

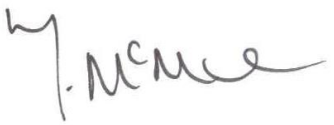
GROUND INVESTIGATION REPORT



**LAND AT WHITWORTH ROAD (DUNELM) CAR PARK, ROCHDALE, OL12 0TY
PREPARED FOR GLENBROOK INVESTMENTS LIMITED**



QUALITY CONTROL

Project No.	GEOL23-7910	Client	Glenbrook Investments Limited
Design Team	The Ratcliffe Groves Partnership Architects		
Report Type	Ground Investigation Report		
Project Type	Proposed Starbucks Drive Through		
Site Address	Land at Whitworth Road (Dunelm) Car Park, Rochdale, OL12 0TY		
NGR	389785, 413902		
Date	26/01/2024		
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REPORT REVISION HISTORY				
Issue	Description	Date	Author	Approval
1	Final Issue	26/01/2024	MD	TMc



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1.0 Introduction

Geol Consultants Limited (GEOL) were instructed by Glenbrook Investments Limited to undertake appropriate ground investigation works for a parcel of land located at the car park of the Dunelm furniture store at Whitworth Road in Rochdale, where proposals have been made to redevelop the site with a new Starbucks Drive Through. The site is situated within a larger car park with some limited soft landscaping around the perimeter. The site is centred on OS National Grid Reference 389785, 413902. A copy of the proposed development layout plan can be seen attached in Appendix I.

A previous Phase I Site Investigation Report was prepared for the site by Integra Consulting dated January 2023. The findings have been summarised in Section 2.0 below.

The purpose of this report is to provide information relating to the following to assist with the new development proposals.

- ▼ Identify the ground conditions below the new development areas and assess the geotechnical properties of the underlying made ground and superficial deposits to assist with new building foundation designs
- ▼ Determine the ground gas regime and required protection measures for the proposed commercial development
- ▼ Determine the levels of contamination within the existing shallow soil deposits, to assess the impacts from those contaminants towards the construction workforce and future site end-users (Human Health) given the development proposals
- ▼ Determine the scope of any further investigation works or remediation measures required for the site prior to commencing with the proposed residential development

The information contained in this technical report is limited to the area of the site as shown on the proposed development layout plan attached in Appendix I, and to those areas accessible at the time of the ground investigation works being undertaken. When considering the scope of works completed for the development proposals, any features or issues not specifically mentioned cannot be assumed to have been covered.

2.0 Summary of Phase I Site Investigation Report

As part of the Land Contamination Management Procedure, a Phase I Site Investigation Report was prepared for the site by Integra Consulting reference 3361-SI dated January 2023 and the main findings of this Phase I Site Investigation Report are shown on the following page.

2.0 Summary of Phase I Site Investigation Report (Cont'd)

- ▼ Site History – The site has been developed for light industrial use since the earliest published maps dated 1851, including a boiler works and warehouse. Duke Street crossed the site on the maps dated 1892. The buildings were demolished in the early 1970s and the site is presently used as a car park.
- ▼ Geology – The site is overlain by superficial deposits comprising Glacial Till. The underlying bedrock deposits comprise the Old Lawrence Formation (sandstone) of Carboniferous age.
- ▼ Coal Mining Risk Assessment – The site is located within a Coalfield Consultation Area and the report advised that Consultants Coal Mining Report is obtained. A review of Coal Authority data undertaken by GEOL indicates the site is situated within a Development Low Risk Area.
- ▼ Landfill & Waste – There are no historic or currently operational recorded landfills on site or within 250m.
- ▼ Hydrology and Hydrogeology – The superficial deposits have been classified as a Secondary Undifferentiated aquifer. The solid geology has been classified as a Secondary A aquifer. The report advised a negligible risk of surface water flooding and low risk of ground water flooding.
- ▼ Radon – The site lies within an area where radon protection measures are not required.
- ▼ Ground Contamination – Based on the data reviewed the site is considered to present a varied level of risk (low to high) in terms of ground contamination from the past use and from adjacent operations.

BGS mapping records the possible presence of 2 wells on site, associated with Holcroft Casting & Forging Limited. The Integra Consulting Phase I Site Investigation Report should be read in conjunction with this Ground Investigation Report.

3.0 Scope of Works

To determine the ground conditions below the site area, the intrusive ground investigation works undertaken by GEOL comprised the sinking of 4 no. windowless sampling boreholes (labelled BH01 to BH04) to assist with new foundation designs. In addition combined ground gas and water monitoring wells were installed at the locations of BH01, BH02 and BH04 primarily to determine the ground gas regime for the site (gas monitoring is currently underway).

Detailed descriptions of the strata encountered during the investigation works, together with the results of all in-situ field testing, are presented on the investigation record sheets attached in Appendix II. The investigation positions can be seen on the investigation location plan attached in Appendix II.

4.0 Ground Conditions

4.1 Soil Profile

A summary of the ground conditions encountered below the site can be seen in the Table below.

Strata	Depths Recorded	Description & Comments
MADE GROUND	From 0.00m up to 0.70m to 2.40m	Made ground was encountered in all the boreholes and initially comprises macadam overlying sandy gravel, slightly sandy gravel with occasional cobbles of brick and concrete or gravelly sand
SUPERFICIAL GEOLOGY Glacial Till	From 0.70m to 2.40m up to 4.45m to 5.45m	The glacial till deposits comprise stiff locally firm, greyish brown locally laminated sandy gravelly CLAY

4.2 Groundwater

Groundwater was largely absent from the majority of the investigation holes however, an ingress was encountered in BH01 at a depth of 1.00m.

The water ingress recorded may be representative of perched water sitting above low permeability clay. Significant water ingresses are unlikely to occur in construction related excavations less than 1.00m, however it should be noted that water levels may be higher than those recorded in the investigation holes, especially during the wetter periods of the year. Therefore it would be deemed prudent to allow for the introduction of temporary groundwater control techniques (i.e. sump pumping), to take care of any localised ingresses of water which may occur during the construction period.

It should also be noted that instability within such excavations may also occur because of water inflow.

5.0 Insitu Geotechnical Testing

5.1 Insitu Hand Shear Vane Tests

Hand shear vane tests were carried out in the boreholes in the natural cohesive deposits. A summary of the results obtained can be seen in the Table on the following page.

5.0 Insitu Geotechnical Testing (Cont'd)

5.1 Insitu Hand Shear Vane Tests (Cont'd)

Strata	VST Results	Comments
Glacial Till	Hand vanes recorded c_u values in the range of 51kN/m ² to 135kN/m ²	The c_u values obtained for the clay deposits indicate firm (medium strength) and stiff (high strength) consistencies

5.2 Standard Penetration Testing

Insitu standard penetration tests (SPT's) were undertaken within the made ground and natural deposits encountered at the borehole locations. A summary of the results obtained can be seen in the Table below.

Strata	SPT Results	Comments
Made Ground	SPT 'N' values of between 6 and 11 were recorded	The SPT 'N' value obtained for the granular made ground deposits indicate loose and medium dense conditions
Glacial Till	SPT 'N' values of between 14 and 32 were recorded with 50 blows for partial penetration of the SPT hammer	The SPT 'N' values obtained for the cohesive soils correlates approximately to a stiff and very stiff strata

6.0 Ground Gas Risk Assessment

Combined ground gas and water monitoring standpipes were installed within three boreholes (BH's 01, 02 and 04), to confirm the ground gas regime below the site. Four monitoring visit have been undertaken. The monitoring installations were constructed using 50mm diameter HDPE standpipe, comprising solid pipe of 1.00m in length within a bentonite seal and a response zone using slotted pipe. Gas monitoring is now complete, and our gas risk assessment is presented as follows.

The design of the ground gas risk assessment for this site is undertaken in general accordance with the CIRIA Report C665 (November 2007), BS8576:2013 – Guidance on investigations for ground gas and BS8485:2015 + A1:2019 – Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings and is based on the criteria shown on the following page.

6.0 Ground Gas Risk Assessment (Cont'd)

- ▼ The proposed development (commercial) has been classified as a low sensitivity
- ▼ Therefore, in accordance with Tables 5.5a and 5.5b in CIRIA C665, the typical / idealised period of monitoring for this site has been determined as 4 no. recorded readings undertaken over a minimum period of 1 month
- ▼ Monitoring visits are undertaken to target and correlate with the worst-case conditions for ground gas emissions to occur, comprising falling atmospheric pressure trends and low atmospheric pressures. Monitoring of the weather conditions and predicted atmospheric pressures were carried out up to 72 hours in advance of the monitoring visits, in order that a reasonable period of data is obtained to determine atmospheric trends, and to target the worst-case scenario

Monitoring was undertaken using a Gas Data GFM436 soil gas analyser with integral flow meter, and a Geotechnical Instruments electronic dip-meter.

A summary of the gas monitoring results obtained to date can be seen in the Table below and on the ground gas monitoring record sheet attached in Appendix IV.

Borehole Position	Date of visit	Atmospheric Pressure (mbar)	Water level (m)	Max CH ₄ (%v/v)	Max CO ₂ (%v/v)	Min O ₂ (%v/v)	Flow Rate (l/hr)
BH01	4/12/2023	984 (Falling trend)	1.72	0.0	2.3	18.1	<0.1
BH02			1.56	0.0	1.4	18.6	<0.1
BH04			2.89	0.0	0.9	18.8	<0.1
BH01	14/12/2023	1015 (Rising trend)	1.68	0.0	2.7	17.4	<0.1
BH02			1.54	0.0	1.9	19.8	<0.1
BH04			2.88	0.0	1.1	17.6	<0.1
BH01	20/12/2023	1000 (Falling trend)	1.82	0.0	2.3	18.3	<0.1
BH02			1.51	0.0	2.5	17.1	<0.1
BH04			1.89	0.0	0.9	9.4	<0.1
BH01	11/01/2024	1024 (Falling trend)	1.84	0.0	1.6	19.0	<0.1
BH02			1.48	0.0	1.1	18.3	<0.1
BH04			1.89	0.0	0.6	19.5	<0.1

Atmospheric pressure trend shown in brackets taken from www.weatheronline.co.uk for Rochdale

No detectable levels of Methane have been recorded during the monitoring period completed.

6.0 Ground Gas Risk Assessment (Cont'd)

Concentrations of Carbon Dioxide have been recorded ranging between 0.6% v/v up to 2.7% v/v at the monitoring wells, along with slightly depleted levels of Oxygen, with a minimum recorded value of 9.4% v/v noted in BH04. No positive flow rates (<0.1 l/hr) have been recorded during the monitoring visits.

For the purpose of assessing the proposed development in accordance with Tables 8.5 & 8.7 in CIRIA C665, and Table 2 in BS8485:2015 + A1:2019, the site is characterised based on the limiting borehole hazardous gas flow rate (Q_{hg}) for Methane and Carbon Dioxide, known as the Gas Screening Value (GSV), and the calculation can be seen below.

The GSV equates to a Characteristic Situation classification which in turn determines the level of gas protection required in accordance with Table 4 in BS8485:2015 + A1:2019.

- ▼ Due to the lack of Methane recorded, a GSV cannot be calculated
- ▼ Multiply the maximum Carbon Dioxide concentration (taken as 2.7% (0.027)) by the maximum flow rate (0.1 l/hr), which gives a GSV value of 0.0027 l/hr

Based on the results obtained, the GSV calculated does not exceed the GSV assessment value of 0.07 l/hr, for a Characteristic Situation 1 (CS1) classification, for the type of development proposed at this site. Therefore in accordance with the guidance, no special gas precautions are required for sites falling within these risk categories.

7.0 Laboratory Testing

7.1 Determination of Natural Moisture Content, Liquid and Plastic Limit

Five representative samples of the natural deposits encountered at the exploratory borehole locations were tested to determine their moisture content and liquid and plastic limits.

The results of the tests are contained in the Professional Soil Laboratory (PSL) Report (reference 23/9904), a copy of which can be seen in Appendix III and are summarised below.

The results have recorded natural moisture content determinations in the range 15% to 18%. Atterberg limit tests indicate liquid and plastic limits in the range 30% to 40% and 16% to 22% respectively. These results indicate clays of low and intermediate plasticity with a low volume change potential when considering the amount passing the 425um sieve.

7.0 Laboratory Testing (Cont'd)

7.1 Determination of Natural Moisture Content, Liquid and Plastic Limit (Cont'd)

As such, the clay deposits tested are unlikely to undergo significant changes in volume if large changes in their natural moisture content were to occur due to seasonal variations or the like, and therefore if new foundations were to be based within these deposits, they can be placed at a minimum depth of 0.75m below finished ground levels, where outside the zone of influence of trees.

7.2 Determination of Chemical Attack on Buried Concrete

Seven representative samples of the made ground and natural soil deposits recovered at the exploratory hole locations were tested by Derwentside Environmental Testing Services Limited (DETS) and CTS Group to determine their pH value and soluble sulphate (sulphate aqueous extract SO_4) levels, so these materials can be classified in accordance with the guidance BRE Special Digest 1:2005, Concrete in Aggressive Ground.

The results of the tests are contained in the DETS Certificate of Analysis Report (reference 22-12915) and CTS Group Analytical Test Report (reference 23-39947) copies of which can be seen attached in Appendix III. The laboratory test results have recorded soluble sulphate concentrations ranging between 25mg/l to 100mg/l and pH values ranging between 8.1 to 8.9.

When considering the total number of samples screened (7 no.) and in conjunction with the BRE guidance, the mean value of the highest two values has been calculated when determining the Design Sulphate Class. Therefore, for this proposed development site and where future foundations and buried concrete are to be constructed the made ground should be classified as Design Sulphate Class of DS-1. The Aggressive Chemical Environment for Concrete (ACEC) class should be assessed as AC-1.

Additional chemical analysis was undertaken on the made ground samples to determine the concentrations of total sulphur. The analysis indicates a characteristic value for total potential sulphate (TPS) of 900 mg/kg or 0.09%. Referring to Special Digest No. 1, the design sulphate class based on this figure for TPS is DS-1. Assuming mobile groundwater conditions, the ACEC class is AC-1.

In accordance with the recommendations contained in Special Digest No. 1, the highest ACEC class is assumed for concrete design. An ACEC class of AC-1 indicates a DC class of DC-1. Should the made ground deposits remain on site this class of concrete should be used for all subsurface concrete.

7.0 Laboratory Testing (Cont'd)

7.3 Contamination Screening / Screening Strategy

Four representative samples of the shallow soil deposits (made ground) encountered at the boreholes were screened for a wide range of chemical analytes to determine the levels of contamination present, and to allow an assessment of the risks these materials may pose to the future site end-users and construction workforce. Ground contamination laboratory testing was completed by DETS of Consett, Co. Durham (UKAS & MCERTS accredited), and the suite of chemical analysis carried out is summarised below.

The results of the tests are contained in the DETS Certificate of Analysis Report (reference 23-27352) a copy of which can be seen attached in Appendix III, and a summary of the contamination results can be seen in the Tables on the following pages.

- ▼ 4 no. soil samples tested for Arsenic, Cadmium, Chromium (III & VI), Copper, Lead, Mercury, Nickel, Selenium, Zinc, Cyanide (free) and Total Organic Carbon (TOC)
- ▼ 4 no. soil samples screened for Speciated Polycyclic Aromatic Hydrocarbons (PAH's) – based on the current USEPA 16 PAH's
- ▼ 4 no. soil sample screened for Petroleum Hydrocarbons (Aliphatic & Aromatic split).
- ▼ 4 no. soil samples tested for Asbestos (presence)

A Human Health Generic Quantitative Risk Assessment (GQRA) is carried out by comparing measured concentrations in soil with generic screening values appropriate for the Conceptual Model and pollutant linkage(s) being assessed.

Provided the measured concentrations are below appropriate generic screening criteria, the risk from the pollutant linkages(s) being assessed are unlikely to represent a significant risk. The generic screening values referred to above usually take the form of risk-based Generic Assessment Criteria (GAC) values, that are most typically derived using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) Model. For the purpose of this Human Health contamination risk assessment, and when considering the nature and sensitivity of the proposed development (Commercial), the results have been compared against currently available assessment values published by LQM / CIEH (Suitable 4 Use Levels – S4UL's), CL:AIRE Category 4 Screening Levels (C4SL's) and Atkins ATRISKsoil Soil Screening Values (SSVs) for Cyanide only. To allow an assessment of the level of risk to be made, the made ground present on this site has been assessed by comparing the maximum recorded value against the appropriate critical concentration.

7.0 Laboratory Testing (Cont'd)

7.3 Contamination Screening / Screening Strategy (Cont'd)

Analyte	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
Arsenic	640 ⁽¹⁾	4	9.7
Cadmium	190 ⁽¹⁾	4	0.2
Chromium III	8,600 ⁽¹⁾	4	21
Chromium VI	33 ⁽¹⁾	4	<1
Copper	68,000 ⁽¹⁾	4	210
Lead	2,330 ⁽³⁾	4	6500 (BH04 at 0.85m)
Mercury	1,100 ⁽¹⁾	4	0.49
Nickel	980 ⁽¹⁾	4	30
Selenium	12,000 ⁽¹⁾	4	<0.5
Zinc	730,000 ⁽¹⁾	4	82
Cyanide	34 ⁽²⁾	4	<0.1
Asbestos	Presence	4	Not Present
Speciated PAH's			
Acenaphthene	100,000 ⁽¹⁾	4	6.2
Acenaphthylene	100,000 ⁽¹⁾	4	0.3
Anthracene	540,000 ⁽¹⁾	4	0.2
Benzo(a)anthracene	180 ⁽¹⁾	4	1.2
Benzo(a)pyrene	36 ⁽¹⁾	4	0.1
Benzo(b)fluoranthene	45 ⁽¹⁾	4	0.2
Benzo(ghi)perylene	4000 ⁽¹⁾	4	0.2
Benzo(k)fluoranthene	1200 ⁽¹⁾	4	0.3
Chrysene	350 ⁽¹⁾	4	1.7
Dibenz(ah)anthracene	3.6 ⁽¹⁾	4	<0.1
Fluoranthene	23,000 ⁽¹⁾	4	0.5
Fluorene	71,000 ⁽¹⁾	4	1.5
Indeno(123cd)pyrene	510 ⁽¹⁾	4	0.5
Naphthalene	1100 ⁽¹⁾	4	0.5
Phenanthrene	23,000 ⁽¹⁾	4	0.4
Pyrene	54,000 ⁽¹⁾	4	0.7

⁽¹⁾= The LQM/CIEH Suitable 4 Use Levels (Commercial land-use, 6% SOM) [GEOL S4UL3816](#), ⁽²⁾ = ATRISK^{SOIL} SSV (2015), ⁽³⁾ = CL:AIRE C4SLs (Commercial land-use)

7.0 Laboratory Testing (Cont'd)

7.3 Contamination Screening / Screening Strategy (Cont'd)

Petroleum Hydrocarbons	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
Aliphatic C5-C6	12,000 ⁽¹⁾	1	<0.01
Aliphatic C6-C8	40,000 ⁽¹⁾	1	<0.01
Aliphatic C8-C10	11,000 ⁽¹⁾	1	<0.01
Aliphatic C10-C12	47,000 ⁽¹⁾	1	1.9
Aliphatic C12-C16	90,000 ⁽¹⁾	1	4.4
Aliphatic C16-C21	1,800,000 ⁽¹⁾	1	43
Aliphatic C21-C35	1,800,000 ⁽¹⁾	1	680
Aromatic C5-C7	86,000(1)	1	<0.01
Aromatic C7-C8	180,000(1)	1	<0.01
Aromatic C8-C10	17,000(1)	1	<0.01
Aromatic C10-C12	34,000(1)	1	<0.9
Aromatic C12-C16	38,000(1)	1	4.9
Aromatic C16-C21	28,000(1)	1	62
Aromatic C21-C35	28,000(1)	1	1000

⁽¹⁾ = The LQM/ClEH Suitable 4 Use Levels (Commercial land-use, 6% SOM) [GEOL S4UL3816](#), ⁽²⁾ = ATRISK^{SOIL} SSV (2015), ⁽³⁾ = CL:AIRE C4SLs (Commercial land-use)

7.4 Contamination Risk Assessment

One sample of made ground from BH04 at 0.85m recorded Lead above the respective screening level.

The findings of the risk assessment have identified that the Lead contamination present within the made ground encountered in BH04, will pose an unacceptable risk to future end users where exposure pathways will be present post-completion of the development. However, as the site will comprise hardcover once the new development has been constructed, this will break the source-receptor-pathway pollutant linkage, reducing the overall risk to an acceptable level and as such no remediation works will be required. It is also possible that large quantities of the made ground from below this area will be removed off-site to accommodate new site levels.

Reference to the proposed development layout plan indicates new areas of soft landscaping around the perimeter of the site. Any soils imported on to the site in the new areas of soft landscaping should be suitable for use and not present harm to people, the environment and/or property.

7.0 Laboratory Testing (Cont'd)

7.4 Contamination Risk Assessment (Cont'd)

It is advised that any soils imported are in accordance with the guidance in the latest edition of the YALPAG document 'Verification Requirements for Cover Systems'.

8.0 New Foundation Recommendations

We understand the proposed development comprises the construction of a new single storey Starbucks retail type unit, areas of carparking and soft landscaping. The retail unit will be located centrally within the site within the area presently occupied by hardstanding and part of the footprint of a wider car park. The remainder of the site will be occupied by car parking and hardstanding. Limited new areas of the site will be allocated to expanding the existing soft landscaping around the perimeter of the car park.

Within the footprint of the retail unit, the ground conditions are likely to comprise moderately thick deposits of made ground up to or only slightly in excess of 2.40m thick but thinner in the area around BH01 (0.70m thick). These deposits overlie glacial till deposits in excess of 3.00m thick. Water levels are present at depths in the range 1.56m to 2.89m bgl.

For the purpose of the following discussion, the made ground deposits are not considered a suitable founding horizon and therefore it is recommended that all foundations are placed in the underlying Glacial Till deposits which comprise mostly firm and stiff clay.

An allowable bearing capacity of 130kPa is recommended for trench fill footings in the firm and stiff glacial till deposits. Based on plasticity index testing, footings should be placed at a minimum depth of 0.75m and as a precaution the footings should be reinforced. This option will generate significant excavation arisings that are likely to require disposal offsite. Based on anticipated water levels, allowance should be made for temporary ground water control.

All the footings should be inspected and any soft spots removed prior to concreting, the latter of which should be carried out as soon as possible following excavation. If this is not possible, the bottom of the footings should be protected by a blinding layer of lean-mix concrete.

In view of the thickness of made ground across the site a fully suspended floor slab is recommended.

9.0 General Comments

For future site works, adequate lateral trench support will be required for excavations, to prevent trench wall collapse or over excavations, as well as to create a safe working environment, and any excavations on this site should remain open for as short a period as possible, since the made ground and natural deposits may be susceptible to deterioration, if left open to the natural elements for any significant period of time.

It is also recommended for any new developments, adequate surface drainage should be designed and installed by a competent contractor, to prevent surface water 'ponding' or collection, during and post construction, particularly where the existing surface drainage system is disrupted or damaged.

In addition, for deeper excavations, drainage, service runs or the like that may pass close to or beneath any proposed new foundations, these should be undertaken with care and completed prior to the preparation of any new foundations, so as not to allow any loose or granular material to move or 'flow', thus causing settlement to occur to any new foundations based at a higher level.

It should be noted that there is always the possibility of variation in the ground conditions around and between the borehole locations. Therefore, during the ground preparation works and development of the site, should the ground conditions appear to differ from those identified as part of these investigation works, then advice should be sought from a suitably qualified Geotechnical Engineer to determine if a reassessment of the ground conditions and recommendations are required before the development works progress further.

In view of the possible presence of two wells on site a watching brief should be undertaken during the construction works. If present the wells should be treated to mitigate the risk to the development.

End of Report

APPENDIX I

Proposed Development Layout Plan

WHITEHALL STREET

QUEEN STREET

DUKE STREET

WHITWORTH ROAD

STARBUCKS
DRIVE-THRU'

c. 171 Sq.M. 1,840 Sq.Ft.
INDICATIVE FFL 141.00

ENTRANCE

OUTDOOR SEATING

CYCLES

PLANTING ZONE

PLANTING ZONE

EXISTING DRAINAGE CHANNEL

DELIVERIES

NEW FOOTPATH ACCESS
LANDSCAPING MODIFIED
TO SUIT.

EXISTING TREE
REMOVED

EXISTING FOOTPATH
RETAINED

EXISTING ONE-WAY
ACCESS RETAINED

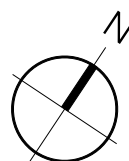
EXISTING ONE-WAY
JUNCTION RETAINED

EXISTING ACCESS
RETAINED.
KERBS & WHITELINING
MODIFIED AS SHOWN.
FOOTPATH MODIFIED
TO SUIT

EXISTING TWO-WAY ROAD
MODIFIED TO PROVIDE ONE-
WAY ENTRY ONLY.
NEW WHITELINING TO SUIT.

SCALE 1:250

0m 2.5 5 7.5 10 12.5 15



NOTES

SITE PLAN BASED ON TOPOGRAPHIC SURVEY BY SURVEY
OPERATIONS. REFER TO DRAWING A0 21G200/001 FOR FULL
DETAILS. LEVELS AND FALLS INDICATIVE ONLY, SUBJECT TO
DETAILED DRAINAGE SCHEME. LEVELS IN RED = EXISTING,
GREEN = PROPOSED

DELIVERIES

PARKING SCHEDULE WITHIN APPLICATION BOUNDARY:

69 CAR PARKING SPACES (INC. 3 ACC., 8 EV, AND 58 STD CARS)
EXCLUDES MOTORCYCLE BAY

59 CAR PARKING SPACES LOST

- BITMAC ROAD
- EXISTING BITMAC FOOTPATH
- PROPOSED BITMAC FOOTPATH
- FOOTPATH BLOCK PAVIOURS
- CONCRETE YARD
- GRAVEL
- EXISTING SOFT LANDSCAPING
- EXTENDED AREAS OF SOFT LANDSCAPING

REV.C 15.06.23 INDICATIVE LEVELS ADDED
REV.B 05.06.23 UPDATED TO COMMENTS RECIEVED
REV.A 07.03.23 UPDATED TO COMMENTS RECIEVED
REV. DATE NOTES INIT.

CLIENT / PROJECT

GLENBROOK
ST. MARYS GATE
ROCHDALE

DRAWING TITLE

ENLARGED SITE PLAN

STATUS

PLANNING

DATE 07.02.22 DRAWN AJP SCALE @ A3 1:250

PROJECT NUMBER UNIT / BLOCK CI / SFB CODE TYPE & NUMBER REVISION LETTER

DRAWING NO. 11390 PL L05 C

Site Location Plans L GA Plans P Elevations E
Sections S Details D Prefix: Colour C

THE RATCLIFFE GROVES PARTNERSHIP

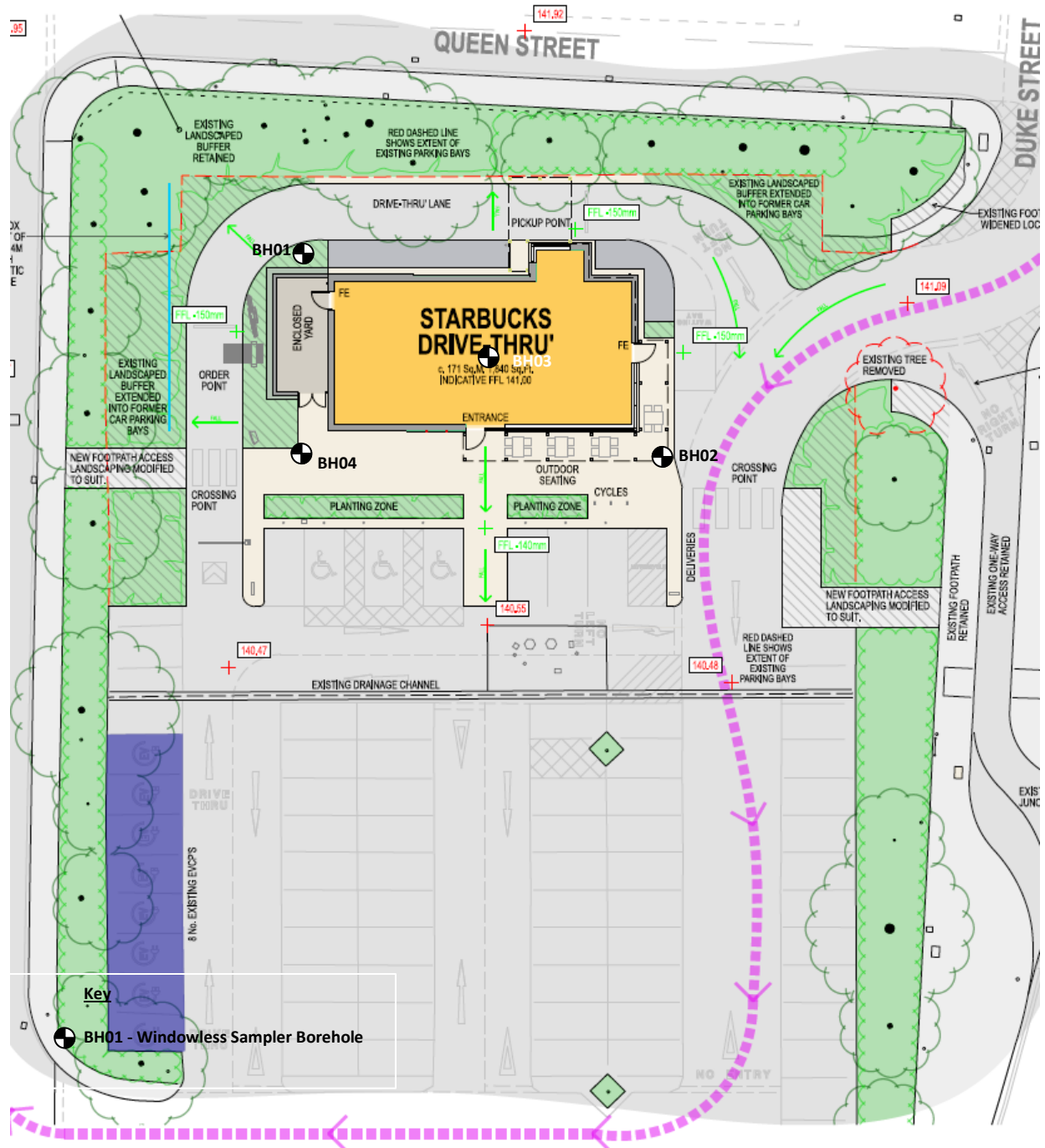
MANCHESTER
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APPENDIX II

Investigation Location Plan & Borehole Record Sheets



INVESTIGATION LOCATION PLAN

Report Type: Ground Investigation Report

Site Address: Land at Whitworth Road (Dunelm) Car Park, Rochdale, OL12

OTY Project No.: GEOL23-7910



Tectonic House, Unit 11
Queens Court North, Third Avenue
Team Valley Trading Estate
Gateshead
Tyne and Wear, NE11 0BU
0191 4772020
enquiries@geolconsultants.co.uk

BOREHOLE LOG

Project Land at Whitworth Road (Dunelm) Car Park, Rochdale, OL12 0TY				BOREHOLE No BH01
Job No GEOL23-7910	Date 17-11-23 17-11-23	Ground Level (m)	Co-Ordinates ()	
Contractor Geol Consultants Limited				Sheet 1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.25	ES					0.05 (0.65) 0.70	MADE GROUND: Black macadam. MADE GROUND SUBBASE: Grey, slightly sandy aggregate gravel.		
0.90 0.90 1.00-1.45	D HSVT SPT	100kPa N=14				(0.45) 1.15	Stiff (high strength), brown mottled grey, slightly sandy, slightly gravelly CLAY. Gravel is subangular fine to coarse mudstone (GLACIAL TILL).		
1.80 1.90 2.00-2.45	HSVT D SPT	98kPa N=18					Stiff (high strength), brown mottled grey, laminated, slightly sandy, slightly gravelly CLAY. Gravel is subangular fine to coarse mudstone (GLACIAL TILL).		
2.70 2.90 3.00-3.45	HSVT D SPT	99kPa N=21				(3.75)			
3.90 4.00-4.45	D SPT	N=15				4.90			
4.90 5.00-5.17	D SPT	50 for 55mm				5.17	Firm, brown, laminated CLAY (GLACIAL TILL).		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Water strike at 1.00m
All dimensions in metres Scale 1:50			Client Glenbrook Investments Limited			Method/ Plant Used Competitor Dart			Logged By MD		

AGS3 UK BH GEOL23-7910 LOGS.GPJ GINT STD AGS 3 1.GPT 26/01/24



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BOREHOLE LOG

Project Land at Whitworth Road (Dunelm) Car Park, Rochdale, OL12 0TY				BOREHOLE No BH02
Job No GEOL23-7910	Date 17-11-23 17-11-23	Ground Level (m)	Co-Ordinates ()	
Contractor Geol Consultants Limited				Sheet 1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.25	ES					0.05 (0.60) 0.65	MADE GROUND: Black macadam. MADE GROUND SUBBASE: Grey, slightly sandy aggregate gravel.		
0.80	ES						MADE GROUND: Loose, greyish brown, orangish brown and red, slightly sandy gravel.		
1.00-1.45	SPT	N=6				(1.50)			
1.55	ES								
2.00-2.45	SPT	N=17				2.15			
2.85	D						Stiff (high strength), brown mottled grey, laminated, slightly sandy, slightly gravelly CLAY. Gravel is subangular fine to coarse mudstone (GLACIAL TILL).		
2.85	HSVT	135kPa							
3.00-3.45	SPT	N=15							
3.40	D								
4.00-4.45	SPT	N=20				(3.30)			
4.90	D								
4.90	HSVT	86kPa							
5.00-5.45	SPT	N=26				5.45			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											No groundwater encountered.
All dimensions in metres Scale 1:50			Client Glenbrook Investments Limited			Method/ Plant Used Competitor Dart			Logged By MD		

AGS3 UK BH GEOL23-7910 LOGS.GPJ GINT STD AGS 3 1.GPT 26/01/24



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BOREHOLE LOG

Project Land at Whitworth Road (Dunelm) Car Park, Rochdale, OL12 0TY				BOREHOLE No BH03
Job No GEOL23-7910	Date 17-11-23 17-11-23	Ground Level (m)	Co-Ordinates ()	
Contractor Geol Consultants Limited				Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.30	ES	N=11				0.05 (0.60) 0.65	MADE GROUND: Black macadam. MADE GROUND SUBBASE: Grey, slightly sandy aggregate gravel.		
0.90 1.00-1.45	ES SPT					(1.15) 1.80	MADE GROUND: Medium dense, greyish brown, orangish brown and red, slightly sandy gravel.		
1.90 2.00-2.45	ES SPT					(0.60) 2.40	MADE GROUND: Medium dense, brown with light grey bands, slightly gravelly sand.		
2.80 2.85 3.00-3.45	D HSVT SPT	102kPa N=25				(2.05) 4.45	Stiff (high strength), greyish brown, slightly sandy, slightly gravelly CLAY. Gravel is subangular fine to coarse mudstone (GLACIAL TILL).		
3.80 4.00-4.45	D SPT	N=26							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											No groundwater encountered.

All dimensions in metres Scale 1:50	Client Glenbrook Investments Limited	Method/ Plant Used Competitor Dart	Logged By MD
--	---	--	-----------------

AGS3 UK BH GEOL23-7910 LOGS.GPJ GINT STD AGS 3 1.GPT 26/01/24



Tectonic House, Unit 11
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enquiries@geolconsultants.co.uk

BOREHOLE LOG

Project Land at Whitworth Road (Dunelm) Car Park, Rochdale, OL12 0TY				BOREHOLE No BH04
Job No GEOL23-7910	Date 17-11-23 17-11-23	Ground Level (m)	Co-Ordinates ()	
Contractor Geol Consultants Limited				Sheet 1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.35	ES					0.05 (0.50) 0.55	MADE GROUND: Black macadam. MADE GROUND SUBBASE: Grey, slightly sandy aggregate gravel.		
0.85 1.00-1.45	ES SPT	N=6				(1.70)	MADE GROUND: Loose and medium dense, greyish brown, orangish brown and red, slightly sandy gravel with occasional cobbles of brick and concrete.		
1.80 2.00-2.45	ES SPT	N=18				2.25			
2.75 2.90 3.00-3.45	HSVT D SPT	130kPa N=25				(3.20)	Stiff (high strength) and locally firm (medium strength), greyish brown, laminated below 4.00m, slightly sandy, slightly gravelly CLAY. Gravel is subangular fine to coarse mudstone (GLACIAL TILL).		
3.85 3.90 4.00-4.45	HSVT D SPT	93kPa N=27				5.45			
4.90 4.90 5.00-5.45	D HSVT SPT	51kPa N=32							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											No groundwater encountered.
All dimensions in metres Scale 1:50			Client Glenbrook Investments Limited			Method/ Plant Used Competitor Dart			Logged By MD		

AGS3 UK BH GEOL23-7910 LOGS.GPJ GINT STD AGS 3 1.GDT 26/01/24

APPENDIX III

Laboratory Testing Results



Certificate of Analysis

Certificate Number 23-27352

Issued: 05-Dec-23

Client Geol-Consultants Ltd.
Tectonic House
Unit 11 Queens Court North
Third Avenue
Team Valley Trading Estate
Gateshead, Tyne & Wear
NE11 0BU

Our Reference 23-27352

Client Reference GEOL23-7910

Order No GEOL23-7910

Contract Title Land at Whitworth Road Car Park, Rochdale, OL12 0TY

Description 4 Soil samples.

Date Received 21-Nov-23

Date Started 21-Nov-23

Date Completed 05-Dec-23

Test Procedures Identified by prefix DETSn (details on request).

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

Approved By

Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 23-27352

Client Ref GEOL23-7910

Contract Title Land at Whitworth Road Car Park, Rochdale, OL12 0TY

Lab No	2265128	2265129	2265130	2265131
Sample ID	BH01	BH02	BH03	BH04
Depth	0.25	0.80	0.90	0.85
Other ID				
Sample Type	ES	ES	ES	ES
Sampling Date	17/11/2023	17/11/2023	17/11/2023	17/11/2023
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Preparation							
Moisture Content	DETSC 1004	0.1	%	9.6	12	10	14
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	5.2	8.0	6.8	9.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	21	18	11	11
Chromium III	DETSC 2301*	0.15	mg/kg	21	18	11	11
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	35	210	17	21
Lead	DETSC 2301#	0.3	mg/kg	25	120	19	6500
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.29	0.15	0.49
Nickel	DETSC 2301#	1	mg/kg	30	27	11	7.1
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	82	57	22	21
Inorganics							
pH	DETSC 2008#		pH	8.6	8.5	8.7	8.9
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Total Organic Carbon	DETSC 2084#	0.5	%	1.2	5.1	< 0.5	1.2
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	73	43	29	25
Sulphur as S, Total	DETSC 2320	0.01	%	0.03	0.02	0.01	
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.04	0.05	0.05	
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	1.9
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	4.4	< 1.2	< 1.2	2.8
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	43	1.7	< 1.5	3.7
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	680	13	< 3.4	20
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	730	14	< 10	28
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	4.9	2.1	< 0.5	1.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	62	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	1000	21	< 1.4	27
Aromatic C5-C35	DETSC 3072*	10	mg/kg	1100	23	< 10	29
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	1800	37	< 10	57
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg	0.2	0.5	0.3	0.2
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.3	0.3	0.2	0.2

Summary of Chemical Analysis Soil Samples

Our Ref 23-27352

Client Ref GEOL23-7910

Contract Title Land at Whitworth Road Car Park, Rochdale, OL12 0TY

Lab No	2265128	2265129	2265130	2265131
Sample ID	BH01	BH02	BH03	BH04
Depth	0.25	0.80	0.90	0.85
Other ID				
Sample Type	ES	ES	ES	ES
Sampling Date	17/11/2023	17/11/2023	17/11/2023	17/11/2023
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Acenaphthene	DETSC 3301	0.1	mg/kg	1.6	6.2	5.1	0.9
Fluorene	DETSC 3301	0.1	mg/kg	0.7	1.5	1.1	0.3
Phenanthrene	DETSC 3301	0.1	mg/kg	0.3	0.4	0.3	0.2
Anthracene	DETSC 3301	0.1	mg/kg	0.2	0.2	0.2	0.2
Fluoranthene	DETSC 3301	0.1	mg/kg	0.1	0.3	0.2	0.5
Pyrene	DETSC 3301	0.1	mg/kg	0.2	0.3	0.2	0.7
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	1.2	< 0.1	< 0.1	0.3
Chrysene	DETSC 3301	0.1	mg/kg	1.7	< 0.1	< 0.1	0.3
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.2
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.5	< 0.1	< 0.1	0.3
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.2
PAH 16 Total	DETSC 3301	1.6	mg/kg	7.4	9.6	7.6	4.6

Summary of Asbestos Analysis

Soil Samples

Our Ref 23-27352

Client Ref GEOL23-7910

Contract Title Land at Whitworth Road Car Park, Rochdale, OL12 0TY

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2265128	BH01 0.25	SOIL	NAD	none	Robertas Ciparis
2265129	BH02 0.80	SOIL	NAD	none	Robertas Ciparis
2265130	BH03 0.90	SOIL	NAD	none	Robertas Ciparis
2265131	BH04 0.85	SOIL	NAD	none	Robertas Ciparis

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-27352
 Client Ref GEOL23-7910
 Contract Land at Whitworth Road Car Park, Rochdale, OL12 0TY

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2265128	BH01 0.25 SOIL	17/11/23	GJ 250ml, PT 1L		BTEX / C5-C10
2265129	BH02 0.80 SOIL	17/11/23	GJ 250ml, PT 1L		BTEX / C5-C10
2265130	BH03 0.90 SOIL	17/11/23	GJ 250ml, PT 1L		BTEX / C5-C10
2265131	BH04 0.85 SOIL	17/11/23	GJ 250ml, PT 1L		BTEX / C5-C10

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report



LABORATORY REPORT



Contract Number: PSL23/9904

Report Date: 07 December 2023

Client's Reference: GEOL21-7910

Client Name: Geol Consultants Ltd

Tectonic House, Unit 11 Queens Court North
Third Avenue
Team Valley Trading Estate
Gateshead
NE11 0BU

For the attention of: Martin Davidson

Project Name: Land at Whitworth Road (Dunelm) Car Park, Rochdale, OL12 0TY

Date Received: 23/11/2023

Date Commenced: 23/11/2023

Date Completed: 05/12/2023

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)


M Fennell
(Senior Technician)

5 – 7 Hexthorpe Road,
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Tel: 01302 768098
Email: rberriman@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

**Land at Whitworth Road (Dunelm) Car Park, Rochdale,
OL12 0TY**

Contract No:

PSL23/9904

Client Ref:

GEOL23-7910

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



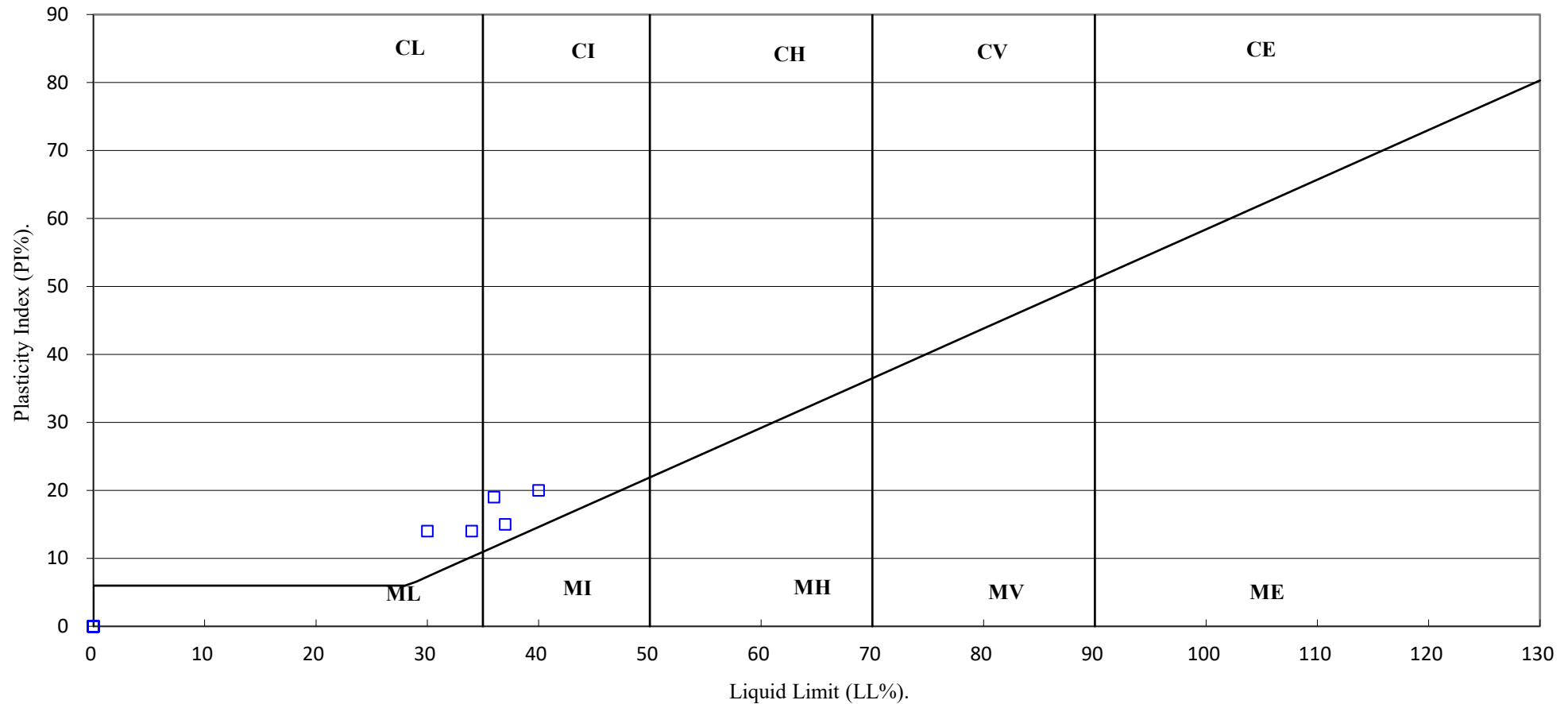
**Land at Whitworth Road (Dunelm) Car Park, Rochdale,
OL12 0TY**

Contract No:

PSL23/9904

Client Ref:**GEOL23-7910**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



Land at Whitworth Road (Dunelm) Car Park, Rochdale,
OL12 0TY

Contract No:

PSL23/9904

Client Ref:

GEOL23-7910



4161



7 - 11 Harding Street
Leicester
LE1 4DH

Professional Soils Laboratory

5/7 Hexthorpe Road
Hexthorpe
Doncaster
DN4 0AR

Analytical Test Report: L23/07658/PSL - 23-39947

Your Project Reference:	PSL23/9904 Land at Whitworth Road (Dunelam) Car Park, Rochdale, OL12 0TY		
Your Order Number:	PSL23/9904	Samples Received / Instructed:	07/12/2023 / 07/12/2023
Report Issue Number:	1	Sample Tested:	07/12 to 14/12/2023
Samples Analysed:	3 soil samples	Report issued:	14/12/2023

Signed

James Gane
Analytical Services Manager
CTS Group

Notes:**General**

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

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

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

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

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

Uncertainty of measurement values are available on request.

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

Deviating Samples

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

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of Issue: 30.10.2023

Issued by: J. Gane

Issue No: 4

Rev No: 5



7 - 11 Harding Street
Leicester
LE1 4DH

L23/07658/PSL - 23-39947

**Project Reference - PSL23/9904 Land at Whitworth
Road (Dunelam) Car Park, Rochdale, OL12 0TY**

Analytical Test Results - Chemical Analysis

Lab Reference			331380	331381	331382
Client Sample ID			-	-	-
Client Sample Location			BH01	BH01	BH02
Client Sample Type			D	D	D
Client Sample Number			0.90	2.90	2.85
Depth - Top (m)			0.90	2.90	2.85
Depth - Bottom (m)			-	-	-
Date of Sampling			-	-	-
Time of Sampling			-	-	-
Sample Matrix			Clay	Clay	Clay
Determinant	Units	Accreditation			
Water soluble sulphate (as SO ₄)	(mg/l)	u	32	100	49
pH Value	pH Units	MCERTS	8.1	8.7	8.5



L23/07658/PSL - 23-39947

Project Reference - PSL23/9904 Land at Whitworth Road (Dunelam) Car Park, Rochdale, OL12 0TY

Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
331380	-	BH01	D	0.90	Brown slightly gravelly sandy silty clay with occasional mudstone	-	-	43
331381	-	BH01	D	2.90	Dark brown slightly gravelly silty clay	-	-	39
331382	-	BH02	D	2.85	Dark brown slightly gravelly silty clay with rare mudstone	-	-	44



4161



7 - 11 Harding Street
Leicester
LE1 4DH

L23/07658/PSL - 23-39947

Project Reference - PSL23/9904 Land at Whitworth Road (Dunelam) Car Park, Rochdale, OL12 0TY

Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
331380	-	BH01	D	0.90	
331381	-	BH01	D	2.90	
331382	-	BH02	D	2.85	



4161



7 - 11 Harding Street
Leicester
LE1 4DH

L23/07658/PSL - 23-39947

Project Reference - PSL23/9904 Land at Whitworth Road (Dunelam) Car Park, Rochdale, OL12 0TY

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis

L23/07658/PSL - 23-39947

Project Reference - PSL23/9904 Land at Whitworth Road (Dunelam) Car Park, Rochdale, OL12 0TY

Sample Deviations

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

Observations on receipt

A - No date of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

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

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
331380	-	BH01	D	1		A
331381	-	BH01	D	3		A
331382	-	BH02	D	3		A

APPENDIX IV

Ground Gas Monitoring Record Sheet

Ground Gas Monitoring Record Sheet



Visit	Date	Time	Equipment	Weather	Site Engineer	Comments	Borehole Position	Gas Flow (l/hr)	Atmospheric Pressure (mbar)	Atmospheric Pressure Trend	Methane (% v/v)		Methane (% LEL)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Hydrocarbons (GFM 435 only)		Other Gases (PPM)			Depth to Water (m bgl)	Depth to Base (m bgl)
											Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Hex %	PID Cf	PID (Isobutylene)	H ₂ S	CO		
1	04/12/2023	10:35	GFM436	Light rain, very wet	IH		BH01	<0.1	984	Falling 1013 - 999		0.0		0.0		2.3		18.1	0.000	1.0		0	0	1.72	3.14
							BH02	<0.1	984			0.0		0.0		1.4		18.6	0.000	1.0		0	0	1.56	3.15
							BH04	<0.1	984			0.0		0.0		0.9		18.8	0.000	1.0		0	0	2.89	3.14
2	14/12/2023	09:05	GFM436	Overcast, wet	IH		BH01	<0.1	1015	Rising 995 - 1020		0.0		0.0		2.7		17.4	0.000	1.0		0	0	1.68	3.14
							BH02	<0.1	1015			0.0		0.0		1.9		19.8	0.000	1.0		0	0	1.54	3.15
							BH04	<0.1	1015			0.0		0.0		1.1		17.6	0.000	1.0		0	0	2.88	3.14
3	20/12/2023	09:20	GFM436	Overcast, wet	IH		BH01	<0.1	1002	Falling 1035 - 1019		0.0		0.0		2.3		18.3	0.000	1.0		0	0	1.82	3.14
							BH02	<0.1	1000			0.0		0.0		2.5		17.1	0.000	1.0		0	0	1.51	3.15
							BH04	<0.1	1000			0.0		0.0		0.9		9.4	0.000	1.0		0	0	1.89	3.14
4	11/01/2024	10:15:00	GFM436	Overcast, wet	IH		BH01	<0.1	1024	Falling 1036 - 1032		0.0		0.0		1.6		19.0	0.000	1.0		0	0	1.84	3.14
							BH02	<0.1	1024			0.0		0.0		1.1		18.3	0.000	1.0		0	0	1.48	3.15
							BH04	<0.1	1024			0.0		0.0		0.6		19.5	0.000	1.0		0	0	1.89	3.14
5																									
6																									