

**REPORT ON  
GROUND INVESTIGATION  
AT  
GORTON EDUCATION VILLAGE  
GORTON  
MANCHESTER**



### REPORT STATUS SHEET

|                       |                                                                                |
|-----------------------|--------------------------------------------------------------------------------|
| <b>Client:</b>        | Bright Futures Educational Trust                                               |
| <b>Report Title:</b>  | Report on Ground Investigation at Gorton Education Village, Gorton, Manchester |
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|                      |                                                             | Date      | Signed for and on behalf of Applied Geology Limited |
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- Exploratory Hole Location Plan, Dwg No AG3331-21-02
- Proposed Floor Plans – MHS, Dwg No 1101 Rev C, dated July 2020, by Bowker Sadler Architecture
- Proposed External Area Plan, Dwg No 1111 Rev A, dated November 2021, by Bowker Sadler Architecture
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### **APPENDIX B**

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## **1.0 INTRODUCTION**

### **1.1 Objectives and Scope of Investigation**

A two-storey extension is proposed at the existing Gorton Education Village (the site) by Bright Future Educational Trust (the Client) to accommodate new classrooms and office space.

A previous Desk Study/Phase I Geo-Environmental Risk Assessment was carried out by Applied Geology Ltd on behalf on the Client in December 2021 (Report Ref: AG3331-21-AN30-Issue 3). A summary of the pertinent desk study findings is presented in Section 3 of this report.

Applied Geology was appointed by the Client to undertake a Phase II ground investigation in order to:

- Assess the potential for hazardous substances or conditions to exist at the site that might warrant mitigation or remediation appropriate to the intended end use proposed by the Client.
- Establish geological conditions and geotechnical parameters to assist in the safe and economic engineering design of the proposed development.
- Support Planning Application Ref: 132456/FO/2021.

The terms of reference/brief for the works were mutually developed between Ridge & Partners LLP (the Client's Engineer) and Applied Geology and are outlined in our proposal and estimate (ref. AG3331-21let001) and estimate (ref. AG3331-21-01), dated 21<sup>st</sup> December 2021.

The scope of works undertaken by Applied Geology comprised a ground investigation together with sampling, monitoring, and a programme of laboratory testing, followed by assessment and reporting of the results of the works.

Underground service plans for the site were obtained by Applied Geology on 28<sup>th</sup> January 2022. An unreferenced undated topographic survey drawing was provided by the Engineer. A UXO pre-start briefing was undertaken by 1<sup>st</sup> Line Defence and service clearance at each exploratory hole was undertaken by Midland Survey Ltd.

### **1.2 Report Layout**

This report presents a brief description of the site, a summary of the desk study data and the factual results of the intrusive investigations carried out. An interpretation of the ground conditions and a discussion/assessment of the findings is presented in the later report text sections. The main text of the report has been produced in a concise format, including the use of data tables to summarise key information where possible. The report should be read in conjunction with the general procedures detailed in Appendix E and General Notes given at the end of the main text, which provide details of investigation techniques, assessment methodology and standards, health & safety and limitations and exceptions of the report. Drawings and factual data including exploratory hole records, and laboratory testing results are presented in the other Appendices.

## 2.0 SITE DESCRIPTION AND PROPOSALS

### 2.1 Site Description

The proposed area of extension is located to the eastern side of Gorton Education Village, Gorton, approximately 6km southeast of Manchester city centre. The approximate Ordnance Survey grid reference for the centre of the site is 388465, 394875 as shown on the Site Location Plan in Appendix A.

The proposed area of extension is irregular in plan shape, covering an area of less than 0.1ha. The site is relatively flat at an approximate elevation of 64m AOD.

A site inspection/walkover was undertaken by Applied Geology on 19<sup>th</sup> October 2021 as part of the previous Phase 1 Desk Study. No significant changes had occurred to the site between the time of the walkover and the ground investigation fieldwork. However, it was subsequently noted by the Engineer that the existing building is anticipated to utilise a piled foundation.

### 2.2 Site Proposals

The proposals for the site comprise the construction of a two-storey steel framed extension to one of the existing wings on the eastern side of the existing Gorton Education Village to accommodate new classrooms and office space. The layout is shown on the Proposed Floor Plans – MHS, drawing No 1101 Rev C, dated July 2020, by Bowker Sadler Architecture, a copy of which is presented in Appendix A.

## 3.0 DESK STUDY INFORMATION

### 3.1 Desk Study Summary

The following section summarises the key findings of the Geoenvironmental Phase I Desk Study findings by Applied Geology, report ref: AG3331-21-AN30-Issue 3, dated December 2021.

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site History</b> | <ul style="list-style-type: none"> <li>• <b>1849</b> – The site is occupied by Pink Bank Plantation. The surrounding area generally comprises open fields. Nico Ditch trending east-west is located 30m to the north and several reservoirs are shown 250m to the southwest.</li> <li>• <b>1892/93</b> – Pink Bank Plantation is no longer shown and the site is now shown to comprise an agricultural field. An old clay pit is located 200m to the southwest of the site. Several ponds are in the near vicinity, the closest is shown 40m to the southwest.</li> <li>• <b>1906/07</b> – No significant changes on site. The old clay pit to the south is no longer shown to be present.</li> <li>• <b>1933</b> – The site is now labelled Melland Playing Field. The pond 40m southwest is no longer present and residential development has taken place from approximately 100m to the northeast.</li> <li>• <b>1956</b> – An unlabelled building is shown on the site.</li> <li>• <b>1968</b> – The unlabelled building on site is no longer shown.</li> <li>• <b>1985</b> – No significant changes on site. Melland School is shown 90m to the southeast.</li> <li>• <b>2010</b> – Development on site concurrent with the Present-day layout is now shown. The former Melland School 90m to the southeast has been redeveloped to comprised residential properties.</li> <li>• <b>2010-2021</b> – No further significant changes to the Present-day.</li> </ul> |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Anticipated Geology and Ground Conditions</b> | <ul style="list-style-type: none"> <li>Published BGS Map Sheet 85 indicates that the site is underlain by Solid geology of the Chester Formation (sandstone), with overlying Superficial deposits comprising Glacial Till (typically firm to stiff sandy gravelly clay). Glaciofluvial Ice Deposits (typically sands and gravels) are shown to be present in the wider area and may be present locally as layers/lenses within the Glacial Till. Available BGS data indicates that bedrock may be present at depths of between 30m and 40m bgl.</li> <li>The nearest BGS archive borehole, SJ89SE168 (90m south) records silty clay and peat to 10m bgl, over stiff clay (Glacial Till) to 27m bgl.</li> <li>Previous ground investigation (reports available on the Local Planning Authority Portal) undertaken by Geotechnics in 2005 and 2006 for the existing building and 100m to the west in 2013 by WML Consulting Ltd generally recorded up to 0.9m of Topsoil over 0.1m to 1.3m of Made Ground onto firm becoming stiff (locally soft) sandy gravelly clay, proven to 15m bgl. Peat was noted in the investigation to the west between 1.5m and 2.1m bgl (a suspected backfilled pond). Although reference was made to the presence of plant roots to shallow depth and fissures throughout the cohesive Glacial Till in the 2005/2006 Geotechnics investigation undertaken for the existing building, no reference was made to the presence of desiccation.</li> </ul> |
| <b>Radon</b>                                     | <ul style="list-style-type: none"> <li>The site is not located in a radon affected area, with &lt;1% of homes above the Action Level. No radon protection measures are therefore considered necessary for new properties.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Natural Ground Stability Hazards</b>          | <ul style="list-style-type: none"> <li>The risks pertaining to shrink-swell clays, landslide, ground dissolution of soluble rocks, compressible deposits, and running sands are all considered to be very low – negligible.</li> <li>It is however noted that archived BGS borehole records approximately 90m south of the site indicate the presence of peat to 10m bgl.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mining/Quarrying</b>                          | <ul style="list-style-type: none"> <li>The site is not located in area of underground coal or other mining.</li> <li>The site not located in an area associated with natural cavity formation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hydrology</b>                                 | <ul style="list-style-type: none"> <li>The nearest surface watercourse is Nico Ditch, 34m to the north of the site.</li> <li>There are no surface water abstractions within 500m of site.</li> <li>There are no licensed discharges with 500m of site.</li> <li>The site lies outside of any floodplain.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hydrogeology</b>                              | <ul style="list-style-type: none"> <li>The Solid strata of the Chester Formation underlying the site are a Principal Aquifer. The Superficial Glacial Till is designated a Secondary 'undifferentiated' Aquifer and any Glaciofluvial Ice Contact Deposits, if present, are designated as a Secondary 'A' Aquifer.</li> <li>The nearest recorded groundwater abstraction license is 130m to the south for 'general use'.</li> <li>The site is not located within a Source Protection Zone (SPZ).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Other Environmental data</b>                  | <ul style="list-style-type: none"> <li>There are no recorded landfills within 250m.</li> <li>Ten licensed waste sites are shown within 250m of the site, the nearest being 185m to the south relating to the treatment of waste to produce soil.</li> <li>Seven current industrial land usages are shown within 250m. Of note, there are electricity substations 65m northeast and 75m to the south.</li> <li>Two historical Part B Activities are shown, 350m west and 435m southwest of the site, relating to coating by Mallatite Ltd and the use of bulk cement by the British Cement Corporation Ltd.</li> <li>There are no current COMAH or NIHHS sites within the local vicinity.</li> <li>No environmentally sensitive or ecological designations are shown within 500m.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>UXO</b>                                       | <ul style="list-style-type: none"> <li>Based on available data (Zetica UXO Risk Interactive Map), the site is shown to located in an area considered to be at moderate risk of encountering UXO.</li> <li>A detailed UXO risk assessment was complete by 1<sup>st</sup> Line Defence (report ref: DA15025-00, dated February 2022). The detailed risk assessment indicated a low-medium risk of encountering UXO at the site. The report recommended that a UXO awareness briefing was conducted prior to any intrusive works, i.e., before the site investigation fieldwork and before future groundworks during the construction phase at the site.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                             |                                                                                                                              |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Railways and Tunnels</b> | <ul style="list-style-type: none"> <li>There are no active above or underground railways within 250m of the site.</li> </ul> |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------|

### 3.2 Conceptual Site Model

The preliminary Conceptual Site Model established as part of the desk study is summarised in the table below.

| Source                                                                                                                            | Pathway                                      | Receptor                                  | Risk*            |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|------------------|
| Potential contaminants (heavy metals, asbestos, hydrocarbons) within Made Ground on site associated with the historical land use. | Inhalation, dermal contact                   | End users                                 | Negligible - Low |
|                                                                                                                                   | Migration and Leaching                       | Principal Aquifer                         | Low              |
|                                                                                                                                   | Leaching/runoff                              | Off-site surface water ditch (Nico Ditch) | Negligible – Low |
|                                                                                                                                   | Direct Contact                               | Water Supply Pipes                        | Low              |
| Elevated sulphates in Made Ground and natural soils                                                                               | Direct Contact                               | Buried concrete                           | Low – Medium     |
| Ground gas from Made Ground on site                                                                                               | Migration into buildings and any excavations | End users                                 | Medium           |

**\* Definition of Risk Categories**

Negligible - Contaminants that might have unacceptable impact on key receptors, are unlikely to be present, or no pathway is envisaged.

Low Risk: Contaminants may be present but are unlikely to be at levels to have unacceptable impact on key receptors, or pathways are likely to be minimal.

Medium Risk: Contaminants are probably present and might have an unacceptable impact on key receptors.

Pathways may also be present therefore remedial measures may be necessary to reduce the risks.

High Risk – Contaminants probably or certainly present and pathways are probably also present. Therefore, contaminants are likely to have an unacceptable impact on key receptors and remedial measures are likely to be necessary to reduce the risks to acceptable levels.

## 4.0 GROUND INVESTIGATION WORKS

### 4.1 Fieldwork

The following scope of fieldwork was undertaken:

- 1 No 150mm diameter Cable Percussion borehole (ref. BH1) to a depth of 15.45m below ground level (bgl).
- 6 No Driven Continuous Sampling boreholes (ref DCS1 to DCS4, including DCS2A-C) to depths of between 0.8m and 4.45m bgl.

The borehole records are included in Appendix B with the SPT calibration certificates.

The locations of the exploratory holes were selected and set out on site by Applied Geology Limited and these were significantly constrained by the available access on site and the presence of underground supply services. The sampling strategy for the exploratory hole locations was to provide best overall coverage given the access constraints. The cable percussive borehole was undertaken to permit collection of deeper geotechnical data while the DCS boreholes were positioned to permit the collection of shallow soil samples for geoenvironmental testing and to allow for installation of gas and groundwater monitoring points. Borehole positions DCS2A and DCS2B were both terminated at 0.8m bgl due to the presence of shallow groundwater.

A UXO pre-start briefing was given immediately prior to the ground investigation fieldworks by 1<sup>st</sup> Line Defence following recommendations in the detailed UXO report (ref. DA15025-00, dated February 2022).

The exploratory hole positions were cleared of services by trained personnel using a calibrated CAT & Genny in addition to consultation of statutory service data. Surveying and service clearance of each location was undertaken by Midland Survey Ltd. The locations are presented on Drawing No. AG3331-21-02 in Appendix A.

#### **4.2 Instrumentation and Monitoring**

On completion of boring, 50mm diameter standpipes were installed in selected boreholes as follows, with further details included in the relevant borehole logs in Appendix B:

- DCS1, with response zone from 2.0 to 4.0m bgl in Glacial Till.
- DCS2C, with response zone from 1.0 to 3.0m bgl, in Glacial Till.
- DCS3, with response zone from 1.0 to 3.0m bgl, in Glacial Till.

Washed silica gravel (6-10mm) was used as the filter medium, and a 300-micron filter sock was wrapped around the slotted section of the standpipe. Each standpipe was fitted with a push-in bung and single gas tap and was finished with flush metal cover concreted in place.

Groundwater monitoring visits were undertaken on 4 occasions between 17<sup>th</sup> March and 13<sup>th</sup> April 2022, including during two periods of falling atmospheric pressure. Although only a thin layer of Made Ground was encountered across the site and no obvious/significant sources of ground gas have been identified, confirmatory gas monitoring visits were undertaken alongside groundwater level monitoring for surety. Each monitoring well was monitored for concentrations of carbon dioxide, methane, oxygen, flow rates and differential pressures and water level. The monitoring results are included in Appendix C.

#### **4.3 Laboratory Testing**

Geotechnical laboratory testing was scheduled by Applied Geology on selected samples recovered. Testing was carried out at UKAS accredited laboratory i2 Analytical and comprised the following:

- 6 No natural moisture content tests.
- 6 No Atterberg limit tests.
- 3 No quick undrained triaxial tests.
- 4 No BRE SD1 suite tests.

Chemical testing was scheduled by Applied Geology based upon the desk study, walkover and site observations during the fieldwork. No specific significant potential sources of contamination were identified during the desk study and site visit, therefore chemical testing was undertaken for a general suite of common contaminants primarily to inform re-use/disposal potential and preliminary waste classification. Testing was carried out at UKAS accredited laboratory i2 Analytical.

Two samples of the Made Ground and a single sample of the natural strata were analysed for the following suite of contaminants:

- Selected metals suite [arsenic, beryllium, boron, cadmium, chromium (total, trivalent and hexavalent), copper, mercury, nickel, lead, zinc, selenium, vanadium];
- Speciated (16 US EPA) Polycyclic Aromatic Hydrocarbons (PAH);
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG);
- Benzene, Toulene, Ethylbenzene, and Xylene (BTEX);
- Methyl-tertiary-butyl-ether (MTBE);
- Phenols (total);
- pH;
- Soluble sulphate;
- Organic matter; and
- Asbestos screening.

Two samples of the Made Ground were submitted for leachate analysis, comprising the following suite of contaminants:

- Selected metals suite [arsenic, beryllium, boron, cadmium, total chromium, copper, mercury, nickel, lead, selenium, vanadium, zinc];
- Speciated (16 US EPA) Polycyclic Aromatic Hydrocarbons (PAHs);
- Phenols (total);
- pH;
- Hardness; and
- Total Organic Carbon.

Laboratory test results are included in Appendix D.

## 5.0 GROUND CONDITIONS

### 5.1 Strata Summary

The ground investigation has identified Made Ground (including hardstanding) to depths of up to 1.5m bgl, overlying natural cohesive Glacial Till. Bedrock of the Chester Formation was not encountered. Full details are given on the borehole records presented in Appendix B. A generalised ground profile is presented below to summarise the information and the materials are described generally in the subsequent paragraphs.

| Stratum             | Depth to Top of Strata (m bgl) | Thickness (range) (m) | Comments                                                                                      |
|---------------------|--------------------------------|-----------------------|-----------------------------------------------------------------------------------------------|
| Hard Standing       | GL                             | 0.05–0.2              | Encountered in all locations as asphalt except DCS2C and DCS4                                 |
| Made Ground/Topsoil | GL                             | 0.25–0.4              | Encountered in DCS2C and DCS4 only                                                            |
| Made Ground         | 0.05–0.4                       | 0.3–1.45              | Encountered at all exploratory hole locations. Thickest in DCS1                               |
| Glacial Till        | 0.7–1.5                        | 14.35+                | Encountered in all locations except DCS2A and DCS2B which failed to penetrate the Made Ground |

## 5.2 Hard Standing and Made Ground/Topsoil

Asphalt hardstanding was encountered at all locations (with the exception of DCS2C and DCS4), from ground level extending to depths of between 0.05m and 0.4m.

Made Ground/Topsoil was encountered at the location of DCS2C and DCS4 from ground level extending to depths of 0.25m and 0.4m bgl respectively. The Made Ground/Topsoil generally comprised grass over dark brown clayey gravelly sand with frequent rootlets. The gravel was fine to coarse angular to subrounded quartzite, mudstone, brick, and ceramic.

## 5.3 Made Ground

Made Ground soils were encountered beneath the above surface materials at all locations at depths of between 0.1m and 0.4m bgl extending to depths of between 0.7m and 1.5m bgl, achieving variable thicknesses of between 0.3m and 1.2m.

The Made Ground generally comprised grey-brown sandy gravel. The gravel was fine to coarse angular to subangular quartzite, concrete, glass, brick, and ceramic. At one location (DCS1, between 0.4m and 0.45m bgl), a layer of sandy fine to coarse angular to subangular gravel of clinker was noted.

At the locations of DCS1, DCS2A, and DCS2B, a subbase type material was recorded beneath the asphalt from depths of 0.05m extending to depths of between 0.15m and 0.4m bgl. The subbase type material generally comprised grey sandy gravel. The gravel was fine to coarse angular to subangular limestone, asphalt, brick, and concrete.

A single Standard Penetration Test (SPT) undertaken in the Made Ground recorded an 'N' value of 12 (medium dense).

Headspace analysis carried out on samples of the Made Ground recorded VOC concentrations less than the limit of detection (<0.1ppm).

## 5.4 Glacial Till

Glacial Till was encountered in all exploratory locations (which penetrated the Made Ground) at depths of between 0.7m and 1.5m bgl, achieving a maximum penetration of 14.35m in BH1.

The Glacial Till generally comprised stiff brown slightly gravelly sandy clay. The gravel was fine to coarse subangular to subrounded mudstone, quartzite, and coal. There was no reported evidence of plant root remains or visual desiccation, such as dry, dusty or blocky fissured materials, in the exploratory holes undertaken.

The results of six Atterberg limit tests undertaken on samples of the Glacial Till recorded plastic limits of between 17% and 23%, liquid limits of between 35% and 49%, plasticity indices of between 17% and 27% (corrected to between 13% and 27%) and moisture contents of between 12% and 22%. The results indicate the soil to be clay of medium plasticity, with a low to medium volume change potential.

The results of three quick undrained triaxial tests undertaken on samples of the Glacial Till at depths of between 1.2m and 7.5m bgl recorded undrained shear strengths of between 115kPa (high strength) and 200kPa (very high strength). The sample at 7.5m bgl recorded the lowest shear strength of the three samples, however, this may have been the result of disturbance while sampling.

Twenty SPTs carried out in the Glacial Till recorded 'N' values of between 15 and >50 (extrapolated to N=55), generally showing an increasing trend of 'N' value with depth, as shown on the SPT versus depth plot presented in Appendix A. By applying the empirical relationship of SPT 'N' value, mass shear strength and assuming an average plasticity index of 20% and corresponding  $f_1$  of 5.5, this correlates to mass shear strengths generally between 80kN/m<sup>2</sup> (high strength) and 300kN/m<sup>2</sup> (very high strength), which is generally in agreement with the triaxial test results.

## **5.5 Groundwater**

Groundwater was encountered in the DCS boreholes only as minor seepages, noted between 0.5m and 1.0m bgl in the Made Ground at the locations DCS1, DCS2, DCS2B, and DCS4 and between 0.8m and 1.0m bgl in the Glacial Till at locations DCS2C and DCS3.

Subsequent monitoring of the standpipes between 17<sup>th</sup> March and 13<sup>th</sup> April 2022 recorded resting groundwater levels of between 0.7m and 1.6m bgl, showing a relatively steady groundwater level during the monitoring period.

It should be noted that groundwater levels may vary beyond that observed during the fieldwork period due to seasonal effects throughout the year.

## **5.6 Visual Contamination**

The Made Ground in places contained gravel of clinker, brick, glass, and concrete. However, the soils inspected during the site investigation did not show any visual or olfactory indicators of gross contamination.

## **5.7 Soil Gas**

Only a relatively thin layer Made Ground was encountered across the site and no significant on-site sources of ground gas were observed during the site investigation.

Monitoring of the standpipes on four occasions has recorded methane concentrations less than detection limit (0.1% by volume). Carbon dioxide concentrations were recorded between 0.1% and 3.3% by volume. Oxygen concentrations between 16.6% (slightly depleted) and 20.9% (atmospheric) by volume. Flow readings taken over a three-minute average period recorded flow rates of between 0.4l/hr and less than the limit of detection (<0.1l/hr).

Gas screening values (GSVs) have been calculated for each installation using the highest concentrations and highest flow rates in accordance with CIRIA C665. The GSVs are as follows:

| Stratum      | BH    | Response Zone (m bgl) | Ground water level (m bgl) | Maximum CH <sub>4</sub> (%) | Maximum CO <sub>2</sub> (%) | Max. Steady Flow (l/hr) | GSV Methane (l/hr) | GSV Carbon Dioxide (l/hr) |
|--------------|-------|-----------------------|----------------------------|-----------------------------|-----------------------------|-------------------------|--------------------|---------------------------|
| Glacial Till | DCS1  | 2.0 – 4.0             | 1.0                        | 0.1                         | 0.1                         | 0.3                     | 0.0003             | 0.0003                    |
|              | DCS2C | 1.0 – 3.0             | 0.7                        | 0.1                         | 0.7                         | 0.3                     | 0.0003             | 0.0021                    |
|              | DCS3  | 1.0 – 3.0             | 1.5                        | 0.1                         | 3.3                         | 0.4                     | 0.0004             | 0.0132                    |

Green highlighted cells indicate CS-1 conditions

Blue highlighted cells indicate a fully saturated response zone

## 6.0 GEOENVIRONMENTAL ASSESSMENT

### 6.1 Human Health Risk Assessment

Given that the proposed end-use comprises a new structure with a hardstanding surrounding, there will be 100% hard cover and therefore there will be no pathway to human health receptors from inhalation, ingestion, or direct contact with potentially contaminated soils, other than via the inhalation of vapours/ground gas pathway. However, the presence of volatiles needs to be addressed as there will still be a pathway to end users via indoor vapour inhalation. The chemical results may also have an implication for waste soil disposal.

The chemical test results have been compared to generic screening criteria for a public open space (residential) end use in order to form an initial indication for potential contamination issues present at the site and in case small, landscaped areas are incorporated into the development. To assess the risk via indoor vapour inhalation pathway for volatile compounds, the results have been compared to residential without plant uptake criteria.

The results of the chemical testing on soils have been assessed as described in Appendix E. The spreadsheets summarising the laboratory results and relevant screening values of each dataset are presented in Appendix D. In respect of benzo(a)pyrene and other genotoxic PAHs, various PAH ratios have been plotted and compared against data from the Culp et al study and found to be within the same range, therefore the use of the surrogate marker approach is justified.

No determinands exceeded their corresponding screening values based upon the current proposed end use.

Naphthalene and volatile hydrocarbon concentrations were reported below the limit of detection or at negligible concentrations within all of the samples tested. Minor concentrations of PAHs were encountered above detection limits within the Made Ground and Glacial Till samples tested. The PAH source signature suggests that the PAHs detected are probably related to the presence of coal in the Made Ground and Glacial Till.

Some low concentrations of petroleum hydrocarbon fractions (C<sub>16</sub> – C<sub>44</sub>) were detected in the two Made Ground samples, which are probably a measure of the same PAHs, at concentrations of between 73mg/kg and 420mg/kg, with the highest recorded within DCS1 at 0.7m bgl. No measurable volatile TPH fractions or BTEX or MTBEs were recorded in any of the samples. No VOCs were detected during the site investigation.

No asbestos was detected within any of the samples tested.

Given the results of the human health risk assessment, the site is considered to pose a low risk to end users.

## **6.2 Controlled Waters Risk Assessment**

The results of the leachate testing on samples of Made Ground from DCS1 at 0.7m and DCS4 at 0.3m bgl recorded concentrations below their relevant screening values.

All PAH compounds were below the detection limits.

Based on the context of the site, the 100% proposed hard standing, the chemical test results, the presence of cohesive Glacial Till, and as the site isn't within a Source Protection Zone, there is considered to be a negligible risk to Controlled Waters.

## **6.3 Disposal of Soil Arisings**

The results of chemical testing should be used to assist with the classification of the soils for disposal.

The natural soils at the site are likely to be classified as inert, provided they are appropriately segregated from the Made Ground, however, this should be confirmed by the landfill operator. WAC testing would also likely be required in any excavated soils are sent to landfill as inert waste. The results of chemical testing on the Made Ground encountered across the site generally indicates that the material would be classified as non-hazardous waste if sent for disposal at landfill.

General comments regarding the procedures for the assessment of waste soil for off-site disposal purposes is included in Appendix E.

## **7.0 GEOTECHNICAL ASSESSMENT**

### **7.1 General**

The proposals comprise the construction of a two-storey steel framed extension to one of the existing wings on the eastern side of the existing Gorton Education Village to accommodate new classrooms and office space. Based on discussions with the Engineer, it is understood that the existing building is supported by precast driven piles. The historical Geotechnics report indicates that shallow foundations within the natural Glacial Till were considered suitable for the existing building. However, the report also notes that a piled foundation solution may also be considered where greater loads are required. As the western parts of the existing building are up to four-storeys, it is considered likely that a piled foundation solution was considered necessary to support the relatively higher loadings and was then adopted for the existing building in its entirety.

No loading information was available for the proposed extension at the time of writing this report, however relatively light loads are anticipated for the two-storey structure, which is understood to be essentially a stand-alone building linked only by walkway corridors to the existing building wings.

The ground investigation has identified Made Ground (including hardstanding) to depths of up to 1.5m bgl, overlying stiff clay (Glacial Till). Bedrock of the Chester Formation was not encountered. Resting groundwater levels of between 0.7m and 1.6m bgl were recorded within the investigated strata during subsequent monitoring visits.

## 7.2 Foundation Design

It is considered that the stiff Glacial Till at the site is generally suitable to support conventional pad or strip foundations. These must be placed below any Made Ground or disturbed ground. It will be necessary to embed the foundations within the in-situ stiff strata beneath these materials. It was noted that semi-mature trees were present on and adjacent to the site during the walkover. As such, excavations should be inspected to ensure new foundations are placed beneath any significant tree roots or evidence of desiccation. Any foundations constructed within the influencing zones of trees will require further deepening in accordance with current guidance.

Although a minimum founding depth of 0.9m will apply to the site to allow for seasonal effects, the borehole data suggests that founding depths of around 1.5m to 2.0m are likely to be required to ensure that the above deepening criteria are met.

Pad foundations (up to 2m x 2m) and strip foundations (up to 1m in width) competently designed to the above requirements may adopt safe net design bearing pressures up to 125kN/m<sup>2</sup>. This is based on a minimum shear strength of 80kN/m<sup>2</sup> using traditional methods of bearing capacity calculations e.g., as set out in Tomlinson 7<sup>th</sup> Edition to provide a minimum factor of safety of 3 against bearing capacity failure and to limit total settlements to <25mm.

It should be noted that some shallow groundwater was encountered in the exploratory holes, which is considered likely to be perched in the Made Ground and/or associated with the upper horizons of Glacial Till. This could cause some limited construction difficulty. However, it is considered that this is likely to be dealt with, relatively simply, by a combination of trench sheeting (to extend excavations into the competent/stiff Glacial Till) and sump pumping where necessary.

Should a deeper piled foundation solution be favoured to match the existing building, the advice of a specialist and experienced piling contractor should be sought in relation to suitable techniques and designs for the ground conditions at the site. An SPT 'N' value versus depth plot is included in Appendix A and should be referred to along with the borehole logs when designing piles.

The junction between the proposed extension and the existing building should be carefully designed (possibly allowing for movement joints) with consideration given to the effects of differential settlement between the new and old foundations.

If conditions, significantly at variance to those expected (and described herein) are encountered during groundworks, specialist geotechnical advice should be sought to make appropriate assessment and recommendations.

### 7.3 Floor Slab and Gas Protection

Owing to the presence of Made Ground greater than 600mm in thickness, a suspended floor slab is recommended for the ground floor. If a ground bearing floor slab is desired, it may be necessary to remove and re-engineer the Made Ground. It should however be noted that shallow groundwater may be encountered locally in the Made Ground and/or shallow granular horizons in the Glacial Till. The formation should be proof rolled and any soft spots removed and replaced with suitable granular fill. If piling is selected as the preferred foundation solution, the turnover and preparation of a working platform to enable piling works could be undertaken concurrently.

Other than peat recorded approximately 90m to the south, no plausible sources of ground gas have been identified. All methane and carbon dioxide concentrations were recorded at less <1% and <5% respectively. Based on the Conceptual Site Model, the ground conditions encountered and the calculated GSVs, the site can be characterised as Situation 1 (CIRIA C665).

It is recommended that the floor construction of the existing building is considered. The Local Authority may require design precautions to match the existing building and as such, the gas risk assessment should be agreed with the Local Authority.

### 7.4 Excavations

Excavations up to c.2.0m (c.1.2m if pile caps utilised) deep are envisaged for the foundation excavations and service trenches. At these depths excavations are expected to be in a combination of Made Ground and cohesive Glacial Till. These materials may be prone to some short-term instability and spalling and may need to be graded back to a stable angle or trench support should be provided. Trench support or the angle of batter should be designed by an appropriately qualified engineer or competent person to suit the required depth and the ground and groundwater conditions. Some groundwater ingress (perched within the Made Ground or upper more granular horizons of till) may be expected locally. However, the ground investigation data indicates that this could be dealt with by a combination of trench sheeting/sump pumping where necessary.

### 7.5 Buried Concrete and Services

The results of the testing in the Made Ground soils on site indicate characteristic values as following:

- water soluble sulphate: 0.39/l;
- total potential sulphate: 0.2%;
- pH: 7.4.

The results of the testing in the natural soils on site indicate characteristic values as following:

- water soluble sulphate: 0.14/l;
- total potential sulphate: 0.28%;
- pH: 8.5.

The results of the sulphate tests carried out have identified the Design Sulphate Class to be DS-2 with the Aggressive Chemical Environment for Concrete (ACEC)

being AC-2 as defined by the BRE Special Digest 1, Concrete Aggressive Ground, 2005 for a brownfield site and mobile groundwater regime. This is due to the concentrations of total potential sulphate identified within the Glacial Till. Further reference should be made to BRE Special Digest 1 for requirements in respect of types of cement and aggregate to be used and variations in type of concrete construction.

Petroleum hydrocarbon fractions (C<sub>10</sub> to C<sub>44</sub>) were detected in the samples of Made Ground between 73mg/kg and 420mg/kg total TPH, although as described in Section 6.1 is likely attributed to the presence of PAHs and clinker/asphalt in the Made Ground. No BTEX, MTBEs, phenols, or 'light end' (less than C<sub>10</sub>) hydrocarbons were detected. Although restrictions are considered unlikely, the chosen materials for new water pipelines should be discussed and agreed with the local Water Authority once water supply routes are known.

## **8.0 CONCLUSIONS AND RECOMMENDATIONS**

### **8.1 Geo-environmental**

The risk assessments in Section 6 have established a low risk to Human Health and negligible risk to Controlled Water receptors. The majority of the source-pathway-receptor linkages to potential end users are effectively broken by the hardstanding cover and lack of landscaping across the site. The highest concentrations of PAHs and TPH in the shallow Made Ground are likely due to the presence of clinker in the Made Ground.

It is therefore considered that further assessment or remedial actions are not warranted for this redevelopment.

This report should be submitted to the Local Authority to support Planning Application Ref: 132456/FO/2021 and assist with the discharge of relevant Planning Conditions, if imposed.

The chemical test results should be provided to the local water authority via a pipeline risk assessment for the selection of suitable water pipe materials.

### **8.2 Geotechnical**

Based upon the ground conditions encountered at the site, pad or strip foundations are considered suitable. However, if preferred, a deeper foundation solution (i.e., piles founded within deeper very stiff clay) may be considered to match existing foundations.

If ground bearing floor slabs are required, the Made Ground would need to be removed and re-engineered. No gas protection measures are considered necessary. However, the Local Authority may require design precautions to match the existing building and as such, the gas risk assessment should be agreed with the Local Authority.

DS-2 and AC-2 conditions are considered appropriate for buried concrete at the site.

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## GENERAL NOTES

- A) The assessment made in this report is based on the site terrain and ground conditions revealed by the various field investigations undertaken and also any other relevant data for the site including previous site investigation reports (if available) and desk study data. There may be special conditions appertaining to the site, however, which have not been revealed by the investigation and which have not, therefore, been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available. It must be recognised that many of the Environmental Searches obtained during the course of the desk study are often lengthy. Applied Geology have, where appropriate and in the interests of simplicity, only reproduced the summary of the searches within the report. A full copy of all the search data is held at the Applied Geology office and is available for inspection if required.
- B) The services provided are defined within our proposal and are carried out in line with the terms of appointment between Applied Geology and the Client.
- C) Where any data supplied by the Client or other external source, including that from previous site investigations, has been used it has been assumed that the information is correct. No responsibility can be accepted by Applied Geology for inaccuracies within this data.
- D) Whilst the report may express an opinion on possible configurations of strata between or beyond the exploratory locations, or on the possible presence of features based on either visual, verbal or published evidence this is for guidance only and no liability can be accepted for the accuracy.
- E) Comments on groundwater (and landfill gas) conditions are based on observations made during the course of the present and past investigations or with reference to published data unless otherwise stated. It should be noted, however, that groundwater (and landfill gas) levels vary due to seasonal (or atmospheric conditions) or other effects.
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- I) Ground conditions should be monitored during the construction of the works and the recommendations of the report re-evaluated in the light of this data by the supervising geotechnical or geo-environmental engineers.
- J) Unless specifically stated, the investigation has not taken into account the possible effects of mineral extraction.
- K) The works performed are not a comprehensive site characterisation and should not be construed as being such.
- L) The findings of the geo-environmental risk assessment are based on information obtained from a variety of sources which Applied Geology believe to be correct. Applied Geology cannot and does not guarantee the authenticity or reliability of the information it has relied upon.
- M) The report represents the findings and opinions of experienced geo-environmental consultants. Applied Geology does not provide legal advice and the advice of lawyers may be required.
- N) Conditions at the site are subject to change from the time of the site inspection.
- O) It is possible that researches carried out by Applied Geology, whilst fully appropriate for a phase 1 desk study, failed to indicate the existence of important information sources. Assuming such indicators actually exist, their information could not have been considered in the formulation of Applied Geology findings and opinions.
- P) The economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, depends on very many factors in addition to geotechnical considerations and hence its evaluation is outside the scope of this report.
- Q) Applied Geology operates as a Consultancy and does not operate its own laboratory for soil testing, this work being sub contracted to known and respected, generally UKAS accredited, laboratories. Applied Geology can therefore not be held responsible for the testing carried out.

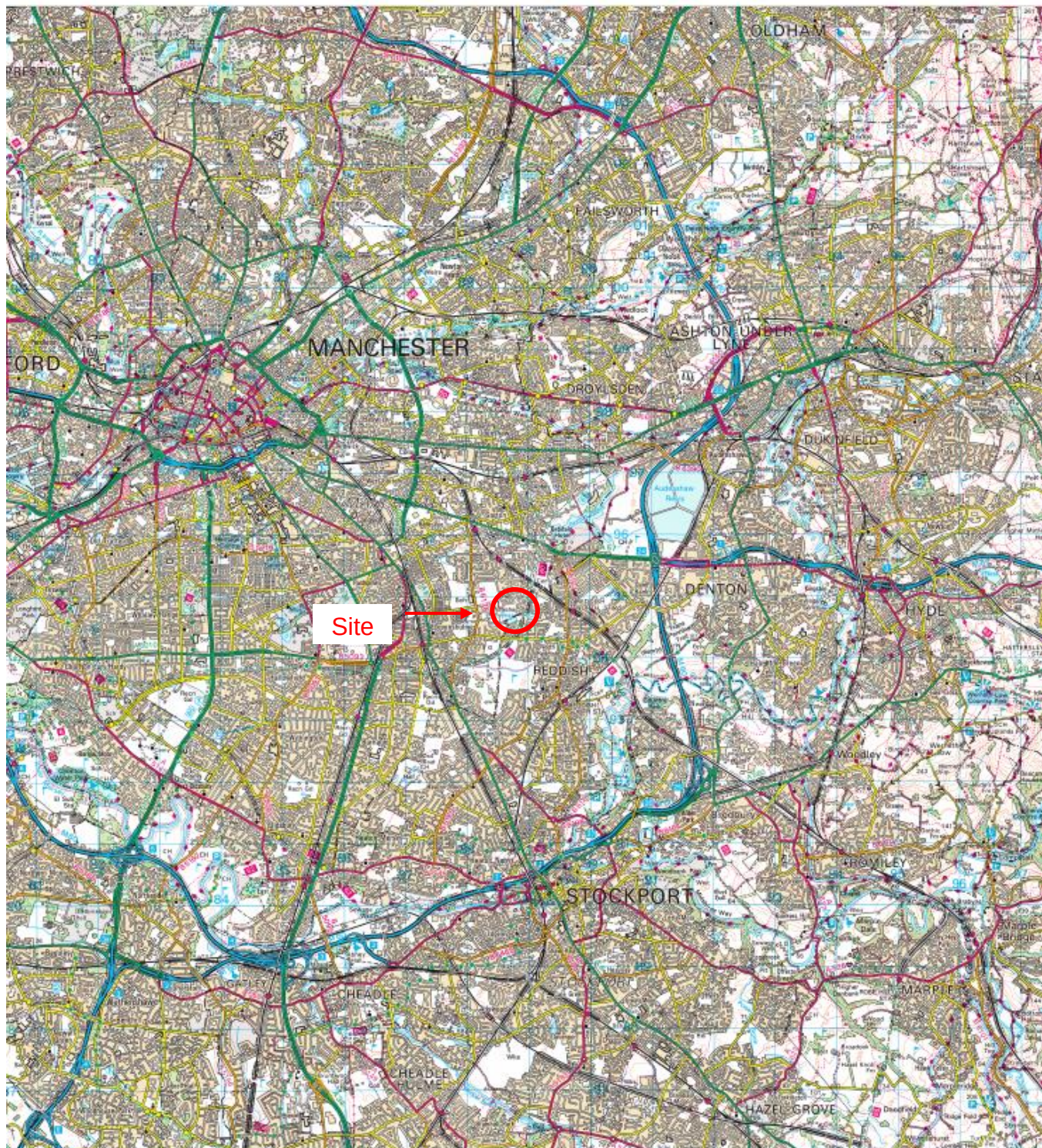
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|                                                                                                                            |                                                                  |
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# **APPENDIX**

## **A**



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## APPLIED GEOLOGY

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email: admin@appliedgeology.co.uk

Client:

BRIGHT FUTURE EDUCATIONAL TRUST

Project:

GORTON EDUCATION VILLAGE,  
GORTON, MANCHESTER

Drawn By:

KR

Checked By:

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Paper Size:

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Date:

21.10.2021

NGR:

388465,394875

Title:

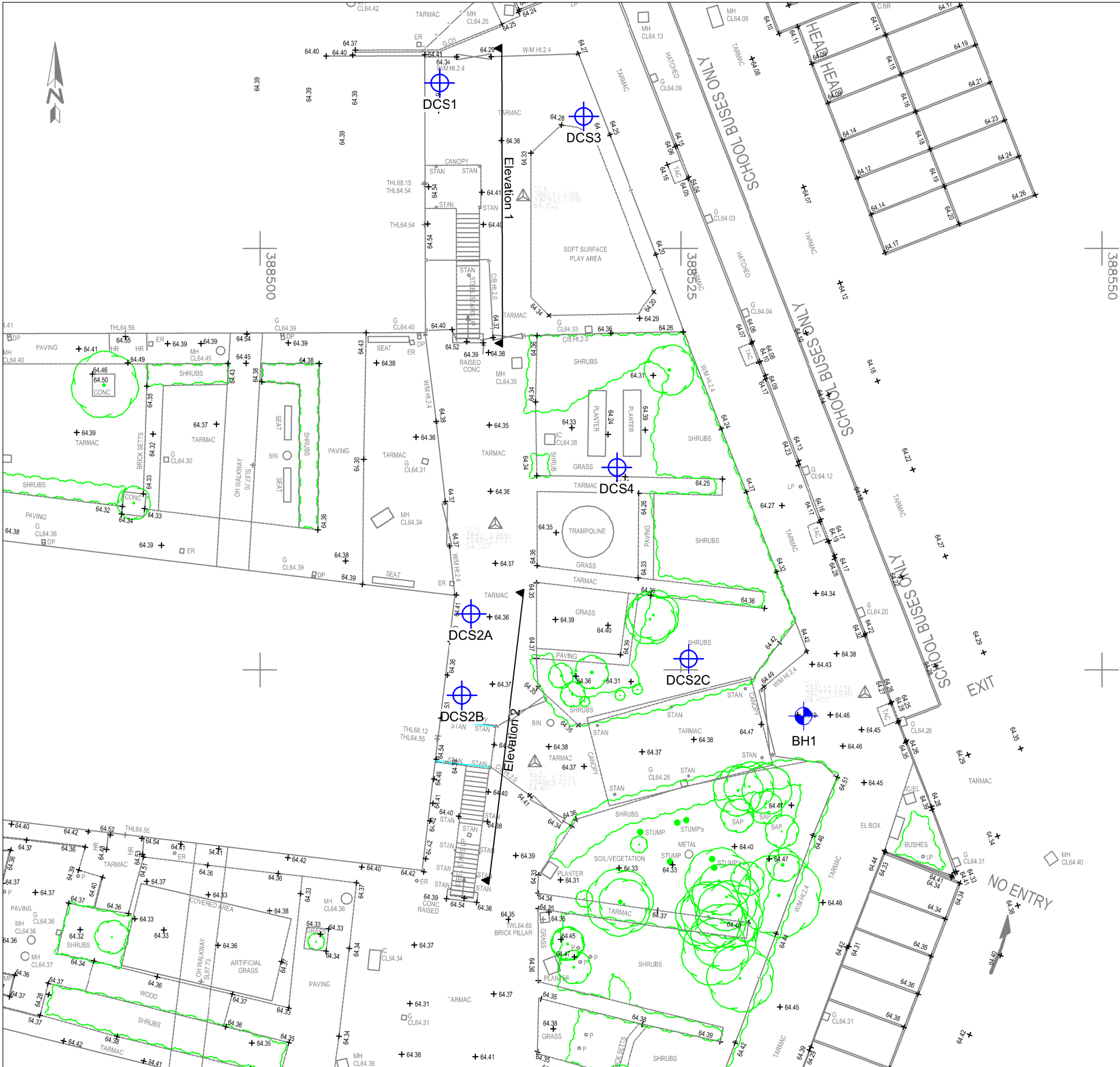
SITE LOCATION PLAN

Drawing No:

AG3331-21-01

Revision:

0



**KEY:**

-  Cable Percussion Borehole
-  BH1
-  Driven Continuous Sampling Borehole
-  DCS1

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BRIGHT FUTURE EDUCATIONAL TRUST

Project:

GORTON EDUCATION VILLAGE  
GORTON, MANCHESTER

Title:

EXPLORATORY HOLE LOCATION PLAN

Drawn By:

KM

Checked By:

JW

Paper Size:

A3

Scale:

NTS

Date:

11.04.2022

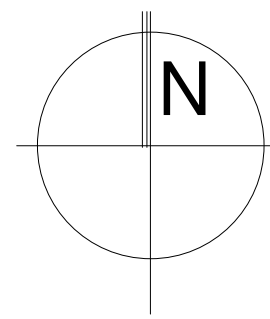
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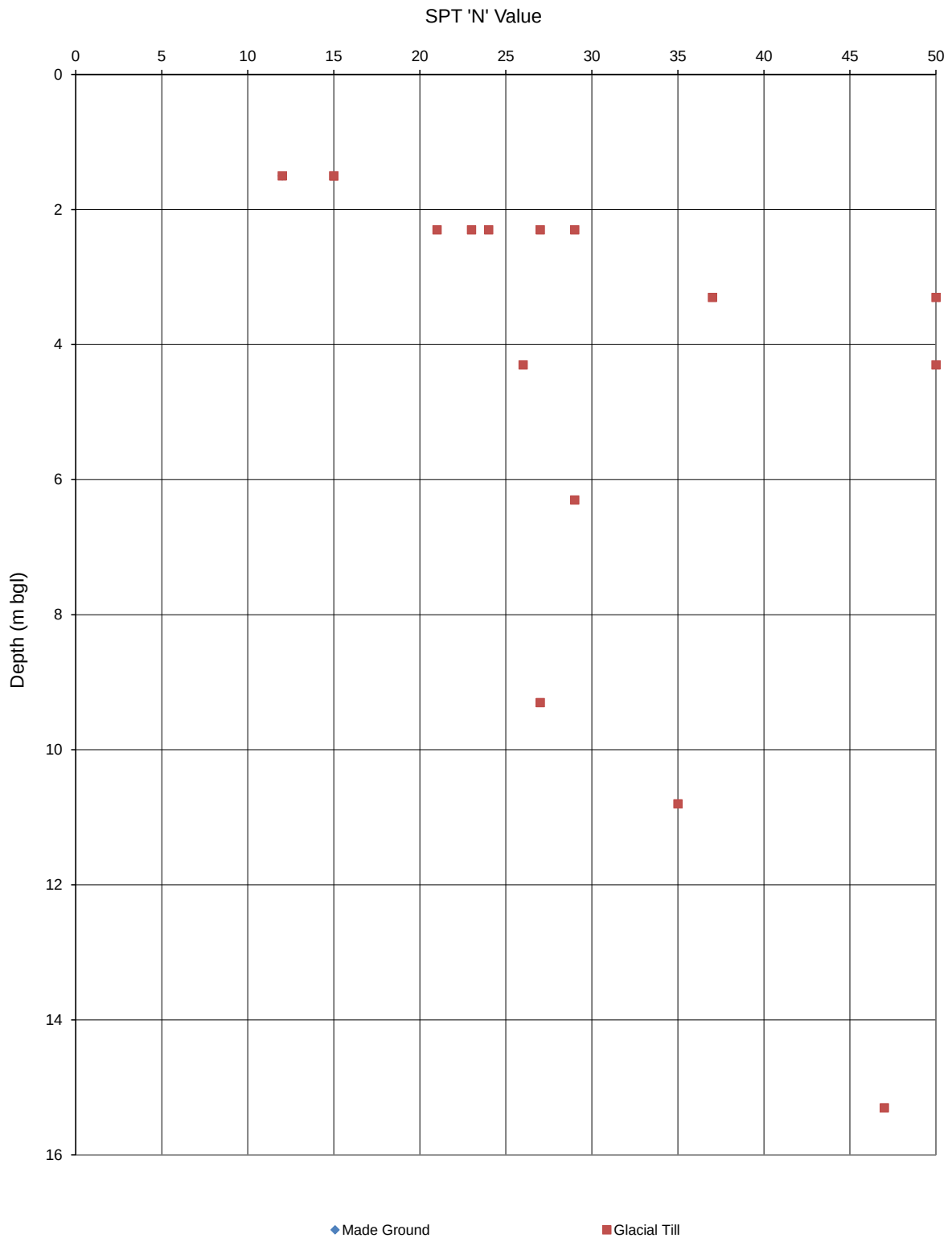
- Site Boundary
- Extent of adjacent land in same ownership
- Pedestrian Access Point
- Vehicular Access Point
- Emergency Access Point
- Soft Outdoor PE Area 27985.0m<sup>2</sup>
- Hard Outdoor PE Area 2724.0m<sup>2</sup>
- Soft Informal Area 16384.0m<sup>2</sup>
- Hard Informal Area 2861.0m<sup>2</sup>
- Habitat Area 4691.0m<sup>2</sup>
- Non-net Area: 19053.0m<sup>2</sup>  
Supports the functioning of the site and includes the footprint of the buildings and access areas such as Paths, Roads and Parking
- Footprint of Building
- Pedestrian Access Pathway
- Vehicular Access Roadway
- Vehicle Parking Bays
- Existing Trees to be retained
- Proposed Trees



Proposed External Area Plan  
1 : 500

|                                                          |            |            |                           |          |    |
|----------------------------------------------------------|------------|------------|---------------------------|----------|----|
| 29/11/21                                                 |            | AT         | Red line boundary amended |          | AC |
| REV                                                      | DATE       | DRN        |                           |          |    |
| PROJECT                                                  |            |            |                           |          |    |
| Gorton Education Village                                 |            |            |                           |          |    |
| CLIENT                                                   |            |            |                           |          |    |
| Bright Futures Educational Trust                         |            |            |                           |          |    |
| DRAWING                                                  |            |            |                           |          |    |
| Proposed External Area Plan                              |            |            |                           |          |    |
| SCALE                                                    | SHEET SIZE | DRAWN      | CHECKED                   | DATE     |    |
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| E: office@bowker-sadler.co.uk                            |            |            |                           |          |    |
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| JOB No                                                   |            | DRAWING No |                           | REVISION |    |
| 20-030                                                   |            | 1111       |                           | A        |    |
| STATUS                                                   |            | PLANNING   |                           |          |    |

# Uncorrected SPT 'N' Value versus depth



Notes: 1. Uncorrected N values plotted  
2. values >50 omitted for clarity

|                    |                                              |                        |
|--------------------|----------------------------------------------|------------------------|
| <b>Client:</b>     | Bright Futures Educational Trust             | <b>APPLIED GEOLOGY</b> |
| <b>Project:</b>    | Gorton Education Village, Gorton, Manchester |                        |
| <b>Project No.</b> | AG3331-21                                    |                        |

# **APPENDIX B**

# BOREHOLE LOG - CABLE PERCUSSION

BH1

**Project** Gorton Education Village, Gorton, Manchester

**Project No.**

AG3331-21

**Client** Bright Futures Educational Trust

**Sheet**

1 of 2

**Start** 23/02/2022

**Coordinates** E 388533.85 N 394873.23

**Scale**

1:50

**End** 23/02/2022

**Ground Level** 64.42m AOD

**Total Depth**

15.45m

| Sample / Test Type | Depth (m) | Result | Casing Depth (m) | Level (mAoD) | Strata Depth (thickness) (m) | Description of Strata                                                                                                                                  | Legend | GW | Install |
|--------------------|-----------|--------|------------------|--------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----|---------|
| B                  | 0.20      |        |                  | 64.22        | (0.20)                       | Asphalt.                                                                                                                                               |        |    |         |
| D                  | 0.20      |        |                  |              | 0.20                         | (MADE GROUND)                                                                                                                                          |        |    |         |
|                    |           |        |                  |              | (0.90)                       | Brownish grey clayey sandy GRAVEL. Gravel is fine to coarse angular to subrounded asphalt, concrete, brick, and ceramic.                               |        |    |         |
|                    |           |        |                  |              |                              | (MADE GROUND)                                                                                                                                          |        |    |         |
| UT                 | 1.20      | (92)   |                  | 63.32        | 1.10                         | Stiff to very stiff brown slightly gravelly silty CLAY. Gravel is fine to coarse subangular to subrounded mudstone, quartzite and coal. (GLACIAL TILL) |        |    |         |
| D                  | 1.70      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| B                  | 2.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 2.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| S                  | 2.00      | N = 27 |                  |              |                              |                                                                                                                                                        |        |    |         |
| UT                 | 3.00      | (100)  |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 3.50      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| B                  | 4.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 4.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| S                  | 4.00      | N = 26 |                  |              |                              |                                                                                                                                                        |        |    |         |
| UT                 | 5.00      | (100)  |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 5.50      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| B                  | 6.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 6.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| S                  | 6.00      | N = 29 |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 7.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| UT                 | 7.50      | (100)  |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 8.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 8.50      |        |                  |              | (14.35)                      |                                                                                                                                                        |        |    |         |
| B                  | 9.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| B                  | 9.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 9.00      |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| S                  | 9.00      | N = 27 |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 10.00     |        |                  |              |                              |                                                                                                                                                        |        |    |         |

Continued next sheet

| Chiselling |    |                  | Groundwater Strikes |         |         |       |        | Drilled: Lundy Site Investigation<br>Logged: JW<br>Checked: PG |
|------------|----|------------------|---------------------|---------|---------|-------|--------|----------------------------------------------------------------|
| From       | To | Duration (hh:mm) | Depth Strike        | Rose to | Remarks | Cased | Sealed |                                                                |
|            |    |                  |                     |         |         |       |        |                                                                |

**Remarks:** Hand dug service inspection pit excavated to 1.20m bgl.

**Installation:**

**Diameter:** 150mm to 15.45m

Exploratory hole logs should be read in conjunction with key sheets

**APPLIED GEOLOGY**

# BOREHOLE LOG - CABLE PERCUSSION

**BH1**

**Project** Gorton Education Village, Gorton, Manchester

**Project No.**

AG3331-21

**Client** Bright Futures Educational Trust

**Sheet**

2 of 2

**Start** 23/02/2022

**Coordinates** E 388533.85 N 394873.23

**Scale**

1:50

**End** 23/02/2022

**Ground Level** 64.42m AOD

**Total Depth**

15.45m

| Sample / Test Type | Depth (m)                        | Result | Casing Depth (m) | Level (mAoD) | Strata Depth (thickness) (m) | Description of Strata                                                                                                                                  | Legend | GW | Install |
|--------------------|----------------------------------|--------|------------------|--------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----|---------|
| B<br>D<br>S        | 10.50<br>10.50<br>10.50          | N = 35 |                  |              |                              | Stiff to very stiff brown slightly gravelly silty CLAY. Gravel is fine to coarse subangular to subrounded mudstone, quartzite and coal. (GLACIAL TILL) |        |    |         |
| D                  | 11.50                            |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| B<br>S             | 12.00<br>12.00                   | N >50  |                  |              |                              |                                                                                                                                                        |        |    |         |
| B<br>D<br>D<br>S   | 13.00<br>13.00<br>13.10<br>13.10 | N >50  |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 14.00                            |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| D                  | 14.50                            |        |                  |              |                              |                                                                                                                                                        |        |    |         |
| S                  | 15.00                            | N = 47 |                  |              |                              |                                                                                                                                                        |        |    |         |
|                    |                                  |        |                  | 48.97        | 15.45                        | End of Borehole at 15.45m                                                                                                                              |        |    |         |

| Chiselling |    |                  | Groundwater Strikes |         |         |       |        | Drilled: Lundy Site Investigation<br>Logged: JW<br>Checked: PG |
|------------|----|------------------|---------------------|---------|---------|-------|--------|----------------------------------------------------------------|
| From       | To | Duration (hh:mm) | Depth Strike        | Rose to | Remarks | Cased | Sealed |                                                                |
|            |    |                  |                     |         |         |       |        |                                                                |

**Remarks:** Hand dug service inspection pit excavated to 1.20m bgl.

**Installation:**

**Diameter:** 150mm to 15.45m

Exploratory hole logs should be read in conjunction with key sheets

**APPLIED GEOLOGY**

# SPT SUMMARY SHEET

**Project:** Gorton Education Village, Gorton, Manchester  
**Client:** Bright Futures Educational Trust  
**Project No:** AG3331-21

| Borehole No. | Borehole depth (m) | Bottom depth (m) | Casing depth (m) | Water Level (m) | Equipment ref. | Seating Drive |          | Test Drive  |             |          |   |                | Test Type | N Value |
|--------------|--------------------|------------------|------------------|-----------------|----------------|---------------|----------|-------------|-------------|----------|---|----------------|-----------|---------|
|              |                    |                  |                  |                 |                | Blows         | Pen (mm) | Blows       |             | Pen (mm) |   | Total Pen (mm) |           |         |
| BH1          | 2.00               | 2.45             |                  |                 | AR3822         | 3 3           | 75 75    | 4 6 8 9     | 75 75 75 75 | 300      | S | 27             |           |         |
| BH1          | 4.00               | 4.45             |                  |                 | AR3822         | 3 6           | 75 75    | 6 6 7 7     | 75 75 75 75 | 300      | S | 26             |           |         |
| BH1          | 6.00               | 6.45             |                  |                 | AR3822         | 3 4           | 75 75    | 6 6 8 9     | 75 75 75 75 | 300      | S | 29             |           |         |
| BH1          | 9.00               | 9.45             |                  |                 | AR3822         | 3 4           | 75 75    | 5 6 8 8     | 75 75 75 75 | 300      | S | 27             |           |         |
| BH1          | 10.50              | 10.95            |                  |                 | AR3822         | 5 6           | 75 75    | 7 9 9 10    | 75 75 75 75 | 300      | S | 35             |           |         |
| BH1          | 12.00              | 12.43            |                  |                 | AR3822         | 7 9           | 75 75    | 9 10 12 19  | 75 75 75 50 | 275      | S | >50            |           |         |
| BH1          | 13.10              | 13.53            |                  |                 | AR3822         | 10 11         | 75 75    | 12 12 12 14 | 75 75 75 50 | 275      | S | >50            |           |         |
| BH1          | 15.00              | 15.45            |                  |                 | AR3822         | 4 8           | 75 75    | 9 10 10 18  | 75 75 75 75 | 300      | S | 47             |           |         |
| DCS1         | 1.20               | 1.65             |                  |                 | DART534        | 3 4           | 75 75    | 3 3 3 3     | 75 75 75 75 | 300      | S | 12             |           |         |
| DCS1         | 2.00               | 2.45             |                  |                 | DART534        | 3 5           | 75 75    | 5 4 6 6     | 75 75 75 75 | 300      | S | 21             |           |         |
| DCS1         | 3.00               | 3.45             |                  |                 | DART534        | 5 6           | 75 75    | 8 9 10 10   | 75 75 75 75 | 300      | S | 37             |           |         |
| DCS1         | 4.00               | 4.45             |                  |                 | DART534        | 6 8           | 75 75    | 10 14 12 14 | 75 75 75 75 | 300      | S | 50             |           |         |
| DCS2C        | 1.20               | 1.65             |                  |                 | DART534        | 2 2           | 75 75    | 3 4 4 4     | 75 75 75 75 | 300      | S | 15             |           |         |
| DCS2C        | 2.00               | 2.45             |                  |                 | DART534        | 5 5           | 75 75    | 6 8 7 8     | 75 75 75 75 | 300      | S | 29             |           |         |
| DCS2C        | 3.00               | 3.44             |                  |                 | DART534        | 7 9           | 75 75    | 12 12 14 12 | 75 75 75 65 | 290      | S | >50            |           |         |
| DCS3         | 1.20               | 1.65             |                  |                 | DART534        | 3 3           | 75 75    | 4 3 4 4     | 75 75 75 75 | 300      | S | 15             |           |         |
| DCS3         | 2.00               | 2.45             |                  |                 | DART534        | 4 6           | 75 75    | 5 6 6 7     | 75 75 75 75 | 300      | S | 24             |           |         |
| DCS3         | 3.00               | 3.45             |                  |                 | DART534        | 3 7           | 75 75    | 11 11 15 13 | 75 75 75 75 | 300      | S | 50             |           |         |
| DCS4         | 1.20               | 1.65             |                  |                 | DART534        | 2 2           | 75 75    | 3 3 3 3     | 75 75 75 75 | 300      | S | 12             |           |         |
| DCS4         | 2.00               | 2.45             |                  |                 | DART534        | 3 5           | 75 75    | 4 5 7 7     | 75 75 75 75 | 300      | S | 23             |           |         |
| DCS4         | 3.00               | 3.45             |                  |                 | DART534        | 5 7           | 75 75    | 10 15 13 12 | 75 75 75 70 | 295      | S | >50            |           |         |

- Notes:
- 1. Test carried out in general accordance with BS EN ISO 22476-3:2005
  - 2. N values have not been subjected to any correction.
  - 3. Test carried out using split spoon S, or solid cone C.

**SPT Hammer Energy Test Report**

In accordance with BSEN ISO 22476-3:2005

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

SPT Hammer Ref: AR3822  
Test Date: 12/11/2021  
Report Date: 12/11/2021  
File Name: AR3822.spt  
Test Operator: CM

**Instrumented Rod Data**

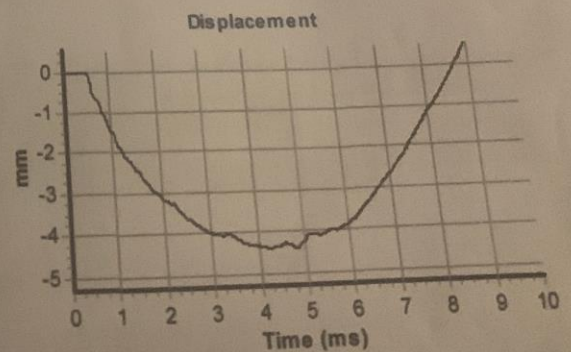
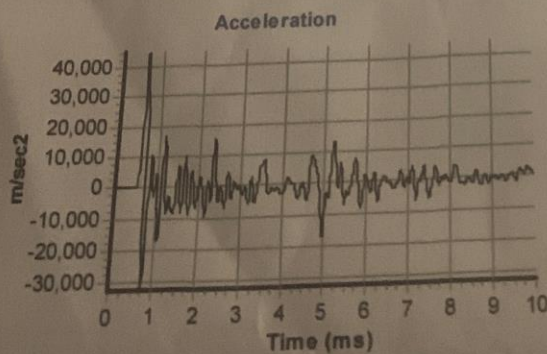
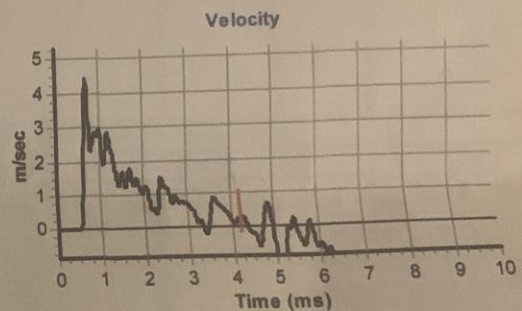
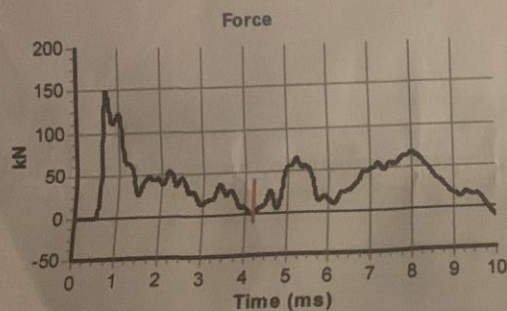
Diameter  $d_r$  (mm): 54  
Wall Thickness  $t_r$  (mm): 6.0  
Assumed Modulus  $E_a$  (GPa): 200  
Accelerometer No.1: 7080  
Accelerometer No.2: 11609

**SPT Hammer Information**

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

**Comments / Location**

KARTER DRILLING - 78070

**Calculations**

Area of Rod A ( $\text{mm}^2$ ): 905  
Theoretical Energy  $E_{\text{theor}}$  (J): 473  
Measured Energy  $E_{\text{meas}}$  (J): 319

**Energy Ratio  $E_r$  (%):** 67

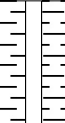
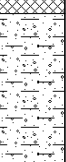
Signed: C. McCUSKEY  
Title: FITTER

The recommended calibration interval is 12 months

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS1

|         |                                              |  |              |             |           |  |  |
|---------|----------------------------------------------|--|--------------|-------------|-----------|--|--|
| Project | Gorton Education Village, Gorton, Manchester |  |              | Project No. | AG3331-21 |  |  |
| Client  | Bright Futures Educational Trust             |  |              | Sheet       | 1 of 1    |  |  |
| Start   | 22/02/2022                                   |  | Coordinates  | Scale       | 1:25      |  |  |
| End     | 22/02/2022                                   |  | Ground Level | Total Depth | 4.45m     |  |  |

| Sample / Test Type | Depth (m)            | Result    | Dia./ Rec.                                    | Level (mAoD) | Strata Depth (thickness) (m) | Description of Strata                                                                                                | Legend                                                                              | GW                                                                                  | Install                                                                             |                                                                                                                                                              |                                                                                     |                                                                                     |
|--------------------|----------------------|-----------|-----------------------------------------------|--------------|------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| D                  | 0.40                 | PID = 0.0 |                                               |              | (0.05)                       | Asphalt.                                                                                                             |  |  |  |                                                                                                                                                              |                                                                                     |                                                                                     |
|                    |                      |           |                                               |              | 0.05                         | (MADE GROUND)                                                                                                        |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                              |                                                                                     |                                                                                     |
|                    |                      |           |                                               |              | (0.35)                       | Brownish grey sandy GRAVEL. Gravel is fine to coarse angular to subangular quartzite, limestone, concrete and brick. |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                              |                                                                                     |                                                                                     |
| D<br>ES<br>PID     | 0.70<br>0.70<br>0.70 |           |                                               |              | N = 12                       | 116mm /90%                                                                                                           | 1.50                                                                                |                                                                                     |                                                                                     | (0.40)                                                                                                                                                       | (MADE GROUND - SUBBASE)                                                             |  |
|                    |                      |           |                                               |              |                              |                                                                                                                      |                                                                                     |                                                                                     |                                                                                     | (0.05)                                                                                                                                                       | Dark grey sandy GRAVEL. Gravel is fine to coarse angular to subangular clinker.     |                                                                                     |
|                    |                      |           |                                               |              |                              |                                                                                                                      |                                                                                     |                                                                                     |                                                                                     | 0.45                                                                                                                                                         | (MADE GROUND)                                                                       |                                                                                     |
| D<br>S             | 1.60<br>2.00<br>2.00 |           |                                               |              | N = 21                       | 101mm /100%                                                                                                          | (2.95)                                                                              |                                                                                     |                                                                                     | Greyish brown sandy GRAVEL. Gravel is fine to coarse angular to subangular mudstone, brick, concrete and ceramic.                                            |  |                                                                                     |
|                    |                      |           |                                               |              |                              |                                                                                                                      |                                                                                     |                                                                                     |                                                                                     | (MADE GROUND)                                                                                                                                                |                                                                                     |                                                                                     |
|                    |                      |           |                                               |              |                              |                                                                                                                      |                                                                                     |                                                                                     |                                                                                     | (1.05)                                                                                                                                                       |                                                                                     |                                                                                     |
| D<br>S             | 2.80<br>3.00<br>3.00 |           |                                               |              | N = 37                       | 92mm /100%                                                                                                           | 4.45                                                                                |                                                                                     |                                                                                     | Stiff to very stiff grey-brown slightly gravelly sandy CLAY. Gravel is fine to coarse subangular to subrounded mudstone, quartzite, and coal. (GLACIAL TILL) |  |                                                                                     |
|                    |                      |           |                                               |              |                              |                                                                                                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                              |                                                                                     |                                                                                     |
|                    |                      |           | From 2.00m bgl: slightly gravelly silty clay. |              |                              |                                                                                                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                              |                                                                                     |                                                                                     |
| D<br>S             | 3.80<br>4.00<br>4.00 | N = 50    |                                               |              |                              |                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                              |                                                                                     |                                                                                     |
|                    |                      |           |                                               |              |                              |                                                                                                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                              |                                                                                     |                                                                                     |
|                    |                      |           |                                               |              |                              |                                                                                                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                              |                                                                                     |                                                                                     |
|                    |                      |           |                                               |              |                              | End of Borehole at 4.45m                                                                                             |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                              |                                                                                     |                                                                                     |

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

| Groundwater Strikes |         |                |       |        | Drilled: PM Sampling Ltd<br>Logged: JW<br>Checked: PG |
|---------------------|---------|----------------|-------|--------|-------------------------------------------------------|
| Depth Strike        | Rose to | Remarks        | Cased | Sealed |                                                       |
| 1.00                | 1.00    | Slight ingress |       |        |                                                       |

# DCS2A

**Project No.** AG3331-21

Sheet 1 of 1

**Scale** 1:25

**Total Depth** 0.80m

| <b>Installation:</b><br><b>Remarks:</b> Hand dug service inspection pit excavated to 0.80m bgl. Pit terminated at 0.80m bgl due to water seepage at 0.50m bgl, unable to observe strata during digging. Pit backfilled with arisings on completion. | Groundwater Strikes |         |         |       |        | <b>Drilled:</b> PM Sampling Ltd<br><b>Logged:</b> JW<br><b>Checked:</b> PG |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------|---------|-------|--------|----------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                     | Depth Strike        | Rose to | Remarks | Cased | Sealed |                                                                            |
|                                                                                                                                                                                                                                                     | 0.50                | 0.50    | Seepage |       |        |                                                                            |

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS2B

Project

Gorton Education Village, Gorton, Manchester

Client

Bright Futures Educational Trust

Start

22/02/2022

End

22/02/2022

Project No.

AG3331-21

Sheet

1 of 1

Scale

1:25

Total Depth

0.80m

Coordinates

Ground Level

| Sample / Test Type | Depth (m) | Result | Dia./ Rec. | Level (mAoD) | Strata Depth (thickness) (m) | Description of Strata                                                                                                      | Legend | GW | Install |
|--------------------|-----------|--------|------------|--------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------|----|---------|
|                    |           |        |            |              | (0.05)                       | Asphalt                                                                                                                    |        |    |         |
|                    |           |        |            |              | 0.05                         | (MADE GROUND)                                                                                                              |        |    |         |
|                    |           |        |            |              | (0.10)                       | Grey sandy GRAVEL. Gravel is fine to coarse angular to subangular                                                          |        |    |         |
|                    |           |        |            |              | 0.15                         | limestone, asphalt and concrete.                                                                                           |        |    |         |
|                    |           |        |            |              |                              | (MADE GROUND - SUBBASE)                                                                                                    |        |    |         |
|                    |           |        |            |              | (0.65)                       | Greyish brown sandy GRAVEL. Gravel is fine to coarse angular to subangular brick, quartzite, mudstone, glass and concrete. |        |    |         |
|                    |           |        |            |              |                              | (MADE GROUND)                                                                                                              |        |    |         |
|                    |           |        |            |              | 0.80                         | End of Borehole at 0.80m                                                                                                   |        |    |         |

Installation:

Remarks: Hand dug service inspection pit excavated to 0.80m bgl. Pit terminated at 0.80m bgl due to water seepage at 0.50m bgl, unable to observe strata during digging. Pit backfilled with arisings on completion.

| Groundwater Strikes |         |         |       |        |
|---------------------|---------|---------|-------|--------|
| Depth Strike        | Rose to | Remarks | Cased | Sealed |
| 0.50                | 0.50    | Seepage |       |        |

Drilled: PM Sampling Ltd

Logged: JW

Checked: PG

# DCS2C

**Project No.** AG3331-21

Sheet 1 of 1

Scale 1:25

**Total Depth** 3.44m

| Groundwater Strikes |         |                |       |        | <b>Drilled:</b> PM Sampling Ltd<br><b>Logged:</b> JW<br><b>Checked:</b> PG |
|---------------------|---------|----------------|-------|--------|----------------------------------------------------------------------------|
| Depth Strike        | Rose to | Remarks        | Cased | Sealed |                                                                            |
| 0.80                | 0.80    | Slight ingress |       |        |                                                                            |

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS3

Project

Gorton Education Village, Gorton, Manchester

Client

Bright Futures Educational Trust

Start

22/02/2022

End

22/02/2022

Coordinates

E 388519.18 N 394907.85

Ground Level

64.24m AOD

Project No.

AG3331-21

Sheet

1 of 1

Scale

1:25

Total Depth

3.45m

| Sample / Test Type | Depth (m) | Result    | Dia./ Rec.  | Level (mAoD) | Strata Depth (thickness) (m) | Description of Strata                                                                                                                                                                            | Legend | GW | Install |
|--------------------|-----------|-----------|-------------|--------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----|---------|
| D                  | 0.30      | PID = 0.0 |             | 64.14        | (0.10)                       | Asphalt.<br>(MADE GROUND)<br>Brownish-grey sandy GRAVEL. Gravel is fine to coarse angular to subangular brick, quartzite and ceramic.<br>(MADE GROUND)<br><i>Below 0.30m bgl: with concrete.</i> |        |    |         |
| ES                 | 0.30      |           |             |              | 0.10                         |                                                                                                                                                                                                  |        |    |         |
| PID                | 0.30      |           |             |              | (0.60)                       |                                                                                                                                                                                                  |        |    |         |
| D                  | 0.80      | N = 15    | 116mm /100% | 63.54        | 0.70                         | Stiff to very stiff brown mottled-dark grey slightly gravelly sandy CLAY. Gravel is fine to coarse subangular to subrounded mudstone, quartzite and coal<br>(GLACIAL TILL)                       |        |    |         |
| ES                 | 0.80      |           |             |              |                              |                                                                                                                                                                                                  |        |    |         |
| S                  | 1.20      |           |             |              |                              |                                                                                                                                                                                                  |        |    |         |
| D                  | 1.80      | N = 24    | 101mm /100% |              | (2.76)                       |                                                                                                                                                                                                  |        |    |         |
| D                  | 2.00      |           |             |              |                              |                                                                                                                                                                                                  |        |    |         |
| S                  | 2.00      |           |             |              |                              |                                                                                                                                                                                                  |        |    |         |
| D                  | 2.80      | N = 50    |             |              |                              |                                                                                                                                                                                                  |        |    |         |
| D                  | 3.00      |           |             |              |                              |                                                                                                                                                                                                  |        |    |         |
| S                  | 3.00      |           |             |              |                              |                                                                                                                                                                                                  |        |    |         |
|                    |           |           |             | 60.78        | 3.46                         | End of Borehole at 3.45m                                                                                                                                                                         |        |    |         |

Installation: 50mm diameter standpipe installed to 3.00m bgl.

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

| Groundwater Strikes |         |                |       |        | Drilled: PM Sampling Ltd<br>Logged: JW<br>Checked: PG |
|---------------------|---------|----------------|-------|--------|-------------------------------------------------------|
| Depth Strike        | Rose to | Remarks        | Cased | Sealed |                                                       |
| 1.00                | 1.00    | Slight ingress |       |        |                                                       |

# DCS4

**Project No.** AG3331-21

Sheet 1 of 1

Scale 1:25

**Total Depth** 3.45m

**Installation:**  
**Remarks:** Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Exploratory hole logs to be read in conjunction with key sheet

# SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

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

SPT Hammer Ref: DART534  
Test Date: 24/11/2021  
Report Date: 26/11/2021  
File Name: DART534.spt  
Test Operator: JL

## Instrumented Rod Data

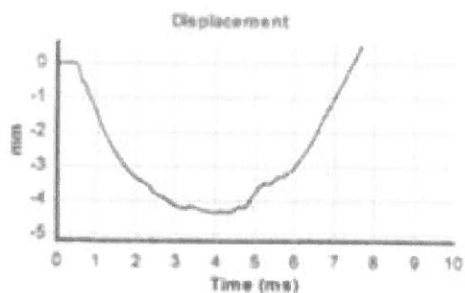
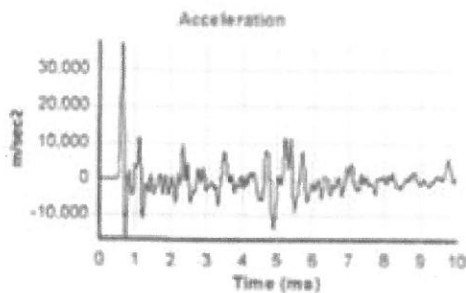
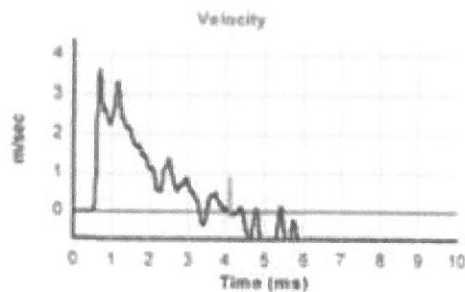
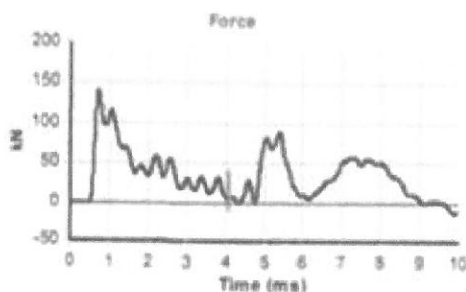
Diameter  $d_r$  (mm): 54  
Wall Thickness  $t_r$  (mm): 6.0  
Assumed Modulus  $E_a$  (GPa): 200  
Accelerometer No.1: 7080  
Accelerometer No.2: 11609

## SPT Hammer Information

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

## Comments / Location

D & I DRILLING - 78888



## Calculations

Area of Rod  $A$  (mm<sup>2</sup>): 905  
Theoretical Energy  $E_{theor}$  (J): 473  
Measured Energy  $E_{meas}$  (J): 329

Energy Ratio  $E_r$  (%): **70**

Signed: J. LOCK  
Title: FITTER



The recommended calibration interval is 12 months

# Exploratory Hole Log Key Sheet

| Sample Notation                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------|
| D                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Small Disturbed sample           |                   |
| B                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Bulk Disturbed sample            |                   |
| ES                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Environmental sample             |                   |
| U                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Undisturbed U100 sample          |                   |
| UT                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Undisturbed UT100 sample         |                   |
| C                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Core sample                      |                   |
| W                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Water sample                     |                   |
| In Situ Test Notation                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                  |                   |
| S                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Standard Penetration Test        |                   |
| S (C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Standard Penetration Test (cone) |                   |
| HV                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Hand Shear Vane Test             |                   |
| PID                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Photoionization Detector Test    |                   |
| MEXE                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mexecone Cone Penetrometer Test  |                   |
| PP                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Pocket Penetrometer Test         |                   |
| K                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Permeability Test                |                   |
| Results Notation                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |                   |
| Cu                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Shear Strength                   | kN/m <sup>2</sup> |
| N                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SPT N Value                      | -                 |
| PID                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | VOC Concentration                | ppm               |
| ( )                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | U/UT Blow Count                  | -                 |
| Rotary Core Notation                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                   |
| TCR                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Total Core Recovery              |                   |
| SCR                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Solid Core Recovery              |                   |
| RQD                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Rock Quality Designation         |                   |
| FI                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Fracture Index                   |                   |
| If                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Fracture Spacing                 |                   |
| NI                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Non Intact                       |                   |
| NR                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | No Recovery                      |                   |
| NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Not Applicable                   |                   |
| Ease of Dig                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |                   |
| VE                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Very Easy                        |                   |
| E                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Easy                             |                   |
| M                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Moderate                         |                   |
| H                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Hard                             |                   |
| VH                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Very Hard                        |                   |
| General Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                   |
| <p>1. Details of the standpipe/piezometer are given on the log. The 'Install' column shows a graphical representation of the installed including depth of instruments including slotted section or piezometer depth, and backfill details.</p> <p>2. Standard Penetration Test is defined in BS EN ISO 17892. Total N value is shown on the logs, full details of the test increments, equipment references, water and casing levels shown on the SPT Summary Sheet.</p> |                                  |                   |

| Backfill Symbols     |                                            |
|----------------------|--------------------------------------------|
|                      | Sand                                       |
|                      | Gravel                                     |
|                      | Concrete                                   |
|                      | Bentonite                                  |
|                      | Arisings                                   |
|                      | Grout                                      |
| Installation Symbols |                                            |
|                      | Plain Standpipe                            |
|                      | Slotted Standpipe                          |
|                      | Piezometer                                 |
|                      | Vibrating Wire Piezometer                  |
|                      | Inclinometer                               |
|                      | Extensometer<br>(with magnet locations)    |
| Groundwater (GW)     |                                            |
|                      | Rise                                       |
|                      | Groundwater Strike -<br>with Recorded Rise |
|                      | Strike                                     |
|                      | Groundwater Strike -<br>No Recorded Rise   |

| Legend Symbols                                                                                                                                        |                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                                                                                                                                                       | Topsoil          |
|                                                                                                                                                       | Made Ground      |
|                                                                                                                                                       | Concrete         |
|                                                                                                                                                       | Clay             |
|                                                                                                                                                       | Silt             |
|                                                                                                                                                       | Sand             |
|                                                                                                                                                       | Gravel           |
|                                                                                                                                                       | Peat             |
|                                                                                                                                                       | Cobbles          |
|                                                                                                                                                       | Boulders         |
|                                                                                                                                                       | Mudstone         |
|                                                                                                                                                       | Siltstone        |
|                                                                                                                                                       | Sandstone        |
|                                                                                                                                                       | Limestone        |
|                                                                                                                                                       | Chalk            |
|                                                                                                                                                       | Coal             |
|                                                                                                                                                       | Breccia          |
|                                                                                                                                                       | Conglomerate     |
|                                                                                                                                                       | Shale            |
|                                                                                                                                                       | Igenous Rock     |
|                                                                                                                                                       | Metamorphic Rock |
| NR NR                                                                                                                                                 | No Recovery      |
| NR NR                                                                                                                                                 | No Recovery      |
| Note: Most soils comprise a mixture of particle sizes. The soil type is graphically represented on the log and may be a combination of these symbols. |                  |

# **APPENDIX C**

# Ground Gas Monitoring and Flow Results

Project Number: AG3331-21

Project Name: Gorton Education Village, Gorton, Manchester

Date and Time of Monitoring: Thursday 17th March 2022 - 09:30

Phase of Monitoring: 1 of 4

| BH No. | Flow Range (litres/hr over 3 mins) |      |      | Differential Pressure (mb) | Methane % v/v |        | Carbon dioxide % v/v |        | Oxygen % v/v |        | Diameter of installation (mm) | Water level (m bgl) |
|--------|------------------------------------|------|------|----------------------------|---------------|--------|----------------------|--------|--------------|--------|-------------------------------|---------------------|
|        | Max                                | Min  | Avg  |                            | Peak          | Steady | Peak                 | Steady | Min          | Steady |                               |                     |
| DCS1   | <0.1                               | <0.1 | <0.1 | <1                         | <0.1          | <0.1   | 0.2                  | 0.2    | 20.4         | 20.4   | 50                            | 1.08                |
| DCS2C  | <0.1                               | <0.1 | <0.1 | <1                         | <0.1          | <0.1   | 0.3                  | 0.3    | 20.4         | 20.4   | 50                            | 0.72                |
| DCS3   | <0.1                               | <0.1 | <0.1 | <1                         | <0.1          | <0.1   | 0.7                  | 0.7    | 19.8         | 19.8   | 50                            | 1.56                |

## Additional gases (if required)

| BH No. | VOCs (ppm) | Carbon Monoxide (ppm) | Hydrogen Sulphide (ppm) | Diameter of installation (mm) |
|--------|------------|-----------------------|-------------------------|-------------------------------|
| DCS1   | N/A        | N/A                   | N/A                     | 50                            |
| DCS2C  | N/A        | N/A                   | N/A                     | 50                            |
| DCS3   | N/A        | N/A                   | N/A                     | 50                            |

| Borehole specific comments/observations |
|-----------------------------------------|
|                                         |
|                                         |
|                                         |

## Meteorological Data

|                              |                 |
|------------------------------|-----------------|
| Atmospheric Pressure (mb)    | Start: 1008     |
| Atmospheric Pressure (mb)    | Finish: 1008    |
| Pressure Rising or Falling   | Rising          |
| Weather Conditions           | 5/8 cloud cover |
| Atmospheric Oxygen (% vol)   | 20.5            |
| Wind Speed & Direction       | 6mph S          |
| Ambient Air Temperature (°C) | 6.0             |

## Site Data

|                                                              |            |
|--------------------------------------------------------------|------------|
| Monitoring Personnel                                         | Jack Welch |
| GPS Instrument                                               |            |
| Gasmeter Serial Number                                       | G503948    |
| PID Serial Number                                            |            |
| Ground Conditions (vegetation stress, visual contamination): |            |

## General Notes:

1. Instrument specification data and calibration information provided on a separate sheet

**APPLIED GEOLOGY**

# Ground Gas Monitoring and Flow Results

Project Number: AG3331-21

Project Name: Gorton Education Village, Gorton, Manchester

Date and Time of Monitoring: Tuesday 29th March 2022 - 11:45

Phase of Monitoring: 2 of 4

| BH No. | Flow Range (litres/hr over 3 mins) |      |      | Differential Pressure (mb) | Methane % v/v |        | Carbon dioxide % v/v |        | Oxygen % v/v |        | Diameter of installation (mm) | Water level (m bgl) |
|--------|------------------------------------|------|------|----------------------------|---------------|--------|----------------------|--------|--------------|--------|-------------------------------|---------------------|
|        | Max                                | Min  | Avg  |                            | Peak          | Steady | Peak                 | Steady | Min          | Steady |                               |                     |
| DCS1   | -0.2                               | -0.2 | -0.2 | -0.74                      | <0.1          | <0.1   | 0.1                  | 0.1    | 20.6         | 20.6   | 50                            | 1.10                |
| DCS2C  | -0.1                               | -0.1 | -0.1 | -0.48                      | <0.1          | <0.1   | 0.3                  | 0.3    | 20.4         | 20.4   | 50                            | 0.70                |
| DCS3   | -0.2                               | -0.2 | -0.2 | -0.60                      | <0.1          | <0.1   | 3.0                  | 0.4    | 17.0         | 20.0   | 50                            | 1.60                |

## Additional gases (if required)

| BH No. | VOCs (ppm) | Carbon Monoxide (ppm) | Hydrogen Sulphide (ppm) | Diameter of installation (mm) |
|--------|------------|-----------------------|-------------------------|-------------------------------|
| DCS1   | N/A        | N/A                   | N/A                     | 50                            |
| DCS2C  | N/A        | N/A                   | N/A                     | 50                            |
| DCS3   | N/A        | N/A                   | N/A                     | 50                            |

| Borehole specific comments/observations |
|-----------------------------------------|
|                                         |
|                                         |
|                                         |

## Meteorological Data

|                              |              |
|------------------------------|--------------|
| Atmospheric Pressure (mb)    | Start: 1007  |
| Atmospheric Pressure (mb)    | Finish: 1007 |
| Pressure Rising or Falling   | Falling      |
| Weather Conditions           | Sunny        |
| Atmospheric Oxygen (% vol)   | 20.0         |
| Wind Speed & Direction       | 12mph WNW    |
| Ambient Air Temperature (°C) | 15.0         |

## Site Data

|                                                              |               |
|--------------------------------------------------------------|---------------|
| Monitoring Personnel                                         | Hannah Hadwin |
| GPS Instrument                                               |               |
| Gasmeter Serial Number                                       | G503948       |
| PID Serial Number                                            |               |
| Ground Conditions (vegetation stress, visual contamination): |               |
|                                                              |               |

## General Notes:

1. Instrument specification data and calibration information provided on a separate sheet

**APPLIED GEOLOGY**

# Ground Gas Monitoring and Flow Results

Project Number: AG3331-21  
Project Name: Gorton Education Village, Gorton, Manchester

Date and Time of Monitoring: Tuesday 5th April 2022 - 11:45  
Phase of Monitoring: 3 of 4

| BH No. | Flow Range (litres/hr over 3 mins) |      |      | Differential Pressure (mb) | Methane % v/v |        | Carbon dioxide % v/v |        | Oxygen % v/v |        | Diameter of installation (mm) | Water level (m bgl) |
|--------|------------------------------------|------|------|----------------------------|---------------|--------|----------------------|--------|--------------|--------|-------------------------------|---------------------|
|        | Max                                | Min  | Avg  |                            | Peak          | Steady | Peak                 | Steady | Min          | Steady |                               |                     |
| DCS1   | <0.1                               | <0.1 | <0.1 | -0.65                      | <0.1          | <0.1   | 0.1                  | 0.1    | 20.7         | 20.7   | 50                            | 1.00                |
| DCS2C  | 0.3                                | 0.2  | 0.2  | -0.74                      | <0.1          | <0.1   | 0.6                  | 0.3    | 20.9         | 21.0   | 50                            | 0.70                |
| DCS3   | 0.3                                | 0.3  | 0.3  | -0.62                      | <0.1          | <0.1   | 2.9                  | 0.5    | 17.6         | 20.3   | 50                            | 1.53                |

Additional gases (if required)

| BH No. | VOCs (ppm) | Carbon Monoxide (ppm) | Hydrogen Sulphide (ppm) | Diameter of installation (mm) |
|--------|------------|-----------------------|-------------------------|-------------------------------|
| DCS1   | N/A        | N/A                   | N/A                     | 50                            |
| DCS2C  | N/A        | N/A                   | N/A                     | 50                            |
| DCS3   | N/A        | N/A                   | N/A                     | 50                            |

| Borehole specific comments/observations |
|-----------------------------------------|
|                                         |
|                                         |
|                                         |

Meterological Data

|                              |                  |
|------------------------------|------------------|
| Atmospheric Pressure (mb)    | Start: 1001      |
| Atmospheric Pressure (mb)    | Finish: 1001     |
| Pressure Rising or Falling   | Falling          |
| Weather Conditions           | Overcast/drizzle |
| Atmospheric Oxygen (% vol)   | 21.2             |
| Wind Speed & Direction       | 18 mph W         |
| Ambient Air Temperature (°C) | 7.0              |

Site Data

|                                                              |               |
|--------------------------------------------------------------|---------------|
| Monitoring Personnel                                         | Hannah Hadwin |
| GPS Instrument                                               |               |
| Gasmeter Serial Number                                       | G503948       |
| PID Serial Number                                            |               |
| Ground Conditions (vegetation stress, visual contamination): |               |

General Notes:

- 1. Instrument specification data and calibration information provided on a separate sheet



# Ground Gas Monitoring and Flow Results

Project Number: AG3331-21

Project Name: Gorton Education Village, Gorton, Manchester

Date and Time of Monitoring: Wednesday 13th April 2022 - 14:45

Phase of Monitoring: 4 of 4

| BH No. | Flow Range (litres/hr over 3 mins) |     |     | Differential Pressure (mb) | Methane % v/v |        | Carbon dioxide % v/v |        | Oxygen % v/v |        | Diameter of installation (mm) | Water level (m bgl) |
|--------|------------------------------------|-----|-----|----------------------------|---------------|--------|----------------------|--------|--------------|--------|-------------------------------|---------------------|
|        | Max                                | Min | Avg |                            | Peak          | Steady | Peak                 | Steady | Min          | Steady |                               |                     |
| DCS1   | 0.3                                | 0.2 | 0.3 | 0.15                       | <0.1          | <0.1   | 0.1                  | 0.1    | 20.5         | 20.6   | 50                            | 1.05                |
| DCS2C  | 0.1                                | 0.1 | 0.1 | 0.07                       | <0.1          | <0.1   | 0.7                  | 0.5    | 20.8         | 20.9   | 50                            | 0.70                |
| DCS3   | 0.4                                | 0.3 | 0.3 | 0.17                       | <0.1          | <0.1   | 3.3                  | 0.4    | 16.6         | 20.4   | 50                            | 1.50                |

## Additional gases (if required)

| BH No. | VOCs (ppm) | Carbon Monoxide (ppm) | Hydrogen Sulphide (ppm) | Diameter of installation (mm) |
|--------|------------|-----------------------|-------------------------|-------------------------------|
| DCS1   | N/A        | N/A                   | N/A                     | 50                            |
| DCS2C  | N/A        | N/A                   | N/A                     | 50                            |
| DCS3   | N/A        | N/A                   | N/A                     | 50                            |

| Borehole specific comments/observations |
|-----------------------------------------|
|                                         |
|                                         |
|                                         |

## Meteorological Data

|                              |              |
|------------------------------|--------------|
| Atmospheric Pressure (mb)    | Start: 1009  |
| Atmospheric Pressure (mb)    | Finish: 1009 |
| Pressure Rising or Falling   | Rising       |
| Weather Conditions           | Sunny        |
| Atmospheric Oxygen (% vol)   | 21.1         |
| Wind Speed & Direction       | 16km/h W     |
| Ambient Air Temperature (°C) | 14.0         |

## Site Data

|                                                              |               |
|--------------------------------------------------------------|---------------|
| Monitoring Personnel                                         | Hannah Hadwin |
| GPS Instrument                                               |               |
| Gasmeter Serial Number                                       | G503948       |
| PID Serial Number                                            |               |
| Ground Conditions (vegetation stress, visual contamination): |               |
|                                                              |               |

## General Notes:

1. Instrument specification data and calibration information provided on a separate sheet

**APPLIED GEOLOGY**

# Gas Monitoring Equipment Specification and Accuracy Details

## Instrument Specifications

| Instrument     | Atmospheric Pressure Range | Temperature Range                          | Flow Range              | Flow Resolution | Borehole Pressure Range    |
|----------------|----------------------------|--------------------------------------------|-------------------------|-----------------|----------------------------|
| GA5000         | 500-1500 mb +/- 5 mb       | -10°C to + 50°C                            | 0-20 lt/hr +/- 0.3 l/hr | 0.1l/hr         | .+500/-500 mbar +/- 4 mbar |
| Phocheck Tiger | -                          | -20 to + 60°C (Certified to -15 to + 45°C) | -                       | -               | -                          |

## Instrument Accuracy

| Instrument     |                    | Methane                                                      | Lower Explosive Limit | Carbon Dioxide                                               | Oxygen                                  | Volatile Organic Compounds                                                 | Hydrogen Sulphide          | Carbon Monoxide               |
|----------------|--------------------|--------------------------------------------------------------|-----------------------|--------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------|----------------------------|-------------------------------|
| GA5000         | Detection Range    | 0-100%                                                       | -                     | 0 -100%                                                      | 0-25%                                   | NA                                                                         | 0 -50ppm response <30 secs | 0 - 1000ppm response <30 Secs |
|                | Detection Accuracy | ./- 0.5% @ 0 to 70%, +/-1.5% @ 70 to 100% Response < 10 secs | N/A                   | ./- 0.5% @ 0 to 60%, +/-1.5% @ 60 to 100% Response < 10 secs | ./- 1.0% @ 0 to 25%, Response < 20 secs | NA                                                                         | ./- 1.5% FS                | ./- 2% of FS                  |
| Phocheck Tiger | Detection Range    | N/A                                                          | N/A                   | N/A                                                          | N/A                                     | 1 ppb - 10,000 ppm                                                         | N/A                        | N/A                           |
|                | Detection Accuracy | N/A                                                          | N/A                   | N/A                                                          | N/A                                     | +/- 1ppb +/- 5% of actual displayed accuracy +/- One digit Response < 2sec | N/A                        | N/A                           |

## Calibration Frequency

## Equipment Serial Numbers

|                                                                                                                                                      |                                                           |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>Instruments are calibrated annually.</p> <p>Details of the instrument calibration certificates and service records are available if required.</p> |                                                           |  |
|                                                                                                                                                      | GA5000 (G503948, G505383, G505737)                        |                                                                                      |
|                                                                                                                                                      | Phocheck Tiger - (T-108308, T-109597, T-109598, T-110423) |                                                                                      |

# **APPENDIX D**

SOIL CHEMICAL RESULTS COMPARED AGAINST SCREENING VALUES FOR HUMAN HEALTH

Site: Gorton Education Village, Gorton, Manchester  
Job No: AG3331-21

Land Use: Public Open Space (Residential)  
Dataset: All Samples  
Soil Organic Matter (%): 1.0 %

| Exploratory Hole Reference   |             | DCS1                       | DCS3                       | DCS4                       | No. of samples<br>(n) | Residential without<br>Plant Uptake | Public Open Space<br>(Residential) | Source/Justification             |
|------------------------------|-------------|----------------------------|----------------------------|----------------------------|-----------------------|-------------------------------------|------------------------------------|----------------------------------|
| Depth (m)                    |             | 0.70                       | 0.80                       | 0.30                       |                       |                                     |                                    |                                  |
| Strata                       |             | MG                         | NAT                        | MG                         |                       |                                     |                                    |                                  |
|                              | Units       |                            |                            |                            |                       |                                     |                                    |                                  |
| Organic Matter (%)           | %           | 1.6                        | 2                          | 1.6                        | 3                     |                                     |                                    |                                  |
| pH                           | pH Units    | 9.3                        | 7.4                        | 9.2                        | 3                     |                                     |                                    |                                  |
|                              |             |                            |                            |                            |                       |                                     |                                    |                                  |
| Arsenic                      | mg/kg       | 8.7                        | 6.9                        | 11                         | 3                     |                                     | 79                                 | LQM/CIEH S4UL (2015)             |
| Beryllium                    | mg/kg       | 0.7                        | 1.1                        | 0.87                       | 3                     |                                     | 2.2                                | LQM/CIEH S4UL (2015)             |
| Boron - Total                | mg/kg       | 10                         | 6.8                        | 7.7                        | 3                     |                                     | 21000                              | LQM/CIEH S4UL (2015)             |
| Cadmium                      | mg/kg       | 0.6                        | 0.4                        | 0.6                        | 3                     |                                     | 120                                | LQM/CIEH S4UL (2015)             |
| Chromium (total)             | mg/kg       | 21                         | 21                         | 58                         | 3                     |                                     | 1500                               | LQM/CIEH S4UL (2015)             |
| Chromium - III               | mg/kg       | 20                         | 20                         | 58                         | 3                     |                                     | 1500                               | LQM/CIEH S4UL (2015)             |
| Chromium (VI) Screen         | mg/kg       | 4                          | 4                          | 4                          | 3                     |                                     | 7.7                                | LQM/CIEH S4UL (2015)             |
| Copper                       | mg/kg       | 31                         | 19                         | 50                         | 3                     |                                     | 12000                              | LQM/CIEH S4UL (2015)             |
| Lead                         | mg/kg       | 70                         | 24                         | 140                        | 3                     |                                     | 630                                | C4SL (2014)                      |
| Mercury (Total)              | mg/kg       | 0.3                        | 0.3                        | 0.3                        | 3                     |                                     | 120                                | LQM/CIEH S4UL (2015)             |
| Nickel                       | mg/kg       | 15                         | 19                         | 20                         | 3                     |                                     | 230                                | LQM/CIEH S4UL (2015)             |
| Selenium                     | mg/kg       | 1                          | 1                          | 1                          | 3                     |                                     | 1100                               | LQM/CIEH S4UL (2015)             |
| Vanadium                     | mg/kg       | 24                         | 25                         | 37                         | 3                     |                                     | 2000                               | LQM/CIEH S4UL (2015)             |
| Zinc                         | mg/kg       | 88                         | 52                         | 110                        | 3                     |                                     | 81000                              | LQM/CIEH S4UL (2015)             |
|                              |             |                            |                            |                            |                       |                                     |                                    |                                  |
| Naphthalene                  | mg/kg       | 0.05                       | 0.05                       | 0.05                       | 3                     | 2.3                                 |                                    | LQM/CIEH S4UL (2015)             |
| Acenaphthylene               | mg/kg       | 0.05                       | 0.05                       | 0.05                       | 3                     |                                     | 15000                              | LQM/CIEH S4UL (2015)             |
| Acenaphthene                 | mg/kg       | 0.05                       | 0.05                       | 0.7                        | 3                     |                                     | 15000                              | LQM/CIEH S4UL (2015)             |
| Fluorene                     | mg/kg       | 0.05                       | 0.05                       | 0.67                       | 3                     |                                     | 9900                               | LQM/CIEH S4UL (2015)             |
| Phenanthrene                 | mg/kg       | 0.91                       | 0.92                       | 6.1                        | 3                     |                                     | 3100                               | LQM/CIEH S4UL (2015)             |
| Anthracene                   | mg/kg       | 0.05                       | 0.05                       | 1.1                        | 3                     |                                     | 74000                              | LQM/CIEH S4UL (2015)             |
| Fluoranthene                 | mg/kg       | 1.4                        | 0.84                       | 8.1                        | 3                     |                                     | 3100                               | LQM/CIEH S4UL (2015)             |
| Pyrene                       | mg/kg       | 1.5                        | 0.71                       | 7.7                        | 3                     |                                     | 7400                               | LQM/CIEH S4UL (2015)             |
| Benzo[a]anthracene           | mg/kg       | 0.97                       | 0.32                       | 4.3                        | 3                     |                                     | *                                  | Genotoxic PAH see Benzo(a)pyrene |
| Chrysene                     | mg/kg       | 0.78                       | 0.31                       | 3.1                        | 3                     |                                     | *                                  | Genotoxic PAH see Benzo(a)pyrene |
| Benzo[b]fluoranthene         | mg/kg       | 0.8                        | 0.05                       | 3.6                        | 3                     |                                     | *                                  | Genotoxic PAH see Benzo(a)pyrene |
| Benzo[k]fluoranthene         | mg/kg       | 0.5                        | 0.05                       | 1.9                        | 3                     |                                     | *                                  | Genotoxic PAH see Benzo(a)pyrene |
| Benzo[a]pyrene               | mg/kg       | 0.82                       | 0.05                       | 3.8                        | 3                     |                                     | 10                                 | C4SL (2014)                      |
| Dibenzo[a,h]anthracene       | mg/kg       | 0.05                       | 0.05                       | 0.51                       | 3                     |                                     | *                                  | Genotoxic PAH see Benzo(a)pyrene |
| Indeno[1,2,3-cd]pyrene       | mg/kg       | 0.43                       | 0.05                       | 1.8                        | 3                     |                                     | *                                  | Genotoxic PAH see Benzo(a)pyrene |
| Benzo[g,h,i]perylene         | mg/kg       | 0.56                       | 0.05                       | 2.3                        |                       |                                     | *                                  | Genotoxic PAH see Benzo(a)pyrene |
| Total of 16 PAHs             | mg/kg       | 8.71                       | 3.1                        | 45.8                       |                       |                                     |                                    |                                  |
|                              |             |                            |                            |                            |                       |                                     |                                    |                                  |
| Phenols (Total)              | mg/kg       | 1                          | 1                          | 1                          | 3                     | 440                                 |                                    | LQM/CIEH S4UL (2015)             |
|                              |             |                            |                            |                            |                       |                                     |                                    |                                  |
| Benzene                      | mg/kg       | 1                          | 1                          | 1                          | 3                     | 0.38                                |                                    | LQM/CIEH S4UL (2015)             |
| Toluene                      | mg/kg       | 1                          | 1                          | 1                          | 3                     | 880                                 |                                    | LQM/CIEH S4UL (2015)             |
| Ethylbenzene                 | mg/kg       | 1                          | 1                          | 1                          | 3                     | 83                                  |                                    | LQM/CIEH S4UL (2015)             |
| m&p Xylene                   | mg/kg       | 1                          | 1                          | 1                          | 3                     | 79                                  |                                    | LQM/CIEH S4UL (2015)             |
| o-Xylene                     | mg/kg       | 1                          | 1                          | 1                          | 3                     | 88                                  |                                    | LQM/CIEH S4UL (2015)             |
|                              |             |                            |                            |                            |                       |                                     |                                    |                                  |
| Aliphatic TPH >C5-C6         | mg/kg       | 0.001                      | 0.001                      | 0.001                      | 3                     | 42                                  |                                    | LQM/CIEH S4UL (2015)             |
| Aliphatic TPH >C6-C8         | mg/kg       | 0.001                      | 0.001                      | 0.001                      | 3                     | 100                                 |                                    | LQM/CIEH S4UL (2015)             |
| Aliphatic TPH >C8-C10        | mg/kg       | 0.001                      | 0.001                      | 0.001                      | 3                     | 27                                  |                                    | LQM/CIEH S4UL (2015)             |
| Aliphatic TPH >C10-C12       | mg/kg       | 1                          | 1                          | 1                          | 3                     | 130                                 |                                    | LQM/CIEH S4UL (2015)             |
| Aliphatic TPH >C12-C16       | mg/kg       | 2                          | 2                          | 2                          | 3                     |                                     | 13000                              | LQM/CIEH S4UL (2015)             |
| Aliphatic TPH >C16-C21       | mg/kg       | 11                         | 8                          | 8                          | 3                     |                                     | -                                  | -                                |
| Aliphatic TPH >C21-C35       | mg/kg       | 71                         | 8                          | 8                          | 3                     |                                     | 250000                             | LQM/CIEH S4UL (2015)             |
| Aliphatic TPH >C35-C44       | mg/kg       | 64                         | 8.4                        | 8.4                        | 3                     |                                     | 250000                             | LQM/CIEH S4UL (2015)             |
| Total Aliphatic Hydrocarbons | mg/kg       | 150                        | 10                         | 10                         | 3                     |                                     |                                    |                                  |
| Aromatic TPH >C5-C7          | mg/kg       | 0.001                      | 0.001                      | 0.001                      | 3                     | 370                                 |                                    | LQM/CIEH S4UL (2015)             |
| Aromatic TPH >C7-C8          | mg/kg       | 0.001                      | 0.001                      | 0.001                      | 3                     | 860                                 |                                    | LQM/CIEH S4UL (2015)             |
| Aromatic TPH >C8-C10         | mg/kg       | 0.001                      | 0.001                      | 0.001                      | 3                     | 47                                  |                                    | LQM/CIEH S4UL (2015)             |
| Aromatic TPH >C10-C12        | mg/kg       | 1                          | 1                          | 1                          | 3                     | 250                                 |                                    | LQM/CIEH S4UL (2015)             |
| Aromatic TPH >C12-C16        | mg/kg       | 5.8                        | 2                          | 10                         | 3                     |                                     | 5100                               | LQM/CIEH S4UL (2015)             |
| Aromatic TPH >C16-C21        | mg/kg       | 17                         | 10                         | 28                         | 3                     |                                     | 3800                               | LQM/CIEH S4UL (2015)             |
| Aromatic TPH >C21-C35        | mg/kg       | 110                        | 10                         | 36                         | 3                     |                                     | 3800                               | LQM/CIEH S4UL (2015)             |
| Aromatic TPH >C35-C44        | mg/kg       | 140                        | 8.4                        | 8.4                        | 3                     |                                     | 3800                               | LQM/CIEH S4UL (2015)             |
| Total Aromatic Hydrocarbons  | mg/kg       | 270                        | 10                         | 73                         | 3                     |                                     |                                    |                                  |
| Total Petroleum Hydrocarbons | mg/kg       | 420                        | 10                         | 73                         | 3                     |                                     |                                    |                                  |
|                              |             |                            |                            |                            |                       |                                     |                                    |                                  |
|                              |             | No<br>Asbestos<br>Detected | No<br>Asbestos<br>Detected | No<br>Asbestos<br>Detected |                       |                                     |                                    |                                  |
| Asbestos ID                  | Detection   | -                          | -                          | -                          |                       |                                     |                                    | Detection Limit                  |
| Asbestos ID                  | Description | -                          | -                          | -                          |                       |                                     |                                    | Detection Limit                  |
| Asbestos Quantity            | %           | -                          | -                          | -                          |                       |                                     |                                    | Detection Limit                  |
|                              |             |                            |                            |                            |                       |                                     |                                    |                                  |

Key -  
Value within sample set exceeds screening value

LQM/CIEH S4UL Reference No. S4UL3159 (2015)  
Values in **bold** are reported at the laboratory limit of detection  
Benzo(a)pyrene has been used as a 'surrogate marker for genotoxic PAH' as discussed in Appendix E of CL:AIRE SP1010 'Development of C4SL for Assessment of Land Affected by Contamination', December 2013.  
This allows assessment of the combined carcinogenic risk associated with genotoxic PAH using only b(a)p. Genotoxic PAHs include Benz(a)pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(ah)anthracene, Indeno(123cd)pyrene, Benzo(ghi)perylene and have been marked with a \* on the table.

SUMMARY OF LEACHATE TEST RESULTS

Site Gorton Eeducation Village, Gorton, Manchester  
Job Number AG3331-21  
Type of Water Leachate

| Determinand             | Limit of Detection | Hazardous or Non-Hazardous^ | Sample Identity<br>Depth<br>Sampled Date | DCS1<br>0.7<br>22/02/2022 | DCS4<br>0.3<br>22/02/2022 | No. of samples (n) | Waters<br>Screening Value | Source & Justification             |
|-------------------------|--------------------|-----------------------------|------------------------------------------|---------------------------|---------------------------|--------------------|---------------------------|------------------------------------|
| pH                      |                    | -                           | -                                        | 9.4                       | 8.1                       | 2                  | -                         | -                                  |
| TOC                     |                    | -                           | mg l <sup>-1</sup>                       | 4.81                      | 3.99                      | 2                  | -                         | -                                  |
| Arsenic                 | 1                  | Haz                         | µg l <sup>-1</sup>                       | 2.9                       | 3.5                       | 2                  | 50                        | WFD Environmental Standard, 2010   |
| Cadmium                 | 0.08               | Non Haz                     | µg l <sup>-1</sup>                       | <b>0.08</b>               | <b>0.08</b>               | 2                  | 5                         | UK Drinking Water Standards (2010) |
| Chromium (Total)        | 0.4                | Non Haz                     | µg l <sup>-1</sup>                       | 3.1                       | 1.8                       | 2                  | 50                        | UK Drinking Water Standards (2010) |
| Chromium (III)          | 5                  | Non Haz                     | µg l <sup>-1</sup>                       | <b>5</b>                  | <b>5</b>                  | 2                  | 50                        | UK Drinking Water Standards (2010) |
| Chromium (VI)           | 5                  | Haz                         | µg l <sup>-1</sup>                       | <b>5</b>                  | <b>5</b>                  | 2                  | 5                         | Detection Limit                    |
| Copper                  | 0.7                | Non Haz                     | µg l <sup>-1</sup>                       | 8.3                       | 8.8                       | 2                  | 2000                      | UK Drinking Water Standards (2010) |
| Lead                    | 1                  | Haz                         | µg l <sup>-1</sup>                       | 4.9                       | 8.7                       | 2                  | 10                        | UK Drinking Water Standards (2010) |
| Mercury                 | 0.5                | Haz                         | µg l <sup>-1</sup>                       | <b>0.5</b>                | <b>0.5</b>                | 2                  | 1                         | UK Drinking Water Standards (2010) |
| Nickel                  | 0.3                | Non Haz                     | µg l <sup>-1</sup>                       | 2.5                       | 3.4                       | 2                  | 20                        | UK Drinking Water Standards (2010) |
| Selenium                | 4                  | Non Haz                     | µg l <sup>-1</sup>                       | <b>4</b>                  | <b>4</b>                  | 2                  | 10                        | UK Drinking Water Standards (2010) |
| Zinc                    | 0.4                | Non Haz                     | µg l <sup>-1</sup>                       | 12                        | 9.1                       | 2                  | 5000                      | UK Drinking Water Standards (2010) |
| Boron                   | 10                 | Non Haz                     | µg l <sup>-1</sup>                       | 79                        | 37                        | 2                  | 1000                      | UK Drinking Water Standards (2010) |
| Beryllium               | 0.2                | Non Haz                     | µg l <sup>-1</sup>                       | 0.4                       | 0.2                       | 2                  | 12                        | UK Drinking Water Standards (2010) |
| Vanadium                | 1.7                | Non Haz                     | µg l <sup>-1</sup>                       | 19                        | 13                        | 2                  | 20                        |                                    |
| Sulphate                | 0.1                | Non Haz                     | mg l <sup>-1</sup>                       | 9.4                       | 8.1                       | 2                  | 250                       | UK Drinking Water Standards (2010) |
| Phenol                  | 1                  | Non Haz                     | µg l <sup>-1</sup>                       | <b>12</b>                 | <b>12</b>                 | 2                  | 7.7                       | WFD Environmental Standard, 2010   |
| Naphthalene             | 0.01               | Non Haz                     | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Acenaphthylene          | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Acenaphthene            | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Fluorene                | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Phenanthrene            | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Anthracene              | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Fluoranthene            | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Pyrene                  | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Benzo[a]anthracene      | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Chrysene                | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Benzo[b]fluoranthene    | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Benzo[k]fluoranthene    | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Benzo[a]pyrene          | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Dibenz(a,h)Anthracene   | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Indeno(1,2,3-c,d)Pyrene | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |
| Benzo(g,h,i)perylene    | 0.01               | Haz                         | µg l <sup>-1</sup>                       | 0.01                      | 0.01                      | 2                  | 0.01                      | Detection limit                    |

Key-

Result exceeds test Detection Limit (for Haz determinands)

Values in bold at the limit of detection

^ Note:

Hazardous and non-hazardous substances determined by JAGDAG (Jan 2017) and published at <http://www.wfduk.org/sites/default/files/Media/170116%20Substance%20Determinationsfinal.pdf>. These are marked in bold.

For substances not assessed by JAGDAG, Applied Geology has assumed a determination based on our understanding of the behaviour of the chemical. These determinations are highlighted in yellow.

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## **Analytical Report Number : 22-42463**

Replaces Analytical Report Number: 22-42463, issue no. 1  
Result correction by laboratory.

|                             |                                     |                                                        |            |
|-----------------------------|-------------------------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Gorton Education Village            | <b>Samples received on:</b>                            | 28/02/2022 |
| <b>Your job number:</b>     | AG3331-21                           | <b>Samples instructed on/<br/>Analysis started on:</b> | 28/02/2022 |
| <b>Your order number:</b>   | 17997                               | <b>Analysis completed by:</b>                          | 07/03/2022 |
| <b>Report Issue Number:</b> | 2                                   | <b>Report issued on:</b>                               | 13/04/2022 |
| <b>Samples Analysed:</b>    | 2 leachate samples - 3 soil samples |                                                        |            |

**Signed:**

*Izabela Wójcik*  
Izabela Wójcik  
Reporting Specialist  
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

Analytical Report Number: 22-42463  
Project / Site name: Gorton Education Village  
Your Order No: 17997

|                                         |       |                    |                      |               |                |               |
|-----------------------------------------|-------|--------------------|----------------------|---------------|----------------|---------------|
| Lab Sample Number                       |       |                    |                      | 2188266       | 2188267        | 2188268       |
| Sample Reference                        |       |                    |                      | DCS1          | DCS3           | DCS4          |
| Sample Number                           |       |                    |                      | Made Ground   | Natural Strata | Made Ground   |
| Depth (m)                               |       |                    |                      | 0.70          | 0.80           | 0.30          |
| Date Sampled                            |       |                    |                      | 22/02/2022    | 22/02/2022     | 22/02/2022    |
| Time Taken                              |       |                    |                      | None Supplied | None Supplied  | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of detection | Accreditation Status |               |                |               |
|                                         | %     | 0.1                | NONE                 | < 0.1         | < 0.1          | < 0.1         |
|                                         | %     | 0.01               | NONE                 | 15            | 17             | 14            |
|                                         | kg    | 0.001              | NONE                 | 1             | 1              | 1             |

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

#### General Inorganics

|                                                                         |          |         |        |      |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 9.3  | 7.4   | 9.2   |
| Total Sulphate as SO <sub>4</sub>                                       | %        | 0.005   | MCERTS | -    | 0.024 | 0.075 |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)         | mg/kg    | 2.5     | MCERTS | 770  | 91    | 150   |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.39 | 0.045 | 0.074 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 386  | 45.4  | 73.7  |
| Water Soluble Chloride (2:1) (leachate equivalent)                      | mg/l     | 0.5     | MCERTS | -    | -     | 4.4   |
| Total Sulphur                                                           | %        | 0.005   | MCERTS | -    | 0.067 | 0.056 |
| Organic Matter (automated)                                              | %        | 0.1     | MCERTS | 1.6  | 2     | 1.6   |
| Water Soluble Nitrate (2:1) as NO <sub>3</sub>                          | mg/kg    | 2       | NONE   | -    | -     | 4.1   |
| Water Soluble Nitrate (2:1) as NO <sub>3</sub> (leachate equivalent)    | mg/l     | 5       | NONE   | -    | -     | < 5.0 |

#### Total Phenols

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

#### Speciated PAHs

|                        |       |      |        |        |        |        |
|------------------------|-------|------|--------|--------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.7    |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.67   |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 0.91   | 0.92   | 6.3    |
| Anthracene             | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 1.1    |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 1.4    | 0.84   | 8.1    |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 1.5    | 0.71   | 7.7    |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 0.97   | 0.32   | 4.3    |
| Chrysene               | mg/kg | 0.05 | MCERTS | 0.78   | 0.31   | 3.1    |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.8    | < 0.05 | 3.6    |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.5    | < 0.05 | 1.9    |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 0.82   | < 0.05 | 3.8    |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 0.43   | < 0.05 | 1.8    |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.51   |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | 0.56   | < 0.05 | 2.3    |

#### Total PAH

|                             |       |     |        |      |     |      |
|-----------------------------|-------|-----|--------|------|-----|------|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 8.71 | 3.1 | 45.8 |
|-----------------------------|-------|-----|--------|------|-----|------|

Analytical Report Number: 22-42463  
Project / Site name: Gorton Education Village  
Your Order No: 17997

|                                         |               |                    |                      |
|-----------------------------------------|---------------|--------------------|----------------------|
| Lab Sample Number                       | 2188266       | 2188267            | 2188268              |
| Sample Reference                        | DCS1          | DCS3               | DCS4                 |
| Sample Number                           | Made Ground   | Natural Strata     | Made Ground          |
| Depth (m)                               | 0.70          | 0.80               | 0.30                 |
| Date Sampled                            | 22/02/2022    | 22/02/2022         | 22/02/2022           |
| Time Taken                              | None Supplied | None Supplied      | None Supplied        |
| Analytical Parameter<br>(Soil Analysis) | Units         | Limit of detection | Accreditation Status |

#### Heavy Metals / Metalloids

|                                    |       |      |        |       |       |       |
|------------------------------------|-------|------|--------|-------|-------|-------|
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS | 8.7   | 6.9   | 11    |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS | 0.7   | 1.1   | 0.87  |
| Boron (total)                      | mg/kg | 1    | MCERTS | 10    | 6.8   | 7.7   |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS | 0.6   | 0.4   | 0.6   |
| Chromium (hexavalent)              | mg/kg | 4    | NONE   | < 4.0 | < 4.0 | < 4.0 |
| Chromium (III)                     | mg/kg | 1    | NONE   | 20    | 20    | 58    |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS | 21    | 21    | 58    |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS | 31    | 19    | 50    |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS | 70    | 24    | 140   |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS | 15    | 19    | 20    |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS | 24    | 25    | 37    |
| Zinc (aqua regia extractable)      | mg/kg | 1    | MCERTS | 88    | 52    | 110   |

|                                 |       |     |      |     |    |     |
|---------------------------------|-------|-----|------|-----|----|-----|
| Magnesium (water soluble)       | mg/kg | 5   | NONE | 7.8 | 22 | 6.6 |
| Magnesium (leachate equivalent) | mg/l  | 2.5 | NONE | -   | -  | 3.3 |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |       |
|------------------------------------|-------|---|--------|-------|-------|-------|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |

#### Petroleum Hydrocarbons

|                                                 |       |       |        |         |         |         |
|-------------------------------------------------|-------|-------|--------|---------|---------|---------|
| TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL        | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL    | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL    | mg/kg | 2     | MCERTS | 2       | < 2.0   | < 2.0   |
| TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL    | mg/kg | 8     | MCERTS | 11      | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL    | mg/kg | 8     | MCERTS | 71      | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic > EC35 - EC44 EH_CU_1D_AL   | mg/kg | 8.4   | NONE   | 64      | < 8.4   | < 8.4   |
| TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL | mg/kg | 10    | MCERTS | 84      | < 10    | < 10    |
| TPH-CWG - Aliphatic (EC5 - EC44) EH_CU+HS_1D_AL | mg/kg | 10    | NONE   | 150     | < 10    | < 10    |

|                                                |       |       |        |         |         |         |
|------------------------------------------------|-------|-------|--------|---------|---------|---------|
| TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR        | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR    | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR    | mg/kg | 2     | MCERTS | 5.8     | < 2.0   | 10      |
| TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR    | mg/kg | 10    | MCERTS | 17      | < 10    | 28      |
| TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR    | mg/kg | 10    | MCERTS | 110     | < 10    | 36      |
| TPH-CWG - Aromatic > EC35 - EC44 EH_CU_1D_AR   | mg/kg | 8.4   | NONE   | 140     | < 8.4   | < 8.4   |
| TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR | mg/kg | 10    | MCERTS | 140     | < 10    | 73      |
| TPH-CWG - Aromatic (EC5 - EC44) EH_CU+HS_1D_AR | mg/kg | 10    | NONE   | 270     | < 10    | 73      |

|                                                          |       |    |      |     |      |    |
|----------------------------------------------------------|-------|----|------|-----|------|----|
| TPHCWG - Total C5 - C44 Aliphatic & Aromatic EH_CU+HS_1D | mg/kg | 10 | NONE | 420 | < 10 | 73 |
|----------------------------------------------------------|-------|----|------|-----|------|----|

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number: 22-42463  
Project / Site name: Gorton Education Village

Your Order No: 17997

|                                             |       |                    |                      |               |               |
|---------------------------------------------|-------|--------------------|----------------------|---------------|---------------|
| Lab Sample Number                           |       |                    |                      | 2188269       | 2188270       |
| Sample Reference                            |       |                    |                      | DCS1          | DCS4          |
| Sample Number                               |       |                    |                      | Made Ground   | Made Ground   |
| Depth (m)                                   |       |                    |                      | 0.70          | 0.30          |
| Date Sampled                                |       |                    |                      | 22/02/2022    | 22/02/2022    |
| Time Taken                                  |       |                    |                      | None Supplied | None Supplied |
| Analytical Parameter<br>(Leachate Analysis) | Units | Limit of detection | Accreditation Status |               |               |

#### General Inorganics

|                             |          |     |           |      |      |
|-----------------------------|----------|-----|-----------|------|------|
| pH (automated)              | pH Units | N/A | ISO 17025 | 9.4  | 8.1  |
| Sulphate as SO <sub>4</sub> | mg/l     | 0.1 | ISO 17025 | 40.1 | 4.7  |
| Total Organic Carbon (TOC)  | mg/l     | 0.1 | NONE      | 4.81 | 3.99 |

#### Total Phenols

|                            |      |   |           |       |       |
|----------------------------|------|---|-----------|-------|-------|
| Total Phenols (monohydric) | µg/l | 1 | ISO 17025 | < 1.0 | < 1.0 |
|----------------------------|------|---|-----------|-------|-------|

#### Speciated PAHs

|                        |      |      |           |        |        |
|------------------------|------|------|-----------|--------|--------|
| Naphthalene            | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Acenaphthylene         | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Acenaphthene           | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Fluorene               | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Phenanthrene           | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Anthracene             | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Fluoranthene           | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Pyrene                 | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Benzo(a)anthracene     | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Chrysene               | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Benzo(b)fluoranthene   | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Benzo(k)fluoranthene   | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Benzo(a)pyrene         | µg/l | 0.01 | ISO 17025 | < 0.01 | < 0.01 |
| Indeno(1,2,3-cd)pyrene | µg/l | 0.01 | NONE      | < 0.01 | < 0.01 |
| Dibenz(a,h)anthracene  | µg/l | 0.01 | NONE      | < 0.01 | < 0.01 |
| Benzo(ghi)perylene     | µg/l | 0.01 | NONE      | < 0.01 | < 0.01 |

#### Total PAH

|                   |      |     |      |       |       |
|-------------------|------|-----|------|-------|-------|
| Total EPA-16 PAHs | µg/l | 0.2 | NONE | < 0.2 | < 0.2 |
|-------------------|------|-----|------|-------|-------|

#### Heavy Metals / Metalloids

|                       |      |      |           |        |        |
|-----------------------|------|------|-----------|--------|--------|
| Arsenic (dissolved)   | µg/l | 1    | ISO 17025 | 2.9    | 3.5    |
| Beryllium (dissolved) | µg/l | 0.2  | ISO 17025 | 0.4    | 0.2    |
| Boron (dissolved)     | µg/l | 10   | ISO 17025 | 79     | 37     |
| Cadmium (dissolved)   | µg/l | 0.08 | ISO 17025 | < 0.08 | < 0.08 |
| Chromium (hexavalent) | µg/l | 5    | ISO 17025 | < 5.0  | < 5.0  |
| Chromium (III)        | µg/l | 5    | NONE      | < 5.0  | < 5.0  |
| Chromium (dissolved)  | µg/l | 0.4  | ISO 17025 | 3.1    | 1.8    |
| Copper (dissolved)    | µg/l | 0.7  | ISO 17025 | 8.3    | 8.8    |
| Lead (dissolved)      | µg/l | 1    | ISO 17025 | 4.9    | 8.7    |
| Mercury (dissolved)   | µg/l | 0.5  | ISO 17025 | < 0.5  | < 0.5  |
| Nickel (dissolved)    | µg/l | 0.3  | ISO 17025 | 2.5    | 3.4    |
| Selenium (dissolved)  | µg/l | 4    | ISO 17025 | < 4.0  | < 4.0  |
| Vanadium (dissolved)  | µg/l | 1.7  | ISO 17025 | 19     | 13     |
| Zinc (dissolved)      | µg/l | 0.4  | ISO 17025 | 12     | 9.1    |

|                       |      |       |           |      |      |
|-----------------------|------|-------|-----------|------|------|
| Magnesium (dissolved) | mg/l | 0.005 | ISO 17025 | 0.51 | 0.62 |
|-----------------------|------|-------|-----------|------|------|

U/S = Unsuitable Sample I/S = Insufficient Sample

**Analytical Report Number : 22-42463**

**Project / Site name: Gorton Education Village**

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

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

| Lab Sample Number | Sample Reference | Sample Number  | Depth (m) | Sample Description *             |
|-------------------|------------------|----------------|-----------|----------------------------------|
| 2188266           | DCS1             | Made Ground    | 0.7       | Brown clay and sand with gravel. |
| 2188267           | DCS3             | Natural Strata | 0.8       | Brown clay and sand.             |
| 2188268           | DCS4             | Made Ground    | 0.3       | Brown clay and sand with gravel. |

**Analytical Report Number : 22-42463**

**Project / Site name: Gorton Education Village**

**Water matrix abbreviations:**

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

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                             | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method.                                                                                                        | L038-PL       | D                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                                    | L038-PL       | D                  | MCERTS               |
| NRA Leachate Prep                                  | 10:1 extract with de-ionised water shaken for 24 hours then filtered.                                                                                     | In-house method based on National Rivers Authority                                                                      | L020-PL       | W                  | NONE                 |
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                     | In house method based on HSG 248                                                                                        | A001-PL       | D                  | ISO 17025            |
| Metals by ICP-OES in leachate                      | Determination of metals in leachate by acidification followed by ICP-OES.                                                                                 | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                                    | L039-PL       | W                  | ISO 17025            |
| Boron in leachate                                  | Determination of boron in leachate. Sample acidified and followed by ICP-OES.                                                                             | In-house method based on MEWAM                                                                                          | L039-PL       | W                  | ISO 17025            |
| Hexavalent chromium in leachate                    | Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.                             | In-house method                                                                                                         | L080-PL       | W                  | ISO 17025            |
| Hexavalent chromium in soil                        | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.     | In-house method                                                                                                         | L080-PL       | W                  | NONE                 |
| Magnesium, water soluble, in soil                  | Determination of water soluble magnesium by extraction with water followed by ICP-OES.                                                                    | In-house method based on TRL 447                                                                                        | L038-PL       | D                  | NONE                 |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                     | In house method.                                                                                                        | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in leachate - LOW LEVEL 1 ug/l  | Determination of phenols in leachate by distillation followed by colorimetry.                                                                             | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)         | L080-PL       | W                  | ISO 17025            |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)         | L080-PL       | W                  | MCERTS               |
| Nitrate, water soluble, in soil                    | Determination of nitrate by reaction with sodium salicylate and colorimetry.                                                                              | In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction. | L078-PL       | D                  | NONE                 |
| Speciated EPA-16 PAHs in leachate                  | Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.           | In-house method based on USEPA 8270                                                                                     | L1028-PL      | W                  | ISO 17025            |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.    | In-house method based on USEPA 8270                                                                                     | L064-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In house method.                                                                                                        | L099-PL       | D                  | MCERTS               |
| pH at 20oC in leachate (automated)                 | Determination of pH in leachate by electrometric measurement.                                                                                             | In house method.                                                                                                        | L099B         | W                  | ISO 17025            |

**Analytical Report Number : 22-42463**

**Project / Site name: Gorton Education Village**

**Water matrix abbreviations:**

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

| Analytical Test Name                             | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                             | Method number | Wet / Dry Analysis | Accreditation Status |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Stones content of soil                           | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                              | L019-UK/PL    | D                  | NONE                 |
| Total organic carbon in leachate                 | Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.                                                                           | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton                  | L037-PL       | W                  | NONE                 |
| BTEX and MTBE in soil (Monoaromatics)            | Determination of BTEX in soil by headspace GC-MS.                                                                                                         | In-house method based on USEPA8260                                                                                      | L073B-PL      | W                  | MCERTS               |
| Cr (III) in soil                                 | In-house method by calculation from total Cr and Cr VI.                                                                                                   | In-house method by calculation                                                                                          | L080-PL       | W                  | NONE                 |
| Cr (III) in leachate                             | In-house method by calculation from total Cr and Cr VI.                                                                                                   | In-house method by calculation                                                                                          | L080-PL       | W                  | NONE                 |
| TPHCWG (Soil)                                    | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method with silica gel split/clean up.                                                                         | L088/76-PL    | W                  | MCERTS               |
| TPH in (Soil)                                    | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                             | In-house method, TPH with carbon banding and silica gel split/cleanup.                                                  | L076-PL       | D                  | NONE                 |
| TPHCWG Ali Aro Sum                               | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method with silica gel split/clean up.                                                                         | L088/76-PL    | W                  | NONE                 |
| Sulphate in leachates                            | Determination of sulphate in leachate by acidification followed by ICP-OES.                                                                               | In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil"                                    | L039-PL       | W                  | ISO 17025            |
| Organic matter (Automated) in soil               | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                             | In house method.                                                                                                        | L009-PL       | D                  | MCERTS               |
| Total Sulphate in soil as %                      | Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.                                                                   | In house method.                                                                                                        | L038-PL       | D                  | MCERTS               |
| Total Sulphur in soil as %                       | Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.                                      | In house method.                                                                                                        | L038-PL       | D                  | MCERTS               |
| D.O. for Gravimetric Quant if Screen/ID positive | Dependent option for Gravimetric Quant if Screen/ID positive scheduled.                                                                                   | In house asbestos methods A001 & A006.                                                                                  | A006-PL       | D                  | NONE                 |
| Chloride, water soluble, in soil                 | Determination of Chloride colorimetrically by discrete analyser.                                                                                          | In house method.                                                                                                        | L082-PL       | D                  | MCERTS               |
| Water Soluble Nitrate (leachate equivalent)      | Determination of nitrate by reaction with sodium salicylate and colorimetry.                                                                              | In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction. | L078-PL       | D                  | NONE                 |
| Sulphate, water soluble, in soil                 | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method.                                                                                                        | L038-PL       | D                  | MCERTS               |

Analytical Report Number : 22-42463

Project / Site name: Gorton Education Village

Water matrix abbreviations:

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

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------|-------------------------------|-----------------------------|---------------|--------------------|----------------------|
|----------------------|-------------------------------|-----------------------------|---------------|--------------------|----------------------|

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

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

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

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

## Information in Support of Analytical Results

### List of HWOL Acronyms and Operators

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

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## **Analytical Report Number : 22-43454**

|                             |                          |                                                        |            |
|-----------------------------|--------------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Gorton Education Village | <b>Samples received on:</b>                            | 04/03/2022 |
| <b>Your job number:</b>     |                          | <b>Samples instructed on/<br/>Analysis started on:</b> | 04/03/2022 |
| <b>Your order number:</b>   | 17998                    | <b>Analysis completed by:</b>                          | 17/03/2022 |
| <b>Report Issue Number:</b> | 1                        | <b>Report issued on:</b>                               | 18/03/2022 |
| <b>Samples Analysed:</b>    | 2 soil samples           |                                                        |            |

  
**Signed:**

Anna Goc  
Technical Reviewer (Reporting Team)  
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

Analytical Report Number: 22-43454  
 Project / Site name: Gorton Education Village  
 Your Order No: 17998

| Lab Sample Number                       |       |                    |                         | 2193944       | 2193945       |
|-----------------------------------------|-------|--------------------|-------------------------|---------------|---------------|
| Sample Reference                        |       |                    |                         | BH1           | BH1           |
| Sample Number                           |       |                    |                         | None Supplied | None Supplied |
| Depth (m)                               |       |                    |                         | 1.20-1.65     | 7.50-7.95     |
| Date Sampled                            |       |                    |                         | Deviating     | Deviating     |
| Time Taken                              |       |                    |                         | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of detection | Accreditation<br>Status |               |               |
| Stone Content                           | %     | 0.1                | NONE                    | < 0.1         | < 0.1         |
| Moisture Content                        | %     | 0.01               | NONE                    | 16            | 18            |
| Total mass of sample received           | kg    | 0.001              | NONE                    | 0.6           | 0.6           |

#### General Inorganics

|                                                                         |          |         |        |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 8.5   | 8.8   |
| Total Sulphate as SO <sub>4</sub>                                       | %        | 0.005   | MCERTS | 0.023 | 0.036 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.057 | 0.14  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 56.5  | 139   |
| Total Sulphur                                                           | %        | 0.005   | MCERTS | 0.089 | 0.092 |

U/S = Unsuitable Sample I/S = Insufficient Sample

**Analytical Report Number : 22-43454**

**Project / Site name: Gorton Education Village**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *                            |
|-------------------|------------------|---------------|-----------|-------------------------------------------------|
| 2193944           | BH1              | None Supplied | 1.20-1.65 | Brown clay and loam with gravel and vegetation. |
| 2193945           | BH1              | None Supplied | 7.50-7.95 | Brown clay and sand with gravel and vegetation. |

**Analytical Report Number : 22-43454**  
**Project / Site name: Gorton Education Village**

**Water matrix abbreviations:**

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

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                     | In house method.                                                           | L019-UK/PL    | W                  | NONE                 |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In house method.                                                           | L099-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements. | L019-UK/PL    | D                  | NONE                 |
| Total Sulphate in soil as %                        | Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.                                                                   | In house method.                                                           | L038-PL       | D                  | MCERTS               |
| Total Sulphur in soil as %                         | Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.                                      | In house method.                                                           | L038-PL       | D                  | MCERTS               |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method.                                                           | L038-PL       | D                  | MCERTS               |
| Sulphate, water soluble, in soil                   | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method.                                                           | L038-PL       | D                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

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

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

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

**Analytical Report Number : 22-43454**

**Project / Site name: Gorton Education Village**

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

| Sample ID | Other ID      | Sample Type | Lab Sample Number | Sample Deviation | Test Name     | Test Ref      | Test Deviation |
|-----------|---------------|-------------|-------------------|------------------|---------------|---------------|----------------|
| BH1       | None Supplied | S           | 2193944           | a                | None Supplied | None Supplied | None Supplied  |
| BH1       | None Supplied | S           | 2193945           | a                | None Supplied | None Supplied | None Supplied  |

Client: Applied Geology Ltd  
Client Address: Lowton Business Park, Newton Road,  
Lowton, Warrington,  
WA3 2AN  
Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 11/03/2022  
Sampled By: Not Given

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

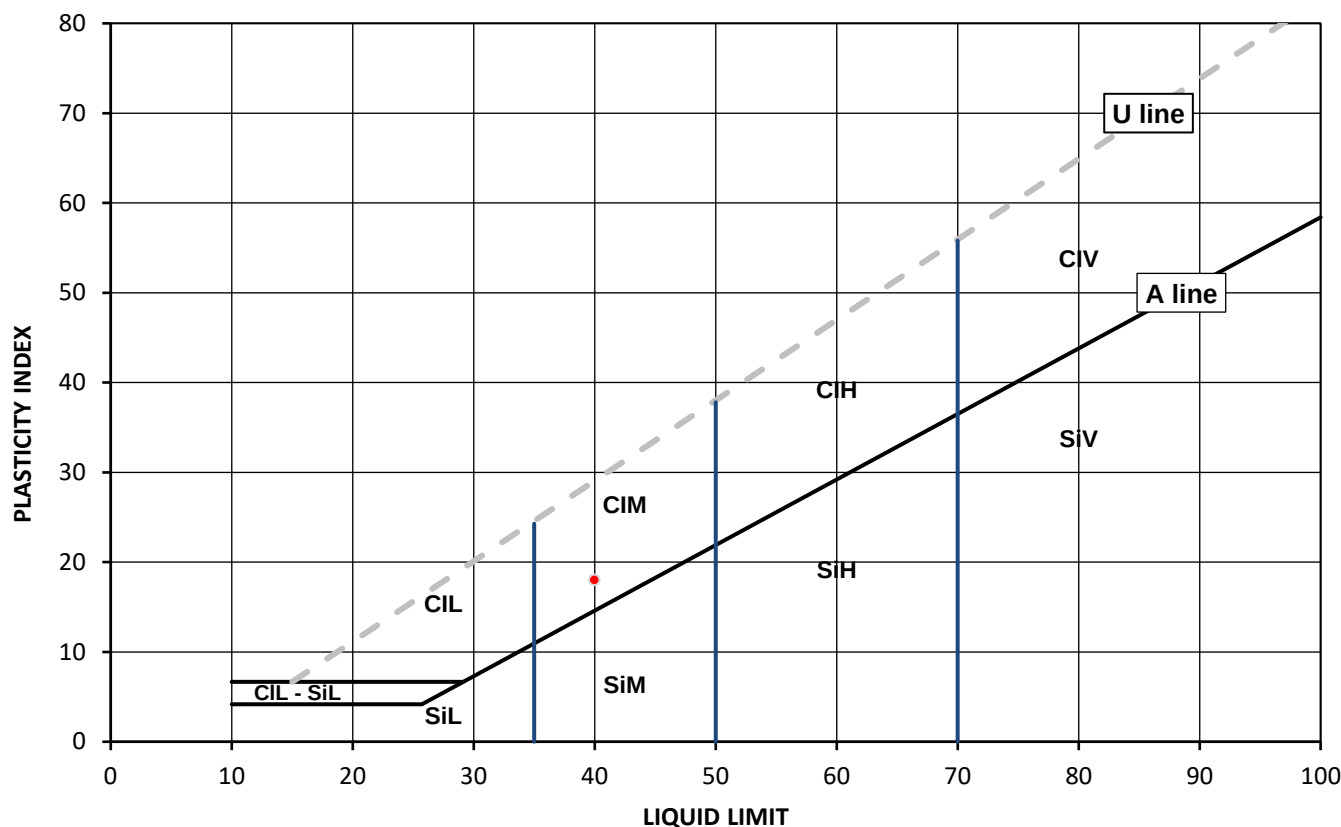
### Test Results:

Laboratory Reference: 2193959  
Hole No.: BH1  
Sample Reference: Not Given  
Sample Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 1.20  
Depth Base [m]: 1.65  
Sample Type: U

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 |
|-----------------------------------|-----------------------|------------------------|---------------------------|-------------------------------|
| 13                                | 40                    | 22                     | 18                        | 71                            |



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

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

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

Remarks:

Signed:



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

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Client: Applied Geology Ltd  
Client Address: Lowton Business Park, Newton Road,  
Lowton, Warrington,  
WA3 2AN  
Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 11/03/2022  
Sampled By: Not Given

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

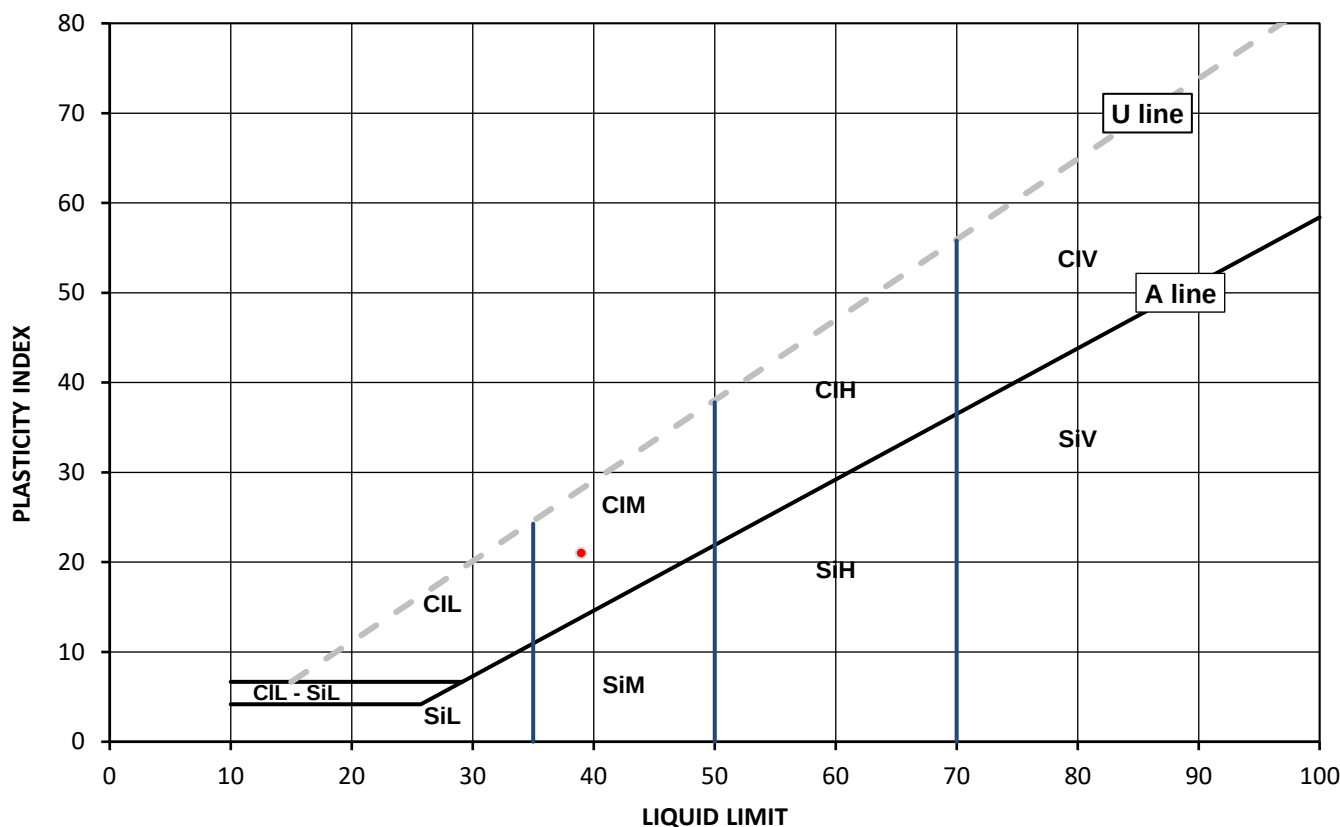
### Test Results:

Laboratory Reference: 2193960  
Hole No.: BH1  
Sample Reference: Not Given  
Sample Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 3.00  
Depth Base [m]: 3.45  
Sample Type: U

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 |
|-----------------------------------|-----------------------|------------------------|---------------------------|-------------------------------|
| 12                                | 39                    | 18                     | 21                        | 84                            |



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

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

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

Remarks:

Signed:

Katarzyna Koziel  
Technical Reviewer  
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Client: Applied Geology Ltd  
Client Address: Lowton Business Park, Newton Road,  
Lowton, Warrington,  
WA3 2AN  
Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 11/03/2022  
Sampled By: Not Given

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

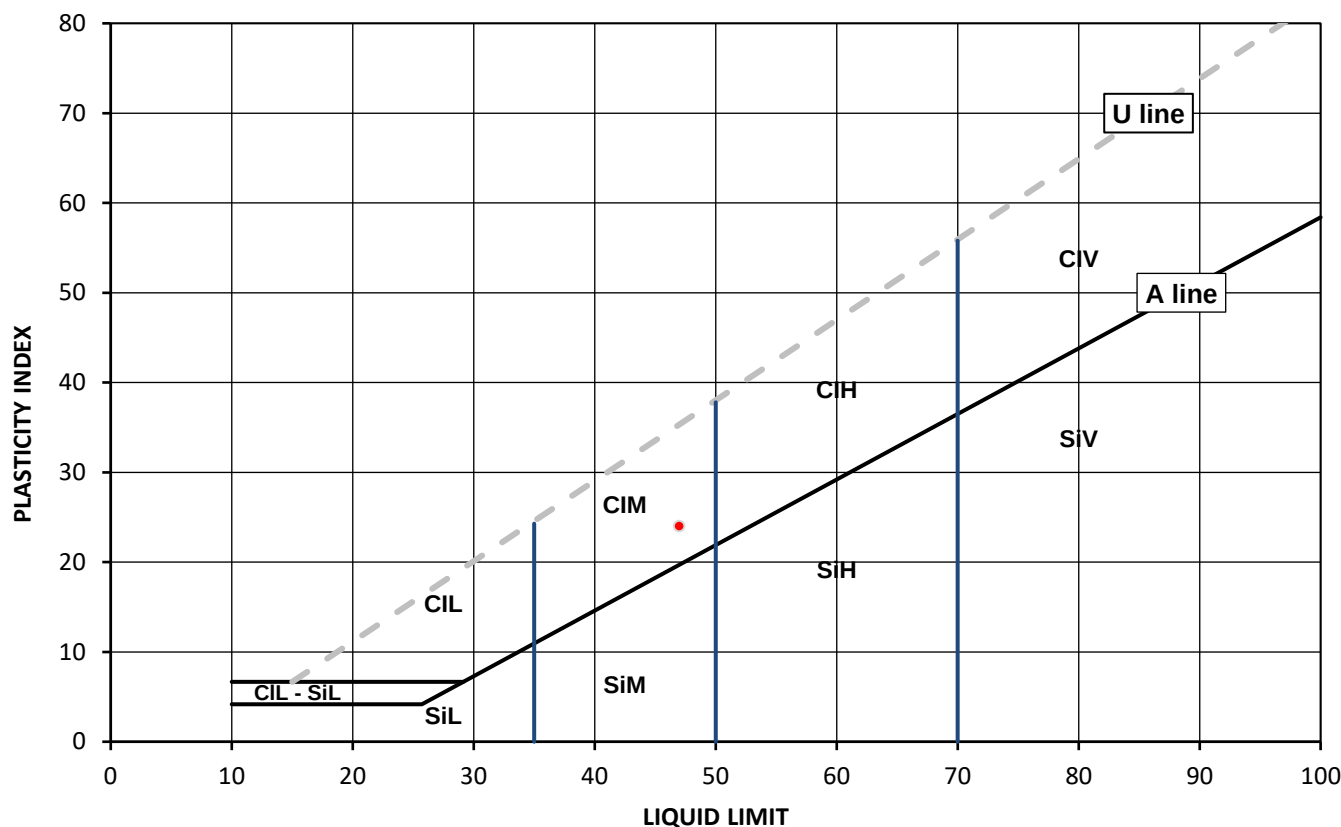
### Test Results:

Laboratory Reference: 2193961  
Hole No.: BH1  
Sample Reference: Not Given  
Sample Description: Brown slightly gravelly slightly sandy CLAY

Depth Top [m]: 7.50  
Depth Base [m]: 7.95  
Sample Type: U

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                                | 47                    | 23                     | 24                        | 96                            |



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

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

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

Remarks:

Signed:

Katarzyna Koziel

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

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Client: Applied Geology Ltd  
Client Address: Lowton Business Park, Newton Road,  
Lowton, Warrington,  
WA3 2AN  
Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 15/03/2022  
Sampled By: Not Given

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

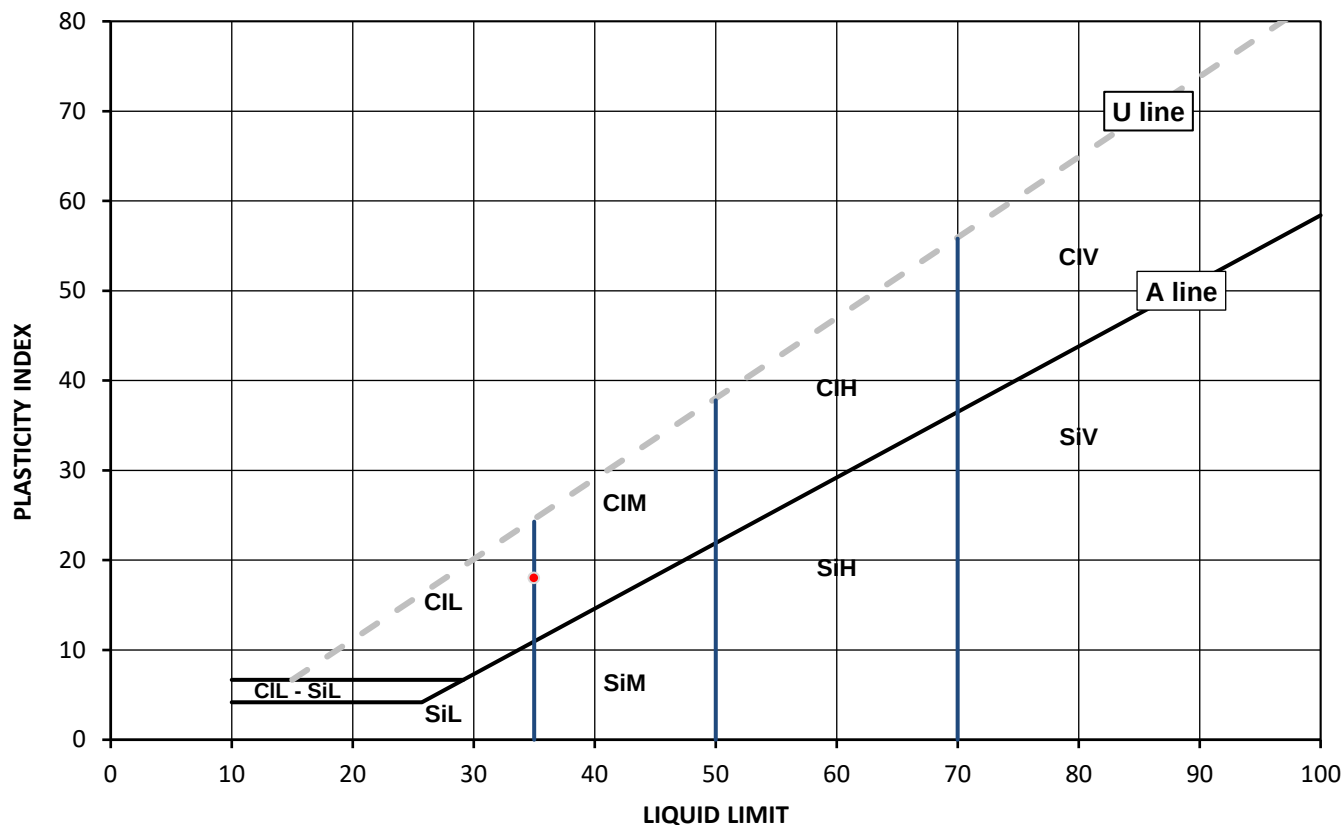
### Test Results:

Laboratory Reference: 2193962  
Hole No.: DCS1  
Sample Reference: Not Given  
Sample Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 2.80  
Depth Base [m]: Not Given  
Sample Type: D

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 |
|-----------------------------------|-----------------------|------------------------|---------------------------|-------------------------------|
| 13                                | 35                    | 17                     | 18                        | 88                            |



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

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

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

Remarks:

Signed:



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

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# TEST CERTIFICATE

## DETERMINATION OF LIQUID AND PLASTIC LIMITS

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

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

Client: Applied Geology Ltd  
Client Address: Lowton Business Park, Newton Road,  
Lowton, Warrington,  
WA3 2AN  
Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 15/03/2022  
Sampled By: Not Given

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

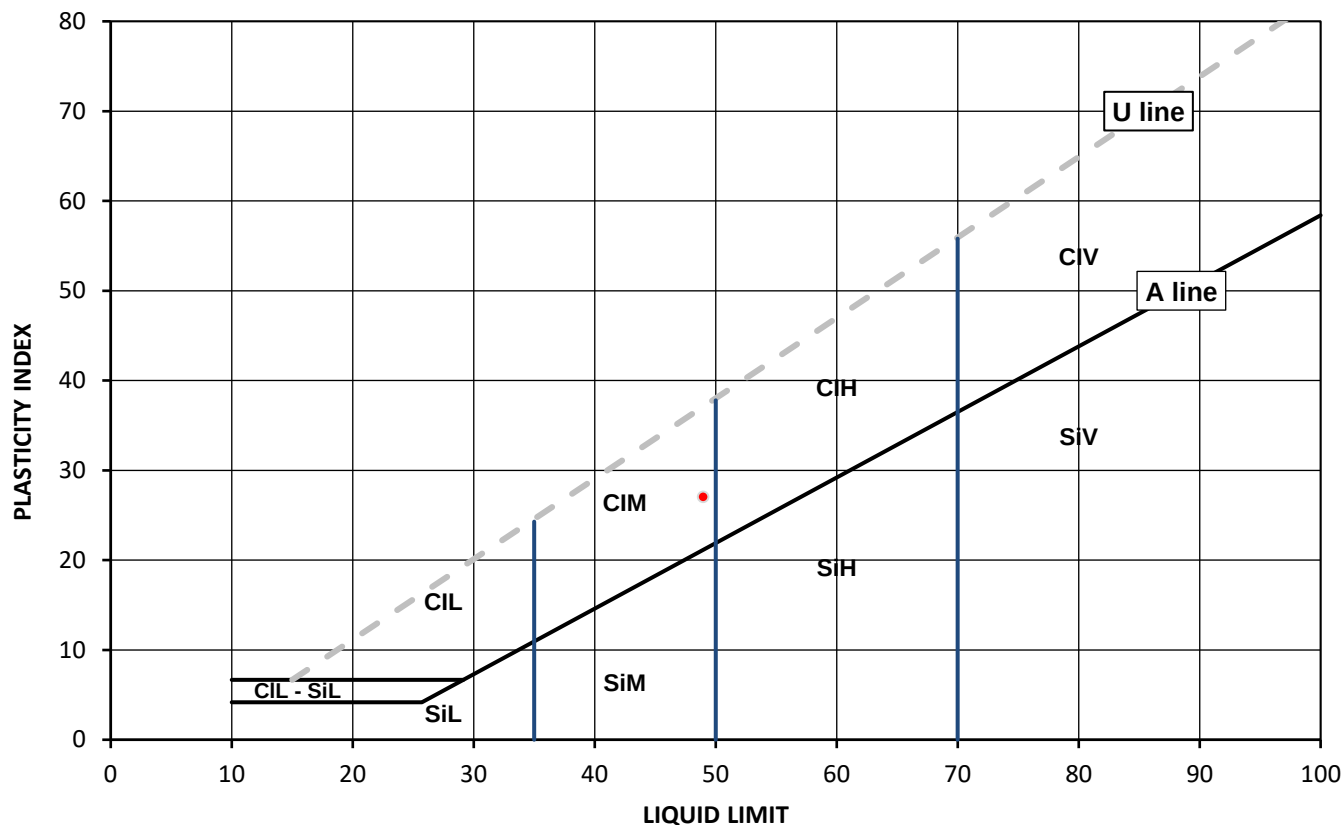
### Test Results:

Laboratory Reference: 2193963  
Hole No.: DCS2c  
Sample Reference: Not Given  
Sample Description: Brown slightly sandy CLAY

Depth Top [m]: 1.80  
Depth Base [m]: Not Given  
Sample Type: D

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                                | 49                    | 22                     | 27                        | 100                           |



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

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

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

Remarks:

Signed:

*Katarzyna Koziel*

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

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Client: Applied Geology Ltd  
Client Address: Lowton Business Park, Newton Road,  
Lowton, Warrington,  
WA3 2AN  
Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 15/03/2022  
Sampled By: Not Given

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

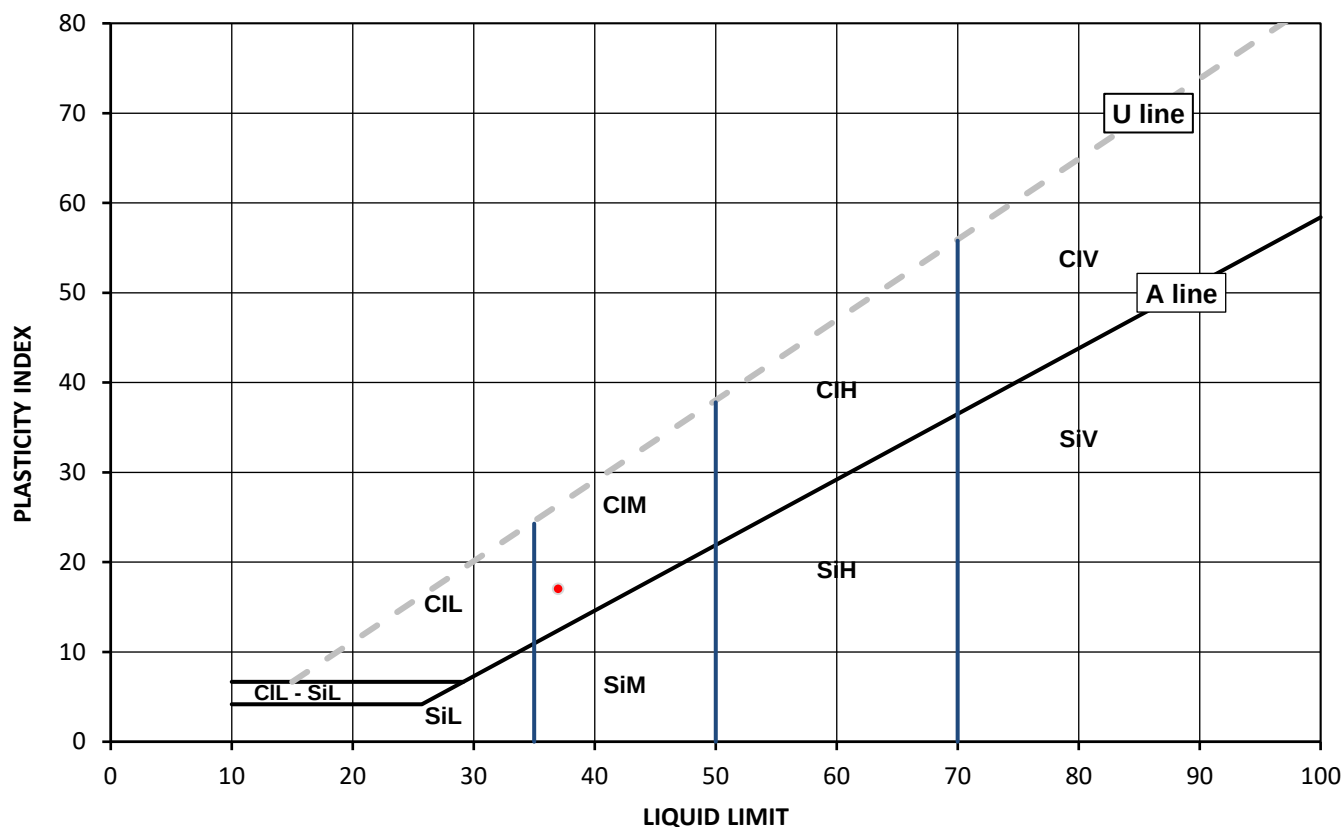
### Test Results:

Laboratory Reference: 2193964  
Hole No.: DCS3  
Sample Reference: Not Given  
Sample Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 2.80  
Depth Base [m]: Not Given  
Sample Type: D

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 |
|-----------------------------------|-----------------------|------------------------|---------------------------|-------------------------------|
| 16                                | 37                    | 20                     | 17                        | 89                            |



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

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

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

Remarks:

Signed:

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

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4041

Client: Applied Geology Ltd  
 Client Address: Lowton Business Park, Newton Road,  
 Lowton, Warrington,  
 WA3 2AN  
 Contact: Jack Welch  
 Site Address: Gorton Education Village

## 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



Environmental Science

Client Reference: 22-43458  
 Job Number: 22-43458  
 Date Sampled: Not Given  
 Date Received: 04/03/2022  
 Date Tested: 11/03 - 15/03/2022  
 Sampled By: Not Given

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<br>BS 1377-2 [ W ]<br>% | Water Content<br>BS EN ISO 17892-1<br>[ W ]<br>% | Atterberg                  |         |         |         | Density       |              |             | Total<br>Porosity#<br>% |  |  |
|----------------------|----------|-----------|-------------------|--------------------|------|---------------------------------------------|-------------------|---------------------------------------|--------------------------------------------------|----------------------------|---------|---------|---------|---------------|--------------|-------------|-------------------------|--|--|
|                      |          | Reference | Depth<br>Top<br>m | Depth<br>Base<br>m | Type |                                             |                   |                                       |                                                  | %<br>Passing<br>425um<br>% | WL<br>% | Wp<br>% | Ip<br>% | bulk<br>Mg/m3 | dry<br>Mg/m3 | PD<br>Mg/m3 |                         |  |  |
| 2193959              | BH1      | Not Given | 1.20              | 1.65               | U    | Brown slightly gravelly sandy CLAY          | Atterberg 1 Point | 13                                    |                                                  | 71                         | 40      | 22      | 18      |               |              |             |                         |  |  |
| 2193960              | BH1      | Not Given | 3.00              | 3.45               | U    | Brown slightly gravelly sandy CLAY          | Atterberg 1 Point | 12                                    |                                                  | 84                         | 39      | 18      | 21      |               |              |             |                         |  |  |
| 2193961              | BH1      | Not Given | 7.50              | 7.95               | U    | Brown slightly gravelly slightly sandy CLAY | Atterberg 1 Point | 22                                    |                                                  | 96                         | 47      | 23      | 24      |               |              |             |                         |  |  |
| 2193962              | DCS1     | Not Given | 2.80              | Not<br>Given       | D    | Brown slightly gravelly sandy CLAY          | Atterberg 1 Point | 13                                    |                                                  | 88                         | 35      | 17      | 18      |               |              |             |                         |  |  |
| 2193963              | DCS2c    | Not Given | 1.80              | Not<br>Given       | D    | Brown slightly sandy CLAY                   | Atterberg 1 Point | 22                                    |                                                  | 100                        | 49      | 22      | 27      |               |              |             |                         |  |  |
| 2193964              | DCS3     | Not Given | 2.80              | Not<br>Given       | D    | Brown slightly gravelly sandy CLAY          | Atterberg 1 Point | 16                                    |                                                  | 89                         | 37      | 20      | 17      |               |              |             |                         |  |  |
|                      |          |           |                   |                    |      |                                             |                   |                                       |                                                  |                            |         |         |         |               |              |             |                         |  |  |
|                      |          |           |                   |                    |      |                                             |                   |                                       |                                                  |                            |         |         |         |               |              |             |                         |  |  |
|                      |          |           |                   |                    |      |                                             |                   |                                       |                                                  |                            |         |         |         |               |              |             |                         |  |  |
|                      |          |           |                   |                    |      |                                             |                   |                                       |                                                  |                            |         |         |         |               |              |             |                         |  |  |

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

*Katarzyna Koziel*

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

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4041

Client: Applied Geology Ltd  
 Client Address: Lowton Business Park, Newton Road,  
 Lowton, Warrington,  
 WA3 2AN  
 Contact: Jack Welch  
 Site Address: Gorton Education Village

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

## 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



Environmental Science

Client Reference: 22-43458  
 Job Number: 22-43458  
 Date Sampled: Not Given  
 Date Received: 04/03/2022  
 Date Tested: 11/03 - 15/03/2022  
 Sampled By: Not Given

### Test results

| Laboratory Reference | Hole No. | Sample    |                |                 |      | Description                                 | Remarks | WC | Sample preparation / Oven temperature at the time of testing |  |  |  |
|----------------------|----------|-----------|----------------|-----------------|------|---------------------------------------------|---------|----|--------------------------------------------------------------|--|--|--|
|                      |          | Reference | Depth Top<br>m | Depth Base<br>m | Type |                                             |         |    |                                                              |  |  |  |
| 2193959              | BH1      | Not Given | 1.20           | 1.65            | U    | Brown slightly gravelly sandy CLAY          |         | 13 | Sample was quartered, oven dried at 109 °C                   |  |  |  |
| 2193960              | BH1      | Not Given | 3.00           | 3.45            | U    | Brown slightly gravelly sandy CLAY          |         | 12 | Sample was quartered, oven dried at 109 °C                   |  |  |  |
| 2193961              | BH1      | Not Given | 7.50           | 7.95            | U    | Brown slightly gravelly slightly sandy CLAY |         | 22 | Sample was quartered, oven dried at 109 °C                   |  |  |  |
| 2193962              | DCS1     | Not Given | 2.80           | Not Given       | D    | Brown slightly gravelly sandy CLAY          |         | 13 | Sample was quartered, oven dried at 109 °C                   |  |  |  |
| 2193963              | DCS2c    | Not Given | 1.80           | Not Given       | D    | Brown slightly sandy CLAY                   |         | 22 | Sample was quartered, oven dried at 109 °C                   |  |  |  |
| 2193964              | DCS3     | Not Given | 2.80           | Not Given       | D    | Brown slightly gravelly sandy CLAY          |         | 16 | Sample was quartered, oven dried at 109 °C                   |  |  |  |
|                      |          |           |                |                 |      |                                             |         |    |                                                              |  |  |  |
|                      |          |           |                |                 |      |                                             |         |    |                                                              |  |  |  |
|                      |          |           |                |                 |      |                                             |         |    |                                                              |  |  |  |
|                      |          |           |                |                 |      |                                             |         |    |                                                              |  |  |  |

Comments:

Signed:

*Katarzyna Koziel*

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

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# TEST CERTIFICATE

## DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

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

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client: Applied Geology Ltd  
Client Address: Lowton Business Park, Newton Road,  
Lowton, Warrington,  
WA3 2AN  
Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 11/03/2022  
Sampled By: Not Given

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

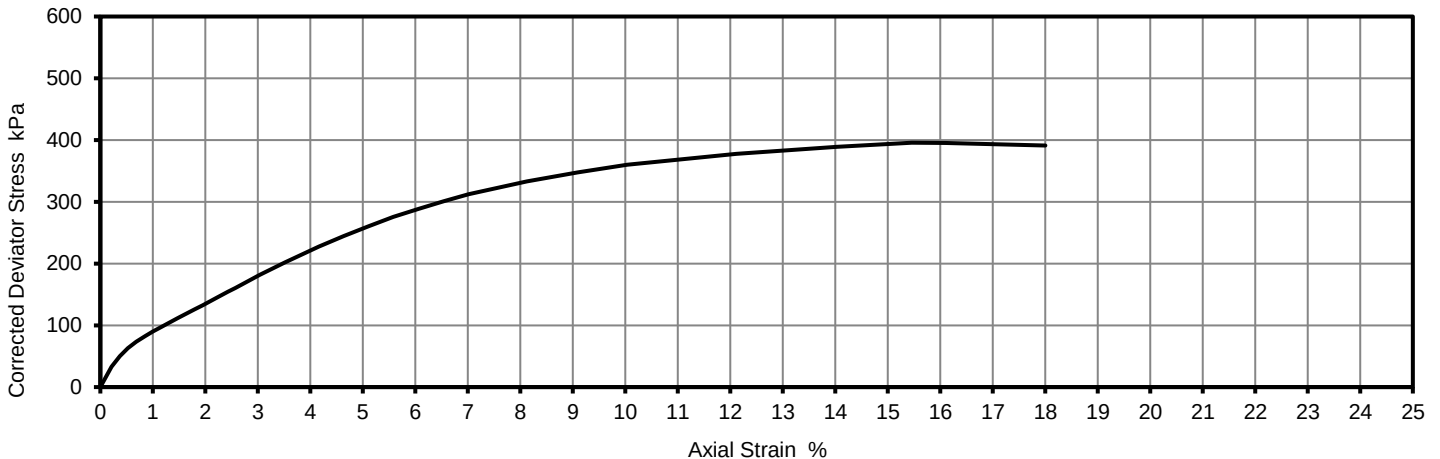
### Test Results:

Laboratory Reference: 2193959  
Hole No.: BH1  
Sample Reference: Not Given  
Sample Description: Brown slightly gravelly sandy CLAY  
Sample Preparation: Sample prepared in accordance with BS 1377-1:2016 Clause 9.1.1.

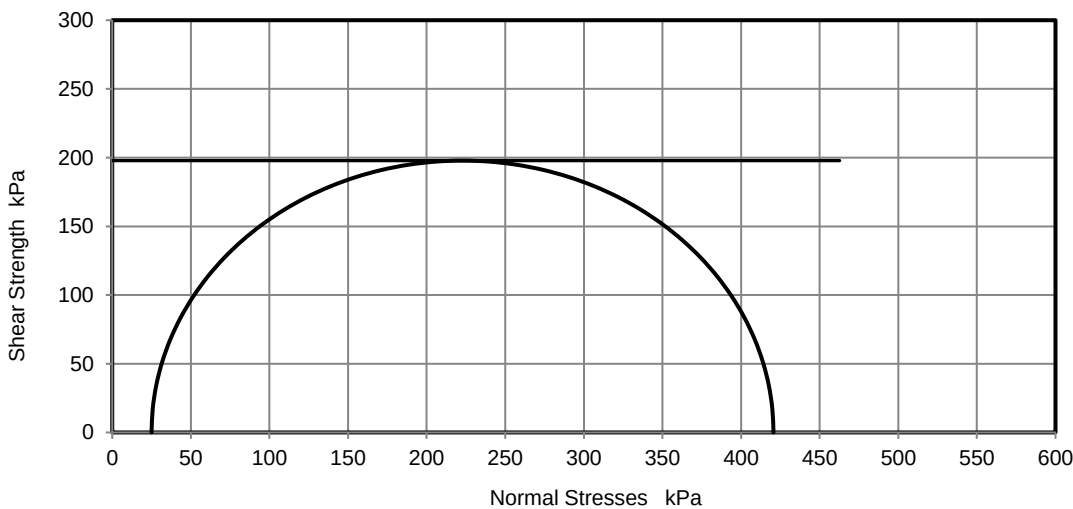
Depth Top [m]: 1.20  
Depth Base [m]: 1.65  
Sample Type: U

|                     |        |                                                         |          |                                          |
|---------------------|--------|---------------------------------------------------------|----------|------------------------------------------|
| Test Number         | 1      | Rate of Strain                                          | 1.95     | %/min                                    |
| Length              | 204.71 | Cell Pressure                                           | 25       | kPa                                      |
| Diameter            | 102.09 | Axial Strain at failure                                 | 15.5     | %                                        |
| Bulk Density        | 2.18   | Deviator Stress, ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> | 396      | kPa                                      |
| Moisture Content    | 13     | Undrained Shear Strength, $c_u$                         | 198      | kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ |
| Dry Density         | 1.93   | Mode of Failure                                         | Compound |                                          |
| Membrane Correction | 0.58   | Membrane thickness                                      | 0.19     | mm                                       |

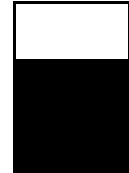
### Deviator Stress v Axial Strain



### Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.  
This is provided for information only.

### Remarks:

### Signed:

Katarzyna Koziel

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

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# TEST CERTIFICATE

## DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

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

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client: Applied Geology Ltd  
Client Address: Lowton Business Park, Newton Road,  
Lowton, Warrington,  
WA3 2AN  
Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 11/03/2022  
Sampled By: Not Given

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

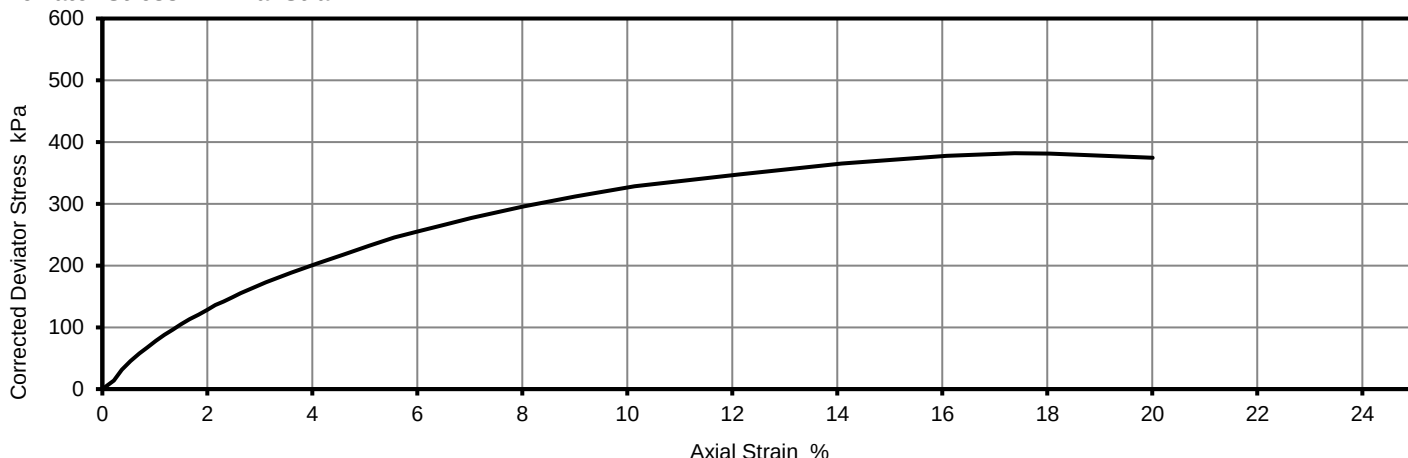
### Test Results:

Laboratory Reference: 2193960  
Hole No.: BH1  
Sample Reference: Not Given  
Sample Description: Brown slightly gravelly sandy CLAY  
Sample Preparation: Sample prepared in accordance with BS 1377-1:2016 Clause 9.1.1.

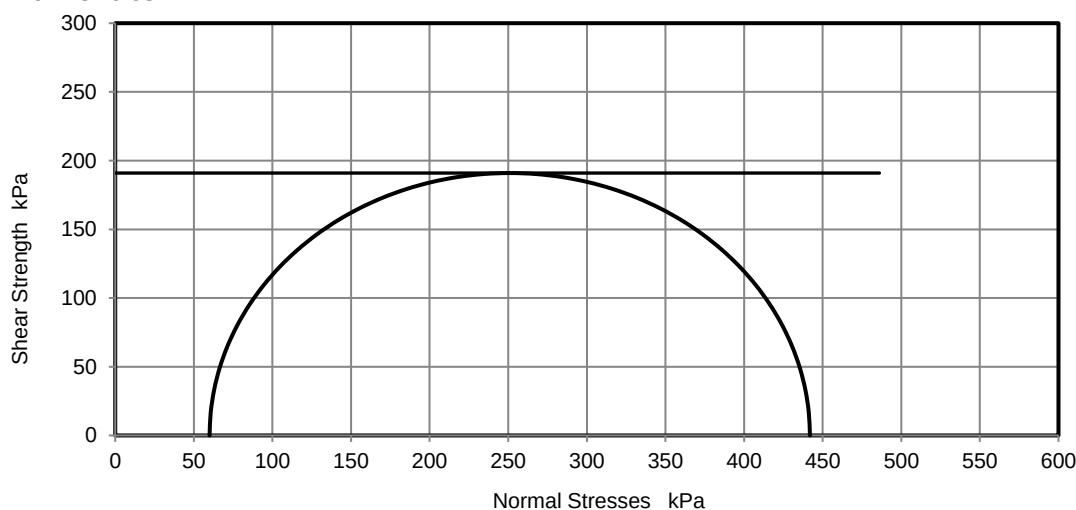
Depth Top [m]: 3.00  
Depth Base [m]: 3.45  
Sample Type: U

|                     |        |                                            |          |                                          |
|---------------------|--------|--------------------------------------------|----------|------------------------------------------|
| Test Number         | 1      | Rate of Strain                             | 2.00     | %/min                                    |
| Length              | 140.21 | Cell Pressure                              | 60       | kPa                                      |
| Diameter            | 69.27  | Axial Strain at failure                    | 17.4     | %                                        |
| Bulk Density        | 2.21   | Deviator Stress, $(\sigma_1 - \sigma_3)_f$ | 382      | kPa                                      |
| Moisture Content    | 12     | Undrained Shear Strength, $c_u$            | 191      | kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ |
| Dry Density         | 1.96   | Mode of Failure                            | Compound |                                          |
| Membrane Correction | 0.89   | Membrane thickness                         | 0.18     | mm                                       |

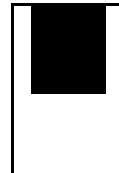
### Deviator Stress v Axial Strain



### Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.  
This is provided for information only.

### Remarks:

### Signed:

Katarzyna Koziel

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

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# TEST CERTIFICATE

## DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

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Tested in Accordance with: BS 1377-7: 1990: Clause 8

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Contact: Jack Welch  
Site Address: Gorton Education Village

Client Reference: 22-43458  
Job Number: 22-43458  
Date Sampled: Not Given  
Date Received: 04/03/2022  
Date Tested: 11/03/2022  
Sampled By: Not Given

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

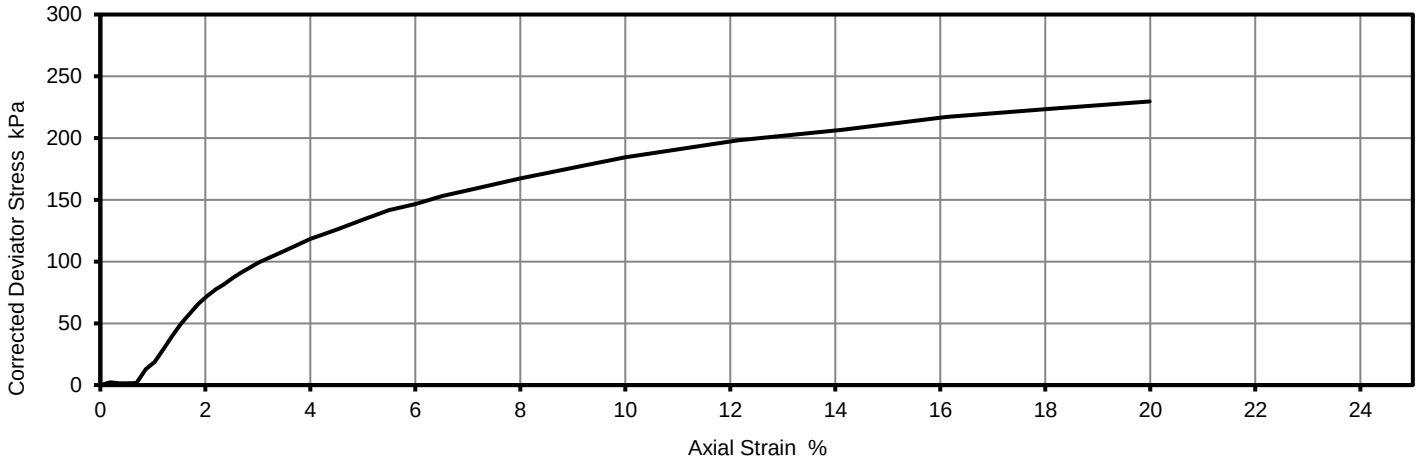
### Test Results:

Laboratory Reference: 2193961  
Hole No.: BH1  
Sample Reference: Not Given  
Sample Description: Brown slightly gravelly slightly sandy CLAY  
Sample Preparation: Sample prepared in accordance with BS 1377-1:2016 Clause 9.1.1.

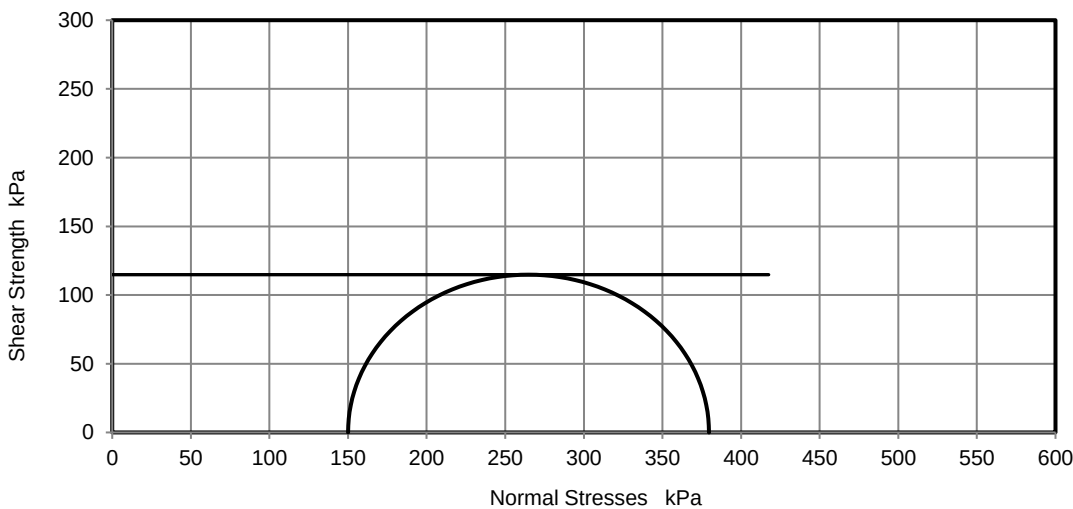
Depth Top [m]: 7.50  
Depth Base [m]: 7.95  
Sample Type: U

|                     |        |                                                         |         |                                          |
|---------------------|--------|---------------------------------------------------------|---------|------------------------------------------|
| Test Number         | 1      | Rate of Strain                                          | 2.00    | %/min                                    |
| Length              | 139.94 | Cell Pressure                                           | 150     | kPa                                      |
| Diameter            | 69.11  | Axial Strain at failure                                 | 20.0    | %                                        |
| Bulk Density        | 2.12   | Deviator Stress, ( $\sigma_1 - \sigma_3$ ) <sub>f</sub> | 230     | kPa                                      |
| Moisture Content    | 22     | Undrained Shear Strength, $c_u$                         | 115     | kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ |
| Dry Density         | 1.73   | Mode of Failure                                         | Plastic |                                          |
| Membrane Correction | 1.22   | Membrane thickness                                      | 0.22    | mm                                       |

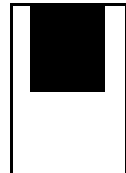
### Deviator Stress v Axial Strain



### Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.  
This is provided for information only.

### Remarks:

### Signed:

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

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# **APPENDIX E**

## APPENDIX E

### STANDARD FIELDWORK AND ASSESSMENT PROCEDURES

#### Scope of Work

The scope of work undertaken is defined in Section 1 of the Report. It should be noted that Applied Geology Limited does not provide arboricultural surveys, specialist surveys for the detection of invasive plant species (such as Japanese Knotweed) or protected species of wildlife. Information from environmental and ecological datasets is included from a review of the MAGIC (Multi-Agency Geographic Information for the Countryside) website, however, if a full assessment of Environmental or Ecological aspects is required, it is recommended that other specialists are consulted. Similarly, information on flood risk is included; obtained from the Environment Agency Web site and the GroundSure report; but this is not intended to be a full hydrological study and, if a flood risk assessment is needed, additional analysis by others is recommended to confirm this aspect of the development. Also, whilst our field staff have undergone asbestos awareness training, Applied Geology does not undertake asbestos surveys or provide specific advice relating to asbestos-containing materials. Any suspected asbestos-containing materials observed by our field staff will be mentioned in the report but further assessment by others may be required.

#### Fieldwork

Fieldwork is generally carried out in accordance with BS5930 (2015) "Code of Practice for Site Investigations" and BS10175 (2011) Investigation of Potentially Contaminated Sites, unless otherwise stated.

Prior to commencement on site, statutory services plans are generally obtained and verbal enquiries are also made regarding the positions of private or statutory services on site. Prior to excavation or drilling, locations are scanned with a cable avoidance tool (CAT) and service pits are generally excavated at borehole positions, where possible.

Descriptions and depths of the various strata recovered are presented on the exploratory hole records, reproduced in the report appendices, together with sample depths, the results of in-situ testing, comments on groundwater inflows, and any other pertinent information. The strata descriptions are in general accordance with BS5930:2015. Disturbed plastic pot and glass amber jar samples are recovered from the various strata and stored and transported in cool boxes, where relevant, for possible future laboratory testing.

Light cable percussion boreholes are generally drilled using a Pilcon Wayfarer or Dando rig and are advanced using equipment to bore 200/150mm diameter boreholes. Disturbed plastic pot samples are recovered from all deposits encountered to allow examination and laboratory testing. Certain strata are cased off due to their tendency to collapse, particularly in the presence of groundwater inflows and/or to reduce the risk of cross contamination. In situ Standard Penetration Tests, using Split Spoon (SPT) and Cone (CPT) are undertaken in the boreholes to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT "N" value results. Within the fine grained (cohesive) deposits, "undisturbed" 100mm driven open tube samples were recovered from the various deposits to provide samples for examination and laboratory testing. On encountering groundwater, boring is usually suspended for 20 minutes while any rise in water level is recorded. Full details of the groundwater observations and monitoring results during boring operations are included on the borehole records. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion, unless otherwise stated on the individual logs.

Unless otherwise stated on the relevant logs, trial pits are excavated using a wheeled backhoe excavator, usually with a 0.6m wide bucket. The excavations are logged from the ground surface by an Engineering Geologist / Geo-environmental Engineer and relevant field testing, appropriate to the soils encountered, is carried out on samples brought to the surface. Representative disturbed soil samples are collected from selected horizons for subsequent laboratory testing. The trial pits are

usually unshored and where reasonable, left open for a period of time to allow observations of pit stability and depth and inflow rate of any groundwater ingress. The excavations are backfilled with arisings prior to moving on to the next position. Any trial pits carried out as part of this or previous investigations may represent soft spots and conduits/sumps for groundwater or surface water. In excavations, such materials may also be loose and unstable.

Driven Continuous Sampling (DCS) boreholes are drilled using a track mounted Global mini-rig or similar using sampling tubes of varying diameter (decreasing with depth). Samples of the deposits encountered are recovered in 1m long clear plastic liners, which are logged and sub-sampled on site by an Engineering Geologist. Generally for geotechnical investigations, during the drilling process in-situ Standard Penetration Tests (SPTs) are undertaken at selected depths to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT "N" value results. Groundwater seepages are noted during drilling if encountered. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion.

Unless specifically stated in the report, exploratory hole locations should be regarded as approximate. Consideration should be given to accurate location of the exploratory holes where it is considered they may impact on proposed development.

It should be noted that groundwater levels at any particular site may fluctuate due to rainfall, seasonal variations etc and, therefore, levels may be different to those measured during the course of the fieldwork and monitoring period.

#### Laboratory Testing

The geotechnical testing was carried out in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes and was undertaken by a UKAS accredited specialist laboratory. Chemical testing was undertaken by a UKAS accredited specialist chemical testing laboratory and MCERTS accredited methods, in accordance with Environment Agency recommendations, were specified where available.

#### Contamination Assessment – Human Health

Applied Geology Limited has followed the guidance given in the CLR 11 publication and other available guidance to assess the contaminant concentrations. Details of the methodology followed are briefly outlined below.

The available chemical data is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial generic quantitative risk assessment is undertaken on this data using statistical tests, where appropriate, and relevant screening values. Risk to human health has been initially assessed by comparing soil results against various published screening criteria. These have been sourced from the following, in order of preference:

- DEFRA. Category 4 Screening Levels (C4SL), March 2014;
- LQM/CIEH S4UL for Human Health Risk Assessment (S4UL), 2015\*;
- Environment Agency/DEFRA, Soil Guideline Values (SGV) published in 2009;
- EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (GAC), 2010.

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Except for lead and benzo(a)pyrene, the assessments will be carried out by comparing results against the LQM/CIEH S4UL in the first instance, where these values are exceeded, then reference will be made to the C4SLs where such exist. Lead will only be compared to the C4SL because no S4UL exists for lead. For Benzo(a)pyrene, Applied Geology has chosen to adopt the approach presented by the C4SL committee rather than the approach proposed by LQM/CIEH. Further discussion on this is presented below.

It is our view, and the view of others in the industry, that the C4SL were derived for use in both the Part IIA system and through the planning system, as they allow identification of those sites that fall within Category 4 (not contaminated) and are therefore able to be developed with no further remedial action. The C4SLs are considered to represent a contamination level that is 'low' from a toxicological view point, which we therefore consider to be 'acceptable' under planning.

Historically, the level of contamination has been assessed with reference to SGV values which were derived to represent a 'minimal' level of contamination. The SGVs are still valid and can be used alongside C4SL, however both screening values are only intended to provide guidance as to the level of contamination and, where concentrations fall below these screening values, the site is not contaminated (and is within Category 4). Exceedance of a SGV/S4UL/C4SL does not automatically indicate that an 'unacceptable' risk exists at a site; simply that further consideration of that particular contaminant is required.

At this time, there are two toxicological methodologies that can be used in the derivation of screening criteria for PAHs; Relative Potency Factor (RPFs) or the Surrogate Marker approach. Applied Geology has chosen (based on the latest guidance from the Health Protection Agency (HPA) to use the surrogate marker approach proposed in the C4SL methodology, whereby benzo(a)pyrene can be used as a surrogate marker for all 'genotoxic' (gene damaging) PAHs. The surrogate marker approach estimates the toxicity of a mixture of PAHs in an environmental matrix by using data from toxicity studies in which a PAH mixture of known composition was tested. Exposure to the surrogate marker benzo(a)pyrene is assumed to represent exposure to all the PAHs in the environmental matrix. Thus, the level of toxicity ascribed to the surrogate represents the toxicity of the PAH mixture. This allows an assessment of the combined carcinogenic risk associated with genotoxic PAHs using only benzo(a)pyrene. In order to confirm that the mixture of genotoxic PAH in the soil is similar to the coal tar mixture used in the toxicological study, various PAH ratios are plotted and checked to see that they fall within the limits set in HPA, 2010.

#### Contamination Assessment – Water Quality

Risks to water quality has been assessed by following the Environment Agency guidance on groundwater protection (previously known as GP3), updated on their website in March 2017, see <https://www.gov.uk/government/policies/water-quality> and 'The Environment Agency's approach to groundwater protection' (March 2017 Version 1.0).

For hazardous substances, which should be prevented from entering groundwater, the screening criteria are initially set as the limit of detection, however, if groundwater has already been impacted, an appropriate environmental standard will then be used. For hazardous substances, background quality may also be taken into account.

For non-hazardous compounds, their release should not result in any pollution or significant risk of pollution in the future, as such comparison with UK DWS or EQS standards will allow determination of whether pollution could occur. Typically screening criteria will be sourced from the following:

- Environmental Standards (ES), which are defined in European legislation such as the Water Framework Directive (WFD) (2000/60/EC) and the Priority Substances Directive (PSD) (2008/105/EC) a daughter directive of the WFD.
- The River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Direction, 2010.
- UK Water Supply (Water Quality) Regulations, 2010.
- UK quality standards for water to be used for direct abstraction to potable supply e.g. Surface Water (Abstraction for Drinking Water) (Classification) Regulations, 1996.
- World Health Organisation (WHO) Guidelines for Drinking Water Quality.

### Re-use of Soils and Waste Soil Disposal

It is noted that if any excavated material is to be reused on site, a Waste Management Plan (WMP) and / or a Materials Management Plan (MMP) will probably be required. Any such materials must be suitable for re-use without further treatment, and only the quantity necessary for the specified works should be used. Any materials not within these definitions may need to be considered as waste whereby a Waste Management Licence Exemption may also be required.

A specific categorisation and assessment of potential waste soils arising from the proposed development has not been undertaken as part of the investigation, unless otherwise detailed in the report text. However, generic comments and advice are made below for the reader.

All waste soils should be sorted to prevent mixtures of waste types. Where possible, any waste soil should be recycled and the volume of soil to be disposed of should be minimised. Any excavated soil material and excess spoil disposed of off-site should be treated as Waste and classified as Inert, Non-hazardous or Hazardous, prior to removal from site, as required by the "Duty of Care" (Environmental Protection Act, 1990) legislation together with Annex II of Directive 1999/31/EC ("Landfill Directive"). Initially, Basic Characterisation of the waste is required whereby the material should be described and its source of origin recorded (a site plan, exploratory hole records and the certificates of chemical analysis in this report should be included). This should also include data on its composition and leaching behaviour, its European Waste Catalogue (EWC) code, and where relevant any hazardous properties according to Annex III of Directive 91/689/EEC. This information should be provided to the licensed waste contractor.

Soils excavated on many sites would generally fall under the EWC description "Soil and Stones", EWC code 17 05 04. Waste Acceptance Criteria (WAC) testing is required for many Inert wastes and generally for all Hazardous Waste but not for non-hazardous waste. There are certain restrictions for inert wastes regarding topsoil and peat. Any asbestos must be disposed of by suitably licensed contractors to a suitably licensed facility.

### Health & Safety Aspects

As outlined within the HSE publication 'Successful Health and Safety Management - HSG65', this report should inform your development of safe systems of work and information as an input into the safety management system.

When developing risk control systems we suggest making reference to the CIRIA report 132 "A guide for safe working on contaminated sites" and the HSE document "Protection of workers and the general public during the development of contaminated land – HSG66". All risk control measures should be in accordance with the guidelines laid down within the Management of Health and Safety at Work Regulations 1999.

The contents of this report may be used to supplement the contents of the Health and Safety File as required under the Construction Design and Management (CDM) Regulations.

Where excavations are undertaken on site, trench support or the angle of batter should be designed by an appropriately qualified engineer or competent person to suit the required depth and the ground and groundwater conditions. Care should be taken when digging excavations to prevent undermining or causing loss of support to the foundations of the nearby adjoining structures. Surcharging such as from spoil or vehicle movements close to excavation sides should be avoided. Practical guidance on trench excavation is given in CIRIA Report 97 Trenching Practice. Guidance on groundwater control is given in CIRIA Report 113 Control of groundwater for temporary works. Temporary works should be designed by a suitably qualified engineer or a competent person particularly where personnel access is necessary, in accordance with the requirements of the Construction (Design and Management) (CDM) Regulations.