road, Ripley –GeoDyne ref: 41011 July 2021

A Coal Mining Risk Assessment was commissioned from GeoDyne with regard to the redevelopment proposal for the site.

The Risk Assessment notes that probable Shallow Coal workings may underlie the site and are likely related to the Top Second Waterloo outcrop and that the Third Waterloo coal seam underlies the Top Second by approximately 14m and may be present at shallow depth below the site. The Assessment notes that the Top Second Waterloo seam is recorded as workable and may have been worked out during opencast activities. As a result of these, the assessment recommends a programme of drilling works to confirm the presence of any shallow or worked coal seams below the site.

The assessment also notes that no mine gas incidents or remediation sites are identified on or within 500m of the site and that if any mine workings or deep Made Ground are revealed, a programme of gas monitoring should be undertaken.

The assessment notes that the desk-based information records that the site and a wide area to the north, east and south are located within a recorded unlicensed opencast mining site, with multiple overlapping opencast phases, with boundaries/highwalls located close to the sites northern corner and far eastern spur. It also notes that highwalls associated with the historical brick works and clay pit on site. A programme of trenching is recommended by the Risk Assessment.

2.5 Initial Conceptual Site Model

The Conceptual Site Model outlined in the GeoDyne report determined that there was the potential for soils beneath the site to contain heavy metals, PAHs, PCBs, asbestos fibres, solvents, herbicides, acid/sulphate contamination, hydrocarbon/oil contamination and ground gases relating to Made Ground deposits, the historic railway activities, localised fuel storage and surrounding historic land uses.

Omnia do not consider herbicides from the former use as railway land to have the potential to present a significant risk to the proposed development due to the time elapsed since the site ceased to be used as railway land, and the usage of herbicides likely being in a highly diluted form.

A summary of the Initial Conceptual Site Model presented by GeoDyne is set out below:

- Seven (7No.) potentially active contamination linkages were identified which were deemed to have the potential to present a risk to future site users. These included ingestion and dermal contact, inhalation of dust and vapours, vertical and lateral migration/leaching of contamination and Services/foundations in contact with shallow soils
    - The mentioned pathways of potential active contamination linkages relate to historic railway use, historic and present Made Ground, current site uses and potential shallow mine workings.
- Recommendations for further woks at the site included:
    - Detailed site investigation works to ascertain the potential environmental risks from the current ground conditions

3 SITE INVESTIGATION

3.1 General

A ground investigation was designed based on the recommendations in the Phase I Report, the Coal Mining Risk Assessment, and the proposed site development as shown in Figure 2.0 (Appendix III).

Following a review of the available data, ground investigation works were required on site to investigate the potential for impacted materials to be present on-site from identified on-site and nearby off-site potential sources and to assess the risk of hazards from historic coal mining activities.

Exploratory fieldwork was conducted over seven (7no.) working days, commencing on 7th October 2022 and comprised the following:

Table 3-1 Site Investigation Summary

Potential Source/Rationale	Location Hole	Type	Maximum Depth (m bgl)	Borehole Response Zone (m bgl)
Investigation across the proposed building footprint for shallow or worked coal seams as recommended by the CMRA	BH101-BH121	Rotary Open Hole	30.00	2.00-28.00 (BH120)
Investigation of historic Made Ground	WS101 WS102 WS105 WS107 WS108	Windowless Sampling	5.00	0.50-2.00 (WS107) 1.00-3.00 (WS108)
Investigation of the area of historic Railway Usage	WS103 WS104		5.00	N/A
Investigation of current hydrocarbon storage area	WS106		5.00	N/A
	BH101	Rotary Open Hole	30.00	3.50-27.50 (BH101)

The exploratory hole locations are illustrated on Figure 3.0 (Appendix III). The ground conditions encountered are indicated on the exploratory hole logs, which are provided in Appendix V.

3.2 Laboratory Analysis

Selected soil samples were submitted for a range of chemical analysis including:

- Asbestos;
- Heavy Metals;
- Speciated Polycyclic Aromatic Hydrocarbons (PAH);
- Speciated Total Petroleum Hydrocarbons (TPH);
- pH and Soluble Sulphate 2:1;
- Total Cyanide;
- Total Organic Carbon.

Element Materials Technology of Deeside undertook the analytical work in accordance with UKAS accreditation where applicable and the laboratory analysis certificates are presented as Appendix VI and discussed in Section 5.

Selected soil samples were submitted to I2 Analytical for a range of geotechnical testing, in accordance with UKAS methodology where applicable, comprising:

- Moisture Content
- Atterberg Limits (4pt)
- BRE Suite D

The geotechnical analysis certificates are presented in Appendix VIII.

3.3 Ground Gas and Groundwater Monitoring

Concentrations of methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) were measured using an infrared gas analyser (GA5000), calibrated to a reference standard (before and after each survey) and gas flow rates were measured using an internal flow pod.

Gas concentrations were recorded at thirty second intervals until gas concentrations stabilised for three (3no.) consecutive readings (a minimum of ninety seconds) at each location, at which point the maximum concentrations of CH_4 and CO_2, together with the lowest concentration of O_2 were recorded.

Groundwater monitoring was undertaken using an electronic dip tape to record the depth to groundwater. Ground gas and groundwater results are presented in Section 4.3.3 and discussed in Section 6.3.

4 GROUND AND GROUNDWATER CONDITIONS

4.1 Summary of Ground Conditions

British Geological Survey (BGS) map for the site (Derby, Sheet 125, Bedrock and Superficial Edition at a scale of 1:50,000 dated 2014) indicates that no Superficial Geology is recorded on site. Bedrock Deposits are recorded as the Pennine Middle Coal Measures Formation across the entire site.

Geology encountered on site generally corresponds with that highlighted within BGS Mapping and the findings have been outlined below.

4.1.1 Made Ground

Made ground was encountered in all nineteen (19no.) exploratory positions to a maximum depth of 3.30mbgl in BH115. Concrete hardstanding was encountered to a maximum depth of 1.20mbgl in WS104. Bituminous material was encountered in BH101, WS106 and WS107 to a maximum depth of 0.10mbgl. The Made Ground encountered in the investigation is predominantly recorded as a black sandy angular to subangular fine to coarse GRAVEL of clinker, brick fragments and concrete fragments.

4.1.2 Superficial Deposits

No superficial deposits were encountered during the investigation.

4.1.3 Bedrock Deposits

4.1.3.1 Pennine Middle Coal Measures Formation

Bedrock deposits of the Pennine Middle Coal Measures were encountered in all exploratory holes except WS105 to a maximum depth of 30.00mbgl with the base not proven. Weathered horizons are recorded to a maximum depth of 6.00mbgl and consist predominantly of firm to stiff yellowish brown or grey CLAY.

Competent bedrock deposits are recorded at a shallowest depth of 0.3mbgl in WS105, consisting of either COAL deposits, yellowish brown MUDSTONE, grey MUDSTONE & SANDSTONE or black SHALE. Coal deposits are discussed further in Section 5.

4.1.4 Groundwater Conditions

Groundwater was struck in the following locations. WS106 at 4.00mbgl, WS104 at 2.30mbgl and WS101 at 4.20mbgl.

4.2 Laboratory Classification Analysis

Soil classification testing, including Atterberg Limits, Moisture Content, Particle Size Distribution and pH and Sulphate results are summarised in Table 4-1 –Table 4-2 with analysis certificates presented in Appendix VIII.

4.2.1 Soil Plasticity

Nine (9no.) samples taken from cohesive deposits across the site were submitted to the laboratory for

laboratory plasticity analysis. The results of this analysis have been summarised in Table 4-1 below.

Table 4-1. Summary of Soil Plasticity

Location	Depth (m bgl)	Geology	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Percentage Passing 425µm sieve	Modified Plasticity Index	Plasticity	Volume Change Potential
WS106	1.8-1.9	PCM	22	38	22	16	89	14	Medium	Low
WS10[illegible]	3.6-3.8	PCM	25	62	24	38	98	37	High	Medium
WS106	4-4.45	PCM	16	62	31	31	92	28	High	Medium
WS104	3-3.45	PCM	10	37	21	16	90	14	Medium	Low
WS101	2-2.45	PCM	10	47	27	20	63	12	Medium	Low
WS107	1.5-1.7	PCM	17	41	24	17	100	17	Medium	Low
WS107	2-2.45	PCM	22	34	17	17	100	17	Low	Low
WS107	3-3.45	PCM	22	36	15	21	99	21	Medium	Medium
WS108	2-2.45	PCM	15	37	18	19	100	19	Medium	Low

The results presented in Table 4-1 indicate that that cohesive deposits within the Middle Pennine Coal Measures formation exhibit a low to high plasticity with a low to medium volume change potential.

Therefore, the cohesive soils at the site should be classed as medium volume change potential.

4.2.2 pH and Sulphate

Chemical analysis for pH and soluble sulphate content are summarised in Table 4-2 below with analysis certificates presented as Appendix VI and VIII.

Table 4-2. Summary of pH and Sulphate Data

Location	Depth (m bgl)	SO_4 in 2:1 water / soil (mg/l)	pH Value	Total Sulphate as SO4 (%)	Water Soluble Chloride (mg/l)	Total Sulphur (%)	Water Soluble Nitrate (mg/l)	Water Soluble Magnesium (mg/l)
WS106	2.6-2.7	311	8.6	0.167	6.7	0.836	<2.0	9.5
WS10[illegible]	1.2-1.65	151	8.7	0.141	7	0.14	<2.0	17
WS107	0.8	1810	8.3	2.41	23	1.3	<2.0	140
WS107	1.2-1.65	529	4.9	0.158	13	0.075	<2.0	26
WS108	0.5	368	8.4	0.301	4.5	0.138	4.5	19
WS106	0.20	49.3	8.65	N/A	N/A	N/A	N/A	N/A
WS106	0.70	50.1	8.46	N/A	N/A	N/A	N/A	N/A
WS106	1.30-1.50	16.4	7.92	N/A	N/A	N/A	N/A	N/A
WS106	2.40-2.60	71.6	7.73	N/A	N/A	N/A	N/A	N/A
WS103	0.20	350.4	11.18	N/A	N/A	N/A	N/A	N/A
WS104	0.30	1459.3	7.98	N/A	N/A	N/A	N/A	N/A
WS104	0.90	1544.2	7.9	N/A	N/A	N/A	N/A	N/A
WS104	1.50-1.60	1571.3	7.98	N/A	N/A	N/A	N/A	N/A
WS104	2.40-2.50	193.9	7.55	N/A	N/A	N/A	N/A	N/A
WS102	0.50	47.9	8.34	N/A	N/A	N/A	N/A	N/A
WS101	0.30	64	10.72	N/A	N/A	N/A	N/A	N/A
WS101	0.80	18.4	8.2	N/A	N/A	N/A	N/A	N/A

Location	Depth (m bgl)	SO_4 in 2:1 water / soil (mg/l)	pH Value	Total Sulphate as SO4 (%)	Water Soluble Chloride (mg/l)	Total Sulphur (%)	Water Soluble Nitrate (mg/l)	Water Soluble Magnesium (mg/l)
WS107	0.50	1086.4	8	N/A	N/A	N/A	N/A	N/A

Due to the size of the dataset (18 samples), characteristic pH and SO_4 values were calculated using the mean of the highest 20% sulphate results and the lowest 20% measured pH results as stated in the BRE Special Digest (2005) producing a site characteristic value for sulphate of 1600 mg/l and a pH value of 6.72.

A characteristic Total Potential Sulphate value was calculated using the mean of the highest two values, producing a site characteristic value of 1.068%.

Characteristic values of water-soluble Chloride and Nitrate were not calculated due to only one sample out of 18 being acidic, as per the BRE Special Digest (2005).

Utilising Table C2 within BRE Special Digest (2005) and pH-sulphate results the ground has been classed as indicative of a Design Sulphate Class DS-3 and an Aggressive Chemical Environment for Concrete of AC-3.

4.3 In-Situ Testing

4.3.1 Standard Penetration Tests (SPT)

Standard Penetration Tests (SPT) were carried out in all windowless sampling boreholes in accordance with techniques outlined in BS1377, to assess the strength/density of the underlying strata. The 'N' value (number of blows per 300mm penetration) was recorded for each test. The results of these in-situ tests, including full blow counts, are presented on the borehole logs within Appendix V.

4.3.2 Dynamic Cone Penetrometer (DCP) Testing

In-situ California Bearing Ratio (CBR) values for near surface strata were obtained via Dynamic Cone Penetrometer (DCP) testing and were undertaken at six locations within locations DCP101 –DCP105 in areas of proposed access infrastructure, as presented on Figure 3.0, Appendix III. The results are summarised in Table 4-3 below with CBR values of underlying strata provided. It should be noted that in DCP101 & DCP102 a concrete core was removed prior to undertaking the test.

The DCP results sheets are included within Appendix IX. CBR results have been given from the blow counts across the strata tested, abnormally high blow counts are likely attributed from larger granular material within the strata and have been excluded as they are not considered to be representative.

It should be noted that DCP103 and DCP103a refused on a concrete pad and DCP105 likely refused on bricks observed in WS105 at 0.3mbgl.

Table 4-3. Summary of In-situ CBR Results

Locatio	Depth (mm bgl)	CBR Value (%)
DCP101	185-505	61.5
	505-620	18
	620-740	55.1

	740-925	39.5
DCP102	230-305	4
	305-400	86.2
	400-585	12.4
	585-925	31.4
DCP103	60-170	6.7
	170-250	84.6
	250-290	390.4
	290-300	398.5
DCP103a	5-60	44.6
	60-80	55.1
	80-125	148.6
	125-210	48.3
	210-215	302
DCP104	90-225	9.3
	225-940	23.2
DCP105	20-70	4.0
	70-95	276.5
	95-125	238.5
	125-140	761.9

CBR values ranged from 4% to 398.5% between 5mmbgl and 940mmbgl within in-situ testing.

Therefore, adopting a conservative approach, a CBR value of 4% should be adopted from ground level at this stage.

4.3.3 Ground Gas

Four (4no.) ground gas and groundwater monitoring visits have been undertaken across four (4no.) monitoring wells at the site from 28/10/2022 to 24/11/2022. The results of the gas and groundwater monitoring are presented in Table 4-4 overleaf.

Table 4-4. Summary of Ground Gas and Groundwater Monitoring Results

Well	Date	CH_4 Peak %v/v	CH_4 Steady %v/v	CH_4 GSV l/hr	CO_2 Peak %v/v	CO_2 Steady %v/v	CO_2 GSV l/hr	O_2 %v/v	PID	Atmos (mb)	Atmos. Dynamic	Flow (l/hr)	Depth to Base (m bgl)	Depth to Water (m bgl)
BH101	28/10/22	*N/A*											26.41	2.50
	1/11/22	0.2	0.1	0.0002	4.4	4.4	0.0044	12.8	12.1	988	Rising	-6.3	Nm*	2.30
	8/11/22	0.1	0.1	0.0042	3.7	3.6	0.1554	13.8	N/A	992	Falling	4.2	Nm*	3.20
	24/11/22	0.2	0.2	0.0084	2.3	2.3	0.096	16.3	N/A	988	Rising	Ff+	Nm*	2.19
WS107	28/10/22	*N/A – inaccessible due to site activities*												
	1/11/22	0.2	0.1	0.0004	15.7	15.2	0.0314	2.2	0.0	988	Rising	0.2	Unable to remove bung	
	8/11/22	0.1	0.1	0.0001	10.1	9.7	0.0101	4.7	N/A	991	Falling	-0.2	2.95	DRY
	24/11/22	0.2	0.1	0.0004	15.4	14.8	0.0308	2.3	N/A	987	Rising	0.2	Unable to remove bung	
WS108	28/10/22	*N/A – inaccessible due to site activities*												
	1/11/22	0.1	0.1	0.0002	6.8	6.1	0.0122	9.1	0.0	989	Rising	0.2	2.18	DRY
	8/11/22	0.1	<0.1	0.0002	5.3	5.3	0.0106	11.0	n/a	990	Falling	0.2	2.09	DRY
	24/11/22	0.2	0.1	0.0004	5.1	5.0	0.0102	9.6	N/A	986	Rising	0.2	2.08	1.84
BH120	28/10/22	*N/A*											27.10	4.00
	1/11/22	<0.1	<0.1	0.0001	5.3	1	0.0053	13.6	0.0	989	Rising	-3.6	27.10	4.93
	8/11/22	0.1	0.1	0.0001	3.8	3.7	0.0038	14.8	0.0	991	Falling	-2.0	27.00	5.00
	24/11/22	0.2	0.1	0.0004	7.3	4.0	0.0146	9.0	N/A	987	Rising	0.2	26.45	3.25

*Nm: Unable to measure well depth due to hydrocarbons in water column.

+Analyser flow failed, unable to measure flow. Flow for GSV calculation assumed to be 4.2l/hr from 8/11/22 visit

5 COAL WORKINGS INVESTIGATION –PROBING

5.1 Background

The works described and reported herein follow on from the Coal Mining Risk Assessment produced by GeoDyne. This section should not be referred to in isolation, and should be read in conjunction with the following:

- Coal Mining Risk Assessment –Site off Whiteley Road, Ripley by GeoDyne, (Ref: 37244) dated July 2021

5.2 Investigation Works

These works comprised the advancing of 11no. rotary boreholes to a maximum depth of 30.00mbgl. All boreholes were drilled utilising a water flush medium. Boreholes were generally reinstated with a mixture of arisings and ordinary portland cement upon completion. A Coal Authority Permit was in place for these works. A borehole location plan and borehole logs are included in Appendix III and V.

5.3 Ground Stability Assessment

Shallow/Worked Seams

The site was generally recorded to be underlain by Made Ground from ground level to 3.30mbgl. The Made Ground was underlain by soft strata in all boreholes from depths of 0.50mbgl to 6.00mbgl comprising yellowish brown CLAY or grey CLAY. Solid strata underlie the soft strata comprising interbedded grey and yellow sandstone and mudstone horizons. The solid strata are considered to be representative of the Pennine Middle Coal Measures.

A maximum of two coal seams were encountered beneath the site in BH101, BH103, BH108, BH109, BH111, BH115, BH117, BH119 and BH121. The shallowest seam was encountered at depths between 5.10mbgl and 7.60mbgl and recorded to attain a maximum thickness of 0.20m. No loss of flush was recorded in conjunction with this seam in any borehole.

A second seam was encountered at depths of between 15.20mbgl and 17.00mbgl and recorded to attain a maximum thickness of 0.50mbgl. No loss of flush was recorded in conjunction with encountering this seam in any borehole.

A maximum of one coal seam was encountered in BH106 and BH120. The seam was encountered at depths between 13.8mbgl and 17.00mbgl and recorded to attain a maximum thickness of 0.60mbgl. No loss of flush was recorded in conjunction with encountering this seam in either borehole.

Based on the above, the rotary investigation has tentatively identified intact seams in all boreholes. It is important to note that no significant voids have been noted during the investigation works. No loss of flush has been recorded in conjunction with coal seams/weak horizons, therefore there is no indication of worked seams.

Based on the above, no further works are recommended as no evidence of worked seams has been encountered.

Mine Gas

All boreholes were monitored for the presence of mine gas (methane, carbon monoxide and hydrogen sulphide) during the probe drilling investigation. No mine gas emissions were recorded during the drilling works.

5.4 Conclusions

The probe drilling investigation has not identified any evidence of worked shallow seams. No further investigation is recommended. However, it is recommended that a watching brief for anomalous features is undertaken during the site groundworks and foundation excavations as a precautionary measure.

6 TIER 1 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

Omnia has undertaken a Tier 1 qualitative risk assessment to determine if any potential contaminants within the underlying soils pose an unacceptable level of risk to the identified receptors.

6.1 Human Health Risk Assessment

At a Tier 1 stage the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published by the EA (Contaminated Land Exposure Assessment (CLEA) Soil Guideline Values (SGV)) and where absent, Generic Assessment Criteria (GACs) published by LQM/CIEH Suitable for Use Levels (S4UL) 2015. Based on the proposed development comprising offices and vehicle parking, Omnia has adopted screening values for a commercial end use. The origin of the GAC values are presented within Appendix VII.

The results of this comparison have been summarised within Table 6-1.

Table 6-1. Summary of Inorganic and Hydrocarbon Toxicity Assessment for Commercial End Use

Determinant	Units	GAC	n	MC	Loc. of Ex	Pathway	Assessment
Inorganics							
Metals							
Arsenic	mg/kg	640	13	32.4	N/A	1	No further action
Barium	mg/kg	ND	13	957	N/A	1	No further action
Beryllium	mg/kg	112	13	6.6	N/A	1	No further action
Cadmium	mg/kg	190	13	1.5	N/A	1	No further action
Chromium III	mg/kg	8,600	13	76.5	N/A	1	No further action
Chromium VI	mg/kg	33	13	<0.3	N/A	1	No further action
Copper	mg/kg	68,000	13	166	N/A	1	No further action
Lead	mg/kg	2,300	13	145	N/A	1	No further action
Mercury	mg/kg	1,100	13	0.1	N/A	1	No further action
Nickel	mg/kg	980	13	69.7	N/A	1	No further action
Selenium	mg/kg	12,000	13	5	N/A	1	No further action
Vanadium	mg/kg	9,000	13	90	N/A	1	No further action
Water Soluble Boron	mg/kg	ND	13	2.3	N/A	1	No further action
Zinc	mg/kg	730,000	13	176	N/A	2	No further action
General Inorganics							
Asbestos	**%**	**0.001%**	**13**	**0.028**	**WS104 0.3m**	**6**	**Further Assessment Required**
				0.08	**WS104 0.9m**		
				0.014	**WS104 1.5-1.6m**		
Total Cyanide	mg/kg	50	13	<0.5	N/A	1	No Further Action
Organics							
General Organics							
Phenol	mg/kg	760	13	<0.15	N/A	3	No Further Action
PAH							
Naphthalene	mg/kg	190$_{(Sol)}$	13	0.51	N/A	4	No Further Action
Acenaphthylene	mg/kg	83,000$_{(Sol)}$	13	0.04	N/A	1	No Further Action
Acenaphthene	mg/kg	84,000$_{(Sol)}$	13	<0.05	N/A	1	No Further Action
Fluorene	mg/kg	63,000$_{(Sol)}$	13	<0.04	N/A	1	No Further Action
Phenanthrene	mg/kg	22,000	13	1.42	N/A	1	No Further Action

Anthracene	mg/kg	520,000	13	0.1	N/A	1	No Further Action
Fluoranthene	mg/kg	23,000	13	0.41	N/A	1	No Further Action
Pyrene	mg/kg	54,000	13	0.37	N/A	1	No Further Action
Benzo(a)Anthracene	mg/kg	170	13	0.25	N/A	1	No Further Action
Chrysene	mg/kg	350	13	0.25	N/A	1	No Further Action
Benzo(b)Fluoranthene	mg/kg	44	13	0.14	N/A	1	No Further Action
Benzo(k)Fluoranthene	mg/kg	1,200	13	0.06	N/A	1	No Further Action
Benzo(a)Pyrene	mg/kg	35	13	0.15	N/A	1	No Further Action
Indeno(123-cd)Pyrene	mg/kg	500	13	0.18	N/A	1	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	3.5	13	<0.04	N/A	1	No Further Action
Benzo(ghi)Perylene	mg/kg	3,900	13	0.18	N/A	1	No Further Action
Banded TPH							
TPH EC 5-6	mg/kg	3,200(Sol)	13	<0.1	N/A	4	No Further Action
TPH EC >6-8	mg/kg	7,800(Sol)	13	<0.1	N/A	4	No Further Action
TPH EC >8-10	mg/kg	2,000(Sol)	13	9	N/A	4	No Further Action
TPH EC> 10-12	mg/kg	9,700(Sol)	13	12	N/A	4	No Further Action
TPH EC> 12-16	mg/kg	36,000(Sol)	13	28	N/A	4	No Further Action
TPH EC> 16-21	mg/kg	28,000	13	86	N/A	1	No Further Action
TPH EC> 21-35	mg/kg	28,000	13	792	N/A	1	No Further Action
TPH EC> 35-44	mg/kg	28,000	13	318	N/A	1	No Further Action

Notes
Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil; 3 = Dermal Contact (Indoor & Outdoor); 4 = Inhalation of Vapour (Indoor & Outdoor); 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres

Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance.
Total cyanide Tier 1 GAC is taken from the Dutch Intervention Value (2010) for complex cyanide.

** The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. Omnia has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health.

(sol) –GAC presented exceeds the solubility saturation limit.
(vap) –GAC presented exceeds the vapour saturation limit.

The laboratory results are presented in Appendix VI and the origin of the screening criteria is presented in Appendix VII.

A review of the Tier 1 table above indicates that samples taken from WS104 exceed the screening values for Asbestos and require further assessment. This is discussed below in Section 6.1.1.

6.1.1 Asbestos

A total of thirteen (13no.) samples were screened for the presence of asbestos with two samples testing positive for the presence of Chrysotile and Amosite (WS104 0.30 & 0.90mbgl) and one testing positive for ACM Debris, Chrysotile and Amosite (WS104 1.50-1.60mbgl). The samples were subject to asbestos fibre quantification which yielded concentrations of 0.028% (WS104 at 0.30mbgl), 0.008% (WS104 at 0.60mbgl) and 0.014% (WS104 at 1.50-1.60mbgl).

Asbestos fibre types and concentrations identified across the site are summarised in Table 6-2, below.

Table 6-2 Summary of Asbestos Screening and Quantification Results

Location	Depth	Asbestos Detected	Asbestos Fibres	Identified ACM	Asbestos ID	Quantification %
WS101	0.30	NAD	-	-	-	-
WS101	0.80	NAD	-	-	-	-
WS102	0.50	NAD	-	-	-	-
WS103	0.20	NAD	-	-	-	-
WS104	**0.30**	**<0.1%**	**Fibre Bundles**	**-**	**Chrysotile Amosite**	**0.028**
WS104	**0.90**	**<0.1%**	**Fibre Bundles**	**-**	**Chrysotile Amosite**	**0.008**
WS104	**1.50-1.60**	**<0.1%**	**Fibre Bundles**	**ACM Debris**	**Chrysotile Amosite**	**0.014**
WS104	2.40-2.50	NAD	-	-	-	-
WS106	0.20	<0.1%	Trace Asbestos	-	Chrysotile	<0.001
WS106	0.70	NAD	-	-	-	-
WS106	1.30-1.50	NAD	-	-	-	-
WS106	2.40-2.60	NAD	-	-	-	-
WS107	0.50	NAD	-	-	-	-

Screening values for the potential risk posed to human health by asbestos containing soils are not currently set out in UK guidance. As such it has been necessary to utilise the former ICRCL guidance figure of <0.001% when assessing the risk of Chrysotile. While this value has not been produced to act as a screening value the ICRCL (1990) document cited that a concentration above 0.001% (of asbestos in soil) was potentially able to generate airborne fibre concentrations, and as such Omnia have adopted this as a means of risk assessment.

It is therefore considered that fibre concentrations at or above 0.001%, for Chrysotile, are considered to pose a significant risk to human health through the inhalation of fibres.

The presence of 0.028% & 0.008% Amosite and Chrysotile at location WS104 (0.30-0.90m) and 0.014% Chrysolite, Amosite and ACM Debris within WS104 (1.50-1.60m) is considered to have the potential to present a significant risk to human health in areas of soft landscaping. However, as the proposed development plans for the site do not include for soft landscaping in the area of the exceedance, the exposure pathway is considered broken and will not affect the end users.

Concentrations above the Limit of Detection (<0.001%) were recorded in WS104 (0.008%-0.028%). None of these samples have been measured to contain asbestos concentrations in excess of 0.1% and are therefore not classified as Hazardous Asbestos Containing Materials

Notwithstanding this, it is considered that the presence of amosite asbestos fibre bundles, chrysotile fibres, and ACM debris in near surface soils in the vicinity of location WS104 have the potential to present a significant risk to site workers during the construction phase. It is therefore recommended that this report is provided to the Principal Contractor so that a risk assessment can be prepared, in

line with the Control of Asbestos Regulations (2012) for tasks due to be undertaken in the affected area prior to the construction phase to ensure the provision of suitable PPE and mitigation measures.

6.2 Controlled Waters Assessment

For the purpose of the Tier 1 assessment, laboratory data has been compared directly to the UK Drinking Water Standards (UK DWS), given the Secondary A Aquifer within the Pennine Coal Measures bedrock. In cases where a determinant does not have a UK DWS screening value, the measured concentrations have also been compared the World Health Organisation Drinking Water Standards (WHO DWS) screening values in order to adopt a conservative approach.

Hardness sensitive meatal screening values based on an average groundwater hardness of 488.5mg/l.

The results of this comparison have been summarised within Table 6-3.

Table 6-3 Controlled Waters Tier 1 Risk Assessment

Determinant	Units	GAC	n	MC	Loc. of Ex	Assessment
Inorganics						
Metals						
Dissolved Arsenic	ug/l	50	2	<2.5	N/A	No Further Action
Dissolved Boron	ug/l	2000	2	675	N/A	No Further Action
Dissolved Cadmium	ug/l	0.25	2	<0.5	N/A	No Further Action
Total Dissolved Chromium	ug/l	4.7	2	<1.5	N/A	No Further Action
Dissolved Copper	ug/l	28	2	<7	N/A	No Further Action
Dissolved Lead	ug/l	7.2	2	<5	N/A	No Further Action
Dissolved Mercury	ug/l	0.05	2	<1	N/A	No Further Action
Dissolved Nickel	ug/l	20	2	13	N/A	No Further Action
Dissolved Selenium	ug/l	10	2	<3	N/A	No Further Action
Dissolved Zinc	ug/l	125	2	24	N/A	No Further Action
PAH						
Naphthalene	ug/l	2.4	2	0.2	N/A	No Further Action
Anthracene	ug/l	0.1	2	0.039	N/A	No Further Action
Fluoranthene	ug/l	0.1	2	<0.005	N/A	No Further Action
Benzo(bk)fluoranthene	**ug/l**	**0.003**	**2**	**0.105**	**BH101**	**Further Assessment Required**
Benzo(a)pyrene	**ug/l**	**0.005**	**2**	**0.056**	**BH101**	**Further Assessment Required**
Indeno(123cd)pyrene	ug/l	0.002	2	<0.005	N/A	No Further Action
Benzo(ghi)perylene	ug/l	0.002	2	<0.005	N/A	No Further Action
Aliphatic TPH						
>C5-C6	ug/l	15,000	2	<10	N/A	No Further Action
>C6-C8	ug/l	15,000	2	<10	N/A	No Further Action
>C8-C10	ug/l	300	2	<10	N/A	No Further Action
>C10-C12	ug/l	300	2	48	N/A	No Further Action
>C12-C16	ug/l	300	2	250	N/A	No Further Action
>C16-C21	**ug/l**	**300**	**2**	**330**	**BH101**	**Further Assessment Required**
>C21-C35	**ug/l**	**300**	**2**	**810**	**BH101**	**Further Assessment Required**
Aromatics TPH						
>C5-C7	ug/l	10	2	<10	N/A	No Further Action
>C7-C8	ug/l	50	2	<10	N/A	No Further Action
>C8-C10	ug/l	20	2	<10	N/A	No Further Action
>C10-C12	ug/l	100	2	<5	N/A	No Further Action
>C12-C16	ug/l	100	2	<10	N/A	No Further Action

>C16-C21	ug/l	90	2	170	BH101	Further Assessment Required
>C21-C35	ug/l	90	2	710	BH101	Further Assessment Required

Controlled Waters Risk Assessment Discussion
Groundwater Analysis

A review of Table 6-3 above indicates that the adopted screening values for controlled waters have been exceeded for the following determinants:

- PAHs
  - Benzo(bk)fluoranthene
  - Benzo(a)pyrene
- TPH Aliphatic
  - >C16-C21
  - >C21-C35
- TPH Aromatic
  - >EC16-EC21
  - >EC21-EC35

It should be noted that all exceedances have been identified in the sample taken from BH101, and no exceedances have been identified in BH120 which suggests, whatever the source of the impact, it is at least partially confined to the area around BH101.

During sampling at BH101 it was noted that a thick black oily residue was left on the bailer and the dip tape. Due to these observations, it is considered that the PAH and TPH impact to the water column is, at least in part, originating from a black LNAPL in the impacted area around BH101.

Groundwater sampling was undertaken using a 'grab-sample' methodology via the use of a bailer. This being the case, the elevated concentrations recorded in the sample could be the result of PAH and TPH molecules which have sorbed to suspended solid particulate matter in the sample which can lead to an artificially high analysis result.

It is therefore recommended that additional groundwater sampling is undertaken using the EA preferred low-flow sampling methodology which minimises disturbance that can result in the presence of suspended solids and will yield samples more representative of dissolved concentrations.

As necessary further investigation may be required to determine the extent of impact, the groundwater flow direction and potentially a Detailed Quantitative Risk Assessment (DQRA).

6.3 Ground Gas Assessment

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in CIRIA Report C665 (*Assessing risks posed by hazardous ground gases to buildings*, 2007). However, it is recommended that the full ground gas assessment and any recommended protection measures are agreed with the local authority prior to the adoption of any protection measures on-site. Furthermore, the installation of any gas protection measures should be validated by a suitably qualified engineer.

The results of the ground gas monitoring and calculated Gas Screening Values (GSVs) are presented in Table 4-4.

Three ground gas monitoring visits have been undertaken at locations BH101, BH120, WS107 and WS108. CH_4 concentrations were recorded to a maximum concentration of 0.2% v/v at all four locations. CO_2 concentrations were recorded to a maximum of 15.7% v/v at location WS107. Ground gas flow rates were recorded across the site, with a maximum flow rate of 4.2l/hr recorded at BH101.

In accordance with the methodology outlined within the CIRIA publication C665, Omnia have utilised the results of the ground gas monitoring surveys to calculate a tentative Gas Screening Value (GSV). The maximum GSV calculated for methane was 0.0084l/hr whilst the maximum GSV for carbon dioxide was 0.6594l/hr.

It is understood that the proposed development is for 48,000 square feet of commercial/industrial units comprising offices and workshops with associated parking and vehicle yard.

Therefore, the proposed development is regarded as Internal Office Areas under BS8485(2015)+A1(2019) classed as a **Type C** building.

6.3.1 BS 8485:2015 – Type C Building – Internal Office Areas

Guidance set out in BS 8485(2015)+A1(2019), which is equivalent to the Characteristic Situations of the modified Wilson & Card classification established in CIRIA Publication C665, stipulates a site characteristic GSV of <0.07 l/hr, with typical permissible concentrations of 1% v/v (CH_4) and 5% v/v (CO_2), for classification as Characteristic Situation 1 (CS-1); a very low hazard potential.

The maximum recorded CO_2 concentrations of 15.7% v/v respectively exceeds the typical permissible concentrations of 5% (CO_2) for classification as CS-1. The maximum GSV guidance value of <0.07l/hr was also exceeded within BH101 for CO_2 (0.6594l/hr and 0.084l/hr).

Given that the typical permissible concentrations of CO_2 and the guidance GSV values for CO_2 have been exceeded it is recommended that at this stage a Characteristic Situation 2 (CS-2) classification is adopted for the site. Classification as CS-2 would require the installation of ground gas protection measures within any new buildings constructed.

Given the identified CS-2 classification, and the Type C building classification a minimum presumed **gas protection score of 2.5** will be required as presented within Tables 3 & 4 within BS8485(2015)+A1(2019).

Ground gas protection measures are required for a CS-2 classification and should be selected as appropriate for a protection score level of **2.5** and comprise elements as presented within Section 7, Tables 5, 6 & 7 of BS8485(2015)+A1(2019).

7 REVISED CONCEPTUAL SITE MODEL

Following completion of the Tier 1 risk assessment active pollution pathways have been identified based on a commercial end use.

Table 7-1 Revised Conceptual Site Model

Source	Potential Migration Pathway	Potential Receptors	Discussion of Pollutant Linkage
Quantifiable asbestos concentrations (Amosite and Chrysotile) identified in WS104	Inhalation of fibres	Future Site Users	Near surface soils containing elevated concentrations of asbestos in excess of the adopted screening level of <0.001% Chrysotile have been identified at WS104. Fibre types identified include Chrysotile and Amosite (**0.028% max**) ACM Debris was also noted. As the development proposal does not include for any areas of soft landscaping, the pollutant linkage is considered to be broken by the site-wide hardstanding and therefore remedial works will not be required, provided that the development proposals do not materially change. Due to the presence of asbestos, consideration should be given to the potential requirement for additional mitigation measures such as dust suppression and perimeter monitoring whilst development works are undertaken.
		Construction Workers	It is recommended that this report is provided to the Principal Contractor so that a full asbestos risk assessment can be undertaken, in line with current asbestos legislation (Control of Asbestos Regulations, 2012) ahead of the commencement of works on site to mitigate against the risk of exposure to asbestos during construction works.
Elevated levels of PAH and TPH compounds in BH101 water column	Vertical Migration	Controlled Waters	One groundwater sample taken from BH101 has been found to contain elevated concentrations of PAH and TPH compounds, exceeding the UK Drinking Water Standards. It is recommended that further investigation of this impact is undertaken via low-flow sampling and further laboratory analysis. Pending the results of any future monitoring works a DQRA and RMS can be produced for the site as required.
Elevated concentrations of CH_4 and CO_2 in Ground Gas	Migration into Confined Spaces	Future Site Users	A ground gas assessment based on three (3no.) visits suggests that concentrations of CO_2 (above 5%) are present which are considered to pose a risk to human health.

Source	Potential Migration Pathway	Potential Receptors	Discussion of Pollutant Linkage
			The gas regime has been classified as CS-2 at this stage, and as such will require specific ground gas protection measures as specified in BS8485. Details of the remedial works required should be set out within a standalone RMS and submitted to the Local Authority for approval.

8 GEOTECHNICAL ASSESSMENT

8.1 Proposed Development

We understand that the Client is proposing to develop the site at Whiteley Road to provide approximately 48,000 square feet of commercial/industrial units comprising offices and workshops with associated parking and vehicle yard.

8.2 Site Preparation

The site should be cleared of any vegetation below the areas of proposed development and stripped in accordance with Series 200 of Specification of Highway Works.

Any roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting voids in-filled with suitable compacted material. This should also be undertaken for any redundant or re-routed services.

8.3 Ground Profile

Based on the findings on the current ground investigation, ground conditions at the site comprise Made Ground overlying bedrock attributed to Middle Pennine Coal Measures to the full depth of the ground investigation, discussed in 4.1. Site ground conditions are summarised in Table 8-1.

Table 8-1 Summary of site ground conditions

Borehole	Topsoil/Made Ground Thickness (m)	Bedrock	Groundwater (m bgl)
		Middle Pennine Coal Measures Thickness (m)	
BH101	2.10	27.90*	N/A
BH103	1.80	28.20*	N/A
BH106	0.60	29.40*	N/A
BH108	1.60	28.40*	N/A
BH109	2.20	27.80*	N/A
BH111	0.80	29.20*	N/A
BH115	3.30	26.70*	N/A
BH117	1.10	28.90*	N/A
BH119	0.50	29.50*	N/A
BH120	1.40	28.60*	N/A
BH121	1.80	28.20*	N/A
WS101	1.65	3.35	N/A
WS102	1.40	3.60	N/A
WS103	0.40	4.60	N/A
WS104	2.30	2.70	N/A
WS105	0.30	4.70	N/A
WS106	1.10	3.90	N/A
WS107	0.70	4.30	N/A
WS108	0.80	4.20	N/A

8.4 Shallow Foundations

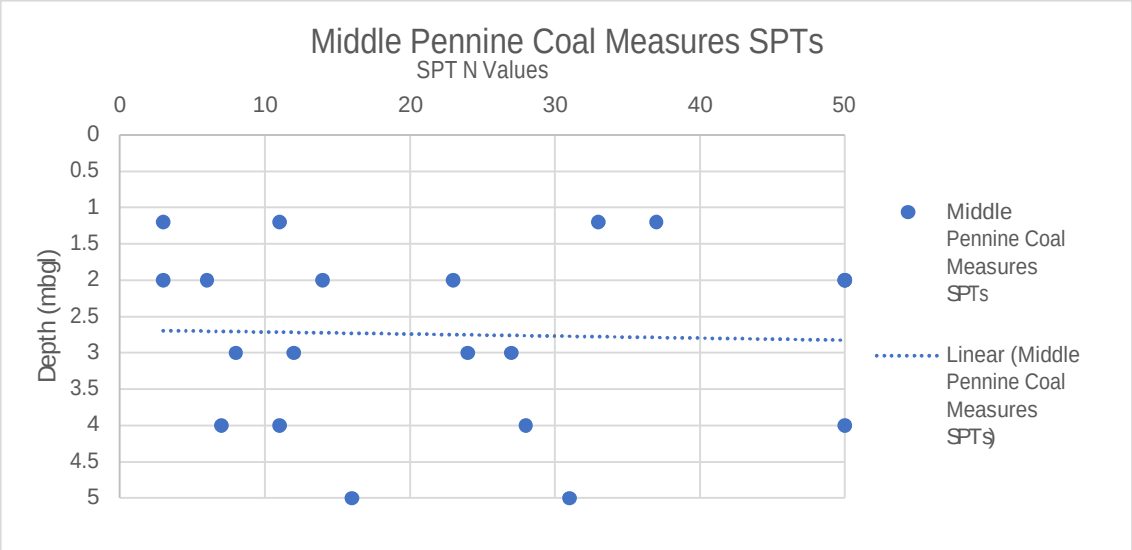
The following geotechnical assessment has been undertaken based on in-situ testing, laboratory analysis, and descriptions on the underlying geology. Foundation depths presented are indicative only based on a minimum presumed bearing value for a particular foundation type. Line loadings have not been made available such that the final depth and type of foundation required following design could vary.

It is considered that Made Ground would not form a suitable founding stratum due to characteristic variability and the associated potential for differential settlement. As such it is recommended that loads are transferred through the Made Ground to a depth at which competent geology, sufficient to support the proposed load, is encountered.

8.4.1 In Situ-Testing

Standard Penetration Testing was undertaken throughout the fine-grained Middle Pennine Coal Measures. The results are presented in Graph 8-1 below:

Graph 8-1 SPT vs Depth



The SPT data shows an increase in N-value with depth from N=3 at 1.20mg to N>50 at 4.00mbgl for the Middle Pennine Coal Measures.

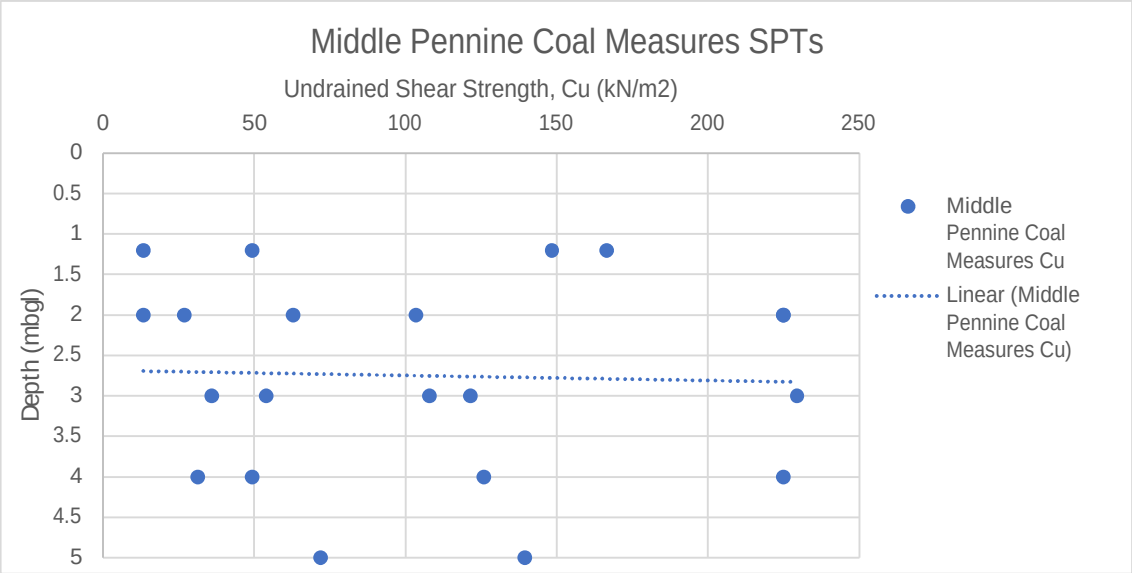
8.4.2 Shear Strength

The undrained Shear Strength of the fine-grained Middle Pennine Coal Measures have been determined by using the widely accepted empirical relationship, where f_1 is based on the correlation factor based on the plasticity index of the soil (Stroud, 1974):

$$_ = \ \times$$

Using a correlation factor of 4.5 gives characteristic undrained shear strengths (C_{uk}) of 13.5kN/m^2 at 1.20mbgl rising to 225kN/m^2 at a depth of 4.00mbgl, represented in Graph 8-2 below. These values are consistent with the formation becoming very low to very high strength material.

Graph 8-2 Shear Strength vs Depth



8.4.3 Bearing Capacities

8.4.3.1 Middle Pennine Coal Measures

Indicative Bearing Capacity at 1.20mbgl

At a depth of 1.20mbgl within the fine-grained soils of the Middle Pennine Coal Measures Formation, SPT N values ranged from N=11 to N=37, indicating firm to stiff clays. It is considered that a traditional strip foundation of 1.00m width at a depth of approximately 1.20mbgl provided corresponding undrained shear strengths of 49.5kN/m^2 to 166.5kN/m^2, indicating medium to very high strength material.

Utilising an undrained shear strength of 49.5kN/m^2, it is considered that a traditional strip foundation of 1.00m width at a depth of approximately 1.20mbgl provides a presumed bearing capacity of approximately 100-200kN/m^2.

An area of soft ground has been identified at WS106, where the SPT N value is N=3 at 1.20mbgl has not been included in this calculation and is referred to in the *Areas of Consideration* subsection.

Indicative Bearing Capacity at 2.00mbgl

At a depth of 2.00mbgl within the fine-grained soils of the Middle Pennine Coal Measures Formation, SPT N values range from N=14 to N=>50, providing corresponding undrained shear strengths of 63kN/m^2 to 225kN/m^2 indicating medium to very high strength material.

Utilising an undrained shear strength of 63kN/m2 it is considered that a traditional strip foundation of 1.00m width at a depth of approximately 2.00mbgl provides a presumed bearing capacity of approximately 100-200kN/m^2.

Two areas of soft ground are identified in WS102 and WS106 with SPT N Values of N=6 and N=3 respectively and are not included in this calculation and are referred to in the *Areas of Consideration* subsection.

Indicative Bearing Capacity at 3.00mbgl

At a depth of 3.00m bgl within the fine-grained soils of the Middle Pennine Coal Measures Formation, SPT N values range from N=12 to N=>50, provided corresponding undrained shear strengths of 54kN/m^2 to 225kN/m^2 indicating medium to very high strength material.

Utilising an undrained shear strength of 54kN/m^2 it is considered that a traditional strip foundation of 1.00m width at a depth of approximately 3.00mbgl provides a presumed bearing capacity of approximately 100-200kN/m^2.

An area of soft ground has been identified at WS102 with an SPT value of N=8 and is not included in this calculation and is referred to in the Area of Consideration subsection.

Areas of Consideration

WS102 may be less suitable for foundations due to relatively low SPT N values at 1.20mbgl, 2.00mbgl, and 3.00mbgl of N=6, N=8, and N=7 respectively. These values may lower the bearing capacity below acceptable levels for the requirements of the development.

WS106 is not suitable for foundations and is considered highly likely to require an alternative foundation solution due to SPT N Values of N=3 at 1.20mbgl and 2.00mbgl respectively. These values are equivalent to bearing capacities below 50kN/m^2 which is considered likely to be too low strength to found into for the proposed development. If traditional foundations are preferred it is recommended the situation is discussed with a ground improvement specialist or that a piled foundation is selected.

8.5 Groundwater Levels

Consideration should also be given to shallow groundwater encountered across the site. If groundwater is below the base of the foundation at a depth of less than the width of the proposed foundation, then groundwater can significantly reduce the bearing capacity of fine-grained soils.

While groundwater was encountered during site works, groundwater monitoring has recorded groundwater levels to a highest level of 1.84mbgl and therefore this should be taken into account when considering foundation design and excavations.

8.6 Building Near Trees

8.6.1 NHBC Minimum Depth to Foundations

The shallow fine-grained soils on site have been shown via laboratory analysis to generally be of low to high plasticity and low to medium volume change potential. Modified plasticity indices range from 12% to 37% therefore it is considered that soils of the upper weathered horizons of the Middle Pennine Coal Measures Formation are predominantly Medium Volume Change Potential.

NHBC guidance offers two foundation depth scenarios dependant on future planting regimes for Medium Volume Change Soils which utilises Tables 4 and 5 of NHBC Chapter 4.2 –Building Near Trees, summarised in Table 8-2 and Table 8-3 below.

Table 8-2 Minimum depth of foundations (after NHBC 2021)

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	1.00
Medium	1.25	0.90
Low	1.00	0.75

Table 8-3 New tree planting (after NHBC 2021)

Water demand	No tree planting zone for column A in Table 8-3	No tree planting zone / zone of influence for column B in Table 8-3
High	1.0 x mature height	1.25 x mature height
Moderate	0.5 x mature height	0.75 x mature height
Low	0.2 x mature height	0.50 x mature height

NHBC guidance indicates a minimum foundation depth of 0.90m bgl for medium volume change soils outside of the zone of tree influence (Column B, Table 8-3), which is dependent on the tree species but may be up to 0.75 x mature tree height (Table 8-3). Foundation depths will need to be increased within the zones of influence of existing or recently removed trees, as set out by NHBC Guidance (Chapter 4.2 –Building near Trees).

8.6.2 Lateral pressure and heave

Where foundations are more than 1.5m deep, within the influence of trees which are to remain or be removed, and may be subject to heave, they should be protected by voids, void formers or compressible materials to be take into account the effects of lateral swelling of soils. Minimum thicknesses of voids are set out in Table 7 of NHBC Chapter 4.2 –Building Near Trees.

Guidance is set out in NHBC the basic requirement is that compressible material or void former should be installed on the inside faces of external foundation walls. With piled foundation additional voids are required below ring beams. Position of heave precautions are set out in Table 8 of NHBC Chapter 4.2 –Building Near Trees.

8.7 Shallow Excavations

All hand excavations undertaken during this investigation were stable and shallow groundwater was encountered during the works. No issues are expected with shallow excavations due to cohesive material at depth. However, water levels during monitoring have been encountered up to 1.84mbgl which may affect the chosen foundation solution.

8.8 Ground Floor Slabs

Due to the variability of ground conditions across the site and Made Ground in excess of 600mm thickness it is considered that ground bearing floor slabs are not suitable for adoption and therefore a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2 to mitigate against the effects of differential settlement.

If levels were to be changed on site requiring steps in the substructure, further consideration should be given to the adoption of ground bearing floor slabs, with reference to NHBC Standards (2011) 5.1 – *Substructure and ground bearing floors*.

8.9 Pavement Construction

CBR values ranged from 4% to 398.5% between 5mmbgl and 940mmbgl within in-situ testing.

Therefore, adopting a conservative approach, a CBR value of 4% should be adopted from ground level at this stage.

Notwithstanding these results, CBR testing should always be carried out at formation level once details are finalised.

8.10 Concrete Durability

Utilising Table C2 within BRE Special Digest (2005) and pH-sulphate results the ground has been classed as indicative of a Design Sulphate Class DS-3 and an Aggressive Chemical Environment for Concrete of AC-3.

8.11 Discussion

At this stage, while the development plans are known, indicative line loads are not, and it is unknown if the calculated indicative bearing capacities at depths from 1.20-3.00m bgl are suitable for a shallow foundation for the proposed office building and workshops, with bearing capacities of 100-200kN/m^2. It is recommended that this assessment is provided to the appointed structural engineer for review.

It should be noted that soft spots (WS102 and WS106) have been identified which have reduced bearing capacities compared with the majority of the site and may require alternative foundation solutions.

Notwithstanding the above, a minimum foundation depth of 0.90m bgl is anticipated for a Medium Volume Change soil within the Pennine Middle Coal Measures outside of the zone of tree influence, in accordance with NHBC. Where foundations are likely to be within the influence of trees foundation depths will require locally deepening. The extent to which they should be deepened should be in accordance with NHBC guidance, Chapter 4.2 –Building Near Trees (Tables 4 and 5).

Should loadings exceed those set out above then alternative founding solutions will need to be explored.

Subject to regulatory requirements, the potential requirement exists to calculate bearing capacities and undertaken settlement analysis for foundations through production of a Geotechnical Design Report (GDR) which would provide calculations to current guidance, UK National Annex to EC7. Foundation design should be completed by a suitably qualified Structural Engineer, with specific consideration given to the variability in soil strengths.

9 CONCLUSIONS AND RECOMMENDATIONS

Revised Conceptual Site Model

Following completion of the Tier 1 risk assessment and all phases of monitoring works it is considered that active pollution linkages are present for human health (ground gas) and controlled waters (PAHs & TPHs) at the site based on a commercial end use.

Ground Gas Classification

Given that the typical permissible concentrations of CO2 and the guidance GSV values for CO2 have been exceeded it is recommended that at this stage a **Characteristic Situation 2 (CS-2)** classification is adopted for the site. Classification as CS-2 would require the installation of ground gas protection measures within any new buildings constructed.

Given the identified CS-2 classification, and the Type C building classification a minimum presumed gas protection score of **2.5** will be required as presented within Tables 3 & 4 within BS8485(2015)+A1(2019).

Ground gas protection measures are required for a CS-2 classification and should be selected as appropriate for a protection score level of 2.5 and comprise elements as presented within Section 7, Tables 5, 6 & 7 of BS8485(2015)+A1(2019).

Concrete Classification

Utilising Table C2 within BRE Special Digest (2005) and pH-sulphate results the ground has been classed as indicative of a Design Sulphate Class DS-3 and an Aggressive Chemical Environment for Concrete of AC-3.

Geotechnical Assessment

Shallow Foundations

It is considered that a traditional strip foundation of 1.00m width at a depth of approximately 1.00mbgl, 2.00mbgl and 3.00mbgl all provide a presumed bearing capacity of approximately 100-200kN/m2.

The area around WS102 may be less suitable for traditional foundations due to low SPT N values at 1.20mbgl, 2.00mbgl and 3,00mbgl of N=6, N=8 and N=7 respectively. These values may lower the bearing capacity below acceptable levels for the requirements of the development.

WS106 is not considered to be suitable for traditional foundations and may require some additional measures due to SPT N Values of N=3 at 1.20mbgl and 2.00mbgl respectively. These values give presumed bearing capacities below 50kN/m^2.

Ground Floor Slabs

Due to Made Ground in excess of 600mm being encountered across the entire site, it is considered that ground bearing floor slabs are not suitable for adoption and therefore a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2.

Recommendations

Environmental

Following the Tier 1 controlled waters risk assessment potential risk to controlled waters have been identified at the site. It is recommended that further investigation of the shallow groundwater at the site is carried out to provide a more complete characterisation of controlled water conditions.

It is recommended that further groundwater monitoring and sampling is undertaken at the site to further assess the risks posed to controlled waters. Further groundwater sampling should be carried out using the EA preferred low-flow sampling methodology to mitigate the potential impact of suspended solids.

Following the Tier 1 Human Health Risk assessment on-going risks to human health have been identified at the site. The measured elevated concentrations of Ground Gas will require remedial measures before the site can be considered suitable for the proposed commercial end use.

Details of required remedial works should be set out in a stand-alone Remediation Method Statement.

If during the development stage any evidence of contamination is identified, works should be halted, and contact made with a suitably qualified Environmental Consultant. As determined appropriate by the Consultant, further investigation and sampling may be required to determine the appropriate actions. Upon completion contact should be made with the regulator to achieve sign off of the works.

Geotechnical

Indicative bearing capacities within shallow soils on the site between 1.20mbgl and 3.00mbgl may offer sufficient bearing capacity for the proposed development but this cannot be confirmed without indicative line loads for the proposed structure.

Should piled foundations be selected, additional ground investigation is recommended in order to confirm the geology inferred from the rotary open holes and provide strength testing at depth to calculate pile bearing capacities.

If shallow foundations are selected, delineation of the soft zones identified in this investigation is recommended to allow for targeted remediation as required.

Subject to NHBC, regulatory and/or design requirements, the potential need exists to calculate bearing capacities and settlement for foundations in accordance with EC7 through production of a Geotechnical Design Report (GDR) which would include detailed design parameters used in structural design.

APPENDIX I - LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Omnia and the Client as indicated in Section 1.2.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

9. Omnia cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Omnia is owned by them, and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Omnia in this connection without their explicit written agreement there to by Omnia.

10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II –GLOSSARY

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (Chlorinated Solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (Petrol, Diesel, Kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo-Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCS	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation

UNITS

M	Metres
KM	Kilometres
%	Percent
%V/V	Percent Volume in Air
MB	Milli Bars (Atmospheric Pressure)
L/HR	Litres Per Hour
µG/L	Micrograms Per Litre (Parts Per Billion)
PPB	Parts Per Billion
MG/KG	Milligrams Per Kilogram (Parts Per Million)
PPM	Parts Per Million
MG/M^3	Milligram Per Metre Cubed
M BGL	Metres Below Ground Level
M BCL	Metres Below Cover Level

MAOD	Metres Above Ordnance Datum (Sea Level)
KN/M^2	Kilo Newtons Per Metre Squared
µM	Micrometre

APPENDIX III - DRAWINGS

Key

Site Boundary

0 500 1,000 1,500 2,000 m

Scale	Paper Size
1:50,000	A4

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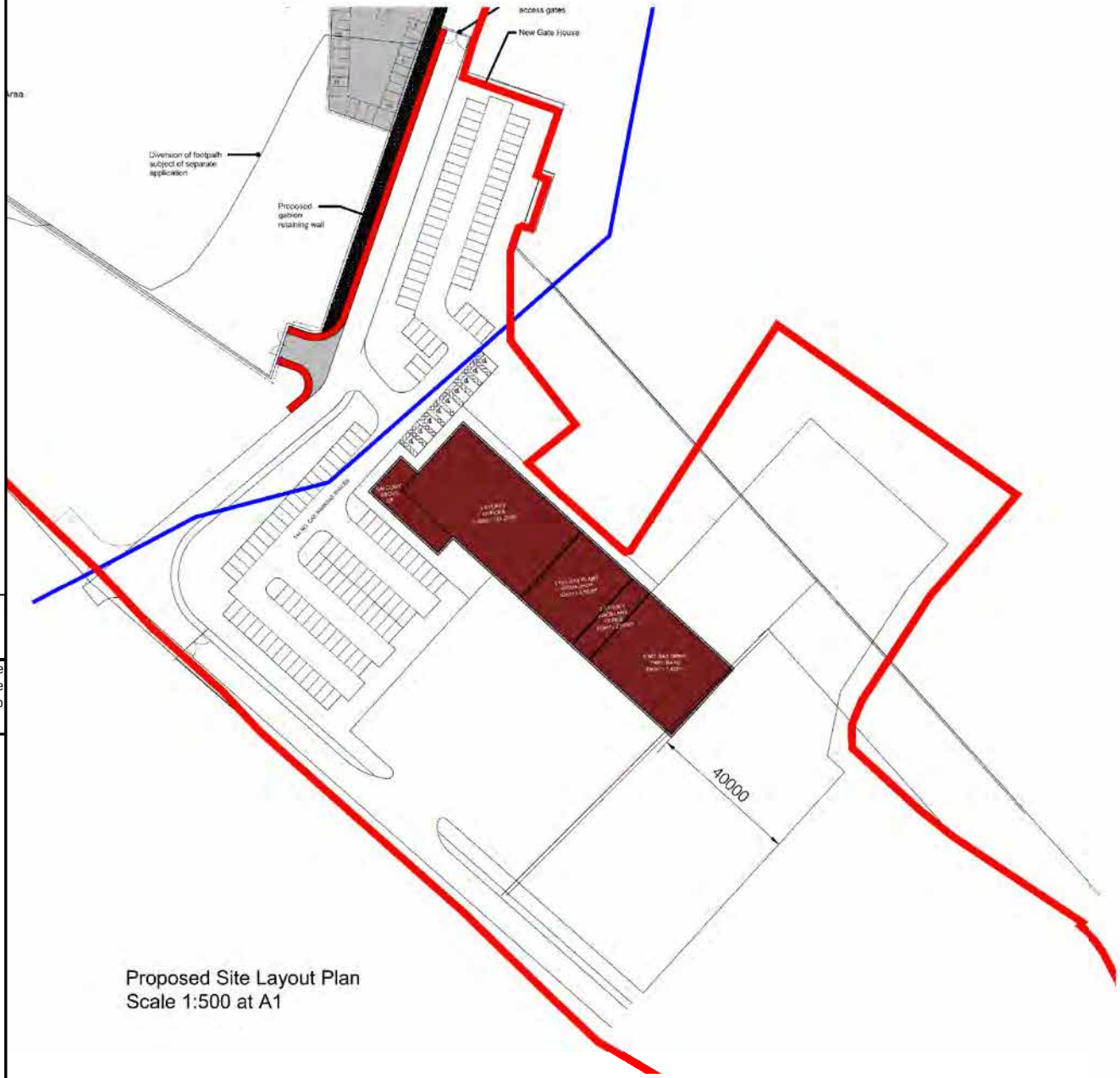
OMNIA

Job Title: Blue Earth Offices (Worksop)	Client: Millward Consulting Engineers	Project Number: B10925	Date: 19/12/22
		Drawn By: J. Roberts	Authorised By: W. Bennett

Drawing Title: Figure 1.0 Site Location Plan

Key

Site Boundary



Proposed Site Layout Plan
Scale 1:500 at A1

Scale	Paper Size
NTS	A4

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BlueEarth Construction

PROJECT: BlueEarth Construction
Proposed Headquarters Facility
Ripley

STATUS: Sketch

DRAWING TITLE: Proposed Site Layout Plan

DATE: 18/05/2022 DRAWN BY: BH

SCALE: 1:500 AT A1 CHECKED BY: ISM

ima ARCHITECTS
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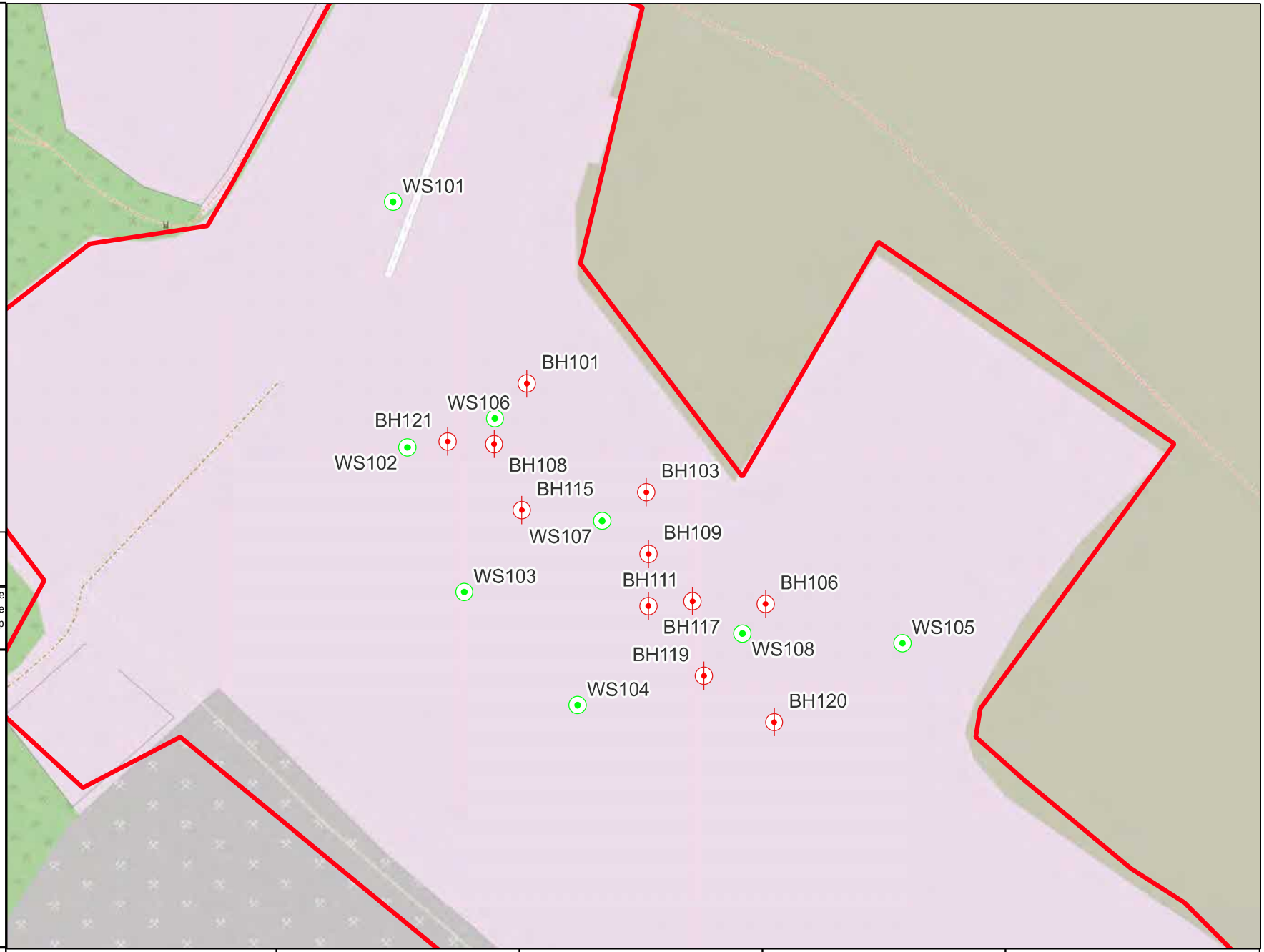
DRAWING NO: 221017-SK07 REVISION: -

OMNIA

Job Title: Blue Earth Offices (Worksop)	Client: Millward Consulting Engineers	Project Number: B10925	Date: 19/12/22
		Drawn By: J. Roberts	Authorised By: W. Bennett

Drawing Title:
Figure 2.0
Proposed Development Plan



Key

Site Boundary

GI Posions

OH

WLS

0 10 20 30 40 50 m

Scale	Paper Size
1:1,250	A4

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		Drawn By: J. Roberts	Authorised By: W. Bennett

Drawing Title: Figure 3.0 Exploratory Hole Location Plan

APPENDIX IV - PHOTOGRAPHS



Photograph 1: Showing the main area of the investigation, the plant yard.



Photograph 2: Drilling works underway at BH108



Photograph 3: Strata recovered from WS104



Photograph 4: DCP103, showing deflection of the DCP due to hard obstruction and surface below the raised plant yard. Disused rail lines cross the image.



Photograph 5: Showing a cored out position after a DCP test.

APPENDIX V - EXPLORATORY HOLE LOGS

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 17/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH101	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								2.10			Grey CLAY. [PENNINE MIDDLE COAL MEASURES]
								4.90			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								7.10			COAL. [PENNINE MIDDLE COAL MEASURES]
								7.20			Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 17/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH101	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
								16.00			COAL. [PENNINE MIDDLE COAL MEASURES]
								16.40			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 17/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH101	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 12/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH103	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								1.80			Yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								2.30			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								7.60			COAL. [PENNINE MIDDLE COAL MEASURES]
								7.70			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 12/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH103	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								15.30			COAL. [PENNINE MIDDLE COAL MEASURES]
								15.80			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 12/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH103	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 12/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH106	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								0.60			Yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								1.30			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								4.80			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 12/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH106	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								16.40			COAL. [PENNINE MIDDLE COAL MEASURES]
								17.00			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 12/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH106	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 10/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH108	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								1.60			Yellow brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								3.00			Grey CLAY. [PENNINE MIDDLE COAL MEASURES]
								5.50			Yellowish brown and grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								6.70			Black SHALE. [PENNINE MIDDLE COAL MEASURES]
								6.80			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 10/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH108	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								16.10			COAL. [PENNINE MIDDLE COAL MEASURES]
								16.50			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 10/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH108	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 11/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH109	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								2.20			Yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								3.90			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								7.50			COAL. [PENNINE MIDDLE COAL MEASURES]
								7.60			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 11/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH109	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								15.20			COAL. [PENNINE MIDDLE COAL MEASURES]
								15.60			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 11/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH109	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 14/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH111	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								0.80			Yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								1.20			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								4.30			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								6.30			COAL. [PENNINE MIDDLE COAL MEASURES]
								6.50			Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 14/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH111	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
								16.00			COAL. [PENNINE MIDDLE COAL MEASURES]
								16.50			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 14/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH111	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 11/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH115	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								3.30			Yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								4.60			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								7.10			COAL. [PENNINE MIDDLE COAL MEASURES]
								7.30			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 11/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH115	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								16.00			COAL. [PENNINE MIDDLE COAL MEASURES]
								16.50			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 11/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH115	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 14/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH117	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								1.10			Yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								3.00			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								5.00			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								6.30			COAL. [PENNINE MIDDLE COAL MEASURES]
								6.40			Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 14/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH117	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
								16.10			COAL. [PENNINE MIDDLE COAL MEASURES]
								16.60			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 14/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH117	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 13/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH119	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
								0.50			MADE GROUND.
											Yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								2.20			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								5.10			COAL [PENNINE MIDDLE COAL MEASURES]
								5.20			Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 13/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH119	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
								15.10			COAL. [PENNINE MIDDLE COAL MEASURES]
								15.60			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 13/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH119	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 13/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH120	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								1.40			Yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
								3.20			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								4.40			Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 13/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH120	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE & SANDSTONE. [PENNINE MIDDLE COAL MEASURES]
								13.80			COAL. [PENNINE MIDDLE COAL MEASURES]
								14.30			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 13/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH120	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 10/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH121	RC		JR	1:50	Sheet 1 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											MADE GROUND.
								1.80			Grey CLAY. [PENNINE MIDDLE COAL MEASURES]
								6.00			Yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								7.00			Black Shale. [PENNINE MIDDLE COAL MEASURES]
								7.10			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

1 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 10/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH121	RC		JR	1:50	Sheet 2 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								16.50			Coal. [PENNINE MIDDLE COAL MEASURES]
								17.00			Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)				

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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Rotary Core Log

Project Name: Blue Earth Offices	Client: Millward Consulting Engineers	Date: 10/10/2022
Location: Ripley	Contractor: MCD	
Project No. : B10925	Crew Name:	Drilling Equipment: Klemm

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH121	RC		JR	1:50	Sheet 3 of 3

Well	Water	Depth (m)	Type /FI	Coring TCR	Coring SCR	Coring RQD	Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description
											Grey MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
			Type/FI	TCR	SCR	RQD	D/R/(SPT)	30.00			End of Borehole at 30.000m

21 22 23 24 25 26 27 28 29 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 (%)
												0.00	30.00	Water	Grey	90	100

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. All descriptions are drillers descriptions.

Borehole Log

OMNIA

Borehole No. **WS101** Sheet 1 of 1

Project Name: Blue Earth Offices	Project No. B10925	Co-ords: -	Hole Type WLS
Location: Ripley		Level:	Scale 1:25
Client: Millward Consulting Engineers		Dates: 14/10/2022 - 14/10/2022	Logged By JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			CONCRETE
								MADE GROUND. Light grey dense sandy angular fine to coarse GRAVEL of limestone.
					0.60			MADE GROUND. Firm dark grey gravelly CLAY. Gravel is angular to subrounded fine to coarse of brick and concrete.
		1.20		N=23 (3,6/5,5,7,6)	1.20			MADE GROUND. Black subangular to subrounded fine to coarse GRAVEL of clinker.
		1.20 - 1.65	SPTLS					
		1.50 - 1.60	D					*Faint hydrocarbon odour (diesel)*
					1.65			Firm light grey mottled brown slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone. [PENNINE MIDDLE COAL MEASURES]
				HVP=89				
		2.00		N=14 (2,2/3,3,4,4)				
		2.00 - 2.45	SPTLS					
				HVP=69 HVR=19				
		2.60 - 2.70	D					
				HVP=64				
		3.00		N=24 (3,4/6,6,6,6)				*Becoming Stiff gravelly CLAY*
		3.00 - 3.45	SPTLS					
		3.50 - 3.60	D					
		4.00		N=50 (9,6/50 for 230mm)				
	▼	4.00 - 4.20	SPTLS		4.20			End of borehole at 4.20 m

Remarks
1. Position scanned with calibrated CAT & 'Genny' prior to excavation.

AGS

Borehole Log

OMNIA		Borehole No. **WS102** Sheet 1 of 1
Project Name: Blue Earth Offices	Project No. B10925	Co-ords: - / Hole Type WLS
Location: Ripley		Level: / Scale 1:25
Client: Millward Consulting Engineers		Dates: 14/10/2022 - 14/10/2022 / Logged By JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			CONCRETE
								MADE GROUND. Black gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of brick and clinker.
		1.20		N=13 (2,3/4,3,3,3)				
					1.40			Firm to stiff light brown mottled grey CLAY. [PENNINE MIDDLE COAL MEASURES]
		2.00		N=6 (1,2/1,2,1,2)				
		3.00		N=8 (1,1/2,2,2,2)				
		4.00		N=7 (1,1/2,1,2,2)	4.00			Stiff grey CLAY. [PENNINE MIDDLE COAL MEASURES]
		5.00		N=16 (2,2/3,4,5,4)	5.00			End of borehole at 5.00 m

Remarks
1. Position scanned with calibrated CAT & 'Genny' prior to excavation.

AGS

Borehole Log

Borehole No. **WS103**

Sheet 1 of 1

Project Name: Blue Earth Offices	Project No. B10925	Co-ords: -	Hole Type WLS
Location: Ripley		Level:	Scale 1:25
Client: Millward Consulting Engineers		Dates: 13/10/2022 - 13/10/2022	Logged By JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.40			MADE GROUND. Dense light brown sandy angular to subrounded fine to coarse GRAVEL of mixed lithology.
					0.40			CONCRETE.
								End of borehole at 0.40 m

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.2. Position refused on buried concrete slab.

Borehole Log

Borehole No. **WS104**

Sheet 1 of 1

Project Name: Blue Earth Offices	Project No. B10925	Co-ords: -	Hole Type WLS
Location: Ripley		Level:	Scale 1:25
Client: Millward Consulting Engineers		Dates: 13/10/2022 - 13/10/2022	Logged By JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES					MADE GROUND. Dense brown very sandy angular to subrounded fine to coarse GRAVEL of mixed lithology. [TYPE 1]
								Edge of concrete pad encountered, extending pit. Pad extends down past 1.2mbgl
		0.90	ES					
		1.20		N=5 (2,2/2,0,1,2)				
		1.20 - 1.65	D					*Whole brick*
		1.50 - 1.60	ES					*Metal spring lodged in concrete blocking barrel*
		2.00		N=9 (4,3/2,2,2,3)				
		2.00 - 2.45	SPTL S					
	▼				2.30			Firm brown CLAY. [PENNINE MIDDLE COAL MEASURES]
		2.40 - 2.50	ES					
				HVP=81 HVR=20				
					2.60			
					2.70			Firm black gravelly silty CLAY. Gravel is angular to subrounded fine to medium of coal. [PENNINE MIDDLE COAL MEASURES]
				HVP=70				Stiff light brown mottled grey CLAY. [PENNINE MIDDLE COAL MEASURES]
		3.00		N=27 (5,5/6,7,7,7)				*Very stiff, brittle*
		3.00 - 3.45	SPTL S					
		3.50 - 3.60	ES					
		4.00		N=28 (3,4/6,6,8,8)				
		4.00 - 4.45	SPTL S					
		4.50 - 4.60	D					
					4.60			End of borehole at 4.60 m

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.

Borehole Log

Borehole No. **WS105** Sheet 1 of 1

Project Name: Blue Earth Offices	Project No. B10925	Co-ords: -	Hole Type WLS
Location: Ripley		Level:	Scale 1:25
Client: Millward Consulting Engineers		Dates: 14/10/2022 - 14/10/2022	Logged By JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30			MADE GROUND. Black andy angular to subrounded fine to coarse GRAVEL of brick fragments. Sand is fine to coarse.
								Extremely weak yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
								Occasionally locally weathered to very stiff clay.
		1.20		N=37 (4,6/7,9,10,11)				
		2.00		N=50 (9,12/50 for 240mm)	2.00			End of borehole at 2.00 m

1 2 3 4 5

Remarks
1. Position scanned with calibrated CAT & 'Genny' prior to excavation.

OMNIA

Borehole Log

Borehole No. **WS106** Sheet 1 of 2

Project Name: Blue Earth Offices	Project No. B10925	Co-ords: -	Hole Type WLS
Location: Ripley		Level:	Scale 1:25
Client: Millward Consulting Engineers		Dates: 13/10/2022 - 13/10/2022	Logged By JR

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.10			BITUMINOUS MATERIAL. Asphalt
								MADE GROUND. Black very sandy angular to subangular GRAVEL of clinker, bricks and limestone.
								Layer of whole bricks
					0.50			MADE GROUND. Black sandy angular to subangular fine to medium GRAVEL of Ash, clinker and brick fragments.
					1.10			Firm yellowish brown CLAY. [PENNINE MIDDLE COAL MEASURES]
		1.20		N=3 (0,1/0,1,1,1)				
		1.30 - 1.50	ES					*No spt recovery*
				HVP=41 HVR=21				
				HVP=22 HVR=19				
		1.80 - 1.90	D					
		2.00		N=3 (1,0/1,1,0,1)	2.00			Soft black gravelly CLAY. Gravel is subangular to subrounded fine to coarse of coal. [PENNINE MIDDLE COAL MEASURES]
		2.00 - 2.45	SPTL S					
		2.40 - 2.60	ES					
					2.70			Firm grey mottled light brown CLAY. [PENNINE MIDDLE COAL MEASURES]
				HVP=35 HVR=15				
		3.00		N=12 (2,2/3,2,3,4)	3.00			Stiff grey mottled light brown slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone. [PENNINE MIDDLE COAL MEASURES]
		3.00 - 3.45	SPTL S					
				HVP=70				
				HVP=65				
	▼	4.00		N=11 (2,2/2,3,3,3)				
		4.00 - 4.45	SPTL S					
		4.60 - 5.00	D					
		5.00		N=31 (3,5/6,7,9,9)				

Continued on next sheet

Remarks
1. Position scanned with calibrated CAT & 'Genny' prior to excavation.

AGS

Borehole Log

Borehole No. **WS106** Sheet 2 of 2

Project Name: Blue Earth Offices	Project No. B10925	Co-ords: -	Hole Type WLS
Location: Ripley		Level:	Scale 1:25
Client: Millward Consulting Engineers		Dates: 13/10/2022 - 13/10/2022	Logged By JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		5.00 - 5.45	SPTLS		5.45			End of borehole at 5.45 m

Remarks
1. Position scanned with calibrated CAT & 'Genny' prior to excavation.

Borehole Log

Borehole No. **WS107**

Sheet 1 of 1

Project Name: Blue Earth Offices	Project No. B10925	Co-ords: -	Hole Type WLS
Location: Ripley		Level:	Scale 1:25
Client: Millward Consulting Engineers		Dates: 14/10/2022 - 14/10/2022	Logged By JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			BITUMINOUS MATERIAL
								MADE GROUND. Black sandy angular to subangular fine to coarse GRAVEL of clinker, brick and concrete
					0.70			
					0.70			MADE GROUND. Black sandy angular to subangular fine to coarse GRAVEL of clinker, brick and concrete
					0.90			Soft black silty gravelly CLAY. Gravel is angular to subrounded fine to coarse of coal. [PENNINE MIDDLE COAL MEASURES]
		1.20		N=11 (2,3/2,3,3,3)				Firm yellowish brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone. [PENNINE MIDDLE COAL MEASURES]
		1.20 - 1.65	SPTLS					
				HVP=35 HVR=9				
		1.50 - 1.70	D					
				HVP=18				
		2.00		N=23 (5,5/5,6,6,6)	2.00			Extremely weak yellowish brown MUDSTONE. [PENNINE MIDDLE COAL MEASURES]
		2.00 - 2.45	SPTLS					
		3.00		N=51 (5,6/11,12,14,14)	3.00			End of borehole at 3.00 m

Remarks

1. Position scanned with calibrated CAT & 'Genny' prior to excavation.

Borehole Log

OMNIA		Borehole No. **WS108** Sheet 1 of 1
Project Name: Blue Earth Offices	Project No. B10925	Co-ords: - / Hole Type WLS
Location: Ripley		Level: / Scale 1:25
Client: Millward Consulting Engineers		Dates: 14/10/2022 - 14/10/2022 / Logged By JR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			CONCRETE
								MADE GROUND. Black sandy angular to subangular fine to coarse GRAVEL of clinker, brick and concrete
					0.80			
					0.90			Soft black silty gravelly CLAY. Gravel is angular to subrounded fine to coarse of coal. [PENNINE MIDDLE COAL MEASURES]
		1.20 1.20 - 1.65	SPTL S	N=33 (6,8/8,8,9,8)				Stiff light brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone. [PENNINE MIDDLE COAL MEASURES]
		2.00 2.00 - 2.45	SPTL S	N=50 (9,11/12,11,12,15)				
					2.45			End of borehole at 2.45 m

Remarks
1. Position scanned with calibrated CAT & 'Genny' prior to excavation.

AGS

APPENDIX VI - CHEMICAL ANALYSIS CERTIFICATES

Element Materials Technology
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Omnia
3-6 The Quarterdeck
Port Solent
Portsmouth
PO6 4TP

Attention :	William Bennett
Date :	11th November, 2022
Your reference :	B10925
Our reference :	Test Report 22/17369 Batch 1
Location :	Ripley
Date samples received :	21st October, 2022
Status :	Final Report
Issue :	1

Fourteen samples were received for analysis on 21st October, 2022 of which thirteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Liza Klebe
Project Co-ordinator

Please include all sections of this report if it is reproduced

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett
EMT Job No: 22/17369

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-23	24-25	26-27	LOD/LOR	Units	Method No.
Sample ID	WS106	WS106	WS106	WS106	WS103	WS104	WS104	WS104	WS104	WS102			
Depth	0.20	0.70	1.30-1.50	2.40-2.60	0.20	0.30	0.90	1.50-1.60	2.40-2.50	0.50			
COC No / misc													
Containers	J	J	J	J	J	J	J	J	J	J			
Sample Date	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	14/10/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022			
Arsenic #	9.8	10.0	8.9	23.3	10.8	23.4	32.4	20.4	4.9	29.8	<0.5	mg/kg	TM30/PM15
Barium #	957	748	68	650	304	251	364	156	68	167	<1	mg/kg	TM30/PM15
Beryllium	0.9	6.6	1.6	6.3	0.9	0.9	0.9	0.6	1.2	2.9	<0.5	mg/kg	TM30/PM15
Cadmium #	1.5	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Chromium #	27.0	51.8	38.8	32.9	69.9	76.5	73.6	60.8	30.5	41.7	<0.5	mg/kg	TM30/PM15
Copper #	34	80	26	166	19	25	23	18	19	48	<1	mg/kg	TM30/PM15
Lead #	31	37	27	145	25	36	28	24	16	43	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Nickel #	12.5	69.7	29.0	31.8	21.6	34.4	37.9	27.7	27.3	33.2	<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	4	<1	5	5	2	<1	1	<1	mg/kg	TM30/PM15
Vanadium	23	90	33	42	35	64	77	54	31	46	<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.5	2.3	1.0	1.4	1.3	1.7	2.1	1.8	0.9	1.1	<0.1	mg/kg	TM74/PM32
Zinc #	102	113	121	176	88	175	135	130	85	74	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	0.10	0.14	<0.04	0.17	<0.04	<0.04	<0.04	<0.04	<0.04	0.51	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.16	0.31	<0.03	0.53	0.06	<0.03	<0.03	<0.03	<0.03	0.40	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.28	0.13	<0.03	0.41	0.10	<0.03	<0.03	<0.03	<0.03	0.32	<0.03	mg/kg	TM4/PM8
Pyrene #	0.27	0.11	<0.03	0.37	0.09	<0.03	<0.03	<0.03	<0.03	0.33	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.18	0.10	<0.06	0.25	0.08	<0.06	<0.06	<0.06	<0.06	0.17	<0.06	mg/kg	TM4/PM8
Chrysene #	0.17	0.08	<0.02	0.25	0.06	<0.02	<0.02	<0.02	<0.02	0.22	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.28	0.13	<0.07	0.45	0.11	<0.07	<0.07	<0.07	<0.07	0.37	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.11	<0.04	<0.04	0.18	0.04	<0.04	<0.04	<0.04	<0.04	0.12	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.12	0.06	<0.04	0.18	0.06	<0.04	<0.04	<0.04	<0.04	0.12	<0.04	mg/kg	TM4/PM8
PAH 16 Total	1.8	1.1	<0.6	2.9	0.6	<0.6	<0.6	<0.6	<0.6	2.8	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.20	0.09	<0.05	0.32	0.08	<0.05	<0.05	<0.05	<0.05	0.27	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.08	0.04	<0.02	0.13	0.03	<0.02	<0.02	<0.02	<0.02	0.10	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	88	95	77	87	94	92	92	100	78	105	<0	%	TM4/PM8
EPH >C8-C10 (EH_1D_Total) #	<5	<5	<5	<5	<5	<5	<5	<5	<5	9	<5	mg/kg	TM5/PM8
EPH >C10-C12 (EH_1D_Total) #	<10	<10	<10	<10	<10	<10	<10	<10	<10	12	<10	mg/kg	TM5/PM8
EPH >C12-C16 (EH_1D_Total) #	15	20	<10	28	<10	<10	<10	<10	<10	27	<10	mg/kg	TM5/PM8
EPH >C16-C21 (EH_1D_Total) #	86	55	<10	67	52	21	17	22	<10	68	<10	mg/kg	TM5/PM8
EPH >C21-C35 (EH_1D_Total) #	409	330	79	372	735	792	628	575	<10	200	<10	mg/kg	TM5/PM8
EPH >C35-C44 (EH_1D_Total)	318	153	63	50	169	106	68	29	<10	<10	<10	mg/kg	TM5/PM8
EPH >C8-C44 (EH_1D_Total)	828	558	142	517	956	919	713	626	<30	316	<30	mg/kg	TM5/PM8
GRO (>C4-C6)	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	mg/kg	TM36/PM12

Please see attached notes for all abbreviations and acronyms

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett
EMT Job No: 22/17369

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-23	24-25	26-27	LOD/LOR	Units	Method No.
Sample ID	WS106	WS106	WS106	WS106	WS103	WS104	WS104	WS104	WS104	WS102			
Depth	0.20	0.70	1.30-1.50	2.40-2.60	0.20	0.30	0.90	1.50-1.60	2.40-2.50	0.50			
COC No / misc													
Containers	J	J	J	J	J	J	J	J	J	J			
Sample Date	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	13/10/2022	14/10/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022	21/10/2022			
GRO (>C6-C8) (HS_1D_Total) #	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	mg/kg	TM36/PM12
GRO (>C4-C8)	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	mg/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	8.0	25.0	22.1	31.8	10.5	14.4	15.1	17.4	24.8	28.4	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0493	0.0501	0.0164	0.0716	0.3504	1.4593	1.5442	1.5713	0.1939	0.0479	<0.0015	g/l	TM38/PM20
Chromium III	27.0	51.8	38.8	32.9	69.9	76.5	73.6	60.8	30.5	41.7	<0.5	mg/kg	NONE/NONE
Total Cyanide #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
pH #	8.65	8.46	7.92	7.73	11.18	7.98	7.90	7.98	7.55	8.34	<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett
EMT Job No: 22/17369

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	28-29	30-31	32-33								LOD/LOR	Units	Method No.
Sample ID	WS101	WS101	WS107										
Depth	0.30	0.80	0.50										
COC No / misc													
Containers	J	J	J										
Sample Date	14/10/2022	14/10/2022	14/10/2022										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	21/10/2022	21/10/2022	21/10/2022										
Arsenic #	1.7	5.3	14.1								<0.5	mg/kg	TM30/PM15
Barium #	230	197	905								<1	mg/kg	TM30/PM15
Beryllium	<0.5	0.9	1.5								<0.5	mg/kg	TM30/PM15
Cadmium #	0.8	<0.1	1.1								<0.1	mg/kg	TM30/PM15
Chromium #	8.4	18.7	26.2								<0.5	mg/kg	TM30/PM15
Copper #	7	22	32								<1	mg/kg	TM30/PM15
Lead #	35	17	31								<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel #	5.3	17.8	19.0								<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	1								<1	mg/kg	TM30/PM15
Vanadium	7	22	27								<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.3	1.1	2.0								<0.1	mg/kg	TM74/PM32
Zinc #	28	41	79								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	0.12								<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	1.42								<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	0.10								<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	0.28								<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	0.30								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	0.17								<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	0.13								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	0.20								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	0.08								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	0.07								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	0.09								<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	3.0								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	0.14								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	0.06								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	84	90								<0	%	TM4/PM8
EPH >C8-C10 (EH_1D_Total) #	<5	<5	<5								<5	mg/kg	TM5/PM8
EPH >C10-C12 (EH_1D_Total) #	<10	<10	<10								<10	mg/kg	TM5/PM8
EPH >C12-C16 (EH_1D_Total) #	<10	<10	13								<10	mg/kg	TM5/PM8
EPH >C16-C21 (EH_1D_Total) #	<10	<10	83								<10	mg/kg	TM5/PM8
EPH >C21-C35 (EH_1D_Total) #	<10	<10	262								<10	mg/kg	TM5/PM8
EPH >C35-C44 (EH_1D_Total)	<10	<10	34								<10	mg/kg	TM5/PM8
EPH >C8-C44 (EH_1D_Total)	<30	<30	392								<30	mg/kg	TM5/PM8
GRO (>C4-C6)	<0.1	<0.1	<0.1 SV								<0.1	mg/kg	TM36/PM12

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett
EMT Job No: 22/17369

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	28-29	30-31	32-33								LOD/LOR	Units	Method No.
Sample ID	WS101	WS101	WS107										
Depth	0.30	0.80	0.50										
COC No / misc													
Containers	J	J	J										
Sample Date	14/10/2022	14/10/2022	14/10/2022										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	21/10/2022	21/10/2022	21/10/2022										
GRO (>C6-C8) (HS_1D_Total) #	<0.1	<0.1	<0.1 SV								<0.1	mg/kg	TM36/PM12
GRO (>C4-C8)	<0.1	<0.1	<0.1 SV								<0.1	mg/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15								<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	4.6	27.4	10.6								<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3								<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0640	0.0184	1.0864								<0.0015	g/l	TM38/PM20
Chromium III	8.4	18.7	26.2								<0.5	mg/kg	NONE/NONE
Total Cyanide #	<0.5	<0.5	<0.5								<0.5	mg/kg	TM89/PM45
pH #	10.72	8.20	8.00								<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/17369	1	WS106	0.20	3	Emma Woodward	02/11/2022	**General Description (Bulk Analysis)**	Soil stone
					Emma Woodward	02/11/2022	**Asbestos Fibres**	Trace Asbestos
					Emma Woodward	02/11/2022	**Asbestos ACM**	NAD
					Emma Woodward	02/11/2022	**Asbestos Type**	Chrysotile
					Remigiusz Blichowski	08/11/2022	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					Remigiusz Blichowski	08/11/2022	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					Remigiusz Blichowski	08/11/2022	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
					Remigiusz Blichowski	10/11/2022	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					Remigiusz Blichowski	10/11/2022	**Asbestos Gravimetric & PCOM Total**	<0.001 (mass %)
22/17369	1	WS106	0.70	6	Emma Woodward	02/11/2022	**General Description (Bulk Analysis)**	Soil stone
					Emma Woodward	02/11/2022	**Asbestos Fibres**	NAD
					Emma Woodward	02/11/2022	**Asbestos ACM**	NAD
					Emma Woodward	02/11/2022	**Asbestos Type**	NAD
22/17369	1	WS106	1.30-1.50	9	Simon Postlewhite	02/11/2022	**General Description (Bulk Analysis)**	Brown soil/stones
					Simon Postlewhite	02/11/2022	**Asbestos Fibres**	NAD
					Simon Postlewhite	02/11/2022	**Asbestos ACM**	NAD
					Simon Postlewhite	02/11/2022	**Asbestos Type**	NAD
22/17369	1	WS106	2.40-2.60	12	Emma Woodward	02/11/2022	**General Description (Bulk Analysis)**	Grey soil stone
					Emma Woodward	02/11/2022	**Asbestos Fibres**	NAD
					Emma Woodward	02/11/2022	**Asbestos ACM**	NAD
					Emma Woodward	02/11/2022	**Asbestos Type**	NAD
22/17369	1	WS103	0.20	15	Simon Postlewhite	02/11/2022	**General Description (Bulk Analysis)**	Brown soil/stones
					Simon Postlewhite	02/11/2022	**Asbestos Fibres**	NAD
					Simon Postlewhite	02/11/2022	**Asbestos ACM**	NAD
					Simon Postlewhite	02/11/2022	**Asbestos Type**	NAD
22/17369	1	WS104	0.30	18	Anthony Carman	02/11/2022	**General Description (Bulk Analysis)**	Brown Soil/Stones
					Anthony Carman	02/11/2022	**Asbestos Fibres**	Fibre Bundles
					Anthony Carman	02/11/2022	**Asbestos Fibres (2)**	Fibre Bundles
					Anthony Carman	02/11/2022	**Asbestos ACM**	NAD
					Anthony Carman	02/11/2022	**Asbestos ACM (2)**	NAD
					Anthony Carman	02/11/2022	**Asbestos Type**	Chrysotile
					Anthony Carman	02/11/2022	**Asbestos Type (2)**	Amosite
					Remigiusz Blichowski	08/11/2022	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					Remigiusz Blichowski	08/11/2022	**Total Detailed Gravimetric Quantification (% Asb)**	0.023 (mass %)

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/17369	1	WS104	0.30	18	Remigiusz Blichowski	08/11/2022	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	0.023 (mass %)
					Remigiusz Blichowski	10/11/2022	Asbestos PCOM Quantification (Fibres)	0.005 (mass %)
					Remigiusz Blichowski	10/11/2022	Asbestos Gravimetric & PCOM Total	0.028 (mass %)
22/17369	1	WS104	0.90	21	Anthony Carman	02/11/2022	General Description (Bulk Analysis)	Brown Soil/Stones
					Anthony Carman	02/11/2022	Asbestos Fibres	Fibre Bundles
					Anthony Carman	02/11/2022	Asbestos Fibres (2)	Fibre Bundles
					Anthony Carman	02/11/2022	Asbestos ACM	NAD
					Anthony Carman	02/11/2022	Asbestos ACM (2)	NAD
					Anthony Carman	02/11/2022	Asbestos Type	Chrysotile
					Anthony Carman	02/11/2022	Asbestos Type (2)	Amosite
					Remigiusz Blichowski	08/11/2022	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	08/11/2022	Total Detailed Gravimetric Quantification (% Asb)	0.006 (mass %)
					Remigiusz Blichowski	08/11/2022	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	0.006 (mass %)
					Remigiusz Blichowski	10/11/2022	Asbestos PCOM Quantification (Fibres)	0.002 (mass %)
					Remigiusz Blichowski	10/11/2022	Asbestos Gravimetric & PCOM Total	0.008 (mass %)
22/17369	1	WS104	1.50-1.60	22	Catherine Coles	02/11/2022	General Description (Bulk Analysis)	soil, stone, brick
					Catherine Coles	02/11/2022	Asbestos Fibres	Fibre Bundles
					Catherine Coles	02/11/2022	Asbestos Fibres (2)	Fibre Bundles
					Catherine Coles	02/11/2022	Asbestos ACM	ACM Debris
					Catherine Coles	02/11/2022	Asbestos ACM (2)	ACM Debris
					Catherine Coles	02/11/2022	Asbestos Type	Chrysotile
					Catherine Coles	02/11/2022	Asbestos Type (2)	Amosite
					Remigiusz Blichowski	08/11/2022	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	08/11/2022	Total Detailed Gravimetric Quantification (% Asb)	0.007 (mass %)
					Remigiusz Blichowski	08/11/2022	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	0.007 (mass %)
					Remigiusz Blichowski	10/11/2022	Asbestos PCOM Quantification (Fibres)	0.007 (mass %)
					Remigiusz Blichowski	10/11/2022	Asbestos Gravimetric & PCOM Total	0.014 (mass %)
22/17369	1	WS104	2.40-2.50	24	Emma Woodward	02/11/2022	General Description (Bulk Analysis)	Brown soil stone
					Emma Woodward	02/11/2022	Asbestos Fibres	NAD
					Emma Woodward	02/11/2022	Asbestos ACM	NAD
					Emma Woodward	02/11/2022	Asbestos Type	NAD
22/17369	1	WS102	0.50	26	Emma Woodward	02/11/2022	General Description (Bulk Analysis)	Brown soil stone
					Emma Woodward	02/11/2022	Asbestos Fibres	NAD
					Emma Woodward	02/11/2022	Asbestos ACM	NAD
					Emma Woodward	02/11/2022	Asbestos Type	NAD
22/17369	1	WS101	0.30	28	Simon Postlewhite	02/11/2022	General Description (Bulk Analysis)	Brown soil/stones
					Simon Postlewhite	02/11/2022	Asbestos Fibres	NAD
					Simon Postlewhite	02/11/2022	Asbestos ACM	NAD
					Simon Postlewhite	02/11/2022	Asbestos Type	NAD
22/17369	1	WS101	0.80	30	Catherine Coles	02/11/2022	General Description (Bulk Analysis)	soil,stone
					Catherine Coles	02/11/2022	Asbestos Fibres	NAD
					Catherine Coles	02/11/2022	Asbestos ACM	NAD
					Catherine Coles	02/11/2022	Asbestos Type	NAD
22/17369	1	WS107	0.50	32	Catherine Coles	02/11/2022	General Description (Bulk Analysis)	soil,stone
					Catherine Coles	02/11/2022	Asbestos Fibres	NAD
					Catherine Coles	02/11/2022	Asbestos ACM	NAD

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/17369	1	WS107	0.50	32	Catherine Coles	02/11/2022	**Asbestos Type**	NAD

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/17369						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

EMT Job No.: 22/17369

SOILS and ASH

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

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_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
MS	Mass Spectrometry.

EMT Job No: 22/17369

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma –Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma –Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

EMT Job No: 22/17369

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) –Al anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) –Al anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
TM131	Quantification of Asbestos Fibres and ACM based on HSG 248 Second edition:2021, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes

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Omnia
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Lace Market
Nottingham
NG1 1HN

Attention :	William Bennett
Date :	11th November, 2022
Your reference :	B10925
Our reference :	Test Report 22/17987 Batch 1
Location :	Ripley
Date samples received :	1st November, 2022
Status :	Final Report
Issue :	1

Two samples were received for analysis on 1st November, 2022 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett
EMT Job No: 22/17987

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1-2	3-4									LOD/LOR	Units	Method No.
Sample ID	BH101 WATER	BH120											
Depth	2.50	4.00											
COC No / misc													
Containers	P G	P G											
Sample Date	28/10/2022	28/10/2022											
Sample Type	Liquid	Liquid											
Batch Number	1	1											
Date of Receipt	01/11/2022	01/11/2022											
Dissolved Arsenic	<2.5	<2.5									<2.5	ug/l	TM30/PM14
Dissolved Barium	90	92									<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Boron	675	201									<12	ug/l	TM30/PM14
Dissolved Cadmium	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Total Dissolved Chromium	<1.5	<1.5									<1.5	ug/l	TM30/PM14
Dissolved Copper	<7	<7									<7	ug/l	TM30/PM14
Dissolved Lead	<5	<5									<5	ug/l	TM30/PM14
Dissolved Mercury	<1	<1									<1	ug/l	TM30/PM14
Dissolved Nickel	13	7									<2	ug/l	TM30/PM14
Dissolved Selenium	<3	<3									<3	ug/l	TM30/PM14
Dissolved Vanadium	<1.5	<1.5									<1.5	ug/l	TM30/PM14
Dissolved Zinc	24	7									<3	ug/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	393	584									<1	mg/l	TM30/PM14
PAH MS													
Naphthalene	0.2	<0.1									<0.1	ug/l	TM4/PM30
Acenaphthylene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Acenaphthene	0.100	<0.005									<0.005	ug/l	TM4/PM30
Fluorene	0.101	<0.005									<0.005	ug/l	TM4/PM30
Phenanthrene	0.122	<0.005									<0.005	ug/l	TM4/PM30
Anthracene	0.039	<0.005									<0.005	ug/l	TM4/PM30
Fluoranthene	<0.005+	<0.005									<0.005	ug/l	TM4/PM30
Pyrene	0.281+	<0.005									<0.005	ug/l	TM4/PM30
Benzo(a)anthracene	0.125	<0.005									<0.005	ug/l	TM4/PM30
Chrysene	0.341	<0.005									<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene	0.105	<0.008									<0.008	ug/l	TM4/PM30
Benzo(a)pyrene	0.056	<0.005									<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
PAH 16 Total	1.470	<0.173									<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	0.076	<0.008									<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	0.029	<0.008									<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	80	82									<0	%	TM4/PM30
MTBE	<5	<5									<5	ug/l	TM36/PM12
Benzene	<5	<5									<5	ug/l	TM36/PM12
Toluene	<5	<5									<5	ug/l	TM36/PM12
Ethylbenzene	<5	<5									<5	ug/l	TM36/PM12
m/p-Xylene	<5	<5									<5	ug/l	TM36/PM12
o-Xylene	<5	<5									<5	ug/l	TM36/PM12

Please see attached notes for all abbreviations and acronyms

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett
EMT Job No: 22/17987

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1-2	3-4									LOD/LOR	Units	Method No.
Sample ID	BH101 WATER	BH120											
Depth	2.50	4.00											
COC No / misc													
Containers	P G	P G											
Sample Date	28/10/2022	28/10/2022											
Sample Type	Liquid	Liquid											
Batch Number	1	1											
Date of Receipt	01/11/2022	01/11/2022											
TPH CWG													
Aliphatics													
>C5-C6	<10	<10									<10	ug/l	TM36/PM12
>C6-C8	<10	<10									<10	ug/l	TM36/PM12
>C8-C10	<10	<10									<10	ug/l	TM36/PM12
>C10-C12	48	<5									<5	ug/l	TM5/PM16/PM30
>C12-C16	250	<10									<10	ug/l	TM5/PM16/PM30
>C16-C21	330	<10									<10	ug/l	TM5/PM16/PM30
>C21-C35	810	<10									<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35	1438	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7	<10	<10									<10	ug/l	TM36/PM12
>EC7-EC8	<10	<10									<10	ug/l	TM36/PM12
>EC8-EC10	<10	<10									<10	ug/l	TM36/PM12
>EC10-EC12	<5	<5									<5	ug/l	TM5/PM16/PM30
>EC12-EC16	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC16-EC21	170	<10									<10	ug/l	TM5/PM16/PM30
>EC21-EC35	710	<10									<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35	880	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35)	2318	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total Phenols HPLC	<0.15	<0.15									<0.15	mg/l	TM26/PM0
Sulphate as SO4	189.5	286.7									<0.5	mg/l	TM38/PM0
Total Cyanide	<0.01	<0.01									<0.01	mg/l	TM89/PM0
Hexavalent Chromium	<0.006	<0.006									<0.006	mg/l	TM38/PM0
Total Dissolved Chromium III	<6	<6									<6	ug/l	TM0/PM0
pH	7.07	7.53									<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Omnia
Reference: B10925
Location: Ripley
Contact: William Bennett

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/17987						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

EMT Job No.: 22/17987

SOILS and ASH

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

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_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
MS	Mass Spectrometry.

EMT Job No: 22/17987

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma –Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) –Al anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.				

APPENDIX VII - ORIGIN OF GAC VALUES

Determinant	Unit	GAC	Exposure Pathway	Origin of Risk Assessment Value
Metals				
Arsenic	mg/kg	640	1	LQM CIEH Suitable for Use Levels (S4UL) 2015- Inorganic Arsenic
Beryllium	mg/kg	12	1	
Boron	mg/kg	240,000	1	
Cadmium	mg/kg	190	1	
Chromium (III)	mg/kg	8,600	1	
Chromium (VI)	mg/kg	33	1	
Copper	mg/kg	68,000	1	
Lead	mg/kg	2,300	1	Category 4 Screening Level (C4SL) utilising exposure parameters from CLEA SR3 report.
Mercury	mg/kg	1,100	1	LQM CIEH Suitable for Use Levels (S4UL) 2015- Inorganic Mercury
Nickel	mg/kg	980	1	LQM CIEH Suitable for Use Levels (S4UL) 2015
Selenium	mg/kg	12,000	1	
Vanadium	mg/kg	9,000	1	
Zinc	mg/kg	730,000	1	
General Inorganics				
Cyanide	mg/kg	50	1	Dutch Intervention Value (2010) for Complex Cyanide
Asbestos	%	0.001%	6	OEC Derived Value based on ICRCL
General Organics				
Phenol	mg/kg	760	3	LQM CIEH Suitable for Use Levels (S4UL) 2015 1%SOM
PAHs				
Naphthalene	mg/kg	190(Sol)	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM.
Acenaphthylene	mg/kg	83,000(Sol)	1	
Acenaphthene	mg/kg	84,000(Sol)	1	
Fluorene	mg/kg	63,000(Sol)	1	
Phenanthrene	mg/kg	22,000	1	
Anthracene	mg/kg	520,000	1	
Fluoranthene	mg/kg	23,000	1	
Pyrene	mg/kg	54,000	1	
Benzo(a)Anthracene(	mg/kg	170	1	
Chrysene	mg/kg	350	1	
Benzo(b)Fluoranthene	mg/kg	44	1	
Benzo(k)Fluoranthene	mg/kg	1,200	1	
Benzo(a)Pyrene	mg/kg	35	1	
Indeno(123-cd)Pyrene	mg/kg	500	1	
Dibenzo(a,h)Anthracene	mg/kg	3.5	1	

Determinant	Unit	GAC	Exposure Pathway	Origin of Risk Assessment Value
Benzo(ghi)Perylene	mg/kg	3,900	1	
BTEX & MTBE				
Benzene	mg/kg	27	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 1%SOM
Toluene	mg/kg	56,000(Vap)	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 1%SOM
Ethylbenzene	mg/kg	5,700(Vap)	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 1%SOM
Xylenes	mg/kg	5,900(Sol)	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 1% SOM p-Xylene
MTBE	mg/kg	7,900	4	Soil Generic Assessment Criteria for Human Health Risk Assessment (2010)
TPH-CWG				
Aliphatic				LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM
Aliphatic EC 5-6	mg/kg	3,200(Sol)	4	
Aliphatic EC >6-8	mg/kg	7,800(Sol)	4	
Aliphatic EC >8-10	mg/kg	2,000(Sol)	4	
Aliphatic EC >10-12	mg/kg	9,700(Sol)	4	
Aliphatic EC > 12-16	mg/kg	59,000(Sol)	4	
Aliphatic EC > 16-35	mg/kg	1,600,000	1	
Aliphatic EC >35-44	mg/kg	1,600,000	1	
Aromatic				LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM
Aromatic EC 5-7	mg/kg	26,000(Sol)	4	
Aromatic EC>7-8	mg/kg	56,000(Vap)	4	
Aromatic EC> 8-10	mg/kg	3,500(Vap)	4	
Aromatic EC> 10-12	mg/kg	16,000(Sol)	1,4	
Aromatic EC> 12-16	mg/kg	36,000(Sol)	1	
Aromatic EC> 16-21	mg/kg	28,000	1	
Aromatic EC> 21-35	mg/kg	28,000	1	
Aromatic EC> 35-44	mg/kg	28,000	1	
Banded TPH				
Aliphatic EC 5-6*	mg/kg	3,200(Sol)	4	LQM CIEH Suitable for Use Levels (S4UL) 2015 based on a sandy loam as defined in SR3 (EA 2009) 1% SOM, utilising the most conservative of the Ali/Aro chain lengths.
Aliphatic EC >6-8*	mg/kg	7,800(Sol)	4	
Aliphatic EC >8-10*	mg/kg	2,000(Sol)	4	
Aliphatic EC> 10-12*	mg/kg	9,700(Sol)	4	
Aliphatic EC> 12-16*	mg/kg	36,000(Sol)	4	
Aromatic EC> 16-21*	mg/kg	28,000	1	
Aromatic EC> 21-35*	mg/kg	28,000	1	
Aromatic EC> 35-44*	mg/kg	28,000	1	

Notes
Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil, 3 = Dermal Contact (Indoor & Outdoor), 4 = Inhalation of Vapour (Indoor & Outdoor), 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres.

Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance.

* Total cyanide Tier 1 GAC is taken from the Dutch Intervention Value (2010) for complex cyanide.

** The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. OEC has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health.

(sol) – GAC presented exceeds the solubility saturation limit.
(vap) – GAC presented exceeds the vapour saturation limit.

APPENDIX VIII - GEOTECHNICAL ANALYSIS CERTIFICATES

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

UKAS TESTING 4041

Environmental Science

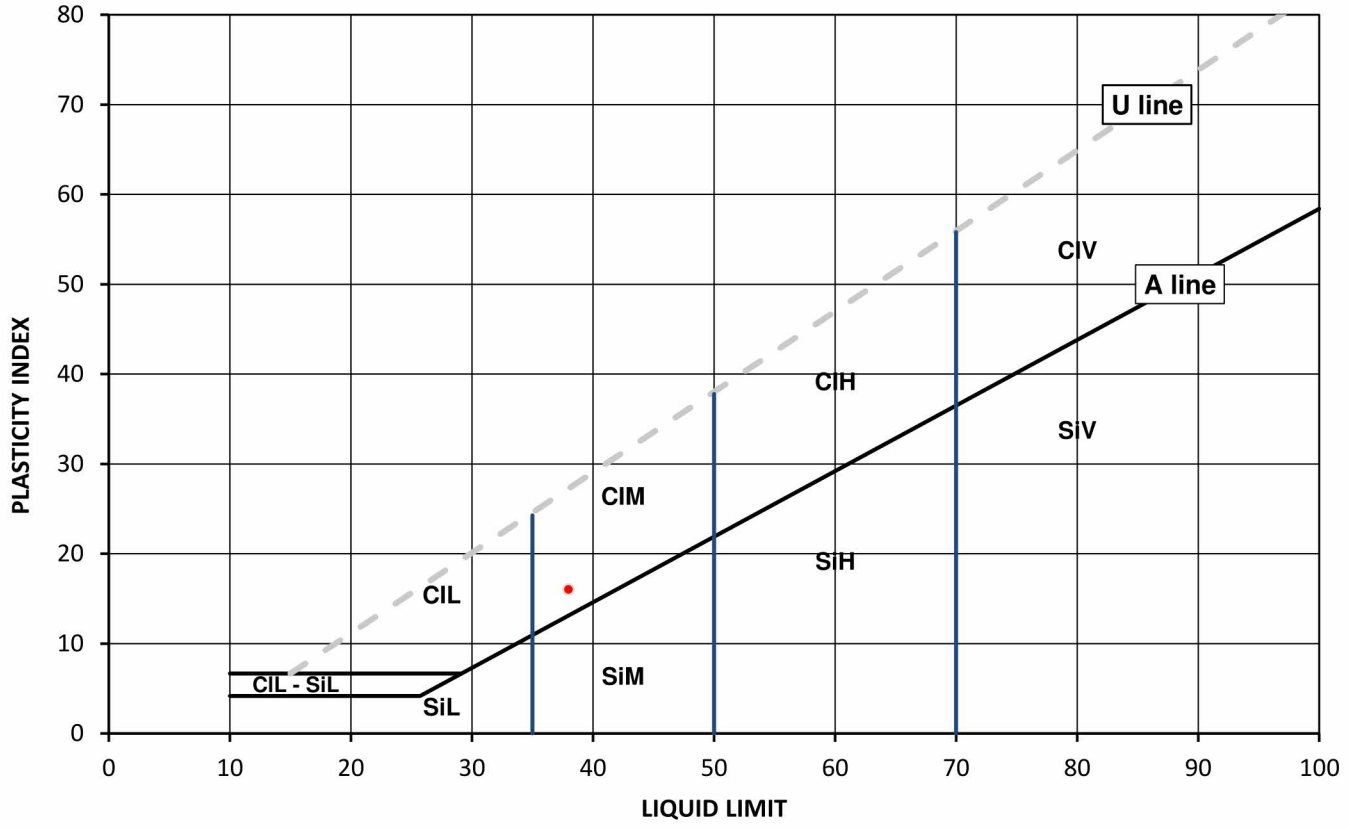
Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

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

Test Results:

Laboratory Reference:	2470076	Depth Top [m]:	1.80
Hole No.:	WS106	Depth Base [m]:	1.90
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	38	22	16	89



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

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

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

Remarks:

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

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

UKAS TESTING 4041

Environmental Science

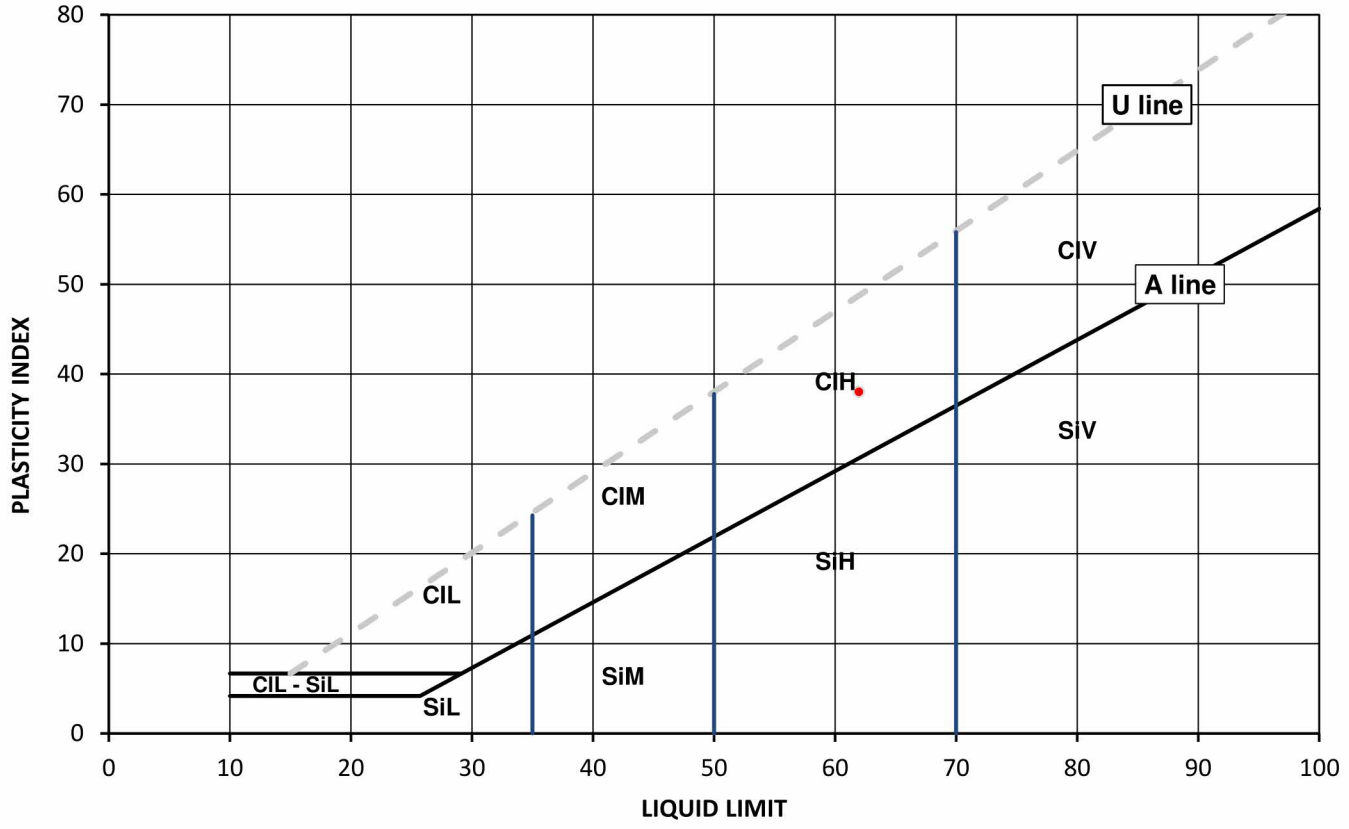
Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

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

Test Results:

Laboratory Reference:	2470077	Depth Top [m]:	3.60
Hole No.:	WS106	Depth Base [m]:	3.80
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
25	62	24	38	98



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

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

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

Remarks:

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

[redacted]

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

UKAS TESTING 4041

Environmental Science

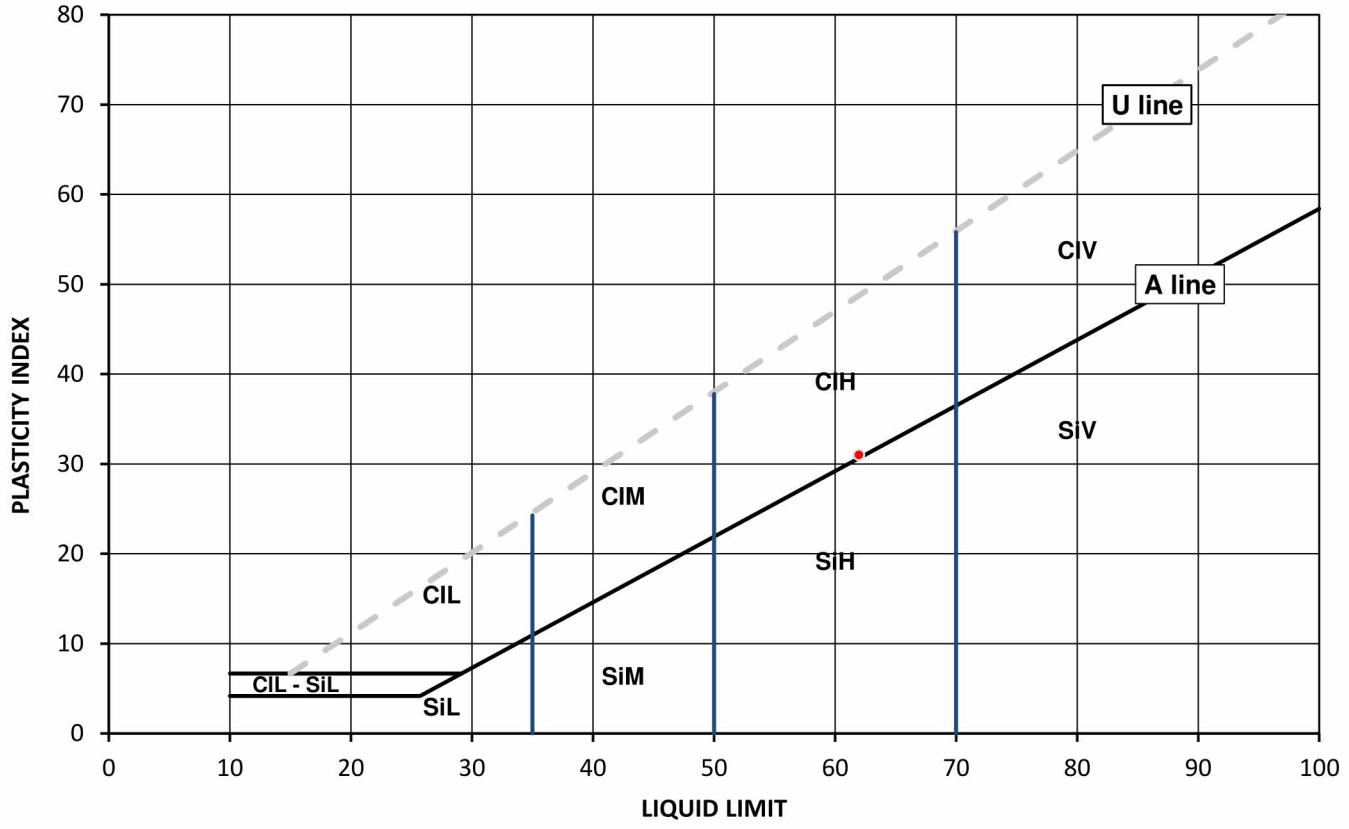
Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

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

Test Results:

Laboratory Reference:	2470078	Depth Top [m]:	4.00
Hole No.:	WS106	Depth Base [m]:	4.45
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	62	31	31	92



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

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

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

Remarks:

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[redacted]

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

UKAS TESTING 4041

Environmental Science

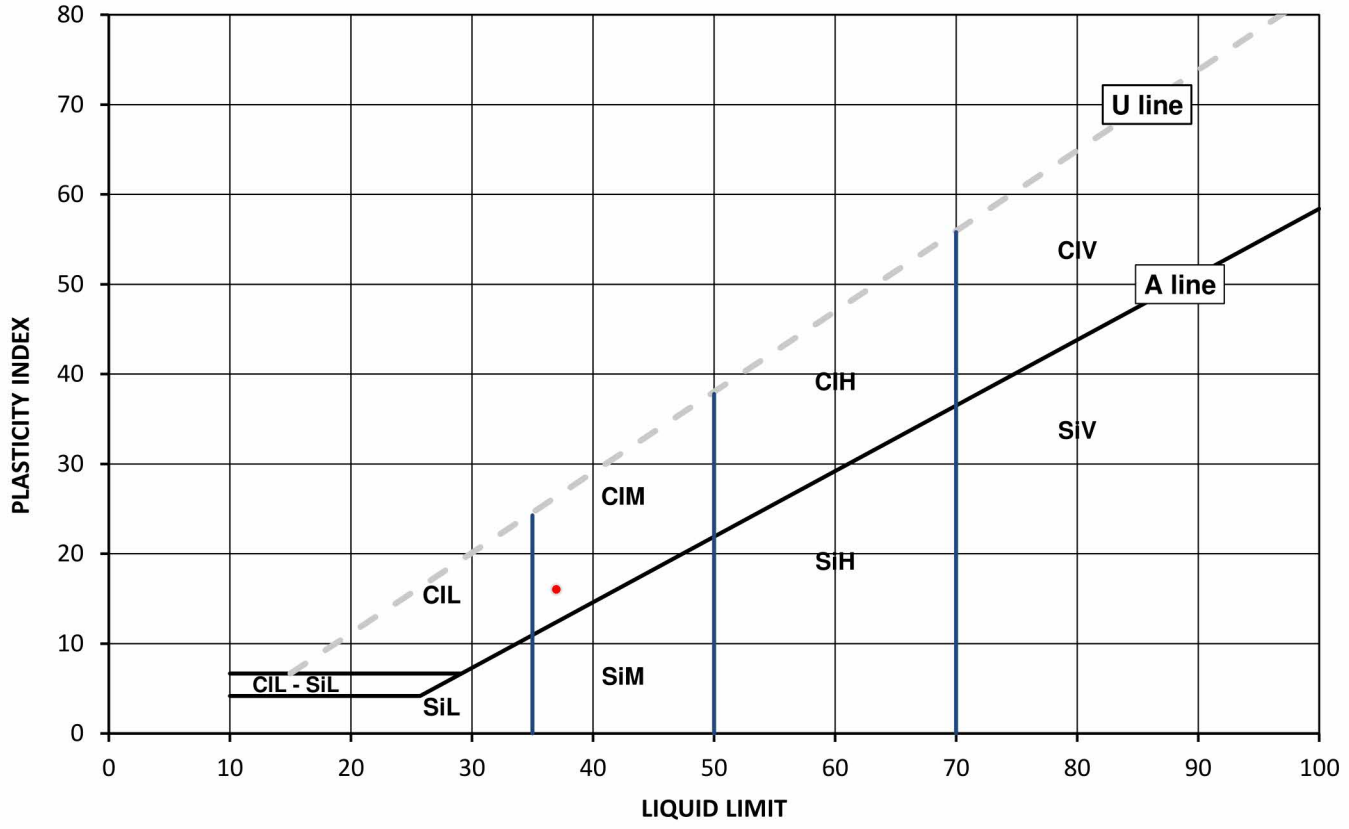
Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

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

Test Results:

Laboratory Reference:	2470079	Depth Top [m]:	3.00
Hole No.:	WS104	Depth Base [m]:	3.45
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
10	37	21	16	90



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

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

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

Remarks:

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[redacted]

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PL Deputy Head of Reporting Team
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Date Reported: 09/11/2022

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
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UKAS TESTING 4041

Environmental Science

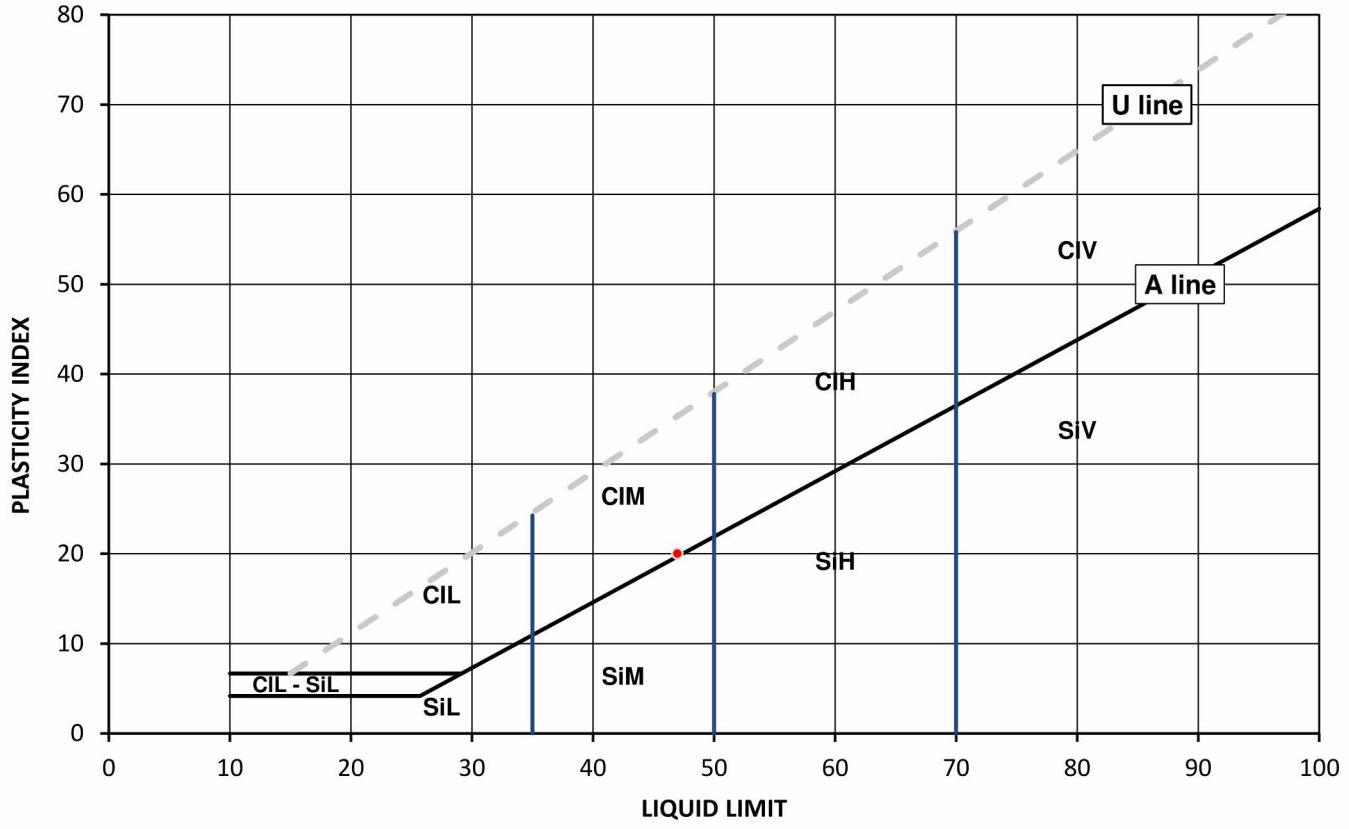
Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

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

Test Results:

Laboratory Reference:	2470080	Depth Top [m]:	2.00
Hole No.:	WS101	Depth Base [m]:	2.45
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Grey gravelly slightly sandy silty CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
10	47	27	20	63



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

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

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

Remarks:

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[redacted]

Anna Dudzinska
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Date Reported: 09/11/2022

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

UKAS TESTING 4041

Environmental Science

Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

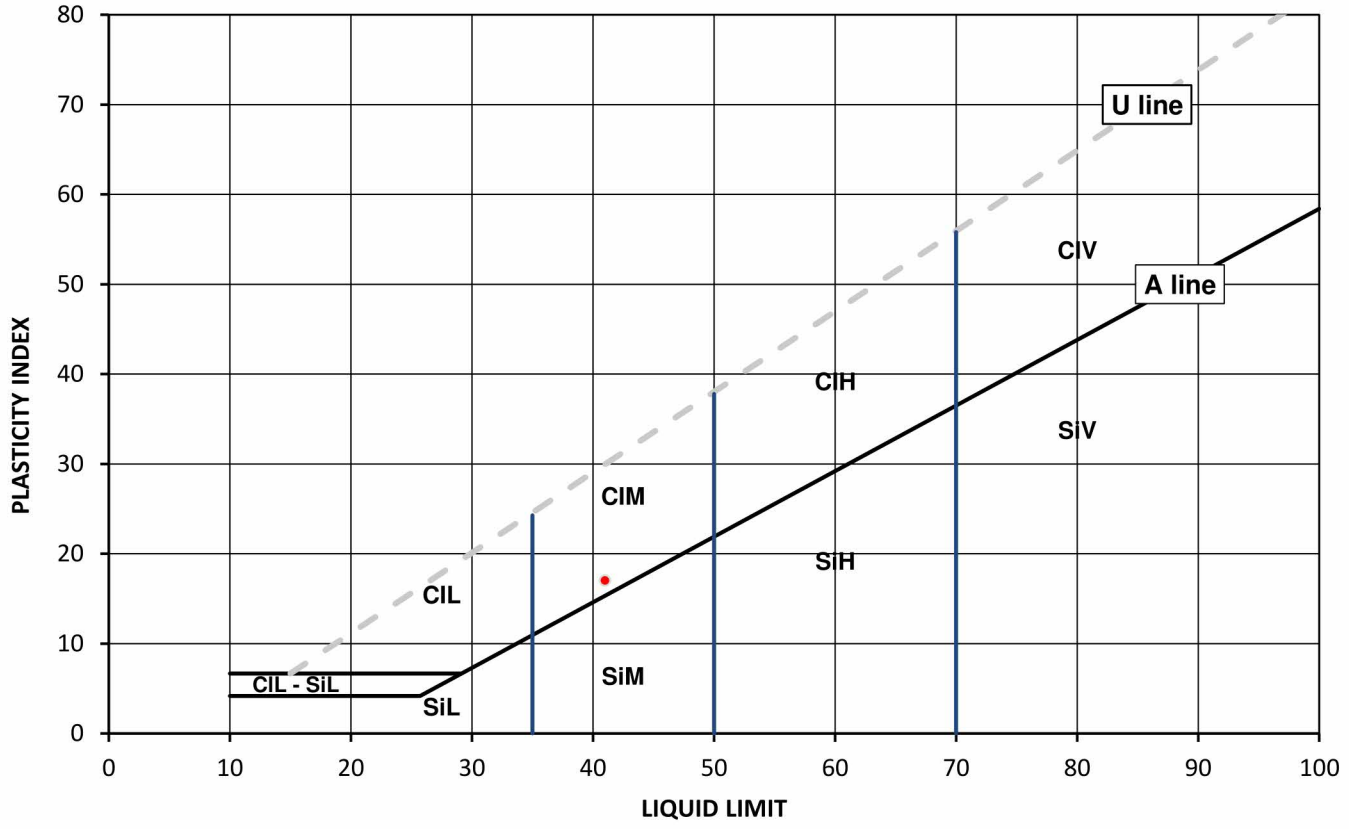
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2470081	Depth Top [m]:	1.50
Hole No.:	WS107	Depth Base [m]:	1.70
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown sandy CLAY		

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
17	41	24	17	100



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

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

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

Remarks:

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Signed: [redacted]

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

UKAS TESTING 4041

Environmental Science

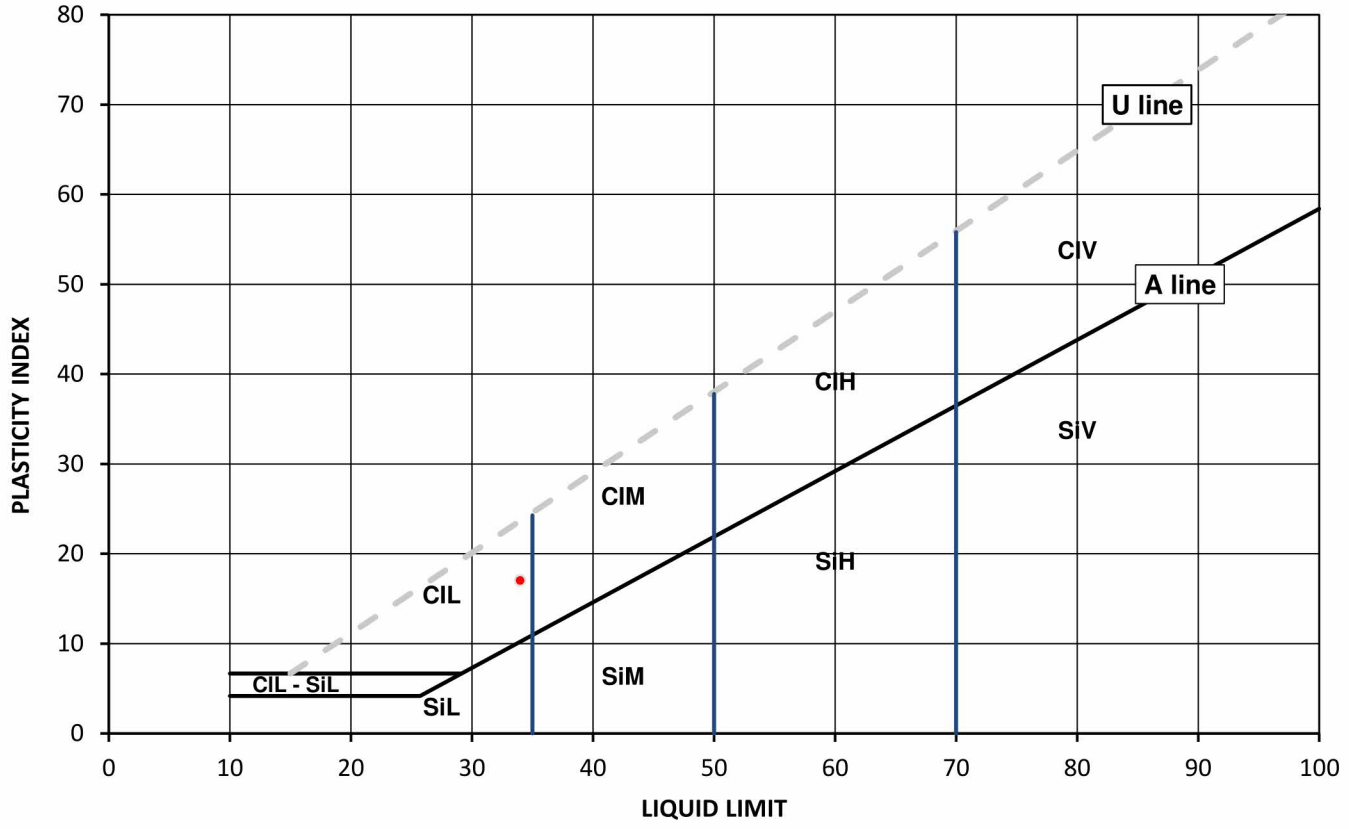
Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

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

Test Results:

Laboratory Reference:	2470082	Depth Top [m]:	2.00
Hole No.:	WS107	Depth Base [m]:	2.45
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light brown very sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	34	17	17	100



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

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

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

Remarks:

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Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

UKAS TESTING 4041

Environmental Science

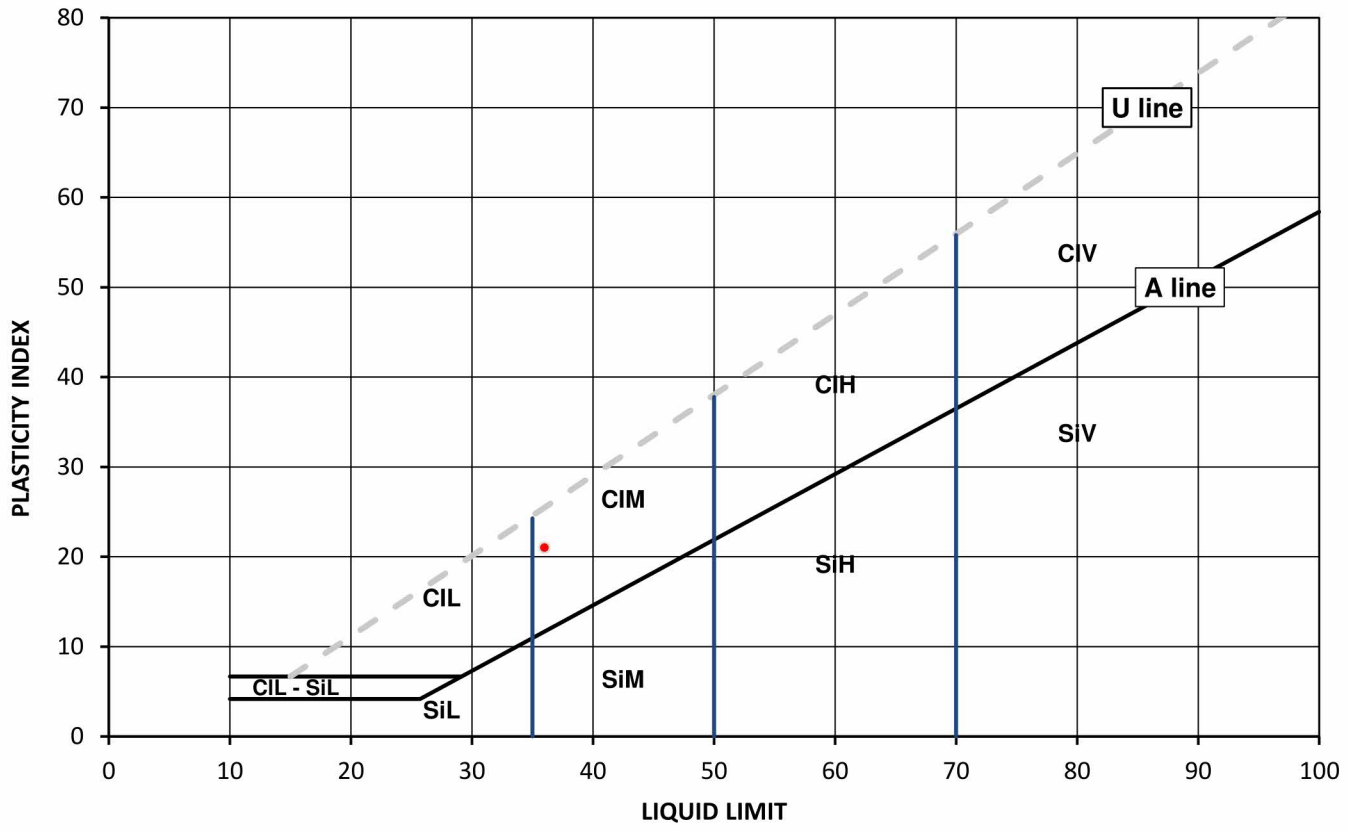
Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

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

Test Results:

Laboratory Reference:	2470083	Depth Top [m]:	3.00
Hole No.:	WS107	Depth Base [m]:	3.45
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	36	15	21	99



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

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

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

Remarks:

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[redacted]

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

UKAS TESTING 4041

Environmental Science

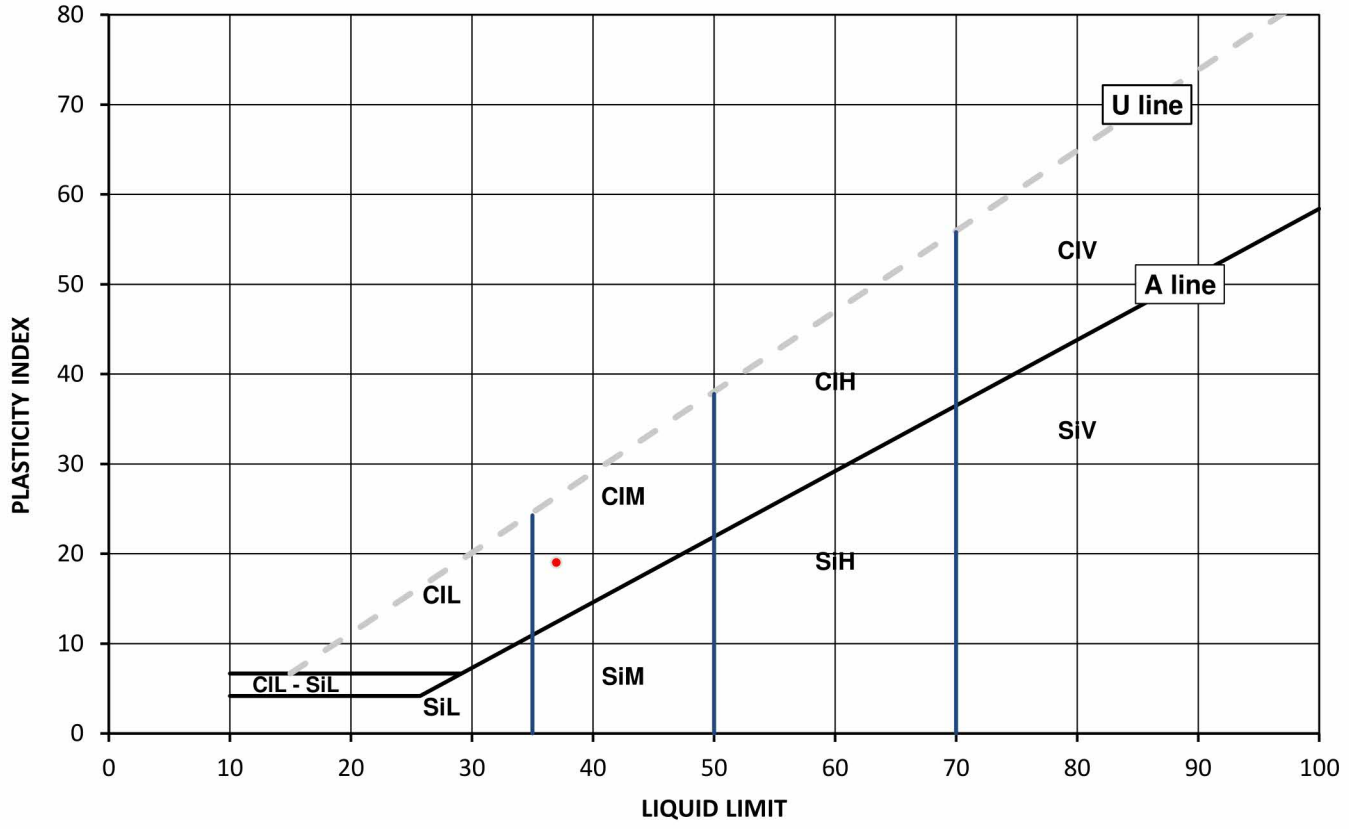
Client:	Omnia Environmental Consulting	Client Reference:	B10925
Client Address:	3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP	Job Number:	22-91626
		Date Sampled:	Not Given
		Date Received:	19/10/2022
Contact:	Will Bennett	Date Tested:	26/10/2022
Site Address:	Ripley	Sampled By:	Client- James Roberts

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

Test Results:

Laboratory Reference:	2470084	Depth Top [m]:	2.00
Hole No.:	WS108	Depth Base [m]:	2.45
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light brown sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
15	37	18	19	100



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

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

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

Remarks:

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[redacted]

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

GF 236.12

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

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

4041

Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP

Contact: Will Bennett

Site Address: Ripley

Client Reference: B10925
Job Number: 22-91626
Date Sampled: Not Given
Date Received: 19/10/2022
Date Tested: 26/10/2022
Sampled By: Client- James Roberts

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2470080	WS101	Not Given	2.00	2.45	D	Grey gravelly slightly sandy silty CLAY	Atterberg 4 Point	10		63	47	27	20						
2470079	WS104	Not Given	3.00	3.45	D	Brown slightly gravelly sandy CLAY	Atterberg 4 Point	10		90	37	21	16						
2470076	WS106	Not Given	1.80	1.90	D	Brown slightly gravelly sandy CLAY	Atterberg 4 Point	22		89	38	22	16						
2470077	WS106	Not Given	3.60	3.80	D	Brownish grey slightly gravelly CLAY	Atterberg 4 Point	25		98	62	24	38						
2470078	WS106	Not Given	4.00	4.45	D	Brownish grey slightly gravelly CLAY	Atterberg 4 Point	16		92	62	31	31						
2470081	WS107	Not Given	1.50	1.70	D	Brown sandy CLAY	Atterberg 4 Point	17		100	41	24	17						
2470082	WS107	Not Given	2.00	2.45	D	Light brown very sandy CLAY	Atterberg 4 Point	22		100	34	17	17						
2470083	WS107	Not Given	3.00	3.45	D	Light brown slightly gravelly sandy CLAY	Atterberg 4 Point	22		99	36	15	21						
2470084	WS108	Not Given	2.00	2.45	D	Light brown sandy CLAY	Atterberg 4 Point	15		100	37	18	19						

Note: # Non accredited; NP - Non plastic

Comments:

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[redacted]

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Omnia Environmental Consulting

Client Address: 3-6 The Quarterdeck, Port Solent, Portsmouth, PO6 4TP

Contact: Will Bennett

Site Address: Ripley

Client Reference: B10925
Job Number: 22-91626
Date Sampled: Not Given
Date Received: 19/10/2022
Date Tested: 26/10/2022
Sampled By: Client- James Roberts

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2470080	WS101	Not Given	2.00	2.45	D	Grey gravelly slightly sandy silty CLAY		10	Sample was quartered, oven dried at 106.2 °C			
2470079	WS104	Not Given	3.00	3.45	D	Brown slightly gravelly sandy CLAY		10	Sample was quartered, oven dried at 106.2 °C			
2470076	WS106	Not Given	1.80	1.90	D	Brown slightly gravelly sandy CLAY		22	Sample was quartered, oven dried at 106.2 °C			
2470077	WS106	Not Given	3.60	3.80	D	Brownish grey slightly gravelly CLAY		25	Sample was quartered, oven dried at 106.2 °C			
2470078	WS106	Not Given	4.00	4.45	D	Brownish grey slightly gravelly CLAY		16	Sample was quartered, oven dried at 106.2 °C			
2470081	WS107	Not Given	1.50	1.70	D	Brown sandy CLAY		17	Sample was quartered, oven dried at 106.2 °C			
2470082	WS107	Not Given	2.00	2.45	D	Light brown very sandy CLAY		22	Sample was quartered, oven dried at 106.2 °C			
2470083	WS107	Not Given	3.00	3.45	D	Light brown slightly gravelly sandy CLAY		22	Sample was quartered, oven dried at 106.2 °C			
2470084	WS108	Not Given	2.00	2.45	D	Light brown sandy CLAY		15	Sample was quartered, oven dried at 106.2 °C			

Comments:

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for and on behalf of i2 Analytical Ltd

Date Reported: 09/11/2022

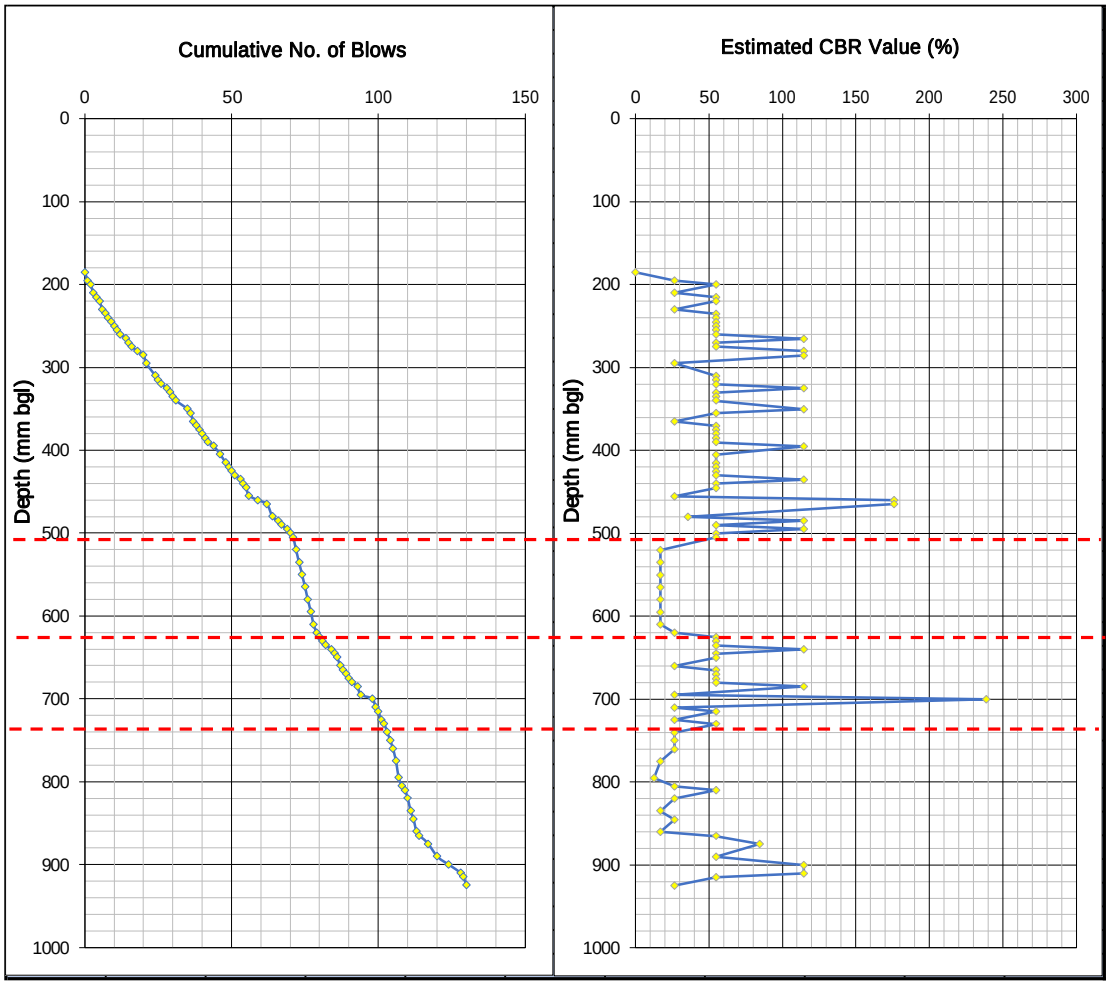
GF 099.16

APPENDIX IX - IN-SITU DCP TEST CERTIFICATES

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Nam	Blue Earth Offices			Test Date:	11/10/2022
Site Re	B10925			Test Locatio	DCP101
Initial Depth:	185	mm bgl		Test No.:	1 of 1
Final Depth:	925	mm bgl		Undertaken By:	JR



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
185	505	320	71	5	61.5
505	620	115	8	14	18.0
620	740	120	24	5	55.1
740	925	185	27	7	39.5

Commen
Concrete core removed prior to test.

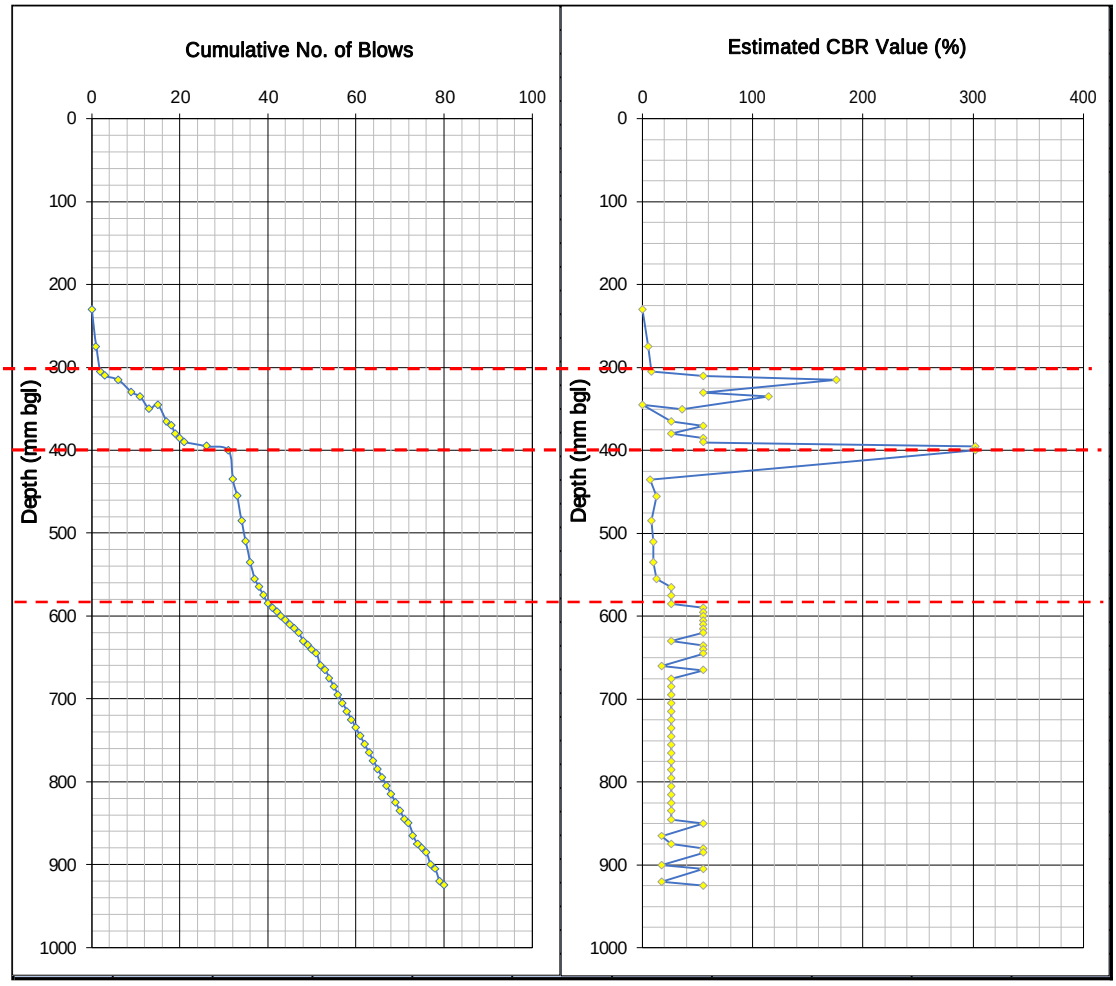
Site Engineer:	Date:	Checked and Approved By:	Date:
JR	11/10/2022	W B	19/10/2022

Location
DCP101

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Nam	Blue Earth Offices			Test Date:	11/10/2022
Site Re	B10925			Test Locatio	DCP102
Initial Depth:	230	mm bgl		Test No.:	1 of 1
Final Depth:	925	mm bgl		Undertaken By:	JR



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
230	305	75	2	38	4.0
305	400	95	29	3	86.2
400	585	185	9	21	12.4
585	925	340	40	9	31.4

Commen
Concrete core removed prior.

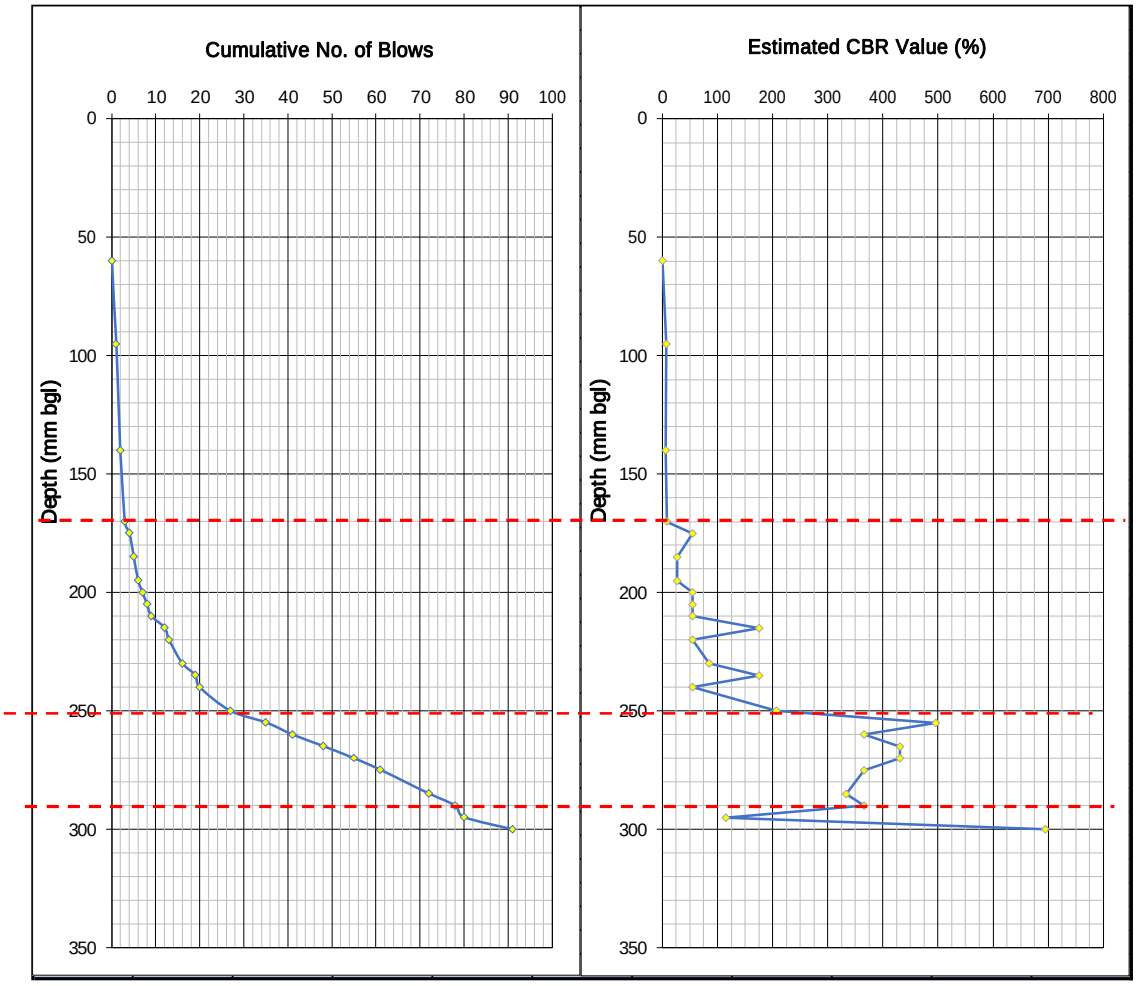
Site Engineer:	Date:	Checked and Approved By:	Date:
JR	11/10/2022	W B	19/10/2022

Location
DCP102

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Nam	Blue Earth Offices			Test Date:	11/10/2022
Site Re	B10925			Test Locatio	DCP103
Initial Depth:	60	mm bgl		Test No.:	1 of 1
Final Depth:	300	mm bgl		Undertaken By:	JR



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
60	170	110	3	37	6.7
170	250	80	24	3	84.6
250	290	40	51	1	390.4
290	300	10	13	1	398.5

Commen

Rods inclined 15 degrees when test aborted, all movement past 300mmbgl may be from rod inclination. Excavation of trial pit immediately after revealed concrete pad.

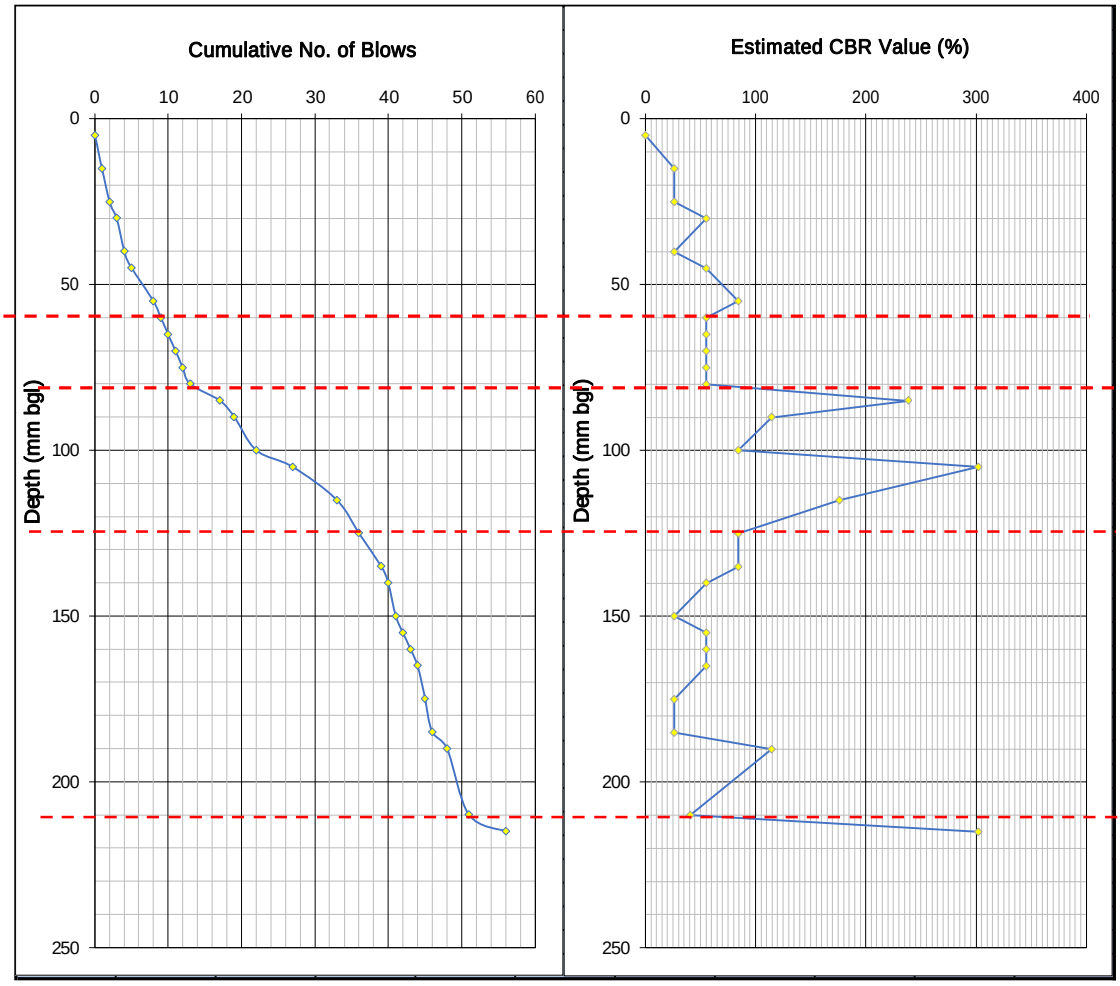
Site Engineer:	Date:	Checked and Approved By:	Date:
JR	11/10/2022	W B	19/10/2022

Location
DCP103

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Nam	Blue Earth Offices			Test Date:	11/10/2022
Site Re	B10925			Test Locatio	DCP103A
Initial Depth:	5	mm bgl		Test No.:	1 of 1
Final Depth:	215	mm bgl		Undertaken By:	JR



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
5	60	55	9	6	44.6
60	80	20	4	5	55.1
80	125	45	23	2	148.6
125	210	85	15	6	48.3
210	215	5	5	1	302.0

Commen
Hammer triple bouncing. Excvation adjacent to probe location revealed same concrete pad as 103.

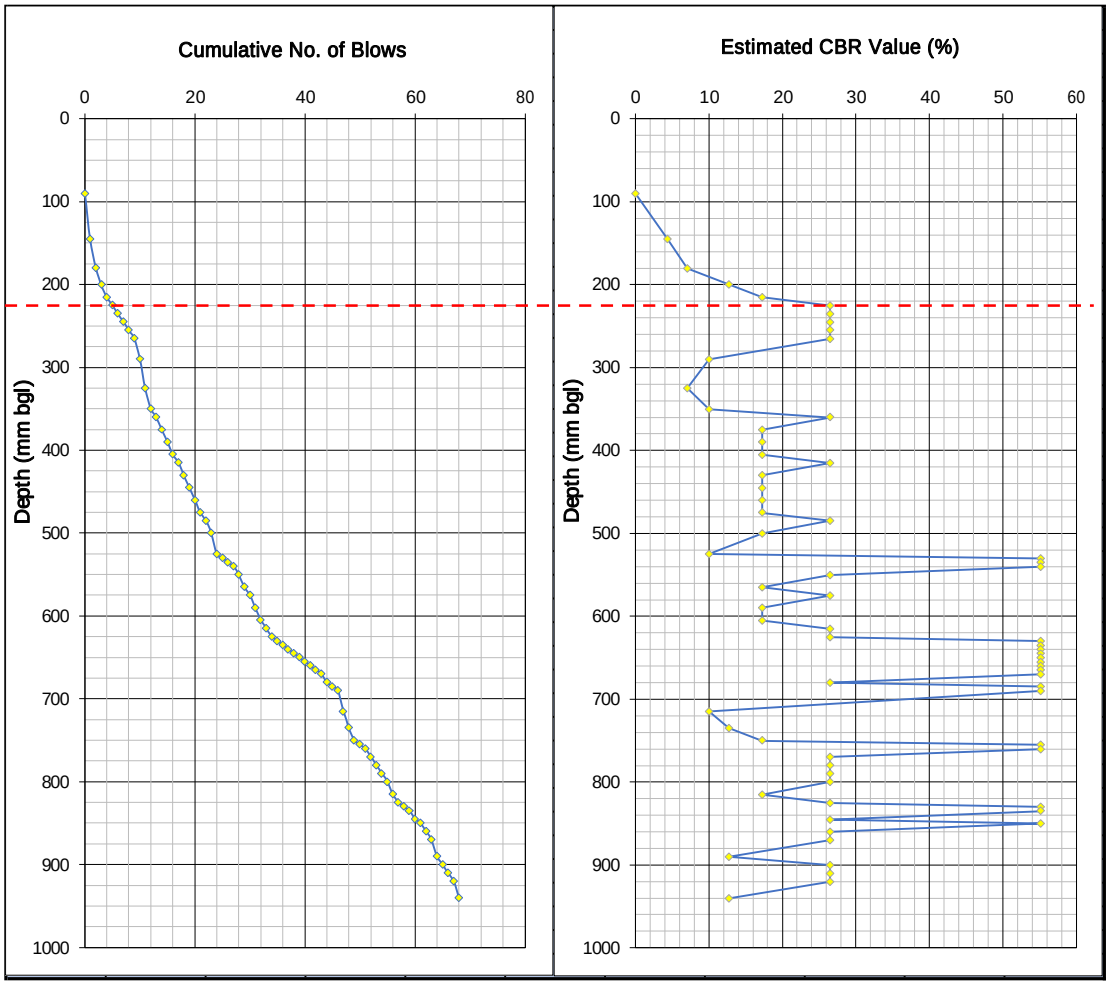
Site Engineer:	Date:	Checked and Approved By:	Date:
JR	11/10/2022	WB	19/10/2022

Location
DCP103/

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Nam	Blue Earth Offices			Test Date:	11/10/2022
Site Re	B10925			Test Locatio	DCP104
Initial Depth:	90	mm bgl		Test No.:	1 of 1
Final Depth:	940	mm bgl		Undertaken By:	JR



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
90	225	135	5	27	9.3
225	940	715	63	11	23.2

Commen

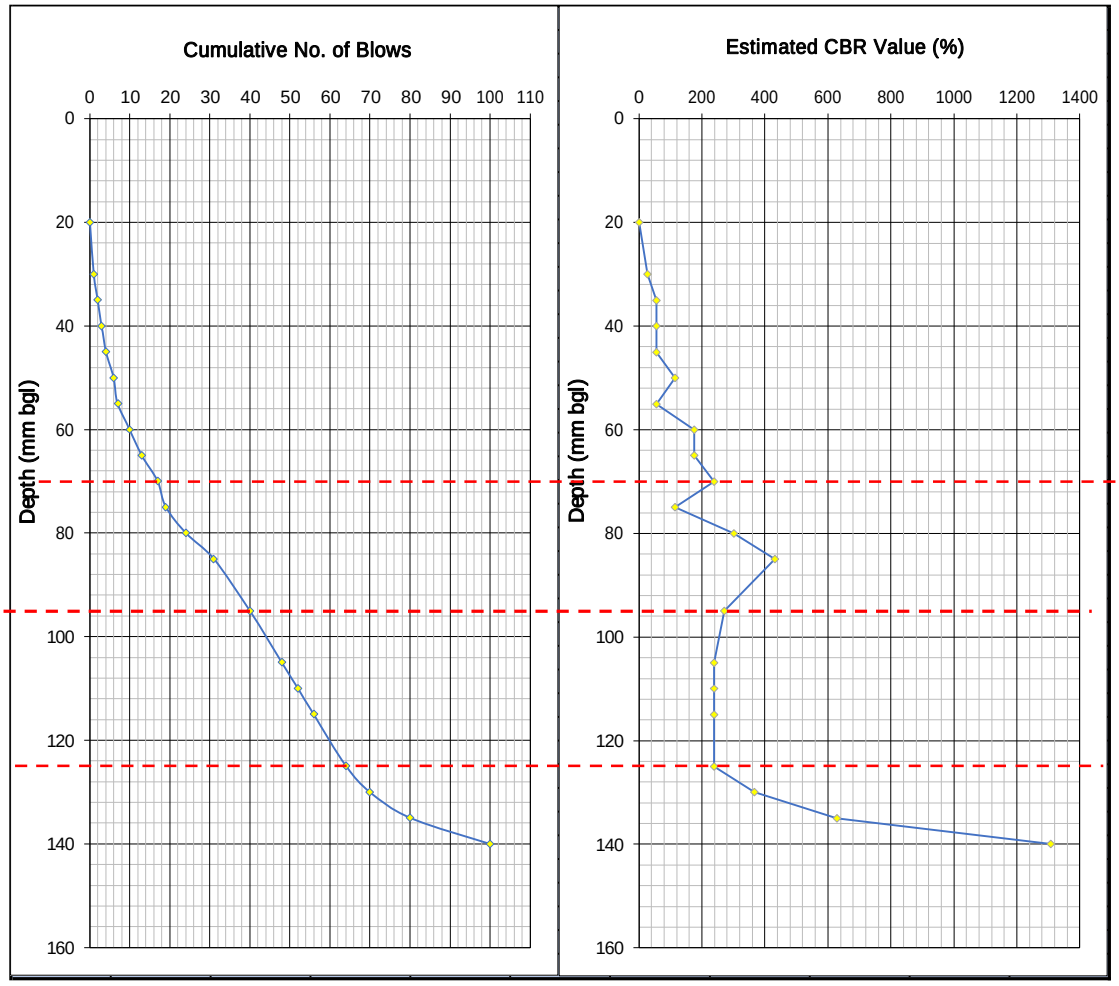
Site Engineer:	Date:	Checked and Approved By:	Date:
JR	11/10/2022	W B	19/10/2022

Location
DCP104

Determination of Dynamic Cone Penetrometer - Estimated CBR Value (%)

In Accordance with TRL Report 587(2003) and PR/INT/277/04

Site Nam	Blue Earth Offices			Test Date:	11/10/2022
Site Re	B10925			Test Locatio	DCP105
Initial Depth:	20	mm bgl		Test No.:	1 of 1
Final Depth:	140	mm bgl		Undertaken By:	JR



Start Depth (mm bgl)	End Depth (mm bgl)	Layer Range (mm)	Blows per Layer	DCP mm/Blows per Layer	Average Layer CBR Value (%)
20	70	50	17	3	4.0
70	95	25	23	1	276.5
95	125	30	24	1	238.5
125	140	15	36	0	761.9

Commen
Test aborted due to practical refusal. WS105 adjacent to probe location revealed layer of bricks to 0.3mbgl.

Site Engineer:	Date:	Checked and Approved By:	Date:
JR	11/10/2022	WB	19/10/2022

Location
DCP105