



GROUNDTECH
CONSULTING

Job title: Didsbury Point

Report type: Geo-Environmental Appraisal

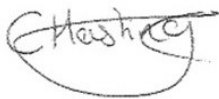
Prepared for: Southway Housing

Date: May 2021

Document Control Form

PROJECT	DIDSBURY POINT
REPORT NAME	GEO-ENVIRONMENTAL APPRAISAL
REPORT REFERENCE	GRO-20064-2216
STATUS	FINAL
ISSUE DATE	10 MAY 2021
REVISION	
CLIENT	SOUTHWAY HOUSING
CLIENT CONTACT	-

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SUMMARY

Site Details

Site Location

The site is located circa 3.54 miles south of Manchester City Centre and is approximately centred on National Grid Reference 383534, 392594. Access to the site is gained off The Boulevard to the north west.

Site Area

The site is roughly square and circa 0.27 hectares in area, the site is generally topographically level. The site is mainly occupied with vegetation, part of the southern area is covered with degraded tarmac. There are two buildings on site, one is associated with an electricity substation and the other is owned by the local council and used for the storage of gardening and landscaping equipment.

Ground Model

Made Ground Soils

Made Ground comprising clayey gravelly topsoil was encountered across the site to a maximum depth of 0.2m bgl. This was underlain by varying gravel and sand that included brick and concrete fragments throughout to depths of 3.5m bgl. Former foundations and redundant utilities were encountered within TPO4 to depth of between 0.8m and 1.5m bgl.

Natural Soils

Natural deposits generally comprised firm to stiff Clay containing sand and gravel bands. This was encountered from 1.2m to a maximum depth of 19.5m bgl.

Bedrock

Bedrock was encountered between 23.0m and 24.4m bgl and consisted of Sandstone.

Groundwater

Groundwater was encountered across the site between 1.9m and 2.2m bgl.

Ground Engineering Assessment

Foundations

The most suitable solution for the proposed nine-storey development is considered to be pile foundations transferring loads through the underlying Made Ground and natural strata to the very weak Sandstone which has been encountered at depth of 23.0m and 24.4m bgl.

Highways

CBR values of between 3.9% and >39.9% have been achieved across the site at a depth of 0.35m bgl.

SuDS

The use of SuDS drainage within the natural ground is not considered to be a feasible as poor drainage rates have been calculated.

Constraints

The main constraint at the site is the presence of the former foundations and utilities located within TPO4 to depths of up to 1.5m bgl. In addition, surface water was observed within the central area of the site, potentially associated with a former pond.

GQRA and Revised (PL) Assessment

Human Health

Elevated concentrations of speciated Polycyclic Aromatic Hydrocarbons (PAHs) have been recorded in BH2 and BH4 within granular Made Ground soils. No other elevated CoC were recorded, and no asbestos was detected. The risk to human health is considered to be Moderate. A cover system should be placed in soft landscaping areas to reduce the risk to an acceptable level.



Controlled Waters

Significant mobile contamination was not encountered and the risk to controlled waters is considered to be Low.

Permanent Ground Gas

Preliminary gas monitoring results place the site in CS1 and gas protection measures are not likely to be required. The risk is Low at present and will be confirmed upon the completion of the monitoring. The site is not in an area requiring radon measures.

Final Appraisal

The following further work is considered necessary to progress the site to construction phase:

- *Completion of gas monitoring programme.*
 - *Issue gas assessment.*
 - *Design of remedial specification.*
 - *Tree survey by qualified arboriculturist.*
 - *Detailed foundation design.*
 - *Confirmation of remedial recommendations made with the Local Authority.*
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Plans		
<i>Plan Reference</i>	<i>Revision</i>	<i>Title</i>
<i>GRO-20064-P01</i>	-	<i>Project Location Plan</i>
<i>GRO-20064-P02</i>	-	<i>Exploratory Hole Location Plan</i>
<i>GRO-20064-P03</i>	-	<i>Illustrative Revised CSM</i>



1.0 INTRODUCTION

1.1 Project Objectives

Groundtech Consulting Limited have been instructed by Civic Engineers to undertake a Ground Investigation for a site at Didsbury Point.

A main investigation was undertaken in accordance with BS 5930:2015, BS 10175:2017, BS 8576:2013 and Eurocode 7.

1.2 Proposed Development

The proposed development is residential end use comprising a multi storey residential building up to nine storeys in height with associated hardsurfacing and soft landscaping on the ground level.

The proposed development plan is currently unavailable.

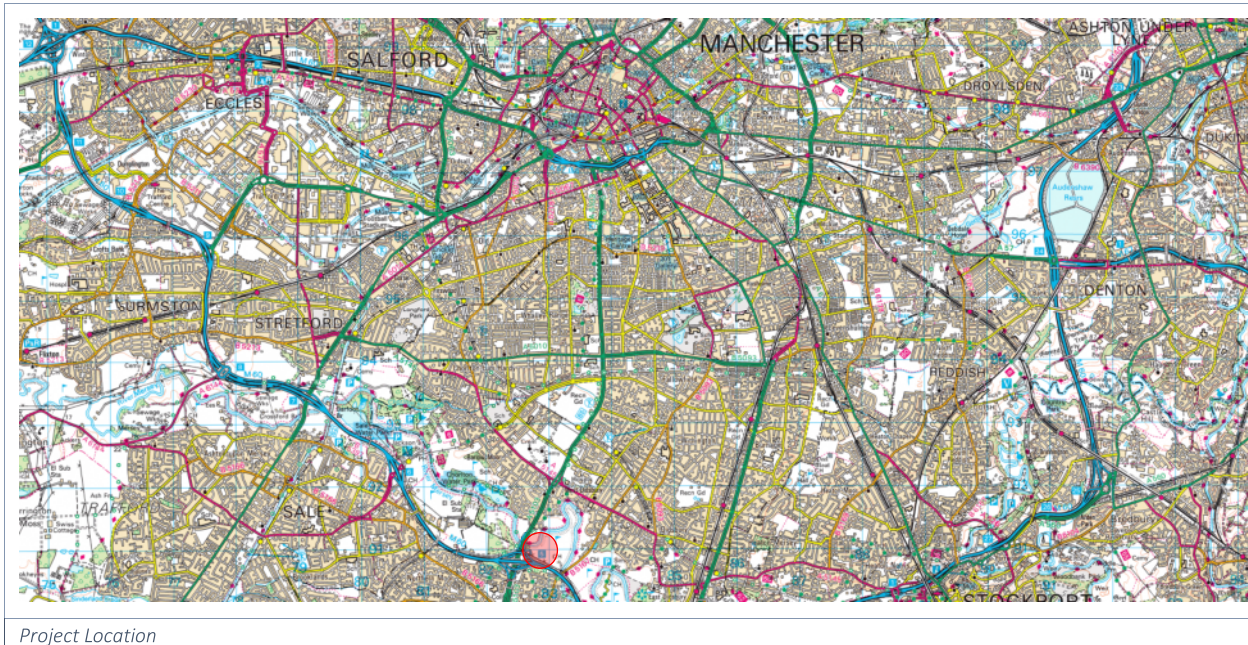
1.3 Limitations

The assessment has been prepared for the exclusive use of the client. No third parties may rely on or reproduce the contents of the report without the written permission of Groundtech Consulting Limited. If any unauthorised third party comes into possession of the report, they rely on it at their own risk and Groundtech Consulting Limited will not be obliged to provide a duty of care.

2.0 SITE SETTING

2.1 Location

The site is located circa 3.5 miles south of Manchester City Centre, as shown on the Project Location Plan GRO-20064-P01 and is approximately centred on National Grid Reference 383534, 392594.



Access to the site is gained off The Boulevard to the north west.

2.2 Site Description

The site is roughly square in shape and circa 0.27 hectares in area. The topography is generally level, however there is a large, stockpiled mound in the middle of the site which has remnants of concrete and rebar throughout, this is assumed to be associated with the former hospital on site that was demolished.

The site is predominantly occupied by waste land which is overgrown with long grass and was waterlogged in the central part where a possible former pond was located. Tall grass and moss plants are present in the waterlogged area.

There are two buildings on site, the first is a white metal storage unit located in the south western area and owned by the local council. It is used for the storage of gardening and landscaping tools and equipment. The second structure is an electricity substation which is located in the northern section and consists of a small, rectangular breeze block building.

The south western part of the site is covered with degraded tarmac surfacing with the remnants of tarmac surfaced pathways present.

Vegetation at the site consists of mature and semi-mature trees along the northern and eastern boundaries of the site. Shrubs and long grass are situated throughout the site in the north eastern part and some areas of less dense immature trees are located along the eastern boundary.

Boundary Features and Surrounding Areas

The site boundary is formed by a mixture of wooden fencing and brick walls.

The site is surrounded by following features/land uses:

- North - Commercial and residential land use.
- East - Residential land use.
- South - Car parking associated with a school followed by residential land use.
- West - Didsbury High School.

Site photographs are presented in *Appendix 2*.

3.0 SUMMARY OF PREVIOUS INVESTIGATION

A Geo-environmental Appraisal Report was carried out by Clancy Consulting in April of 2016 ref. 20/0867/001. The report covered the site and pertained to the development of a commercial two storey office building with associated car parking and soft landscaping.

Site Conditions

The site comprised an area of approximately 0.35ha and was occupied by undeveloped open land with the remains of buried floor slabs being exposed in various locations. The site was occupied by an area of rough ground/undeveloped land however signs of previous development are evident in certain areas of the site. A small electricity substation and water tap are present in the north east of the site.

The site was surrounded by a mixture of residential properties, apartment blocks and commercial properties.

Historical Site Use

The site was located in an area of open undeveloped land until 1922/23 where the hospital located adjacent had expanded onto the eastern side of the site, this was then demolished in 1934. Withington Hospital was developed in the 1970s and occupied most of the east and west areas of the site. This was finally demolished in 2006 where the site remained as undeveloped land.

Geology

Geological maps indicate that the superficial deposits beneath the site comprise Glaciofluvial Sheet Deposits (clay or sand and gravel) with solid strata comprising Sherwood Sandstone Formation. Boreholes located on site indicate cohesive strata with bands of Sand to depths of around 23m where Sandstone bedrock was recorded.

Hydrogeology

According to the Environmental Agency Groundwater Vulnerability Map (Sheet 17 Manchester) the Sandstone bedrock is classified as a Principal Aquifer, and the overlying superficial deposits are a Secondary A Aquifer.

Scope of Works

The following scope of works was carried out by Clancy Consulting.

- 9 No. Windowless Sample Boreholes (WS1 to WS7A) were advanced to depths of between 0.15m and 4.0m bgl.

Ground Model

Made Ground was encountered across the site within all locations to a maximum depth of 4.0m bgl. None of these boreholes succeeded in reaching natural strata. Made Ground was generally granular in nature consisting of slightly silty gravelly fine to coarse sand and gravel of brick, sandstone, concrete with wood fragments, metal, plastic and glass. This was underlain with dark grey medium to coarse sand with occasional fine to medium subrounded gravel of quartzite and sandstone with occasional coal and brick fragments.

Foundations

A piled foundation solution was recommended with the possibility of a ground improvement or a vibro-pile solution as 4.0m of granular Made Ground had been encountered.



Contamination

Chemical testing undertaken at the site did not identify any elevated inorganic or organic contaminants when compared to SSV's for a commercial end use.

In addition, no asbestos was detected in any of the samples tested.

Ground Gas

Previous investigations undertaken by GRM Development Solutions on an adjacent site in September 2010 encountered methane concentrations up to 0.5% v/v, and carbon dioxide concentrations of up to 5.1% v/v, with maximum flow rates of 0.9l/hr. The gas concentrations would be borderline CS1 to CS2 conditions and some form of gas protection may be required.

4.0 SCOPE OF INVESTIGATION AND RATIONALE

4.1 Project Objectives

The aim of the fieldwork was to:

Determine the stratification beneath the site.
Maintain a watching brief for visual and olfactory evidence of contamination.
Obtain samples using methodology in current guidance for contamination analysis.
Identify realistic pollution linkages to groundwater.
Obtain relevant geotechnical parameters for preliminary foundation design to address both ULS and SLS conditions.
Determine the infiltration rates of the underlying soils.
Determine the modulus of subgrade reaction to inform pavement and slab design.
Trial pitting to identify obstructions, composition of surfacing and geometrics of foundations to the perimeter wall.
Determine if targeted supplementary investigation in areas of concern is required and for remedial design.
Install monitoring standpipes for gas and groundwater monitoring.
Assess the identified pollution linkages in the CSM.

4.2 Scope of Works

The following scope of works was completed between the 1st February and 9th February 2021:

- *Five cable percussive boreholes (BH01 to BH05) were advanced to depths of between 5.0m bgl and 27.5m bgl. Rotary coring was followed on for 6.0m within the two deeper cable percussive boreholes (BH01 and BH02) to depths of 33.0m and 28.0m bgl respectively.*
- *Four trial pits (TP02 to TP05) were excavated to depths of between 2.1m and 2.7m bgl.*
- *Two soil percolation tests (TP03 and IP3) were conducted at depths of 1.5m and 0.9m bgl respectively.*
- *Six plate load tests (PLT01 to PLT06) were carried out at depths of 0.35m bgl within the trial pit locations prior to deeper excavation.*
- *Two foundation pits (TP01 and TP06) were excavated to depths of between 0.16m and 0.55m bgl.*

The exploratory hole locations are presented on Groundtech Consulting Plan GRO-20064-P02 and the exploratory hole logs are in Appendix 3.

The exploratory holes were positioned to establish the stratification beneath the site, and target any areas of concern as summarised in the table below:

Location	Target Rationale
BH01 and BH02	Determine stratification of superficial and bedrock deposits beneath the site.
BH03 and BH05 TP04 and TP05	Determine stratification beneath the site.

TP01 and TP06	Determine the geometrics of foundations of existing substation and perimeter wall.
TP02	Determine build-up of tarmac surfaced area.
TP03 and IP3	Determine soil percolation rates for the site.
PLT01 to PLT06	Determine CBR values across the site.

The exploratory holes were logged by a suitably experienced geo-environmental engineer in general accordance with the following current guidance:

- BS 5930 'Code of Practice for Site Investigations' 2015.
- BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil'.
- BS EN ISO 14689:2002 'Geotechnical investigation and testing – Identification and classification of rock'.

4.3 Soil Sampling

During the intrusive investigation, representative samples were taken at regular intervals, changes of strata and where evidence of contamination existed. Laboratory analysis was scheduled on the samples obtained.

The samples obtained are summarised in the table below:

Soil Sample	Number
Environmental Sample	47
Disturbed Sample	22
Bulk Sample	32
Undisturbed U100 Sample	10

The samples have been obtained in accordance with current environmental and geotechnical guidance. The sampling plan has been designed to obtain samples from all required strata using the correct methodology.

Disturbed samples of soil for geo-environmental testing were placed in the correct sampling containers as required by the laboratory in accordance with their MCERTS and UKAS Accreditation. Transportation was arranged in a timely manner and the samples were at the correct temperature.

The sample locations and depths are recorded on the exploratory logs.

4.4 Geo-Environmental Testing

To inform the Generic Quantitative Risk Assessment, the following geo-environmental testing was scheduled to assess the risk from contamination on the site. The testing is based on the potential sources identified in the Ground Investigation.

Contaminants of Concern	Matrix	Number
Arsenic, Cadmium, Chromium (total and hex), Copper, Nickel, Mercury, Lead, Zinc, Selenium, Speciated Polycyclic Aromatic Hydrocarbons, Organic Matter, Sulphate and pH.	Soil	6
Asbestos Screening	Soil	6

The Geo-Environmental Laboratory Testing Results are presented in *Appendix 4*.

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' 1990. The following tests were scheduled:

British Standard	Test Method	Number
<i>Part 2</i>	<i>Water Content</i>	<i>6</i>
<i>Part 2</i>	<i>Plasticity Index Analysis</i>	<i>6</i>
<i>Part 3</i>	<i>pH Value</i>	<i>6</i>
<i>Part 3</i>	<i>Water Soluble Sulphate Content</i>	<i>6</i>
<i>Part 7</i>	<i>Quick Undrained Triaxial</i>	<i>8</i>
<i>ISRM Suggested Methods</i>	<i>Unconfined Compressive Strength</i>	<i>3</i>
<i>ISRM Suggested Methods</i>	<i>Point Load Test Results</i>	<i>10</i>

The Geotechnical Laboratory Testing Results are presented in *Appendix 5*.

4.5 Gas and Groundwater Monitoring

Gas and groundwater monitoring installations were constructed in the boreholes. The standpipes consisted of high-density polyethylene (HDPE) pipe - a bentonite seal was placed around the plain pipe and a clean gravel pack was placed around the slotted pipe. A summary of the installation construction is presented in the table below:

Location	Depth (m)	Response Zone (m bgl)	Targeted Strata	Reason
<i>BH01</i>	<i>12.00</i>	<i>4.00 – 12.00</i>	<i>Natural Clay</i>	<i>Ground Gas</i>
<i>BH02</i>	<i>12.00</i>	<i>4.00 – 12.00</i>	<i>Natural Clay</i>	<i>Ground Gas</i>
<i>BH03</i>	<i>5.00</i>	<i>4.00 – 5.00</i>	<i>Natural Clay</i>	<i>Ground Gas</i>
<i>BH04</i>	<i>5.00</i>	<i>2.00 – 5.00</i>	<i>Natural Sand</i>	<i>Ground Gas</i>
<i>BH05</i>	<i>5.00</i>	<i>1.00 – 5.00</i>	<i>Made Ground/Natural Sand</i>	<i>Ground Gas</i>

Permanent gas and flow rate monitoring was carried out using a GFM 436 infrared gas monitor with integral electronic flow analyser. The measurements taken are listed below:

- *Oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) as the percentage volume in air (%v/v).*
- *Hydrogen sulphide (H₂S) and carbon monoxide (CO) as the percentage volume in air (%v/v).*
- *Lower Explosive Limit (%LEL) of methane.*
- *Atmospheric and borehole pressure, including pressure trend.*
- *Flow measurements (l/hr).*
- *Weather and ground surface conditions.*

Both peak and steady state conditions were monitored to understand the behaviour of the permanent ground gas, the steady state conditions were recorded by allowing the gas monitor to run for a minimum of 3 minutes.

Interim permanent gas and groundwater monitoring results are presented in *Appendix 6*.

5.0 GROUND MODEL

5.1 Made Ground

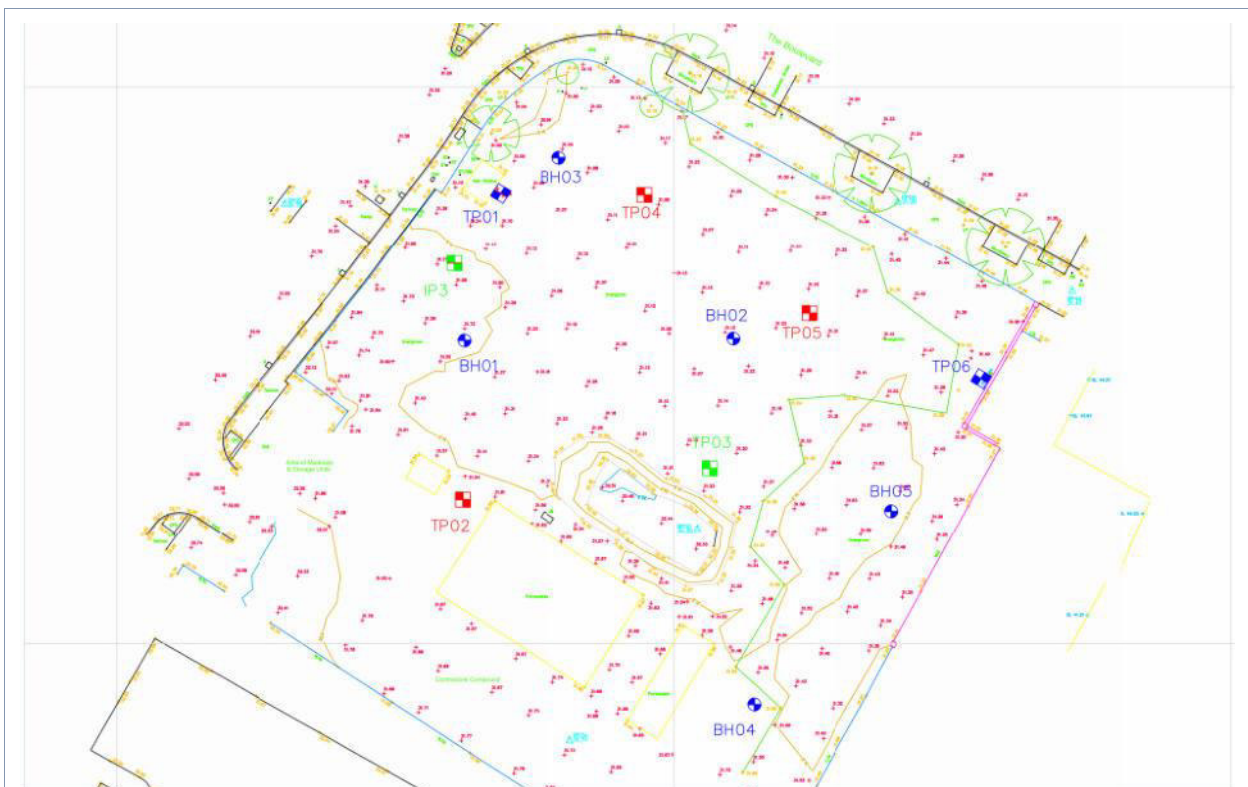
Made Ground was encountered across the entire site to a maximum depth of 3.5m bgl.

Hardstanding consisting of a degraded tarmac was encountered within TP02 from ground level to a maximum depth of 0.2m bgl. Brown sandy gravelly clayey topsoil was present in all locations excluding TP02 and BH04 from ground level to a maximum depth of 0.2m bgl.

Three main Made Ground populations were encountered during the investigation and are described below:

- *Orange brown sandy cobbly gravel was observed in all trial pit locations from 0.15m bgl to a maximum depth of 0.8m bgl.*
- *Grey brown cobbly sandy gravel was present in all trial pit locations excluding TP03 from 0.7m to a maximum depth of 2.1m bgl.*
- *Brown grey slightly clayey gravelly sand was observed in all borehole locations and TP03 from 0.6m to a maximum depth of 3.5m bgl.*

Former foundations were encountered within TP04 in the northern part of the site. Concrete slabs and bricks were encountered at circa 1.5m bgl and beneath this was plastic and metal piping, presumably the services for the former hospital building.



Exploratory Hole Locations

5.2 Natural Ground

Three main natural stratification encountered during the investigation and are described below:

- *Medium dense to very dense grey brown and orange brown gravelly Sand was encountered within BH01, TP02, TP03 and TP05 to a maximum depth of 4.0m bgl.*
- *Firm to stiff sandy gravelly Clay was encountered in BH01 and BH02 from 4.0m to a maximum depth of 19.5m bgl.*
- *Gravel and sand bands were encountered within BH01 and BH02 - between depths of 11.0m to 12.0m bgl and 17.0m to 19.2m bgl within BH01 and between depths of 2.0m to 4.0m within BH02.*

5.3 Bedrock

Residual bedrock comprising very dense red brown Sand was encountered within BH01 from 22.2m bgl to a maximum depth of 24.4m bgl.

Bedrock was encountered during the investigation from depths of between 23.0m and 24.4m bgl and consisted of an extremely weak red Sandstone.

5.4 Groundwater

Perched Groundwater was encountered across the site between depths of 1.9m to 2.2m bgl within granular Made Ground deposits.

5.5 Watching Brief

A watching brief was maintained during the Ground Investigation for visual and olfactory evidence of contamination. No evidence of contamination was encountered during the site investigation.

5.6 Excavation Stability

Evidence of collapse was noted during excavation of the trial pits within the sand strata encountered across the site between 1.1m and 2.2m bgl. The Made Ground strata generally remained relatively stable during the excavation of the trial pits.

5.7 Excavation Progress

Slow progress whilst drilling the boreholes was experienced during the advancement through the Made Ground due to the density of sands and gravels to depths of up to 3.5m bgl. Slow progress was also experienced during the drilling of bedrock strata at depths of between 23.0m and 33.0m bgl.

Concrete obstructions were observed within TP04 which are related to the former buildings located on site.

6.0 GROUND ENGINEERING

6.1 Geotechnical Testing Results

Comparison of water content and the value of 0.4 times the Liquid Limit in accordance with BRE Digest 412 'Desiccation in Clay Soils' suggests significant desiccation has taken place when 0.4 times the Liquid Limit is greater than the actual water measured water content. This is a rudimentary method but also a good guide.

Results of the Plasticity Index analysis and the volume change potential of the Clay is summarised in the table below:

Reference	Depth (m bgl)	Modified PI	Volume Change Potential	Significantly Desiccated Y/N
BH01	5.00	19.8	Low	N
BH01	8.00	36.0	Medium	N
BH01	12.50	16.3	Low	N
BH02	8.00	35.0	Medium	N
BH02	11.00	14.1	Low	N
BH02	18.50	39.2	Medium	Y

Quick undrained triaxial testing was carried out on four samples of natural undisturbed Clay and the results of the triaxial testing are summarised in the table below:

Reference	Depth (m)	Undrained Shear Strength (kN/m ²)	Relative Strength
BH01	5.00	114	High
BH01	8.00	57	Medium
BH01	12.50	223	Very High
BH02	8.00	51	Medium
BH02	11.00	59	Medium
BH02	18.50	98	High

Unconfined Compressive Strength (UCS) testing was undertaken on three samples of Sandstone. The results are summarised in the table below:

Reference	Depth (m)	Load Failure (kN)	UCS (MPa)
BH01	28.36 – 28.50	8.20	1.50
BH02	28.32 – 28.44	17.50	3.10
BH02	28.86 – 29.00	8.70	1.50

Point load testing (axial and diametral) was also undertaken on recovered Sandstone core and the results are summarised in the table below:

Reference	Depth (m)	Axial or Diametral Test	Load Failure (kN)	I (MPa)
BH01	27.75	Axial	0.24	0.08
BH01	28.90	Axial	0.39	0.13
BH01	29.80	Axial	0.15	0.05
BH01	31.10	Axial	0.35	0.14

BH01	32.70	Axial	0.66	0.26
BH02	24.80	Axial	0.17	0.06
BH02	25.50	Axial	0.45	0.16
BH02	26.20	Axial	0.44	0.17
BH02	27.50	Axial	0.58	0.21
BH02	28.70	Axial	0.16	0.05
BH01	27.75	Diametral	0.23	0.04
BH01	28.90	Diametral	0.30	0.05
BH01	29.80	Diametral	0.21	0.04
BH01	31.10	Diametral	0.07	0.01
BH01	32.70	Diametral	0.28	0.05
BH02	24.80	Diametral	0.08	0.01
BH02	25.50	Diametral	0.18	0.03
BH02	26.20	Diametral	0.17	0.03
BH02	27.50	Diametral	0.18	0.03
BH02	28.70	Diametral	0.08	0.01

6.2 Assessment Background

The ground engineering investigation has been undertaken to formulate an accurate ground model in order to undertake preliminary foundation design. The ground model has been constructed with a moderate to high level of confidence.

The proposed development is residential end use comprising the construction of a multi storey residential building up to nine storeys in height with associated car parking and soft landscaping at ground floor level. It is proposed to construct the new building in the central part of the site. At this stage, the loadings associated with the proposed building are not available and the following recommendations are based on existing site levels.

Boreholes advanced within the proposed footprint of the residential building (BH01, BH02) indicate that Made Ground is present to a maximum depth of 3.5m bgl which is predominantly underlain by medium dense Sand and firm to stiff Clay. These strata were interbedded throughout the boreholes until bedrock was encountered at 24.4m bgl within BH01 and 23.0m bgl in BH02. The bedrock consisted of red Sandstone. Rotary coring was undertaken in both locations to a maximum depth of 33.5m bgl.

During the Ground Investigation, groundwater was encountered at depths of between 1.9m to 2.2m bgl.

As part of the enabling works, the reworked topsoil material should be stripped and stockpiled separately. It is envisaged that the majority of the topsoil will be removed offsite as minimal soft landscaping is proposed as part of the proposed development.

The main limitations associated with the proposed development are the presence of deep Made Ground with concrete obstructions along with former utilities and foundations associated with the previous hospital buildings on site. These were encountered within TP04 and are assumed to extend across the whole footprint of the hospital formerly on site and will require grubbing up during the construction phase.

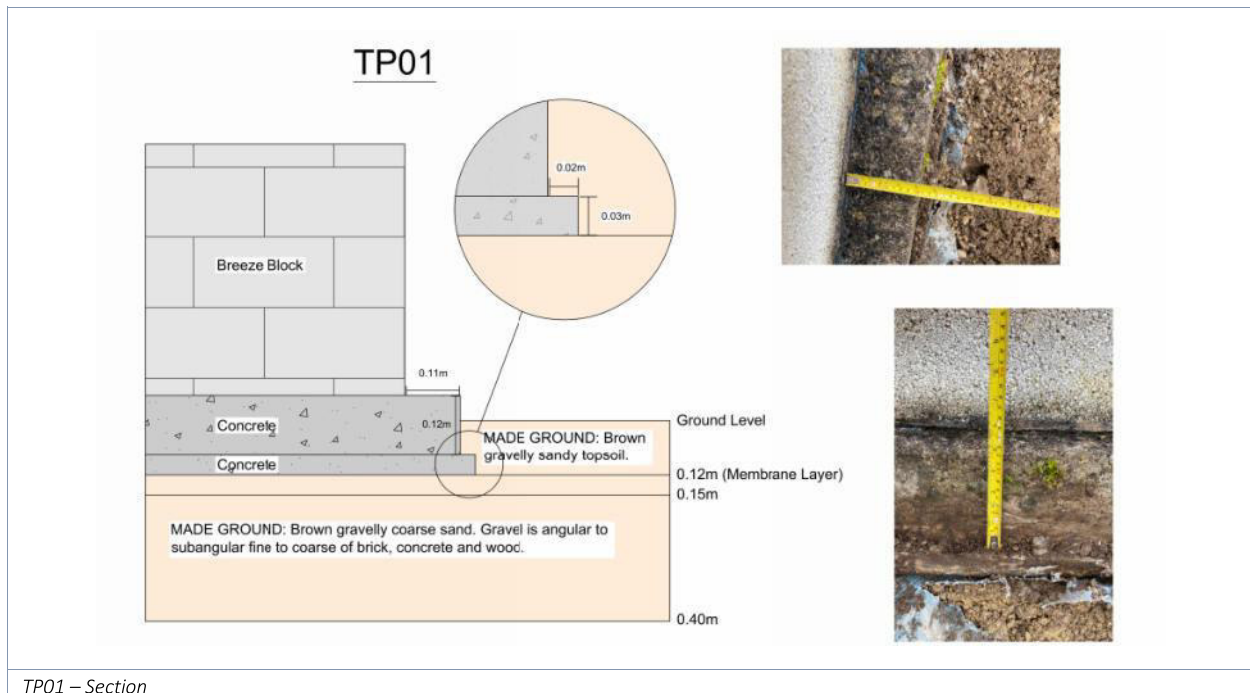
Another limitation associated with the site is the amount of surface water encountered especially within the central part of the site.

6.3 Trial Pit Assessment

During the Ground Investigation a number of parameters had been set for the Trial Pitting, this was done to make sure that different factors associated with the site were investigated properly. Justification and follow on explanation of each Trial Pit and how these were properly assessed is detailed below:

TP01

Hand excavated trial pit to assess the foundations associated with the electricity substation located on site, shallow foundations were encountered comprising of concrete footings shown below:



TP01 – Section

The second layer of concrete beneath the substation is prefabricated and likely to be a raft on the Made Ground.

TP02

This trial pit was used to identify and to understand the tarmacked area of the site, Tarmac was encountered to a maximum depth of 0.2m bgl and was observed as a degraded tarmac recovered as a gravel. This was then followed by a light grey sub-base material to a maximum depth of 0.4m bgl. Finally, the subbase was underlain with a Geo-membrane layer that separated the road construction in this area with the Made Ground encountered throughout the rest of the site.

TP03, TP04 and TP05

These trial pits were excavated in order to gain a further understanding of the build-up of strata present beneath the site and also to determine the location of any obstructions present.

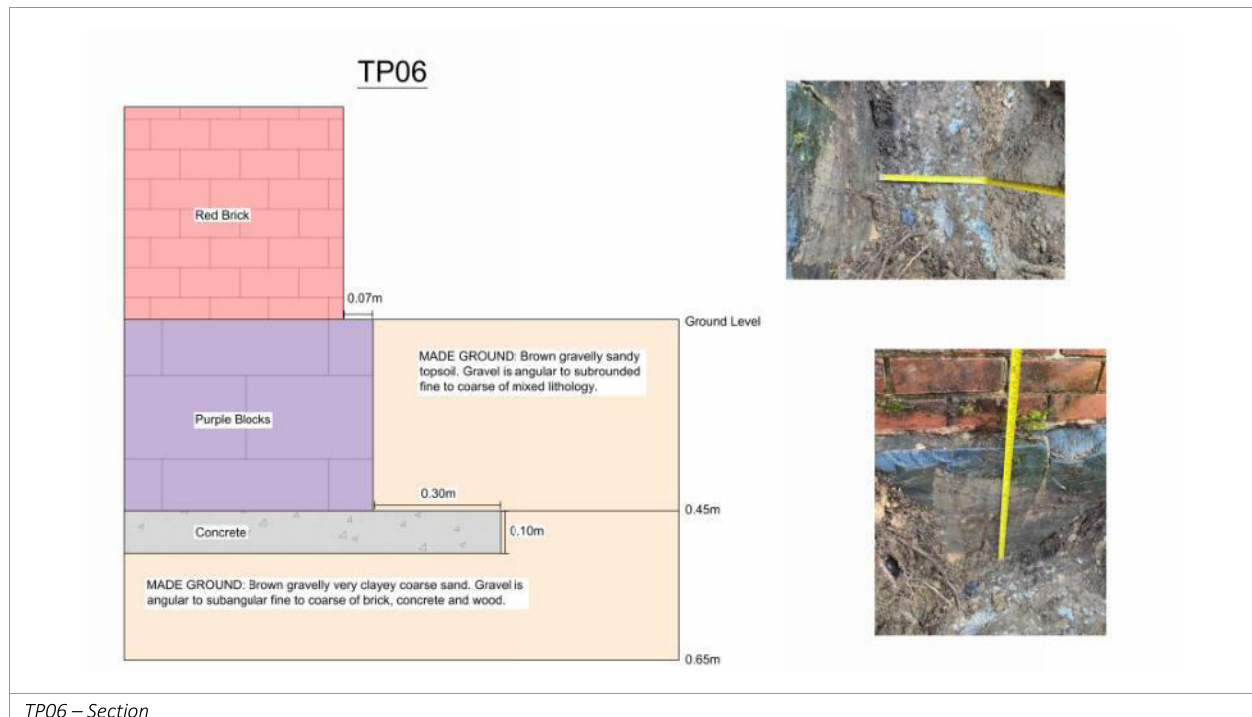
TP03 - this trial pit was excavated in the central south eastern area of the site. Made Ground was encountered to a maximum depth of 1.1m bgl and was underlain with natural Sand deposits of grey and orange to a maximum depth of 2.1m bgl. A soil percolation test was conducted within this location between depths of 1.5m and 2.1m bgl to determine soil infiltration rates within the underlying natural strata.

TP04 - this trial pit was excavated in the north western area of the site. Made Ground was encountered to the base of the trial pit at 2.1m bgl. Multiple concrete obstructions were encountered within this trial pit between depths of 0.8m and 1.5m bgl, these were remnants of former slab foundations associated with the previous hospital building on site. Beneath this, redundant utilities were encountered in the form of plastic and metal piping, these are also presumed to be associated with the former hospital buildings on site.

TP05 - this trial pit was excavated within the central north eastern area of the site. Made Ground was encountered to a maximum depth of 1.2m bgl and was underlain with natural grey orange Sand deposits to a maximum depth of 2.2m bgl.

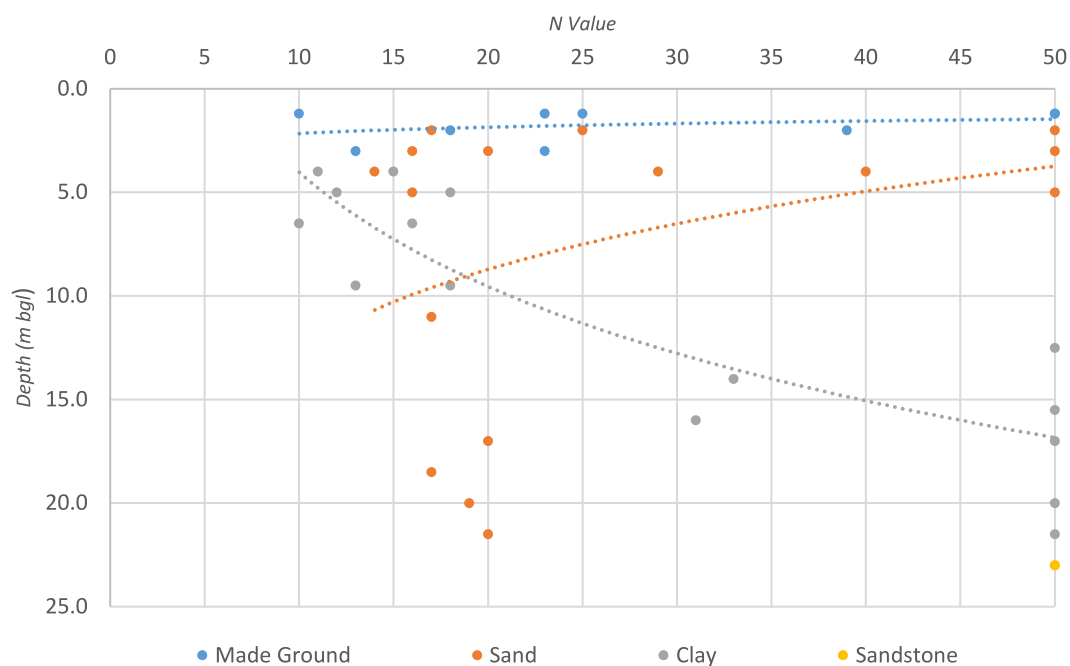
TP06

Hand excavated trial pit to assess the foundations associated with the wall located on site, shallow foundations were encountered comprising of concrete footings shown below:



6.4 Geotechnical Parameters

The geotechnical test results have been evaluated to derive geotechnical parameters for the soils underlying the site. A 'depth to SPT N value' graph is presented below to provide a generalised ground model for the site.



Depth v SPT Chart

Characterisation of the geotechnical parameters above has been undertaken to select a characteristic value, which is a cautious estimate of the value affecting the occurrence of the limit state. The characteristic values for Ultimate Limit State (ULS) conditions selected are presented in the table below:

Stratum	Parameter	Selected Characteristic Value
Medium strength Clay	Undrained Shear strength (C_u)	55kPa
High strength Clay	Undrained Shear strength (C_u)	106kPa
Very High Strength Clay	Undrained Shear strength (C_u)	223kPa
Sand and Gravel	Drained angle of friction (ϕ')	32°
Residual Sandstone	Drained angle of friction (ϕ')	30°
Sandstone	Unconfined Compressive Strength	1.5MPa

6.5 Preliminary Foundation Design

The proposed development is nine storeys in height and is expected to generate large column loads, therefore traditional shallow foundations will not be a suitable option for the apartment block. At this stage, the loadings of the proposed structure are unknown and designs will need to be confirmed once they are provided.

Loads will be transferred to the piles from ground beams, pile caps and floor slabs of the superstructure. Transverse loading on the piles and the requirement for reinforcement should be taken into consideration in the detailed design to satisfy Equilibrium Limit State conditions.

Pile Foundations

The most suitable solution for the proposed seven-storey development is considered to be piled foundations transferring loads through the underlying Made Ground and natural Clay and Sand strata to the very weak Sandstone which has been encountered between 23.0m and 24.4m bgl. When permanent and variable actions are available, the utilisation factor can be confirmed or otherwise in accordance with EC7.

Driven piles are not considered an option due to the depth and strength of the Glacial Till deposits. The most suitable type of pile for the development is considered to be Continuous Flight Auger (CFA) bored pile, this should be discussed with the preferred piling contractor. Good workmanship will be required when installing the piles to ensure the assumptions in the design by calculation are met.

Piled Solution – Design by Calculation

Preliminary design by calculation has been carried out using due skill and care using the allowable load method for pile design. The preliminary design by calculation is based on the following ground model:

- *Made Ground to 3.5m*
- *Sandy Gravel to 4.5m*
- *Medium to high strength Clay to 11.0m*
- *Medium dense Sand to 12.0m*
- *Very high strength Clay to 17.0m*
- *Dense to Very dense Sand to 24.4m*
- *Very weak Sandstone to 25.5m*

For a single bored pile 600mm in diameter end bearing in the very weak Sandstone at 25.5m bgl, an allowable load of 2750kN has been calculated. If greater loads are required, the diameter of the piles should be increased and/or the piles installed in groups. This should be considered once the site layout and loadings are confirmed. If less is required, the design can be made more efficient by the piles end bearing in the dense gravels.

The depth of rock socket has been taken as 2m into the residual bedrock. The extent of the socket will depend on the competency of the bedrock and consistency across the development area. The end bearing resistance will depend on the drilling technique and magnitude of disruption of the Sandstone which may reduce the base resistance.

The ground conditions and the below ground construction indicate downdrag will not be an issue and has not been taken into consideration in the preliminary design.

An appropriate working platform should be constructed in accordance with BR470 guidance.

Design Validation

The piling type, length, depth of reinforcement and design should be discussed with a specialist piling contractor. They can then undertake the detailed design including drawings and specifications to provide fitness for purpose design.

The piling works should be carried out in accordance with Execution Standard EN 1536 for Bored Piles.

If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during the Ground Investigation, work should cease and Groundtech Consulting contacted for further advice.

During the construction phase, supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design. Supervision should include inspections, Control Ground Investigations and monitoring.

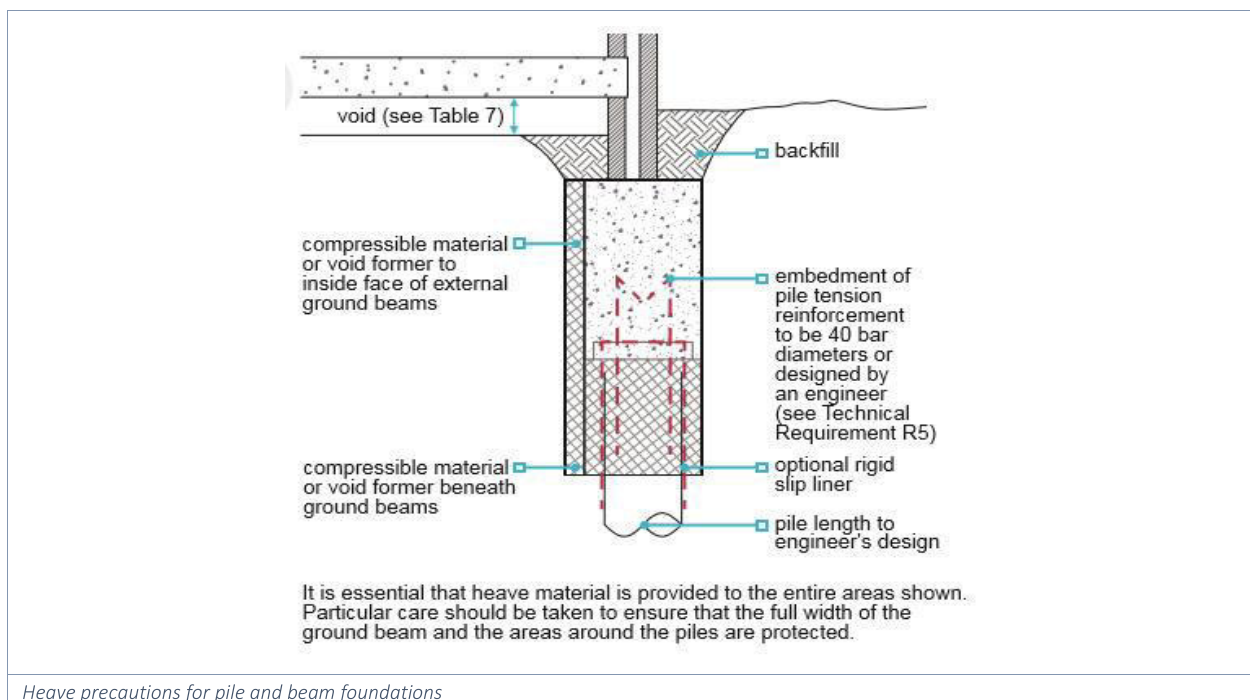
6.6 Building Near Trees

Trees and bushes are present around the border of the existing car parking area. Foundation excavations will encounter cohesive strata in the vicinity of existing, proposed or recently removed trees, foundations should be adjusted in full accordance with current guidance.

All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings. The clay is of a low to medium volume change potential.

A survey of all trees and hedges on the site and within 30m of the site boundary should be undertaken to identify tree species, locations and heights. This information will be required in order to assess the effects of trees on the cohesive strata and inform a foundation schedule.

Where heave precautions are deemed necessary, the pile installation design will need to accommodate the following precautions in the design.



6.7 Floor Slabs

Floor slab design should take into consideration the presence of deep Made Ground to 3.5m bgl. A suspended floor slab is considered to be suitable for the proposed development that is compatible with the proposed piled foundations. The slab loadings are not available at this stage.

Heave precautions will need to be installed when within the influence of trees.

6.8 Construction

The trial pits indicate that instability of excavations is anticipated during the construction phase as the sand strata encountered within the trial pits collapsed on multiple occasions and required further excavation. If excavations are subject to adverse weather conditions, this may provide further instability. Instability of the Made Ground is a possibility and should be considered in the groundworks method statements.

In addition, groundwater was observed within the exploratory holes during the investigation at depths of between 1.9m to 2.2m bgl. This may also result in the instability of excavations where groundwater is encountered. Localised dewatering of excavations may be required prior to the concrete being poured.

Tracked high specification plant is recommended to maintain the build programme. Breaking equipment may also be required locally to penetrate obstructions identified by the Ground Investigation such as within TP04 and likely to be widespread given the history of the site.

Draining of surface water on the site may also be required prior to construction as a substantial quantity was present predominantly within the middle part of the site during the Ground Investigation.

6.9 Concrete Classification

Made Ground

Water soluble sulphate testing was undertaken on six samples of the Made Ground. The range of soluble sulphate (SO_4) recorded is 13.7mg/l to 250.7mg/l and associated pH values ranged between 8.56 and 11.22 indicating slightly alkaline conditions.

In a dataset where there are five to nine results, the mean of the highest two sulphate results should be taken together with the mean of the lowest two pH values. The characteristic sulphate concentration is therefore 241.5mg/l and the pH value is 8.61.

Natural Strata

Water soluble sulphate testing was also undertaken on six samples of the natural strata encountered. The range of soluble sulphate (SO_4) recorded is 10.3mg/l to 219.9mg/l and associated pH values ranged between 8.26 and 10.99 indicating slightly alkaline conditions.

A similar dataset is available therefore, the characteristic sulphate concentration is 132.2mg/l and the pH value is 8.29.

Natural granular deposits are present beneath the site therefore the groundwater is considered to be mobile.

The results of laboratory pH and sulphate content indicate that ACEC Class AC-1 and sulphate class DS-1 conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site-specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

6.10 Highway Design

Plate load testing was undertaken across the site in order to obtain a representative CBR value of the underlying strata at proposed formation levels for access roads and car parking. The full results are presented in *Appendix 7*, a summary of the results is below:

Location	Depth (m bgl)	Strata	CBR Value (%)
TP01	0.35	MG: Gravel	11.3
TP02	0.35	MG: Clayey gravelly sand	9.6
TP03	0.35	MG: Clayey sand	>39.9
TP04	0.35	MG: Sandy clay	>39.9
TP05	0.35	MG: Gravelly sandy clay	>39.9
TP06	0.35	MG: Gravelly sandy clay	3.9

Plate load testing was undertaken in the vicinity of proposed access roads and car parking areas across the development. All results have achieved the required design value of 5% for highway and pavement construction excluding TP06 which achieved a CBR value of 3.9%. As a minimum, the subgrade should be proof rolled prior to construction.

The soils are considered to be frost susceptible due to the fines content and highway construction should be a minimum thickness of 450mm to mitigate the risk.

6.11 Sustainable Urban Drainage System (SuDS)

SuDS testing was undertaken in two locations on the site in general accordance with BRE Digest 365 'Soakaways' (2016). A summary of the soil percolation test results is given below, and the full results are presented in *Appendix 8*.

Location	Test No.	Dimensions of Pit Before Test	Behaviour During Test	Dimensions of Pit After Test	Soil Infiltration Rate (m/sec)
IP3	1	1200 (L) x 800 (W) x 1600 (D)	Pit sides stable	1200 (L) x 800 (W) x 1600 (D)	1.14×10^{-6}
IP3	2	1200 (L) x 800 (W) x 1600 (D)	Pit sides stable	1200 (L) x 800 (W) x 1600 (D)	2.41×10^{-6}
IP3	3	1200 (L) x 800 (W) x 1600 (D)	Pit sides stable	1200 (L) x 800 (W) x 1600 (D)	3.28×10^{-6}
TP03	1	1300 (L) x 700 (W) x 2100 (D)	Pit sides stable	1300 (L) x 700 (W) x 2100 (D)	3.21×10^{-6}
TP03	2	1300 (L) x 700 (W) x 2100 (D)	Pit sides stable	1300 (L) x 700 (W) x 2100 (D)	3.10×10^{-6}
TP03	3	1300 (L) x 700 (W) x 2100 (D)	Pit sides stable	1300 (L) x 700 (W) x 2100 (D)	1.92×10^{-6}

Three soil percolation tests were carried out at both positions IP3 and TP03 at a depth of 1.6m bgl and 2.1m bgl respectively. The calculated soil infiltration rates ranged between 1.14×10^{-6} m/s and 3.28×10^{-6} m/s which indicate poor drainage conditions are present within the underlying soils.

The use of SuDS drainage within the natural ground is not considered to be a feasible option at these locations and depths on the site.

7.0 LAND QUALITY

7.1 Geo-Environmental Testing Results - Soils

Samples of Made Ground have been tested for a range of relevant Contaminants of Concern. In accordance with CLR11 (DEFRA & EA, 2004), a Generic Quantitative Risk Assessment (GQRA) has been undertaken to determine the significance of the concentrations as derived through Geo-Environmental analysis.

The GQRA process comprises the comparison of the actual concentrations measured on site with Generic Assessment Criteria (GACs) for the protection of human health.

The GACs used for the assessment of soil concentrations have been derived using the CLEA model. The GACs used and their ranking of importance are listed below:

- *Soil Guideline Values (SGVs) which demonstrate minimal risk.*
- *LQM/CIEH S4ULs which use the same toxicological data as the SGVs but different exposure criteria.*
- *C4SLs which demonstrate low risk.*

In deriving the GACs for use on Brownfield sites, we have assumed a 1% Soil Organic Matter unless the results indicate otherwise.

The proposed development comprises a multi-storey residential building up to nine storeys in height, with associated car parking and soft landscaping at ground floor level. We have therefore undertaken the GQRA on the basis that the proposed development site falls under the Residential (without Plant Uptake) land-use scenario as defined in SR3 (EA, 2009b).

The strata or sources of contamination targeted by the laboratory testing scheduled is summarised in the table below:

Strata	Number of Samples Tested	Locations
<i>Granular Made Ground (Population 1)</i>	<i>6</i>	<i>BH02, BH04, BH05, TP02, TP04, IP3.</i>

A summary of the Geo-Environmental Testing results is presented below and the GQRA screening values are presented in *Appendix 9*:

Contaminant	Metals		Exceedances	Locations
	Range (mg/kg)	Screening Value		
<i>Arsenic</i>	<i>2.4 – 13.6</i>	<i>40</i>	-	-
<i>Cadmium</i>	<i>0.2 – 8.4</i>	<i>85</i>	-	-
<i>Chromium</i>	<i>18.3 – 59.4</i>	<i>910</i>	-	-
<i>Hexavalent Chromium</i>	<i><0.3</i>	<i>21</i>	-	-
<i>Copper</i>	<i>10 – 72</i>	<i>7100</i>	-	-
<i>Lead</i>	<i>21 – 123</i>	<i>310</i>	-	-
<i>Mercury</i>	<i>0.1 – 0.4</i>	<i>1.2</i>	-	-
<i>Nickel</i>	<i>5.2 – 23.3</i>	<i>180</i>	-	-
<i>Selenium</i>	<i><1 – 1</i>	<i>430</i>	-	-

Zinc	27 - 320	40000	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)				
Contaminant	Range (mg/kg)	Screening Value	Exceedances	Locations
Naphthalene	<0.04 – 1.35	2.3	-	-
Acenaphthylene	<0.03 – 0.42	2900	-	-
Acenaphthene	<0.05 – 2.15	3000	-	-
Fluorene	<0.04 – 2.12	2800	-	-
Phenanthrene	0.29 – 15.23	1300	-	-
Anthracene	0.08 – 6.77	31000	-	-
Fluoranthene	0.63 – 26.37	1500	-	-
Pyrene	0.59 – 21.94	3700	-	-
Benzo(a)anthracene	0.37 – 10.07	11	-	-
Chrysene	0.33 – 9.39	30	-	-
Benzo(a)pyrene	0.34 – 9.04	3.2	2	BH2, BH4
Indeno(123cd)pyrene	0.22 – 5.43	45	-	-
Dibenzo(ah)anthracene	0.04 – 0.98	0.31	2	BH2, BH4
Benzo(ghi)perylene	0.23 – 5.43	360	-	-
Benzo(b)fluoranthene	0.43 – 11.52	3.9	2	BH2, BH4
Benzo(k)fluoranthene	0.17 – 4.48	110	-	-
Others				
Organic Matter	1.0 – 8.0%			
Asbestos Screen				
Position	Depth (m bgl)	Result		
BH2	0.50	None Detected		
BH4	0.50	None Detected		
BH5	0.50	None Detected		
TP02	0.50	None Detected		
TP04	1.80	None Detected		
IP3	0.50	None Detected		

7.2 Statistical Analysis

Statistical analysis for the elevated Polycyclic Aromatic Hydrocarbons (PAHs) concentrations in the Made Ground population was undertaken using CL:AIRE 'Guidance on Comparing Soil Contamination Data with a Critical Concentration'. Analysis was carried out on the granular Made Ground based on the observations and descriptions during the Ground Investigation. The aim of the statistical analysis was to reject the Null Hypothesis - 'the true mean concentration is equal to or greater than the critical concentration' with a level of confidence greater than 95%. The results of the statistical analysis are presented in *Appendix 10*.

Benzo(a)pyrene

Elevated benzo(a)pyrene was detected in the BH02 and BH04 within the granular Made Ground. For benzo(a)pyrene, the following statistical analysis was carried out:

- Granular Made Ground - an upper confidence limit of 6.8mg/kg was calculated which is higher than the critical concentration of 3.2mg/kg, the Null Hypothesis was not rejected and **remediation measures are required**.

Dibenzo(ah)anthracene

Elevated dibenzo(ah)pyrene was present in the BH02 and BH04 within the granular Made Ground. For dibenzo(ah)pyrene, the following statistical analysis was carried out:

- *Granular Made Ground - an upper confidence limit of 0.73mg/kg was calculated which is higher than the critical concentration of 0.31mg/kg, the Null Hypothesis was not rejected and remediation measures are required.*

Benzo(b)fluoranthene

Elevated benzo(b)fluoranthene was detected in the BH02 and BH04 within the granular Made Ground. For benzo(b)fluoranthene, the following statistical analysis was carried out:

- *Granular Made Ground - an upper confidence limit of 8.48mg/kg was calculated which is higher than the critical concentration of 3.9mg/kg, the Null Hypothesis was not rejected and remediation measures are required.*

7.3 Tier I Generic Quantitative Risk Assessment - Soils

Made Ground was encountered across the entire site to a maximum depth of 3.5m bgl and consisted of inert materials and former building rubble associated with a former hospital that was located onsite. No significant visual or olfactory evidence of contamination was noted within the soils that were recovered at the site however, former foundations along with redundant utilities was encountered within TP04.

Metals

Testing undertaken across the site indicated that all metal concentrations encountered were below the screening value for residential land use without plant uptake.

Polycyclic Aromatic Hydrocarbons (PAHs)

Testing indicates that all speciated PAH concentrations were generally encountered below the screening value for the residential end use without plant uptake except for Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene. Elevated concentrations were recorded in BH02 at 0.5m and BH04 at 0.5m bgl within Made Ground comprising gravelly sand. These locations were present in the central and southern areas.

Benzo(a)pyrene was found at elevated concentrations of 7.9mg/kg and 9.04mg/kg when compared to the screening value of 3.2mg/kg. Benzo(b)fluoranthene was elevated at levels of 9.46mg/kg and 11.52mg/kg compared to the screening value of 3.9mg/kg. Dibenzo(ah)anthracene was indicated to be elevated at concentrations of 0.79mg/kg and 0.98mg/kg when compared to the screening value of 0.31mg/kg. The statistical analysis results also confirm remedial action is required.

The elevated speciated PAH concentrations are likely to be associated with the general Made Ground and the former use of the site as a hospital.

Asbestos

No asbestos was detected within the Made Ground soils that were screened.

7.4 Permanent Ground Gases

Made Ground has been recorded beneath the site to a maximum depth of 3.5m bgl and Glaciofluvial deposits are present to a depth of between 23.0m and 24.0m bgl. No significant quantities of organic material have been noted within the Glaciofluvial deposits.

Two gas monitoring visits has been undertaken to date and a further two are scheduled.

No concentrations of methane (CH₄) have been recorded within the standpipes however, detectable levels of carbon dioxide (CO₂) were recorded within the standpipes up to a maximum concentration of 3.8% v/v together with associated slightly depleted oxygen (O₂) concentrations (minimum of 9.5% v/v). The carbon dioxide concentration of 3.8% v/v was recorded in BH05.

The maximum positive gas flow rate is considered to be 0.1l/hr as no positive flow rates have been encountered. The atmospheric pressure ranged between 1027mb and 1033mb and the monitoring was carried out during periods of falling and steady barometric pressure.

Groundwater was encountered within all the standpipes at depths of between 1.9m and 2.44m bgl.

Characterisation of the Gas Screening Value (GSV)

In accordance with CIRIA Report C665, November 2007 it is felt that an adequate risk assessment can be undertaken based on the following limiting factors:

- *The proposed development has been considered as **low sensitivity** based on the site being a proposed Residential Development (Table 5.5 – Typical/Idealised frequency and period of monitoring, after Wilson et al, 2005).*
- *The risk associated with the generation potential of a source is considered as **very low**, (assessment based on the environmental setting).*
- *Relatively low positive flow rates have been recorded (Table 8.5 – Modified Wilson & Card classification). For this site, one of the monitoring visits undertaken to date was carried out during a falling atmospheric pressure trend.*

Based upon the results recorded, in accordance with CIRIA Report C665, the risk to the site from ground gases has been assessed by converting the results to gas screening values (GSVs), calculated by multiplying the typical maximum gas concentrations with the recorded maximum positive flow rates. In addition, individual “hazardous gas flow rates” (Q_{hg}) have been derived for each monitoring point. As no levels of methane have been recorded, a GSV for carbon dioxide only has been calculated.

$$GSV (l/hr) = \text{max borehole flow rate (l/hr)} \times \text{max gas concentration (\%)}$$

For this assessment, the maximum recorded concentration of carbon dioxide of 3.8%v/v has been used together with a maximum gas flow rate of 0.1l/hr to calculate the GSV. This is worst case scenario.

$$\text{Carbon Dioxide GSV} = 0.038 (3.8\%) \times 0.1 = 0.0038 \text{ l/hr}$$

In order to assess the ground gas regime beneath the site and the need to incorporate ground gas precautions, guidance was taken from CIRIA C665 ‘Assessing risks posed by hazardous ground gases to

buildings'. Based on the site being developed for a commercial end use, the Wilson and Card method has been used to carry out the assessment.

When considering the preliminary results in accordance with CIRIA C665 (Section A Development and Table 8.5 – Modified Wilson and Card Classification) it can be seen that the interim GSV values place the site within Characteristic Situation 1.

Characteristic Situation 1

The proposed development is classified as a Building Type C in accordance with BS 8485:2015 and the site falls in CS1 in accordance with Table 2 of the above guidance, gas protection measures are not required. The recommendations will be confirmed or otherwise on completion of the monitoring.

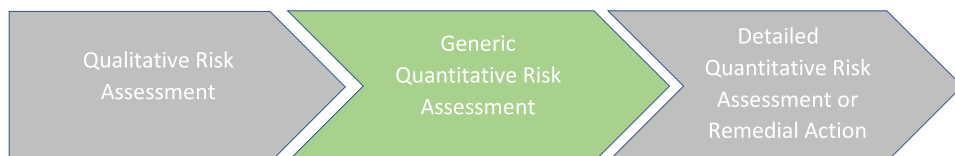
Radon

The site is an are not requiring radon precautions.

7.5 Revised Pollution Linkage Assessment

The CSM has been revised to inform the following pollution linkage assessment. Using Source-Pathway-Receptor assessment criteria that is applicable in the UK, the risk assessment has been devised to determine if a plausible pollution linkage exists between the identified contaminants and receptors. The risk classification has been estimated in accordance with the CIRIA C552 assessment criteria and an Illustrative Revised CSM is presented on Groundtech Consulting Plan *GRO-20064-P03*.

Human Health Pollution Linkage Assessment



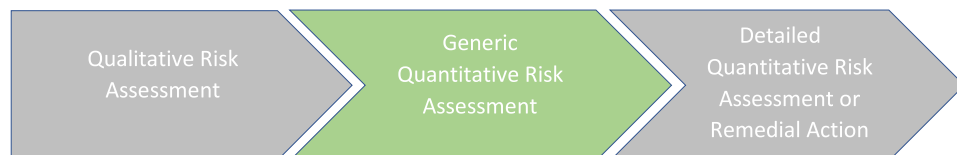
- The table below represents the second stage in the land quality risk assessment process - **the Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL1	Contaminated Soils	Ingestion of soil and dust. Dermal contact with soil.	Likely	Medium	Moderate	<i>Pollution Linkage 1 refers to proposed site users coming into contact with contaminated soils on the site.</i> <i>The site is currently formed by waste land and has previously been occupied by the Withington Community Hospital.</i> <i>Made Ground is present beneath the site to a maximum depth of 3.5m bgl mainly due to the presence of the former hospital. Speciated PAH contamination was detected within the granular Made Ground soils. No other elevated CoC were recorded, and no asbestos was detected.</i> <i>Depending on the age of the electricity substation located in the northwest of the site, PCBs may have been used as a cooling agent within the transformers, however due to the relative immobility of PCBs and the small volume used they are unlikely to have impacted the site.</i>

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
						The proposed development is for a nine storey residential building to be constructed at the site with associated car parking and soft landscaping. As the Made Ground is contaminated with PAHs, a viable pollution linkage is considered to exist in soft landscaped areas only.
PL2	Contaminated Soils	Inhalation of vapour.	Unlikely	Medium to Severe	Low	Volatile vapours migrating into confined spaces within the proposed development is not a potential linkage. No significant sources of volatiles have been encountered and the risk is considered to be low.
PL3	Contaminated Soils	Inhalation of soil dust by adjacent site users.	Unlikely	Medium	Low	Pollution Linkage 3 relates to contamination on the subject site affecting adjacent site users. Significant mobile contamination has not been encountered therefore a plausible pollution linkage is not considered to exist.
PL4	Contaminated Soils	Attacking potable water supply pipe.	Likely	Medium	Moderate	Pollution Linkage 4 refers to the possible contaminants permeating potable water pipes and consumption by the future site end users of the tainted water supply. Made Ground is present at installation depth of proposed water pipes which is contaminated with PAHs. As potable water pipes are to be included as part of the proposed development, a pollution linkage is considered to exist and a local water company risk assessment is required prior to construction to advise on the level of protection required for the potable water supply.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL5	Ground Gas	Migration and accumulation of ground gas in internal spaces.	Unlikely	Medium to Severe	Low	Made Ground is present beneath the site to a maximum depth of 3.5m bgl due to the historic land use as a hospital. Initial gas monitoring indicates that no methane is present beneath the site and a maximum carbon dioxide concentration of 3.8% v/v has been recorded. The interim results place the site in CS1 and gas protection measures are not required. This will be confirmed or otherwise on completion of the monitoring. The site is not within an area requiring radon precautions within foundations.

Controlled Waters Pollution Linkage Assessment



- The table below represents the second stage in the land quality risk assessment process – **Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL6	Contaminated Soils	Impaction of groundwater from soil contamination (diffuse and point). Impaction of groundwater from groundwater plume.	Unlikely	Medium	Low	Deep Made Ground has been encountered to a maximum depth of 3.5m bgl, however significant mobile contamination has not been encountered. Geological maps indicate that the site is underlain by Glaciofluvial Clay, Sand and Gravel. The bedrock underlying the site is the Wilmslow Sandstone Formation. Due to the thickness of the superficial deposits in excess of 20m, a pollution linkage is not currently considered to exist between potentially contaminated Made Ground and the Principal Bedrock Aquifer. Furthermore, the proposed development will be predominantly covered with hardsurfacing and a new drainage system installed. This will considerably reduce infiltration and leaching of potential contaminants. Therefore, no pollution linkage is considered to exist.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL7	Contaminated Soils	Migration of soil and groundwater contamination impacting surface waters.	Unlikely	Medium	Low	Pollution Linkage 7 refers to the impaction of River Mersey 820m south of the site from contaminated soils and groundwater. Significant mobile contamination has not been encountered and there is a significant attenuation distance. A plausible pollution linkage is not considered to exist.

7.6 Outline Remedial Strategy

Based on the results of the investigation a cover system should be placed in soft landscaped areas to mitigate the risk from contaminated soils on site, elevated levels of concentration have been observed within two locations across the site (BH2 and BH4) in the form of Polycyclic Aromatic Hydrocarbons. The clean cover layer system should comprise 600mm of clean topsoil material underlain with 100mm of hard dig subsoil material.

The depth and chemical suitability of the cover system should be validated after placement.

Testing of onsite topsoil is recommended to confirm suitability for reuse as part of the proposed development. If soils are to be imported, they should be tested at source and on arrival on site to confirm it is the same material.

No remediation required with respect to groundwater.

Preliminary ground gas results place the site within CS1 at present and gas protection measures will not be required. This will be confirmed or otherwise on completion of the gas monitoring. Radon protective measures are not required within the proposed development.

A watching brief should be in place during ground works and construction. If previously unidentified contamination is encountered, work should cease in that area and Groundtech Consulting contacted for advice.

Regulatory compliance should be obtained pre-commencement to avoid delays during the construction phase which will have cost implications.

7.7 Asbestos in Soils

No asbestos has been detected in the Made Ground soils that have been screened.

7.8 Health and Safety - Construction and Ground Workers

During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

PL Ref	Potential Source	Pollution Linkage	Likelihood	Severity	Level of Risk
PL8	Made Ground	Ingestion, direct contact, inhalation of dusts.	Unlikely to Low Likelihood	Medium	Moderate to Low

Generally, contaminated soils have not been encountered beneath the site with the exception of localised elevated PAHs within samples of shallow granular Made Ground. The risk of soils should be conveyed to construction and ground workers through a site induction and information on noticeboards.

General guidance on these matters is given in the Health and Safety Executive (HSE) document “Protection of Workers and the General Public during the Redevelopment of Contaminated Land”. In summary, the following measures are suggested to provide a minimum level of protection:

- *All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.*
- *Hand-washing and boot-washing facilities should be provided.*
- *Care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works.*
- *Good practices relating to personal hygiene should be adopted on the site.*
- *The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.*

7.9 Waste Classification by Assessment

We have reviewed the testing results and inputted them into the HazWasteOnline model which allows users to code and classify waste as defined in the EWC (European Waste Catalogue 2002) based on EC Regulation 1272/2008 on the Classification, labelling and packaging of substances and mixtures (CLP) and latest Environment Agency guidance (WM3 “Guidance on the classification and assessment of waste (1st edition 2015)-Technical Guidance”).

This is a useful tool as waste producers have the legal responsibility to classify any waste they produce.

Twelve samples were tested to assess whether they contained any contaminants in the hazardous range when screened against assessment criteria within WM3. The results are in the Waste Classification Report presented in *Appendix 11*.

Based on the HazWasteOnline assessment tool, the Made Ground soils have been classified as Non-Hazardous. No asbestos was detected and does not affect the classification by assessment.

Total testing was not undertaken on the natural soils and are assumed to be Non-Hazardous.

7.10 Waste Acceptance Criteria (WAC) Results

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste) led to the establishment of a methodology for classifying wastes. Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. There are three different WAC, these are for:

- *Inert waste*
- *Non-hazardous waste*
- *Hazardous waste*

Wastes should first be classified based on their total concentrations as detailed in the previous section. WAC testing is then required if the end disposal route is a landfill.

Waste Acceptance Criteria (WAC) testing was outside the scope of this investigation and the guidance given below is general.

The possibility of automatic inert classification of the natural soils should be explored in accordance with Section 4.3 of the EA guidance document. The Council Decision includes a list of wastes in Section 2.1.1 of the document that are assumed to be inert and therefore acceptable at a landfill for inert waste without testing, this is the case if:

- *They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source) and*
- *There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other their disposal in other classes of landfill.*

If any organic contaminated material is encountered during the construction phase, it is possible that this may be classified as hazardous and testing should be undertaken at that time.

Materials should be segregated and where necessary sufficient time is allowed to further classify the material properly, including discussion with landfill sites and waste transfer stations to find the best disposal route. It is recommended that where possible, the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route.

Soils will be generated during the enabling works and CFA piling, the reuse of soils on the site this should be done in accordance with the CL:AIRE "Development Industry Code of Practice for the Definition of Waste" (CL:AIRE CoP). Any re-use scheme should be designed to minimise disposal costs.

After a cut and fill balance plan/volume calculation has been carried out, a U1 and T5 exemption could be registered. This will allow the use of the following soils without a waste permit or under Dow CoP MMP:

- *1,000 tonnes (c.600m³) of non-hazardous soil*
- *5,000 tonnes (c.3,000m³) of natural sand and gravels.*
- *50,000 tonnes (c.25,000m³) of bituminous material to be used in roadways.*
- *5,000 tonnes (c.3,000m³) of crushed concrete / stone.*

8.0 FINAL APPRAISAL

8.1 Land Quality

The site formerly consisted of the old Withington Community Hospital which was constructed in the 1800s. Made Ground was encountered during the Ground Investigation to a maximum depth of 3.5m bgl and consisted of reworked topsoil and sand, no visual or olfactory of contamination was encountered. Former foundations, slabs and redundant utilities associated with the hospital were encountered within TP04 in the northern part of the site and are likely elsewhere beneath the site.

Elevated concentrations of speciated Polycyclic Aromatic Hydrocarbons (PAHs) have been recorded in BH2 and BH4 within granular Made Ground soils. No other elevated CoC were recorded, and no asbestos was detected. The risk to human health is considered to be *Moderate*. A cover system should be placed in soft landscaping areas to reduce the risk to an acceptable level.

Significant mobile contamination was not encountered and the risk to controlled waters is considered to be *Low*.

Preliminary gas monitoring results place the site in CS1 and gas protection measures are not likely to be required. The risk is *Low* at present and will be confirmed upon the completion of the monitoring. The site is not in an area requiring radon measures.

Based on the HazWasteOnline assessment tool, the Made Ground soils have been classified as Non-Hazardous for waste disposal purposes.

8.2 Ground Engineering

The most suitable solution for the proposed nine-storey development is considered to be pile foundations transferring loads through the underlying Made Ground and natural strata to the very weak Sandstone which has been encountered at depth of 23.0m and 24.4m bgl.

The use of SuDS drainage within the natural ground is not considered to be a feasible as poor drainage rates have been calculated.

8.3 Further Work

The following further work is considered necessary to progress the site to construction phase:

Completion of gas monitoring programme.

Issue gas assessment.

Design of remedial specification.

Tree survey by qualified arboriculturist.

Detailed Foundation design.

Confirmation of remedial recommendations made with the Local Authority.

9.0 RELEVANT INDUSTRY REFERENCES

- British Standards Institution. *Investigation of Potentially Contaminated sites - code of practice*. BS 10175:2017.
- British Standards Institution '*Code of Practice for Site Investigations*' BS 5930:2015
- British Standards Institution "*Geotechnical investigation and testing – Identification and classification of soil*" BS EN ISO 14688:2002.
- British Standards Institution "*Geotechnical investigation and testing – Identification and classification of rock*" BS EN ISO 14689:2002.
- BRE Report BR211 '*Radon – Guidance on protective measures for new buildings*' 2015 Edition.
- BRE Special Digest 1: "*Concrete in Aggressive Ground*" 3rd Ed 2005.
- CIRIA 552 "*Contaminated Land Risk Assessment – A guide to good practice*" 2001.
- CIRIA C665 "*Assessing Risks Posed by Hazardous Ground Gases to Buildings*" 2007.
- Wilson & Card "*Proposed method classifying gassing sites*" Ground Engineering 1999.
- Card & Steve Wilson in "*A pragmatic approach to ground gas risk assessment for the 21st Century*" - CIRIA/Environmental Protection UK Ground gas seminar 2011
- BS 8576:2013 '*Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)*'
- BS 8485:2015 '*Code of practise for the design of protective measures for methane and carbon dioxide ground gases for new buildings*'
- The Hazardous Waste (England) Regulations 2005.
- Environment Agency Hazardous Waste: "*Guidance on the classification and assessment of waste*" WM3 ver. 1 May 2015.
- The National Planning Policy Framework (NPPF) March 2012
- DETR. Circular 02/2000 Contaminated Land.
- Environment Agency, 2009 'Using Soil Guideline Values'.
- Environment Agency, 2009 'Updated Technical Background to the CLEA model'.
- Environment Agency, 2009 'Human health toxicological assessment of contaminants in soil'.
- Department of the Environment, 1994, CLR Report No 1 'A framework for assessing the impact of contaminated land on groundwater and surface water'.
- Department of the Environment, 1994, CLR Report No 2 'Guidance on Preliminary Site Inspection of Contaminated Land'.
- Department of the Environment, 1994, CLR Report No 3 'Documentary research on Industrial Sites'.
- Department of the Environment, 1994, CLR Report No 4 'Sampling Strategies for Contaminated Land'.
- DEFRA and the Environment Agency, 2002-2004, CLR10 'Soil Guideline Value Reports for Individual Soil Contaminants'.
- DEFRA and the Environment Agency, 2004, CLR Report No 11 'Model Procedures for the Management of Contaminated Land'.
- Nathanail, C. P., McCaffrey, C., Gillett, A., Ogden, R. C. and Nathanail, J.F. 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.
- CL:AIRE, 2014 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination'.
- Water Framework Directive.
- Environmental Quality Standards.

UK Drinking Water Standards: Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) and Water Supply (Water Quality) Regulations

UKWIR Report 10/WM/03/21 2010 "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites"

Health & Safety Executive, 1991. 'Protection of Workers & the General Public during the Development of Contaminated Land'.

Environment Agency & NHBC, 2000. R&D Publication 66. Guidance for the Safe Development of Housing on Land Affected by Contamination.

Environment Agency "Guidance on the classification and assessment of waste (1st edition 2015) Technical Guidance WM3"

CL:AIRE "*The Definition of Waste: Development Industry Code of Practice*" Version 2 March 2011.

CIRIA "*Asbestos in soil and made ground: a guide to understanding and managing risks*" C733 2014

Control of Asbestos Regulations (CAR) 2012

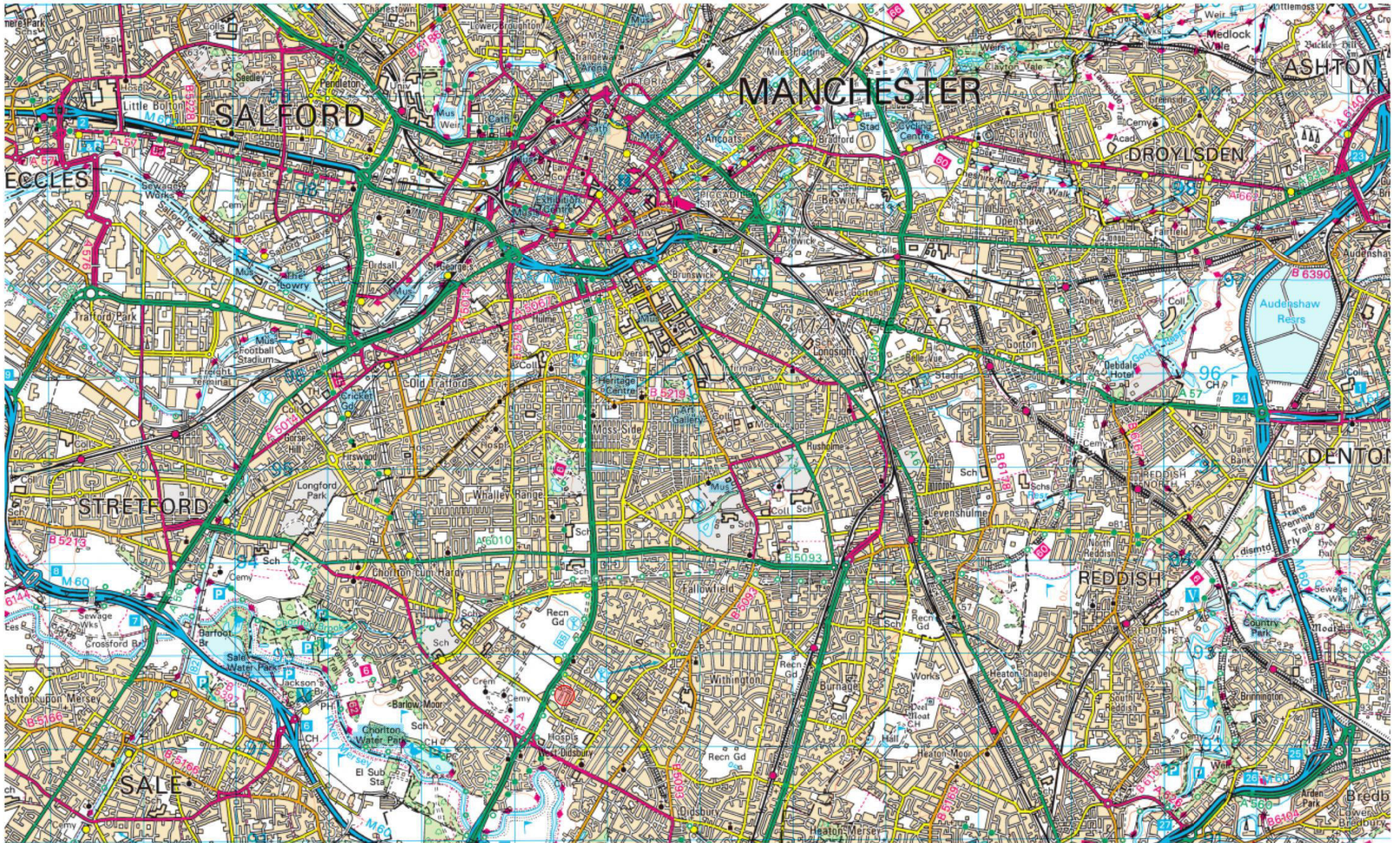
Harris, M R, Herbert, S. M, Smith, M A 'Remedial Treatment for Contaminated Land' (twelve volumes), special publications 101-112, CIRIA 1996.

Department of the Environment. 1995. Industry Profiles - 48 separate publications available from The Stationery Office, London

Environment Agency. R&D Publication 20. Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources. 1999.

Specification for Highways Works – Series 600 Earthworks November 2016.

APPENDIX 1 - Plans



GROUNDTECH
CONSULTING



CLIENT
SOUTHWAY HOUSING
PROJECT TITLE
DIDSBURY POINT
PLAN TITLE
PROJECT LOCATION PLAN

DATE
APRIL 2021
SCALE
NTS
PLAN NUMBER
GRO-20064-P01

Rev.	Details	Date

Status
Preliminary
Draft
Issued
For Comment
Approved

Notes

● SITE LOCATION





GROUNDTECH
CONSULTING



CLIENT
SOUTHWAY HOUSING
PROJECT TITLE
DIDSBUY POINT
PLAN TITLE
EXPLORATORY HOLE PLAN

DATE
APRIL 2021
SCALE
NTS
PLAN NUMBER
GRO-20064-P02

Rev. Details

Date

Status
Preliminary
Draft
Issued
For Comment
Approved

Notes
● CABLE PERCUSSIVE BOREHOLE LOCATION
■ TRIAL PIT LOCATION
■ FOUNDATION PIT LOCATION
■ SOIL PERCOLATION TEST LOCATION



SOURCES

- A. Contaminated soils / Made Ground.
- B. Ground gas.

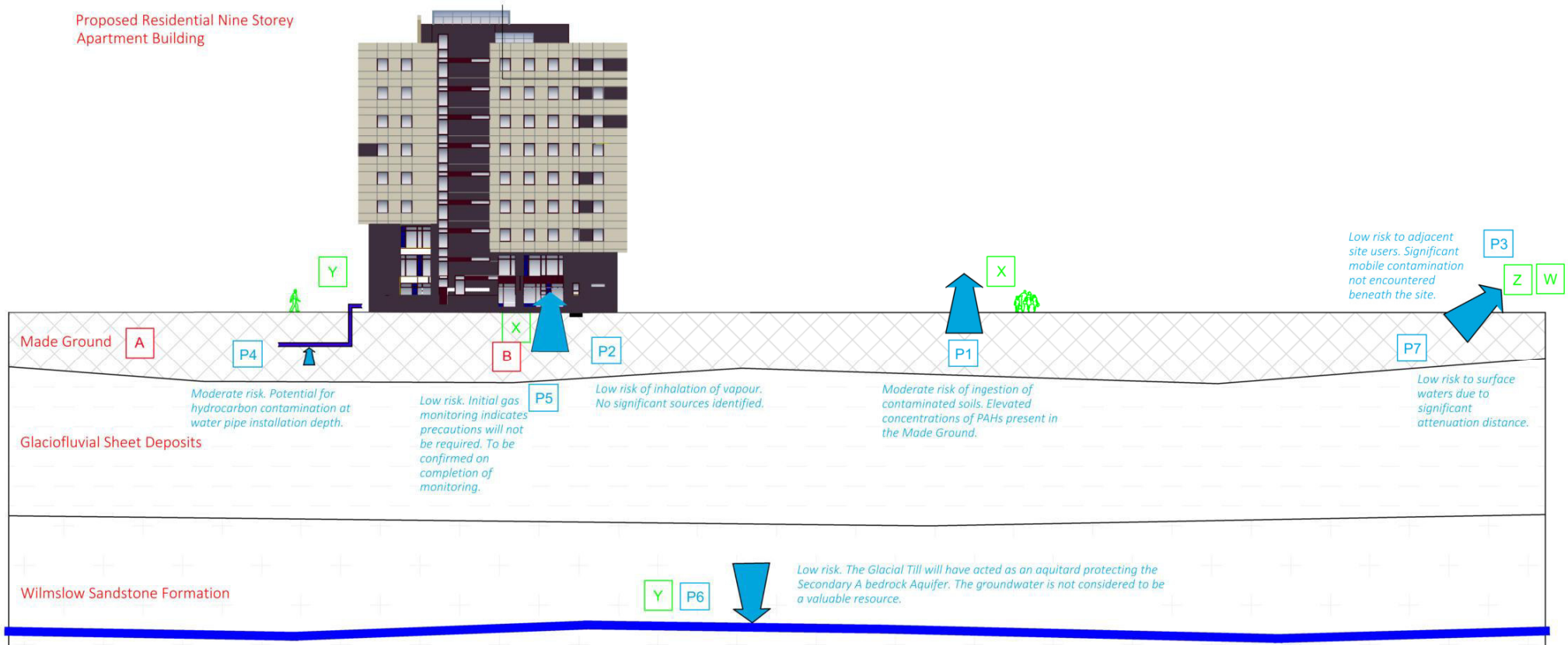
POLLUTION LINKAGES

- P1. Ingestion of soil and dust.
- P2. Inhalation of vapour.
- P3. Inhalation of soil dust by adjacent site users.
- P4. Attacking of potable water supply pipe.
- P5. Migration and accumulation of ground gas in internal places.
- P6. Impaction of groundwater from soil contamination.
- P7. Migration of soil and groundwater contamination impacting surface waters.

RECEPTORS

- W. River Mersey c. 820m south of the site.
- X. Site end users.
- Y. Groundwater within the underlying Secondary A Superficial and Principal bedrock Aquifers.
- Z. Adjacent site users.

Proposed Residential Nine Storey
Apartment Building



GROUNDTECH
CONSULTING



CLIENT
SOUTHWAY HOUSING

PROJECT TITLE
DIDSBURY POINT

PLAN TITLE
ILLUSTRATIVE REVISED CSM

DATE
APRIL 2021

SCALE
NTS

PLAN NUMBER
GRO-20064-P03

Rev.	Details	Date

Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

Notes



APPENDIX 2 - Site Photographs



Photograph 1 – Central and eastern areas



Photograph 2 – Former substation in the west



Photograph 3 – Northern site area



Photograph 4 - TP02



Photograph 5 – TP03



Photograph 6 – TP04



Photograph 7 – IP3

APPENDIX 3 - Exploratory Hole Logs

Trial Pit Log

Trialpit No
IP3
Sheet 1 of 1

Project Name: DIDSbury POINT	Project No. GRO-20064	Co-ords: - Level:	Date 04/02/2021
Location: MANCHESTER		Dimensions (m): Depth 1.60	Scale 1:25 Logged CJH
Client: SOUTHWAY HOUSING		1.2 0.8	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20 0.20	B ES		0.30			MADE GROUND: Brown gravelly sandy slightly clayey topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including plastic, brick, concrete and wood.	
	0.50 0.50	B ES		0.60			MADE GROUND: Grey slightly sandy angular to subangular fine to coarse gravel of mixed lithologies.	
	0.90 1.00	B ES		1.10			MADE GROUND: Brown grey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and concrete.	1
	1.50 1.60	B ES		1.60			MADE GROUND: Light grey brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and concrete.	
							End of pit at 1.60 m	2
								3
								4
								5

Remarks: 1. Location cleared using handheld CAT scanner. 2. Trial pit excavated to 1.60m bgl. 3. Soil percolation test conducted 4. No groundwater encountered. 5. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
PLT01
Sheet 1 of 1

Project Name: DIDSBURY POINT	Project No. GRO-20064	Co-ords: - Level:	Date 03/02/2021
Location: MANCHESTER	Dimensions (m): Depth 0.35		Scale 1:25 Logged CJH
Client: SOUTHWAY HOUSING		0.7	1.3

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	B					
	0.10	ES		0.20			MADE GROUND: Brown gravelly sandy slightly clayey topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including plastic, brick, concrete and wood.
	0.30	B		0.35			MADE GROUND: Grey slightly sandy angular to subangular fine to coarse gravel of mixed lithologies.
	0.30	ES					End of pit at 0.35 m

Remarks: 1. Location cleared using handheld CAT scanner. 2. Plate load CBR test conducted at 0.35m bgl. 3. No groundwater encountered. 4. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No

PLT06

Sheet 1 of 1

Project Name:	DIDSBURY POINT
---------------	----------------

Project No.
GRO-20064

Co-ords:	-
Level:	

Date
03/02/2021

Location: MANCHESTER

Dimensions
(m):

14

Scale
1:25

Client: SOUTHWAY HOUSING

Depth
0.35

0.8

Logged
CJH

[illegible]

Remarks:	1. Location cleared using handheld CAT scanner. 2. Plate load CBR test conducted at 0.35m bgl. 3. No groundwater encountered. 4. Trial pit backfilled with arisings.
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Stability:



Trial Pit Log

Trialpit No

TP02

Sheet 1 of 1

Project Name: DIDSBURY POINT

Project No.
GRO-20064

Co-ords: -
Level:

Date
03/02/2021

Location: MANCHESTER

Dimensions
(m):

1.5

Scale
1:25

Client: SOUTHWAY HOUSING

Depth
2.70

0.8

Logged
CJH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.20			MADE GROUND: Degraded tarmac gravel.	
	0.30	B					MADE GROUND: Light grey slightly sandy angular to subangular fine to coarse gravel of mixed lithologies.	
	0.40			0.40			MADE GROUND: Geo-membrane.	
	0.50	B		0.42			MADE GROUND: Orange brown slightly clayey gravelly sand. Gravel is angular to subangular fine to coarse of brick, concrete, plastic and wood.	
	0.50	ES						
				0.80			MADE GROUND: Brown grey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and concrete.	1
	1.00	ES						
	1.40	B						
	1.40	D		1.50			Orange slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of mixed lithologies.	
	2.00	ES						2
▼	2.20	ES						
	2.50	B						
	2.50	D						
				2.70			End of pit at 2.70 m	3
								4
								5

Remarks: 1. Location cleared using handheld CAT scanner. 2. Plate load CBR test conducted at 0.35m bgl. 3. Trial pit excavated to 2.70m bgl. 4. Groundwater encountered at 2.20m bgl. 5. Trial pit walls unstable due to collapse from sand strata. 6. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
TP03
Sheet 1 of 1

Project Name: DIDSBURY POINT	Project No. GRO-20064	Co-ords: - Level:	Date 04/02/2021
Location: MANCHESTER	Dimensions (m): Depth 2.10		Scale 1:25 Logged CJH
Client: SOUTHWAY HOUSING		1.3 0.7	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	B		0.20			MADE GROUND: Brown gravelly sandy slightly clayey topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including plastic, brick, concrete and wood.	
	0.20	ES						
	0.30	B						
	0.50	ES		0.60			MADE GROUND: Orange brown slightly clayey gravelly sand. Gravel is angular to subangular fine to coarse of brick, concrete, plastic and wood.	
	1.00	B		1.10			MADE GROUND: Grey brown slightly clayey gravelly sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick.	1
	1.00	D						
	1.00	ES						
				1.40			Grey brown slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of mixed lithologies.	
	1.50	B		2.10			Orange slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of mixed lithologies.	
	2.00	ES		2.10			End of pit at 2.10 m	2
	2.10	B						
	2.10	D						
	2.10	ES						
								3
								4
								5

Remarks: 1. Location cleared using handheld CAT scanner. 2. Plate load CBR test conducted at 0.35m bgl. 3. Trial pit excavated to 2.10m bgl. 4. Groundwater encountered at 1.90m bgl. 5. Trial pit walls unstable due to collapse from sand strata. 6. Soil percolation test conducted between 1.50m bgl and 2.10m bgl within natural sand strata. 7. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
TP04
Sheet 1 of 1

Project Name: DIDSBURY POINT	Project No. GRO-20064	Co-ords: - Level:	Date 04/02/2021
Location: MANCHESTER	Dimensions (m): Depth 2.10		Scale 1:25 Logged CJH
Client: SOUTHWAY HOUSING		1.4	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 0.20 0.20	B B ES		0.15			MADE GROUND: Brown gravelly sandy slightly clayey topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including plastic, brick, concrete and wood.	
	0.50 0.50	B ES					MADE GROUND: Orange brown sandy cobbly angular to subangular fine to coarse gravel of brick, concrete, plastic and wood.	
	1.00 1.00	B ES		0.80			MADE GROUND: Brown cobbly gravelly fine to coarse sand. Gravel is angular to subangular of brick, concrete, wood, glass and metal. Large pieces of concrete and adjoined brick foundation associated with former slab of hospital building between 0.8m bgl and 1.5m bgl.	1
▼	2.00 2.00	B ES		2.10			End of pit at 2.10 m	2
								3
								4
								5

Remarks: 1. Location cleared using handheld CAT scanner. 2. Plate load CBR test conducted at 0.35m bgl. 3. Trial pit excavated to 2.10m bgl. 4. Groundwater encountered at 2.00m bgl. 5. Trial pit terminated due to presence of metal and plastic pipe associated with former hospital building. 6. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
TP05
Sheet 1 of 1

Project Name:	DIDSBURY POINT	Project No.	GRO-20064	Co-ords:	-	Date	04/02/2021
Location:	MANCHESTER	Dimensions (m):	1.6	Depth	2.20	Scale	1:25
Client:	SOUTHWAY HOUSING					Logged	CJH

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	B					MADE GROUND: Brown gravelly sandy slightly clayey topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including plastic, brick, concrete and wood.	
	0.20	ES		0.20			MADE GROUND: Grey brown slightly clayey gravelly sand with abundant concrete cobbles and boulders. Gravel is angular to subangular fine to coarse of mixed lithologies including brick.	
	0.50	B					MADE GROUND: Grey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick and concrete.	
	0.50	ES		0.70				
	0.90	B					Grey slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of mixed lithologies.	1
	1.00	ES		1.20				
	1.50	B					Orange slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of mixed lithologies.	
	1.50	D		1.70				
	2.00	ES		2.20			End of pit at 2.20 m	2
	2.20	B						
	2.20	D						

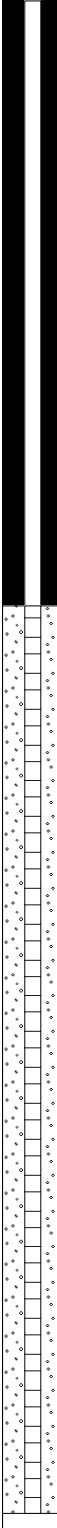
Remarks: 1. Location cleared using handheld CAT scanner. 2. Plate load CBR test conducted at 0.35m bgl. 3. Trial pit excavated to 2.20m bgl. 4. Groundwater encountered at 2.10m bgl. 5. Trial pit walls unstable due to collapse from sand strata. 6. Trial pit backfilled with arisings.

Stability:



Rotary Core Log

Project Name: DIDSBURY POINT				Client: SOUTHWAY HOUSING				Date: 01/02/2021 - 03/02/2021			
Location: MANCHESTER				Contractor:							
Project No. : GRO-20064				Crew Name:				Drilling Equipment:			
Borehole Number BH01		Hole Type CP+RC		Level		Logged By CJH		Scale 1:50		Page Number Sheet 1 of 4	

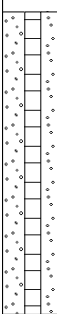
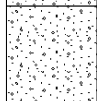
Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
		0.20	ES					0.10			MADE GROUND: Grass over brown sandy gravelly topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete, rubber and glass.	1
		0.50	ES									
		1.00	ES								MADE GROUND: Brown grey very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete, plastic and wood.	1
		1.20 - 1.65	D				N=50 (22.22/50 for 270mm)					
		2.00	D				(18)	2.00			MADE GROUND: Brown grey slightly clayey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of brick and concrete.	2
		2.00 - 2.45	ES									
		3.00	D				(13)					3
		3.00 - 3.45	ES									
		4.00	D				(15)	4.00			Brown grey sandy subrounded to rounded fine to coarse GRAVEL of mixed lithologies.	4
		4.00 - 4.45	ES								Firm high strength brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of mixed lithologies.	4
	5.00 - 5.45	U									5	
	5.50	D									6	
	6.50 - 6.95	D				(10)					7	
	8.00 - 8.45	U						8.00			Firm to stiff medium strength brown CLAY.	8
	8.50	D									9	
	9.50 - 9.95	D				(13)					10	

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

Remarks 1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater seepage from Made Ground at 3.50m bgl. 4. Sandstone bedrock encountered at 24.40m bgl. 5. Cable percussive drilling terminated at 24.40m bgl. 6. Rotary core follow on to 33.5m bgl. 7. Monitoring standpipe installed to 12.00m bgl (4.00m plain, 8.00m slotted).																

Rotary Core Log

Project Name: DIDSBUY POINT			Client: SOUTHWAY HOUSING			Date: 01/02/2021 - 03/02/2021		
Location: MANCHESTER			Contractor:					
Project No. : GRO-20064			Crew Name:			Drilling Equipment:		
Borehole Number BH01		Hole Type CP+RC		Level		Logged By CJH		Page Number Sheet 2 of 4

Well	Water	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		10.50	D				10.50			Firm to stiff medium strength brown CLAY.	11
		11.00 - 11.45	D				11.00			Firm to stiff red brown sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of mixed lithologies.	
										Medium dense brown clayey gravelly fine to coarse SAND. Gravel is rounded to subrounded fine to coarse of mixed lithologies.	
		12.50 - 12.95	U				12.00			Firm to stiff very high strength brown slightly sandy CLAY.	12
											13
		14.00 - 14.45	D								14
											15
		15.50 - 15.95	U								16
		16.00 - 16.45	D								17
		17.00 - 17.45	D								18
											19
		18.50 - 18.95	D								20
		19.20	D				19.20			Stiff brown slightly sandy CLAY.	
		19.50	D				19.50			Dense brown clayey gravelly fine to coarse SAND. Gravel is rounded to subrounded fine to coarse of mixed lithologies.	
			D				(40)				

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

Remarks
 1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater seepage from Made Ground at 3.50m bgl. 4. Sandstone bedrock encountered at 24.40m bgl. 5. Cable percussive drilling terminated at 24.40m bgl. 6. Rotary core follow on to 33.5m bgl. 7. Monitoring standpipe installed to 12.00m bgl (4.00m plain, 8.00m slotted).



Rotary Core Log

Project Name: DIDSBURY POINT			Client: SOUTHWAY HOUSING			Date: 01/02/2021 - 03/02/2021		
Location: MANCHESTER			Contractor:					
Project No. : GRO-20064			Crew Name:			Drilling Equipment:		
Borehole Number BH01		Hole Type CP+RC		Level		Logged By CJH		Page Number Sheet 3 of 4

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
		20.00 - 20.45									Dense brown clayey gravelly fine to coarse SAND. Gravel is rounded to subrounded fine to coarse of mixed lithologies.	21
		21.50 - 21.95	D				N=50 (10,15/50 for 270mm)	22.20				22
		22.50	D								Very dense red brown slightly gravelly SAND. Gravel is angular to subrounded fine to coarse of sandstone. <i>Becoming cobbly between 22.20m bgl and 23.00m bgl.</i>	23
		23.00 - 23.45	D				N=50 (6,7/50 for 295mm)					24
		23.50	D					24.40				25
											Extremely weak red brown SANDSTONE residually weathered recovered as gravelly sand. Gravel is angular to subrounded fine to coarse of mixed lithologies.	26
												27
			NR					27.50			NO RECOVERY.	28
		27.50 - 29.00	9	51	51	16		27.91			Extremely weak red SANDSTONE distinctly weathered with horizontal smooth to rough planar discontinuities.	29
			NR					29.00			NO RECOVERY.	30
		29.00 - 30.50	14	85	85	0		29.48			Extremely weak red SANDSTONE distinctly weathered with horizontal smooth to rough planar discontinuities.	

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

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater seepage from Made Ground at 3.50m bgl. 4. Sandstone bedrock encountered at 24.40m bgl. 5. Cable percussive drilling terminated at 24.40m bgl. 6. Rotary core follow on to 33.5m bgl. 7. Monitoring standpipe installed to 12.00m bgl (4.00m plain, 8.00m slotted).



Rotary Core Log

Project Name: DIDSBURY POINT			Client: SOUTHWAY HOUSING			Date: 01/02/2021 - 03/02/2021		
Location: MANCHESTER			Contractor:					
Project No. : GRO-20064			Crew Name:			Drilling Equipment:		
Borehole Number BH01		Hole Type CP+RC		Level		Logged By CJH		Page Number Sheet 4 of 4

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
								30.50			Extremely weak red SANDSTONE distinctly weathered with horizontal smooth to rough planar discontinuities. NO RECOVERY.	
			NR					30.99				
		30.50 - 32.00	15	67	67	14		32.00			Extremely weak red SANDSTONE distinctly weathered with horizontal smooth to rough planar discontinuities.	31
		32.00 - 33.50	NR	24	22	0		33.13			NO RECOVERY.	32
			3 3					33.50			Extremely weak red SANDSTONE extremely weathered with horizontal smooth to rough planar discontinuities. <i>Between 33.29 and 33.33m bgl recovered as sandy angular to subrounded fine to coarse gravel.</i>	33
											End of Borehole at 33.500m	34
												35
												36
												37
												38
												39
												40

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

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater seepage from Made Ground at 3.50m bgl. 4. Sandstone bedrock encountered at 24.40m bgl. 5. Cable percussive drilling terminated at 24.40m bgl. 6. Rotary core follow on to 33.5m bgl. 7. Monitoring standpipe installed to 12.00m bgl (4.00m plain, 8.00m slotted).



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Rotary Core Log

Project Name: DIDSBUYRY POINT				Client: SOUTHWAY HOUSING				Date: 03/02/2021 - 05/02/2021			
Location: MANCHESTER				Contractor:							
Project No. : GRO-20064				Crew Name:				Drilling Equipment:			
Borehole Number BH02		Hole Type CP+RC		Level		Logged By CJH		Scale 1:50		Page Number Sheet 1 of 3	

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD							
		0.10						0.10			MADE GROUND: Grass over brown sandy gravelly topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete, rubber and glass.		
		0.50	ES										
		1.00	ES						1.00			MADE GROUND: Brown grey very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete.	1
		1.20 - 1.65	D					(10)					
		2.00	D										
		2.00 - 2.45	ES					(20)	2.00			MADE GROUND: Brown grey sandy angular to subangular fine to coarse gravel of mixed lithologies including brick and concrete.	2
		3.00	D										
		3.00 - 3.45	ES					(14)					
		4.00 - 4.45	D					(11)	4.00			Medium dense brown gravelly fine to coarse SAND. Gravel is rounded to subrounded fine to coarse of mixed lithologies.	
		4.50	D									Firm brown slightly sandy silty CLAY with occasional sand and gravel bands present.	4
5.00 - 5.45	B												
5.00 - 5.50	U												
5.50 - 5.95	D						(12)						
6.00	D												
6.50 - 6.95	D						(16)						
8.00 - 8.95	U												
8.50	D												
9.50 - 9.95	D						(18)						
												10	

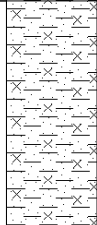
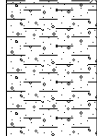
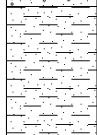
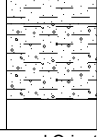
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation				Drilling Flush					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation	Depth Top	Depth Base	Type	Colour	Min (%)	Max (%)

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater seepage from Made Ground at 1.5m bgl.
4. Sandstone bedrock encountered at 23.00m bgl. 5. Cable percussive drilling terminated at 23.50m bgl. 6. Rotary core follow on to 29.5m bgl. 7. Monitoring standpipe installed to 12.00m bgl (4.00m plain, 8.00m slotted).

Rotary Core Log

Project Name: DIDSBURY POINT				Client: SOUTHWAY HOUSING				Date: 03/02/2021 - 05/02/2021			
Location: MANCHESTER				Contractor:							
Project No. : GRO-20064				Crew Name:				Drilling Equipment:			
Borehole Number BH02		Hole Type CP+RC		Level		Logged By CJH		Scale 1:50		Page Number Sheet 2 of 3	

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD							
		11.00 - 11.45	U								Firm brown slightly sandy silty CLAY with occasional sand and gravel bands present.	11	
		11.50	D					11.50			<i>Medium strength at 11.0m bgl.</i>		
		12.00	D								Firm to stiff brown slightly gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse of mixed lithologies with occasional sand and gravel bands.	12	
		12.50 - 12.95	D				N=50 (8,12/5 0 for 215mm)						13
		13.50	D										
		14.00 - 14.45	B U										14
		14.00 - 14.50	D				(53)						
		14.50 - 14.95											
		15.00	D										15
		15.50 - 15.95	D				N=50 (5,9/50 for 225mm)						16
		16.50	D										
		17.00 - 17.45	D				N=50 (8,12/5 0 for 265mm)						17
	18.00	D										18	
	18.50 - 18.95	U					18.50				Stiff high strength brown slightly sandy CLAY.	19	
	19.00	D					19.50				Stiff red brown gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse of mixed lithologies.	20	
			D										

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

Remarks															
1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater seepage from Made Ground at 1.5m bgl. 4. Sandstone bedrock encountered at 23.00m bgl. 5. Cable percussive drilling terminated at 23.50m bgl. 6. Rotary core follow on to 29.5m bgl. 7. Monitoring standpipe installed to 12.00m bgl (4.00m plain, 8.00m slotted).															

Rotary Core Log

Project Name: DIDSBUYRY POINT				Client: SOUTHWAY HOUSING				Date: 03/02/2021 - 05/02/2021			
Location: MANCHESTER				Contractor:							
Project No. : GRO-20064				Crew Name:				Drilling Equipment:			
Borehole Number BH02		Hole Type CP+RC		Level		Logged By CJH		Scale 1:50		Page Number Sheet 3 of 3	

Well	Water	Depth (m)	Type /FI	Coring			Diameter Recovery (SPT)	Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD						
		20.00 - 20.45					N=50 (7,12/50 for 280mm)				Stiff red brown gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse of mixed lithologies.	21
		21.50 - 21.95	D				N=50 (9,15/50 for 265mm)					22
		23.00 - 23.45	D				N=50 (10,15/50 for 280mm)	23.00			Extremely weak red brown SANDSTONE residually weathered recovered as gravelly sand. Gravel is angular to subrounded fine to coarse of mixed lithologies.	23
		23.50 - 25.00	NR					23.50			NO RECOVERY.	
			7	67	28	0	23.99			Extremely weak red SANDSTONE distinctly weathered with horizontal smooth to rough planar discontinuities.	24	
		25.00	D					25.00			NO RECOVERY.	25
		25.00 - 26.50	NR								Extremely weak red SANDSTONE extremely weathered with horizontal smooth to rough planar discontinuities.	
			11	82	73	0	26.50			From 25.20m and 25.29m bgl recovered as firm grey sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone between. From 25.85 to 25.89m bgl firm grey sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone.	26	
		26.00	D					26.50			NO RECOVERY.	
		27.00	NR								Extremely weak red SANDSTONE residually weathered recovered as sandy angular to subangular fine to coarse gravel.	
			NI	72	56	13	26.99			Extremely weak red SANDSTONE distinctly weathered with horizontal smooth to rough planar discontinuities.	27	
		26.50 - 28.00	12				27.26					
28.00 - 29.50	NR					28.00			NO RECOVERY.	28		
	18	83	83	30	28.25			Extremely weak red SANDSTONE distinctly weathered with horizontal smooth to rough planar discontinuities.	29			
						29.50			End of Borehole at 29.500m	30		

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

Remarks															
1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater seepage from Made Ground at 1.5m bgl. 4. Sandstone bedrock encountered at 23.00m bgl. 5. Cable percussive drilling terminated at 23.50m bgl. 6. Rotary core follow on to 29.5m bgl. 7. Monitoring standpipe installed to 12.00m bgl (4.00m plain, 8.00m slotted).															





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Borehole Log

Borehole No.

BH03

Sheet 1 of 1

Project Name: DIDSBURY POINT

Project No.
GRO-20064

Co-ords: -

Hole Type
CP

Location: MANCHESTER

Level:

Scale
1:50

Client: SOUTHWAY HOUSING

Dates: 04/02/2021 - 04/02/2021

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.10			MADE GROUND: Grass over brown sandy gravelly topsoil. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete, rubber and glass. MADE GROUND: Brown grey very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete.	
		0.50	ES						
		0.50	ES						
		1.00	ES						
		1.20		N=50 (5,10/50 for 227mm)					
		2.00	ES						
		2.00		N=39 (3,4/5,10,10,14)					
		3.00	B						
		3.00		N=23 (5,3/5,5,6,7)					
		4.00	B		3.50				
		4.00		N=25 (4,5/4,5,6,10)	4.30				
		5.00	B		5.00				
		5.00		N=18 (3,4/4,5,4,5)					
								End of borehole at 5.00 m	

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater encountered at 2.00m bgl rising to 1.80m bgl after 20 minutes. 4. Monitoring standpipe installed to 5.00m bgl (4.00m plain, 1.00m slotted).





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Borehole Log

Borehole No.

BH04

Sheet 1 of 1

Project Name: DIDSBURY POINT

Project No.
GRO-20064

Co-ords: -

Hole Type
CP

Location: MANCHESTER

Level:

Scale
1:50

Client: SOUTHWAY HOUSING

Dates: 04/02/2021 - 05/02/2021

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Brown grey very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete.	
		1.00 1.20	ES	N=23 (3,4/4,6,6,7)				MADE GROUND: Brown clayey gravelly fine to coarse sand. Gravel is rounded to subrounded fine to coarse of mixed lithologies including brick.	1
		2.00 2.00	ES	N=20 (1,1/4,4,7,5)	2.00			Medium dense brown gravelly fine to coarse SAND. Gravel is rounded to subrounded fine to coarse of mixed lithologies.	2
		3.00 3.00	D	N=17 (1,1/3,4,4,6)					3
		4.00 4.00	D	N=16 (1,3/4,3,4,5)					4
		5.00 5.00	D	N=29 (4,5/7,6,6,10)	5.00			End of borehole at 5.00 m	5
									6
									7
									8
									9
									10

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater encountered at 2.50m bgl rising to 2.10m bgl after 20 minutes. 4. Monitoring standpipe installed to 5.00m bgl (2.00m plain, 3.00m slotted).





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Borehole Log

Borehole No.

BH05

Sheet 1 of 1

Project Name: DIDSBURY POINT

Project No.
GRO-20064

Co-ords: -

Hole Type
CP

Location: MANCHESTER

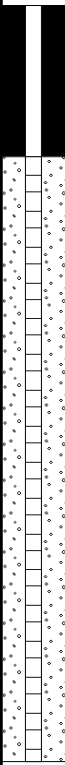
Level:

Scale
1:50

Client: SOUTHWAY HOUSING

Dates: 05/02/2021 - 05/02/2021

Logged By
CJH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			0.20			MADE GROUND: Brown grey very gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithologies including brick, concrete.	
		0.50	ES					MADE GROUND: Brown clayey gravelly fine to coarse sand. Gravel is rounded to subrounded fine to coarse of mixed lithologies including brick.	1
		1.00	ES						
		1.20		N=25 (3,4/4,7,9,5)					
		2.00	ES		1.80			Medium dense brown gravelly fine to coarse SAND. Gravel is rounded to subrounded fine to coarse of mixed lithologies.	2
		2.00		N=17 (2,3/5,4,5,3)					
		3.00	D						3
		3.00		N=20 (3,3/3,5,6,6)					
		4.00	D						4
		4.00		N=17 (3,4/5,4,4,4)					
		5.00	D		5.00			End of borehole at 5.00 m	5
		5.00		N=19 (3,3/4,4,5,6)					6
									7
									8
									9
									10

Remarks

1. Location cleared using hand held CAT scanner. 2. Hand dug pit to 1.2m bgl. 3. Groundwater encountered at 2.50m bgl rising to 2.20m bgl after 20 minutes. 4. Monitoring standpipe installed to 5.00m bgl (1.00m plain, 4.00m slotted).



APPENDIX 4 - Geo-Environmental Testing Results

Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE



Attention :	Connor Hastings
Date :	24th February, 2021
Your reference :	20064
Our reference :	Test Report 21/1759 Batch 1
Location :	Didsbury Point
Date samples received :	9th February, 2021
Status :	Final report
Issue :	1

Forty six samples were received for analysis on 9th February, 2021 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Hayley Prowse

Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: 20064
Location: Didsbury Point
Contact: Connor Hastings
EMT Job No: 21/1759

Report : Solid

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

EMT Sample No.	21-23	35-37	44-46	61-63	94	122-124					Please see attached notes for all abbreviations and acronyms			
Sample ID	BH2	BH4	BH5	TP02	TP04	IP3								
Depth	0.50	0.50	0.50	0.50	1.80	0.50								
COC No / misc														
Containers	V J T	V J	V J	V J T	T	V J T								
Sample Date	03/02/2021	04/02/2021	05/02/2021	03/02/2021	04/02/2021	04/02/2021								
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1	1								
Date of Receipt	09/02/2021	09/02/2021	09/02/2021	09/02/2021	09/02/2021	09/02/2021					LOD/LOR	Units	Method No.	
Arsenic #	3.1	4.3	4.9	13.6	8.3	2.4					<0.5	mg/kg	TM30/PM15	
Cadmium #	0.6	0.3	0.2	8.4	0.2	1.3					<0.1	mg/kg	TM30/PM15	
Chromium #	21.8	45.4	53.7	44.3	59.4	18.3					<0.5	mg/kg	TM30/PM15	
Copper #	10	19	14	72	21	12					<1	mg/kg	TM30/PM15	
Lead #	63	29	21	123	46	33					<5	mg/kg	TM30/PM15	
Mercury #	0.4	0.2	0.1	0.4	0.4	0.4					<0.1	mg/kg	TM30/PM15	
Nickel #	5.9	11.3	14.2	23.3	13.5	5.2					<0.7	mg/kg	TM30/PM15	
Selenium #	<1	<1	<1	1	<1	<1					<1	mg/kg	TM30/PM15	
Zinc #	27	58	39	320	57	57					<5	mg/kg	TM30/PM15	
PAH MS														
Naphthalene #	0.06	1.35 _{AA}	<0.04	0.85 _{AA}	0.06	<0.04					<0.04	mg/kg	TM4/PM8	
Acenaphthylene	0.42	<0.30 _{AA}	<0.03	<0.30 _{AA}	0.06	<0.03					<0.03	mg/kg	TM4/PM8	
Acenaphthene #	2.15	1.73 _{AA}	<0.05	0.84 _{AA}	0.70	<0.05					<0.05	mg/kg	TM4/PM8	
Fluorene #	2.12	1.34 _{AA}	<0.04	0.54 _{AA}	0.29	<0.04					<0.04	mg/kg	TM4/PM8	
Phenanthrene #	15.23	9.01 _{AA}	0.41	4.58 _{AA}	3.01	0.29					<0.03	mg/kg	TM4/PM8	
Anthracene #	6.77	3.10 _{AA}	0.11	0.97 _{AA}	0.78	0.08					<0.04	mg/kg	TM4/PM8	
Fluoranthene #	>>26.37	13.71 _{AA}	0.83	5.86 _{AA}	3.33	0.63					<0.03	mg/kg	TM4/PM8	
Pyrene #	>>21.94	11.83 _{AA}	0.76	5.64 _{AA}	2.79	0.59					<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene #	10.07	5.59 _{AA}	0.40	3.50 _{AA}	1.04	0.37					<0.06	mg/kg	TM4/PM8	
Chrysene #	9.39	5.83 _{AA}	0.39	3.29 _{AA}	1.02	0.33					<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	16.00	13.14 _{AA}	0.74	5.28 _{AA}	1.70	0.60					<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene #	9.04	7.90 _{AA}	0.42	2.87 _{AA}	0.99	0.34					<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene #	5.19	5.43 _{AA}	0.28	1.71 _{AA}	0.61	0.22					<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene #	0.98	0.79 _{AA}	0.06	<0.40 _{AA}	0.12	0.04					<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene #	5.13	5.43 _{AA}	0.28	2.03 _{AA}	0.57	0.23					<0.04	mg/kg	TM4/PM8	
PAH 16 Total	130.9	86.2 _{AA}	4.7	38.0 _{AA}	17.1	3.7					<0.6	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	11.52	9.46 _{AA}	0.53	3.80 _{AA}	1.22	0.43					<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	4.48	3.68 _{AA}	0.21	1.48 _{AA}	0.48	0.17					<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	96	94 _{AA}	91	90 _{AA}	94	94					<0	%	TM4/PM8	
Natural Moisture Content	8.1	15.5	17.1	19.5	16.7	9.0					<0.1	%	PM4/PM0	
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/kg	TM38/PM20	
Sulphate as SO4 (2:1 Ext) #	0.0521	0.1008	0.1078	0.2323	0.2507	0.0137					<0.0015	g/l	TM38/PM20	
Organic Matter	1.0	1.4	1.9	8.0	2.0	0.7					<0.2	%	TM21/PM24	
pH #	8.94	8.56	8.66	8.82	11.22	9.02					<0.01	pH units	TM73/PM11	

Please see attached notes for all abbreviations and acronyms

Client Name: Groundtech Consulting Limited
Reference: 20064
Location: Didsbury Point
Contact: Connor Hastings

Note:

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

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/1759	1	BH2	0.50	23	22/02/2021	General Description (Bulk Analysis)	soil/stones
					22/02/2021	Asbestos Fibres	NAD
					22/02/2021	Asbestos ACM	NAD
					22/02/2021	Asbestos Type	NAD
					22/02/2021	Asbestos Level Screen	NAD
21/1759	1	BH4	0.50	37	22/02/2021	General Description (Bulk Analysis)	soil/stones
					22/02/2021	Asbestos Fibres	NAD
					22/02/2021	Asbestos ACM	NAD
					22/02/2021	Asbestos Type	NAD
					22/02/2021	Asbestos Level Screen	NAD
21/1759	1	BH5	0.50	46	22/02/2021	General Description (Bulk Analysis)	Soil/Stones
					22/02/2021	Asbestos Fibres	NAD
					22/02/2021	Asbestos ACM	NAD
					22/02/2021	Asbestos Type	NAD
					22/02/2021	Asbestos Level Screen	NAD
21/1759	1	TP02	0.50	63	22/02/2021	General Description (Bulk Analysis)	soil/stones
					22/02/2021	Asbestos Fibres	NAD
					22/02/2021	Asbestos ACM	NAD
					22/02/2021	Asbestos Type	NAD
					22/02/2021	Asbestos Level Screen	NAD
21/1759	1	TP04	1.80	94	22/02/2021	General Description (Bulk Analysis)	Soil/Stones
					22/02/2021	Asbestos Fibres	NAD
					22/02/2021	Asbestos ACM	NAD
					22/02/2021	Asbestos Type	NAD
					22/02/2021	Asbestos Level Screen	NAD
21/1759	1	IP3	0.50	124	22/02/2021	General Description (Bulk Analysis)	Soil/Stones
					22/02/2021	Asbestos Fibres	NAD
					22/02/2021	Asbestos ACM	NAD
					22/02/2021	Asbestos Type	NAD
					22/02/2021	Asbestos Level Screen	NAD

Client Name: Groundtech Consulting Limited **Matrix : Solid**

Reference: 20064

Location: Didsbury Point

Contact: Connor Hastings

Matrix : Solid

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/1759

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

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

AA	x10 Dilution
----	--------------

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics extracted.
#2	EU_Total but with fatty acids extracted.
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/1759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH ₄ ⁺ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH ₄ ⁺ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE

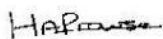


Attention :	Connor Hastings
Date :	1st March, 2021
Your reference :	20064
Our reference :	Test Report 21/1759 Batch 2
Location :	Didsbury Point
Date samples received :	23rd February, 2021
Status :	Final report
Issue :	1

Six samples were received for analysis on 23rd February, 2021 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Hayley Prowse

Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: 20064
Location: Didsbury Point
Contact: Connor Hastings
EMT Job No: 21/1759

Report : Solid

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

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

[illegible]

Client Name: Groundtech Consulting Limited

Reference: 20064

Location: Didsbury Point

Contact: Connor Hastings

[illegible]

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/1759

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

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

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics extracted.
#2	EU_Total but with fatty acids extracted.
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/1759

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

APPENDIX 5 – Geotechnical Testing Results



LABORATORY REPORT



4043

Contract Number: PSL21/1438

Report Date: 11 March 2021
Client's Reference: 20120-1583
Client Name: Groundtech Consulting
PO Box 499
Manchester
M28 4EE

For the attention of: Richard Wyatt

Contract Title: Didsbury Point
Date Received: 16/2/2021
Date Commenced: 16/2/2021
Date Completed: 11/3/2021

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins
(Director)

L Knight
(Senior Technician)

R Berriman
(Quality Manager)

S Eyre
(Senior Technician)

S Royle
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T Watkins
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5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL

Professional Soils Laboratory

Didsbury Point

Contract No:

PSL21/1438

Client Ref:

GRO-20064

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

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



4043

PSL

Professional Soils Laboratory

Didsbury Point

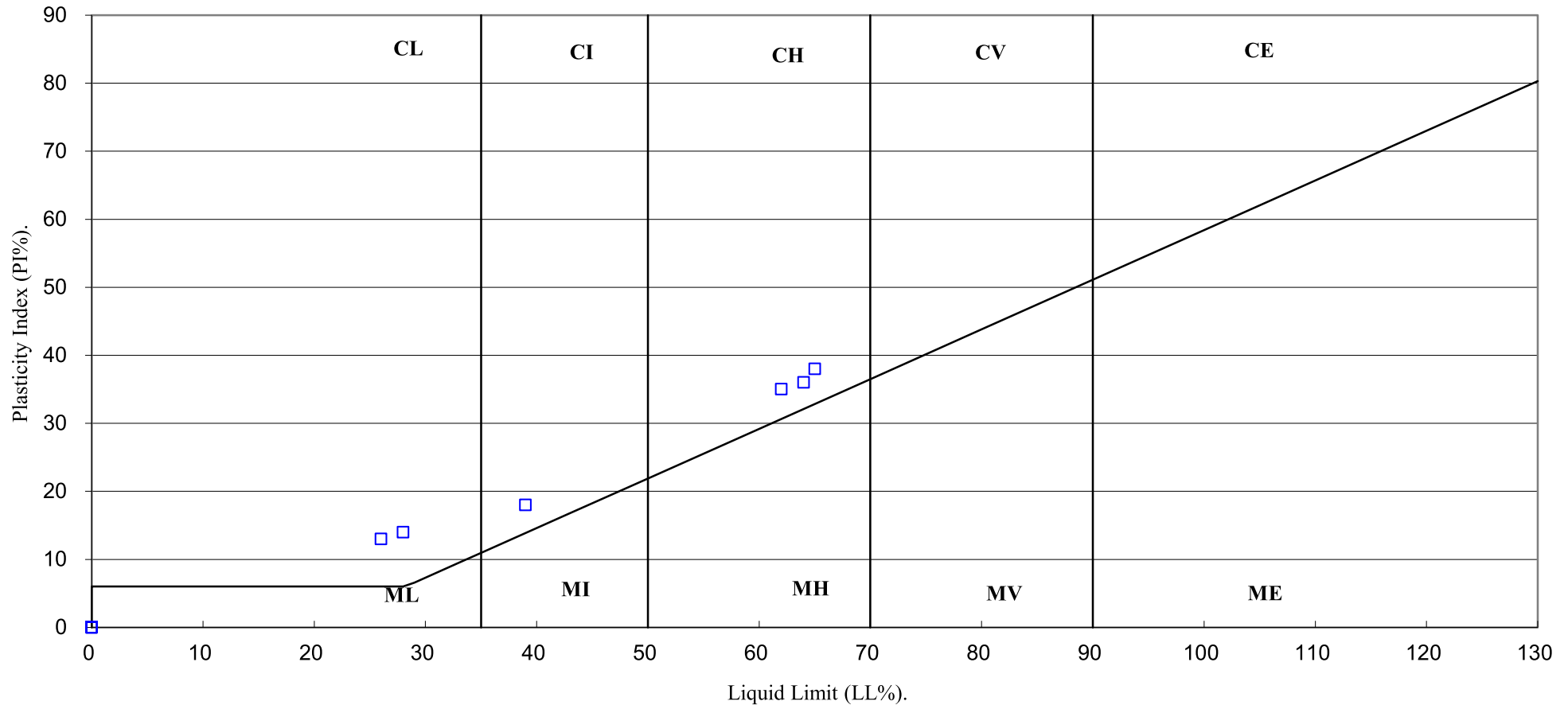
Contract No:

PSL21/1438

Client Ref:

GRO-20064

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Didsbury Point

Contract No:

PSL21/1438

Client Ref:

GRO-20064

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

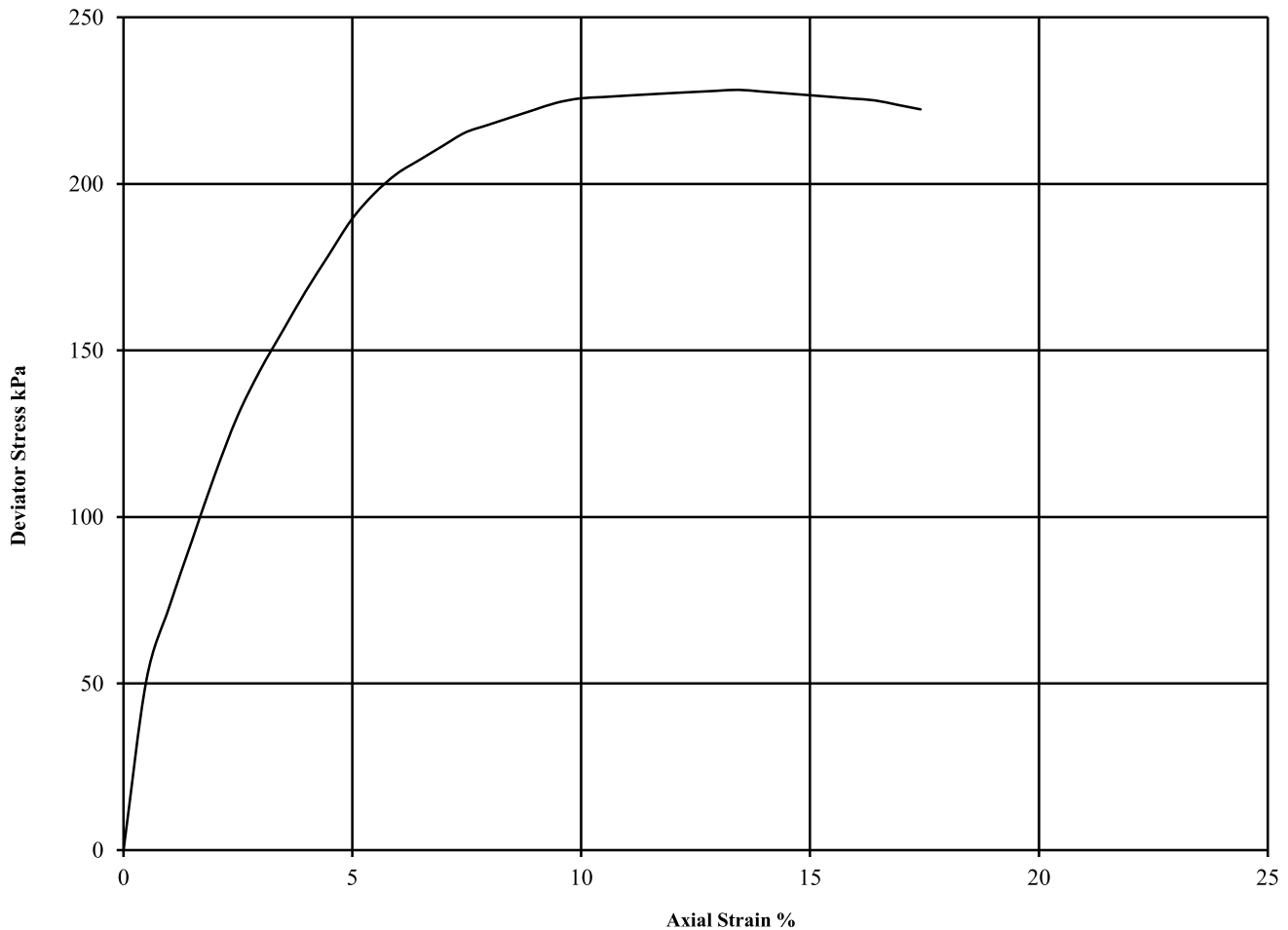
Hole Number: BH01

Top Depth (m): 5.00

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	22	2.05	1.68	100	228	114	13.4	Plastic	



Didsbury Point

Contract No:

PSL21/1438

Client Ref:

GRO-20064

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

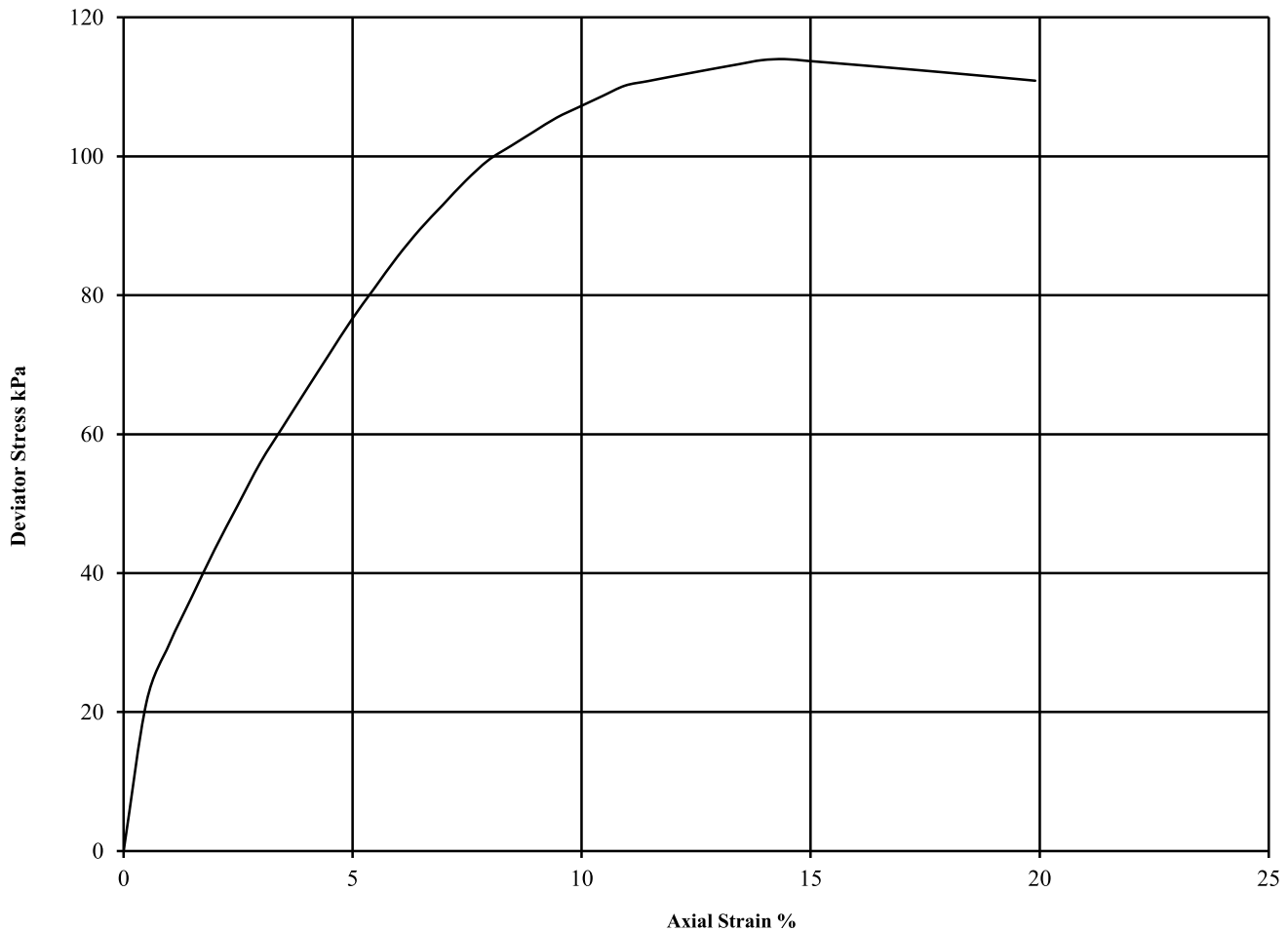
Hole Number: BH01

Top Depth (m): 8.00

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	32	1.92	1.45	160	114	57	14.4	Plastic	



Didsbury Point

Contract No:

PSL21/1438

Client Ref:

GRO-20064

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

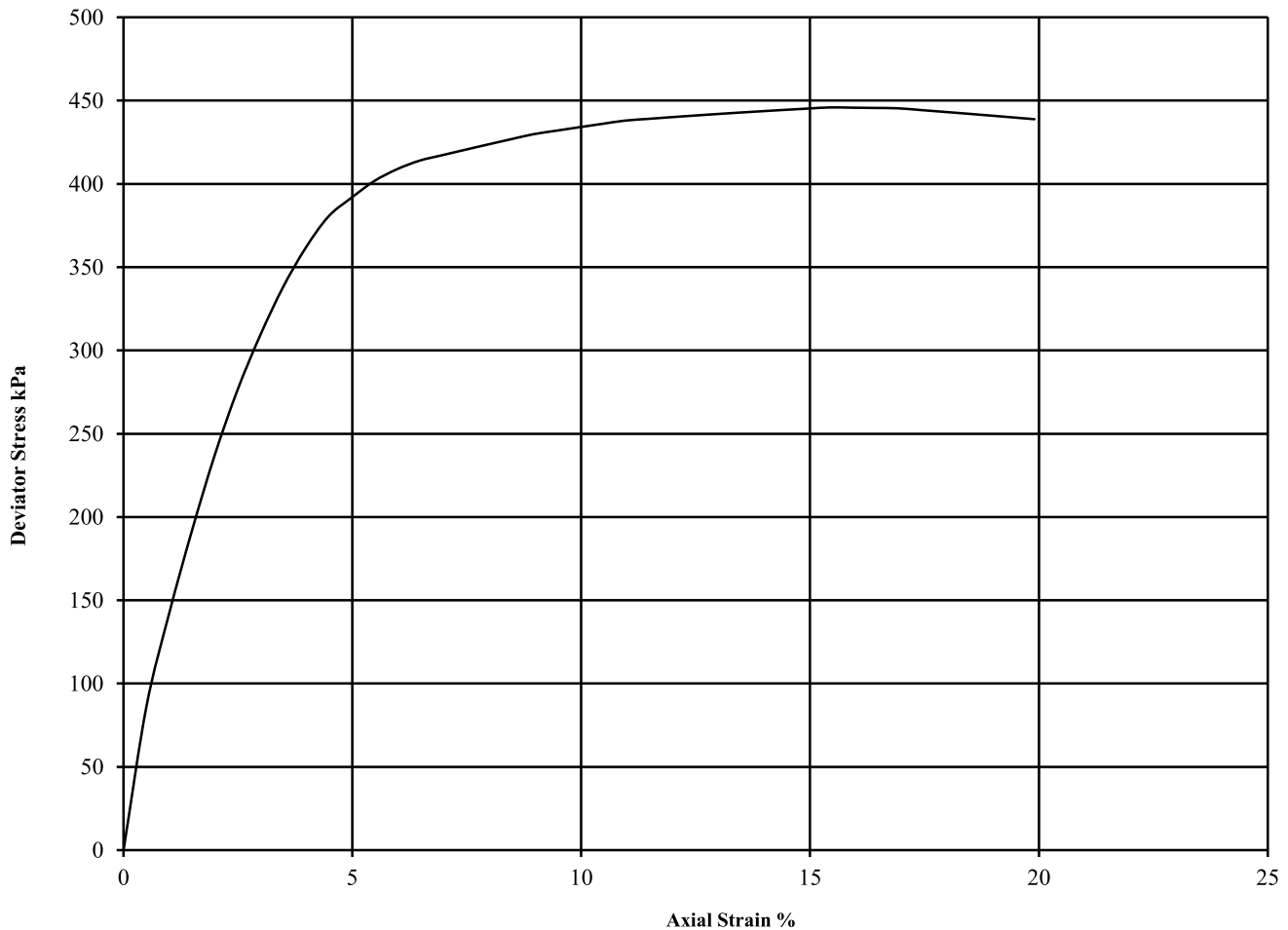
Hole Number: BH01

Top Depth (m): 12.50

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	12	2.24	2.00	250	446	223	15.4	Intermediate	



Didsbury Point

Contract No:

PSL21/1438

Client Ref:

GRO-20064

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

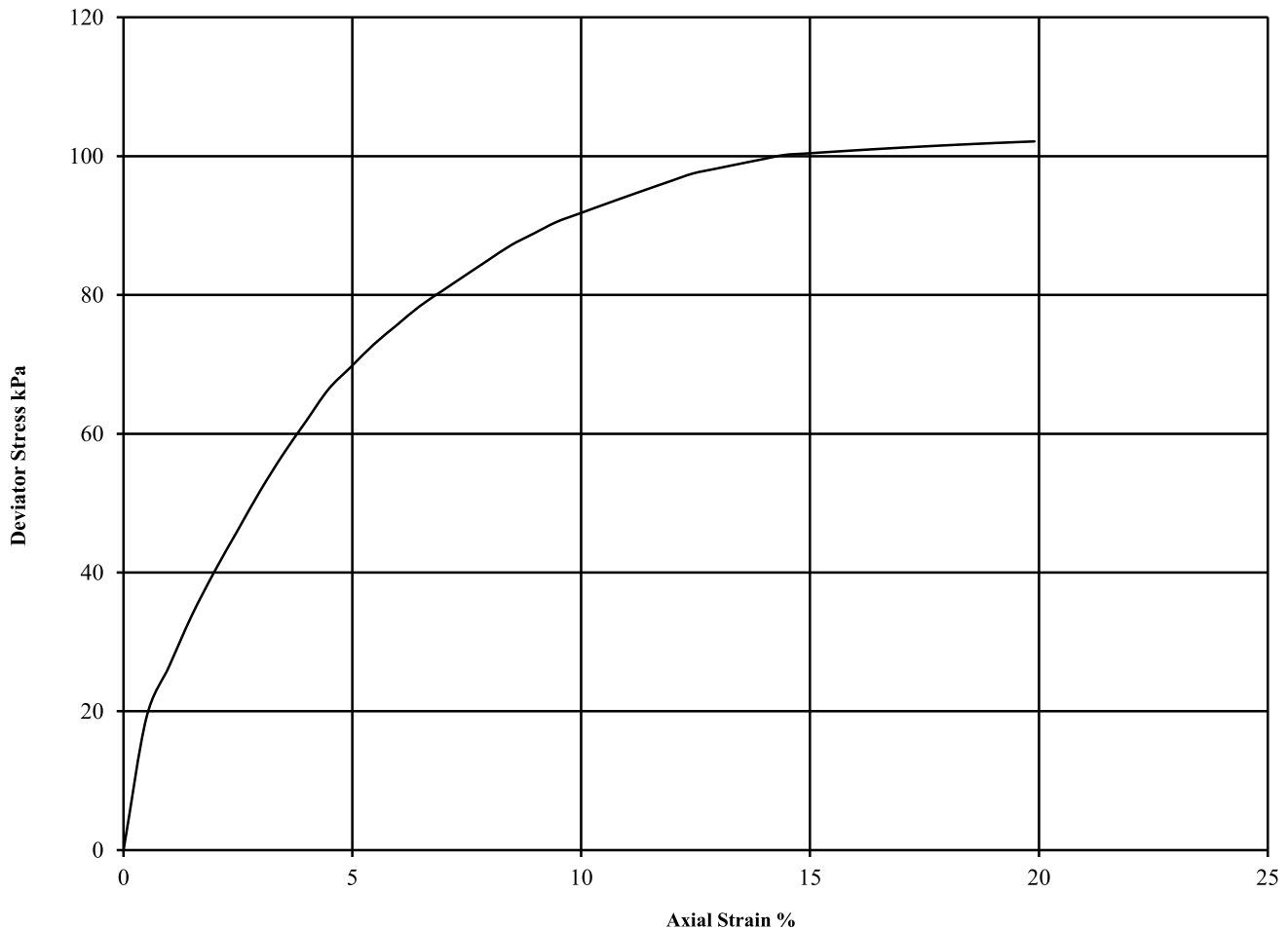
Hole Number: BH02

Top Depth (m): 8.00

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.33 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	29	1.96	1.52	160	102	51	19.9	Plastic	



Didsbury Point

Contract No:

PSL21/1438

Client Ref:

GRO-20064

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

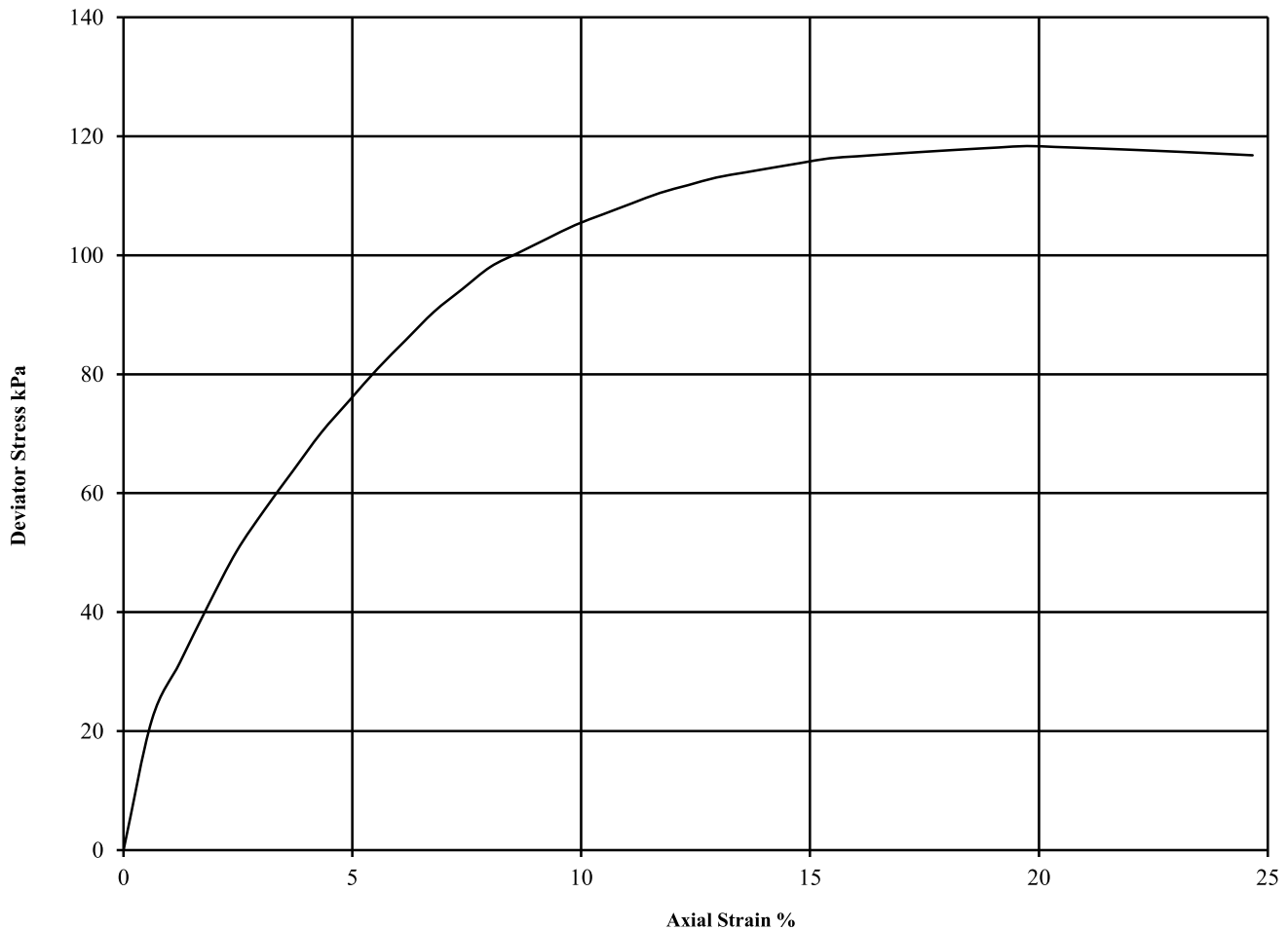
Hole Number: BH02

Top Depth (m): 11.00

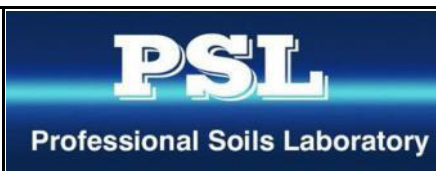
Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		167	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.33 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	13	2.11	1.87	220	118	59	19.7	Plastic	



Didsbury Point

Contract No:

PSL21/1438

Client Ref:

GRO-20064

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

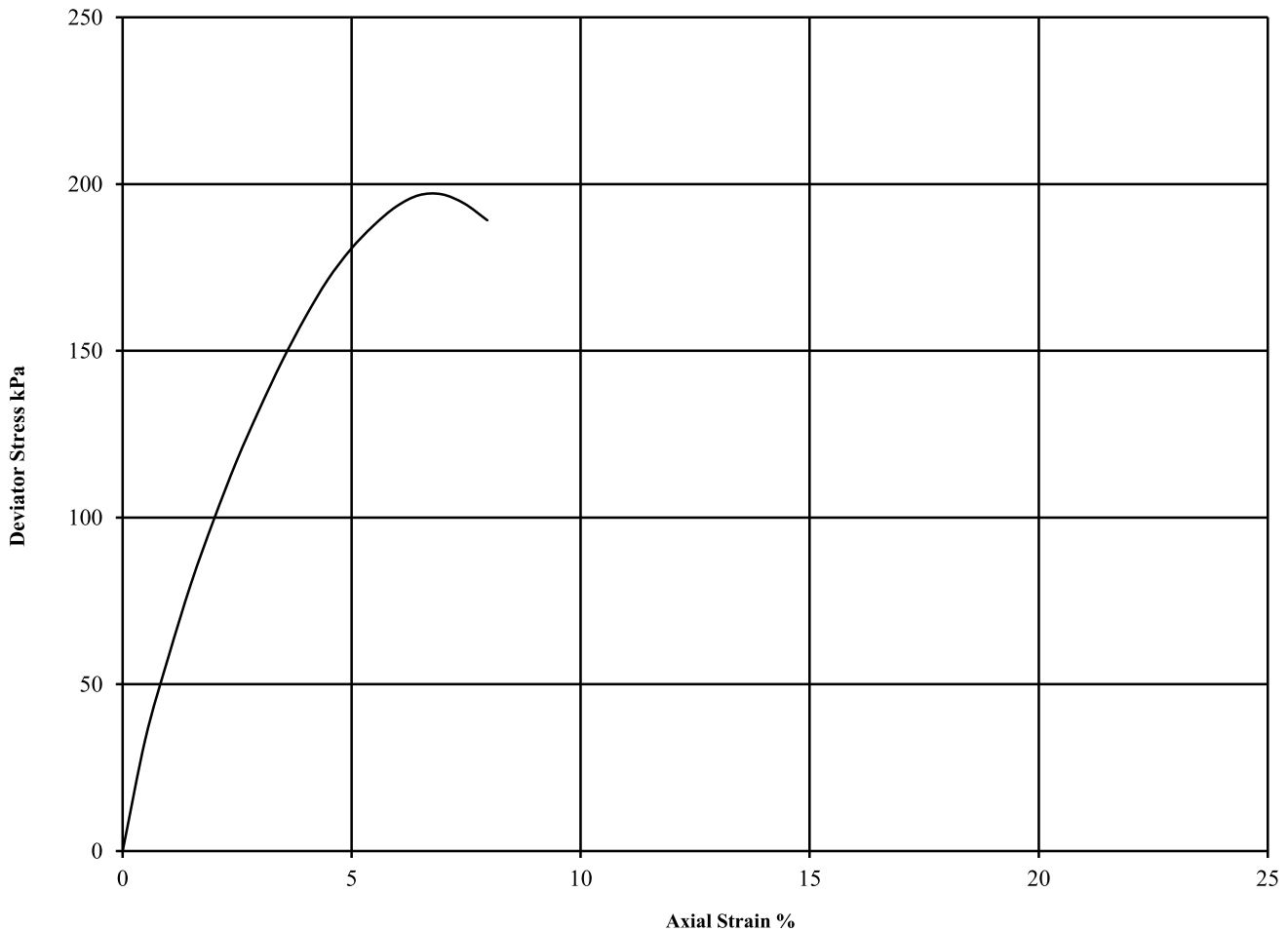
Hole Number: BH02

Top Depth (m): 18.50

Sample Number:

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.36 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	23	2.02	1.65	370	197	98	7.0	Brittle	



Didsbury Point

Contract No:

PSL21/1438

Client Ref:

GRO-20064



LABORATORY REPORT



4043

Contract Number: PSL21/2135

Report Date: 24 March 2021
Client's Reference: GRO-20064
Client Name: Groundtech Consulting
First Floor
Lloyd House
Orford Court
Greenfold Way
WN7 3XJ

For the attention of: Connor Hastings

Contract Title: Didsbury Point
Date Received: 15/3/2021
Date Commenced: 15/3/2021
Date Completed: 24/3/2021

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Senior Technician)


S Eyre
(Senior Technician)

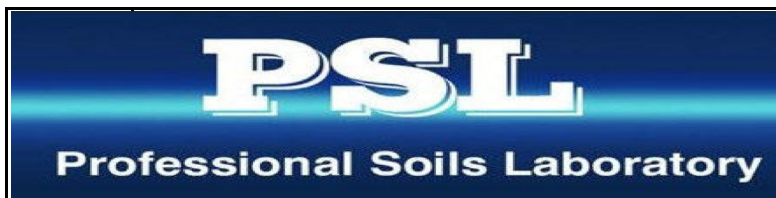
H Daniels
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Page 1 of

DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

[illegible]

Didsbury Point

Contract No:

PSL21/2135

Client Ref:

GRO-20064

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation Par / Perp	Dimensions (mm)		Area (mm ²)	D _e ²	D _e (mm)	Failure Load (P)		I _s (MPa)	Corr Fac F	I _{s50} (MPa)	Failure Type	Remarks
					W	D				(Mpa)	(kN)					
BH01	27.75		A	Perp	84	28	2352	2994.66	54.72	-	0.24	0.08	1.041	0.08	Valid	
BH01	28.90		A	Perp	84	29	2436	3101.61	55.69	-	0.39	0.13	1.050	0.13	Valid	
BH01	29.80		A	Perp	84	27	2268	2887.71	53.74	-	0.15	0.05	1.033	0.05	Valid	
BH01	31.10		A	Perp	85	24	2040	2597.41	50.96	-	0.35	0.13	1.009	0.14	Valid	
BH01	32.70		A	Perp	85	24	2040	2597.41	50.96	-	0.66	0.25	1.009	0.26	Valid	
BH02	24.80		A	Perp	84	29	2436	3101.61	55.69	-	0.17	0.05	1.050	0.06	Valid	
BH02	25.50		A	Perp	85	28	2380	3030.31	55.05	-	0.45	0.15	1.044	0.16	Valid	
BH02	26.20		A	Perp	85	25	2125	2705.63	52.02	-	0.44	0.16	1.018	0.17	Valid	
BH02	27.50		A	Perp	85	27	2295	2922.08	54.06	-	0.58	0.20	1.036	0.21	Valid	
BH02	28.70		A	Perp	85	32	2720	3463.21	58.85	-	0.16	0.05	1.076	0.05	Valid	

***Note** All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular

 4043	 Professional Soils Laboratory	Didsbury Point	Contract No:
			PSL21/2135
			Client Ref:
			GRO-20064

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimensions (mm)		D_c^2	D_c (mm)	Failure Load		I_s (MPa)	Corr Fac F	I_{s50} (MPa)	Failure Type	Remarks
				Par / Perp	L	D			(Mpa)	(kN)					
BH01	27.75		D	Par	-	84	7056	84.00	-	0.23	0.033	1.263	0.04	Valid	
BH01	28.90		D	Par	-	84	7056	84.00	-	0.30	0.043	1.263	0.05	Valid	
BH01	29.80		D	Par	-	84	7056	84.00	-	0.21	0.030	1.263	0.04	Valid	
BH01	31.10		D	Par	-	85	7225	85.00	-	0.07	0.010	1.270	0.01	Valid	
BH01	32.70		D	Par	-	85	7225	85.00	-	0.28	0.039	1.270	0.05	Valid	
BH02	24.80		D	Par	-	84	7056	84.00	-	0.08	0.011	1.263	0.01	Valid	
BH02	25.50		D	Par	-	85	7225	85.00	-	0.18	0.025	1.270	0.03	Valid	
BH02	26.20		D	Par	-	85	7225	85.00	-	0.17	0.024	1.270	0.03	Valid	
BH02	27.50		D	Par	-	85	7225	85.00	-	0.18	0.025	1.270	0.03	Valid	
BH02	28.70		D	Par	-	85	7225	85.00	-	0.08	0.011	1.270	0.01	Valid	

***Note** All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Didsbury Point

Contract No:

PSL21/2135

Client Ref:

GRO-20064

APPENDIX 6 – Interim Ground Gas Results

PERMANENT GROUND GAS MONITORING FORM



SITE NAME:	DIDSBURY POINT	ENGINEER:	Joshua Turton
CLIENT:	CIVIC ENGINEERS	DATE:	01/03/2021
JOB NO:	20064		

Pressure Trend:	Rising	Weather:	Sunny			Equipment:	GFM 436	
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)		
Start	20.5	0.0	0.0	0.0	0.0	0.0		
Finish	20.6	0.0	0.0	0.0	0.0	0.0		

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{mg} CO ₂ (l/hr)	Q _{mg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (V/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
BH01	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.2	20.0	0.0	0.0	0.0	0.0	0.0000	0.0000	1031	-		2.13
BH02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-		2.03
BH03	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.6	20.6	0.0	0.0	0.0	0.0	0.0000	0.0000	1027	-		1.90
BH04	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.3	20.6	0.0	0.0	0.0	0.0	0.0000	0.0000	1027	-		2.44
BH05	0.0	0.0	0.00	0.0	0.0	0.0	1.5	0.9	15.0	17.6	0.0	0.0	0.0	0.0	0.0015	0.0000	1027	-		2.31

Notes: BH02 monitoring pipe fallen.

PERMANENT GROUND GAS MONITORING FORM



SITE NAME:	DIDSBURY POINT	ENGINEER:	Joshua Turton
CLIENT:	CIVIC ENGINEERS	DATE:	17/03/2021
JOB NO:	20064		

Pressure Trend:	Steady	Weather:	Clear			Equipment:	GFM 436
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)	
Start	20.5	0.0	0.0	0.0	0.0	0.0	
Finish	20.5	0.0	0.0	0.0	0.0	0.0	

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{ing} CO ₂ (l/hr)	Q _{ing} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
BH01	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	15.2	17.3	0.0	0.0	0.0	0.0	0.0000	0.0000	1033	-	N	1.95
BH02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-		1.27
BH03	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.4	20.4	0.0	0.0	0.0	0.0	0.0000	0.0000	1033	-	N	1.76
BH04	0.0	0.0	0.00	0.0	0.0	0.0	0.7	0.4	18.8	19.8	0.0	0.0	0.0	0.0	0.0007	0.0000	1033	-	N	2.33
BH05	0.0	0.0	0.00	0.0	0.0	0.0	3.8	3.0	9.5	11.7	0.0	0.0	0.0	0.0	0.0038	0.0000	1033	-	N	2.23

Notes: BH02 monitoring pipe fallen.

APPENDIX 7 – Plate Load Test Results



LABORATORY REPORT



4043

Contract Number: PSL21/1039

Report Date: 04 February 2021

Client's Reference:

Client Name: Groundtech Consulting
First Floor
Lloyd House
Orford Court
Greenfold Way
WN7 3XJ

For the attention of: Connor Hastings

Contract Title: Didsbury Park, Manchester

Date Received: 3/2/2021

Date Commenced: 3/2/2021

Date Completed: 4/2/2021

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Senior Technician)

S Eyre
(Senior Technician)


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Page 1 of

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 03-Feb-21

Test Position: TP1

Depth (m): 0.35

Plate Area (m²): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

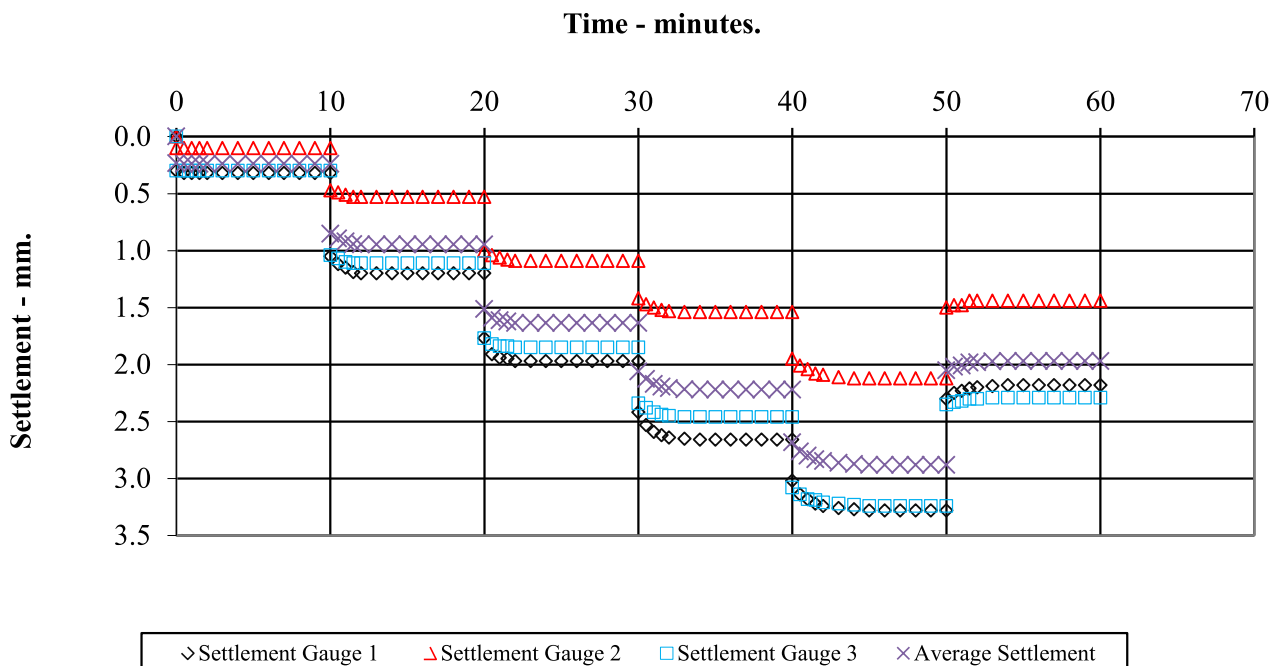
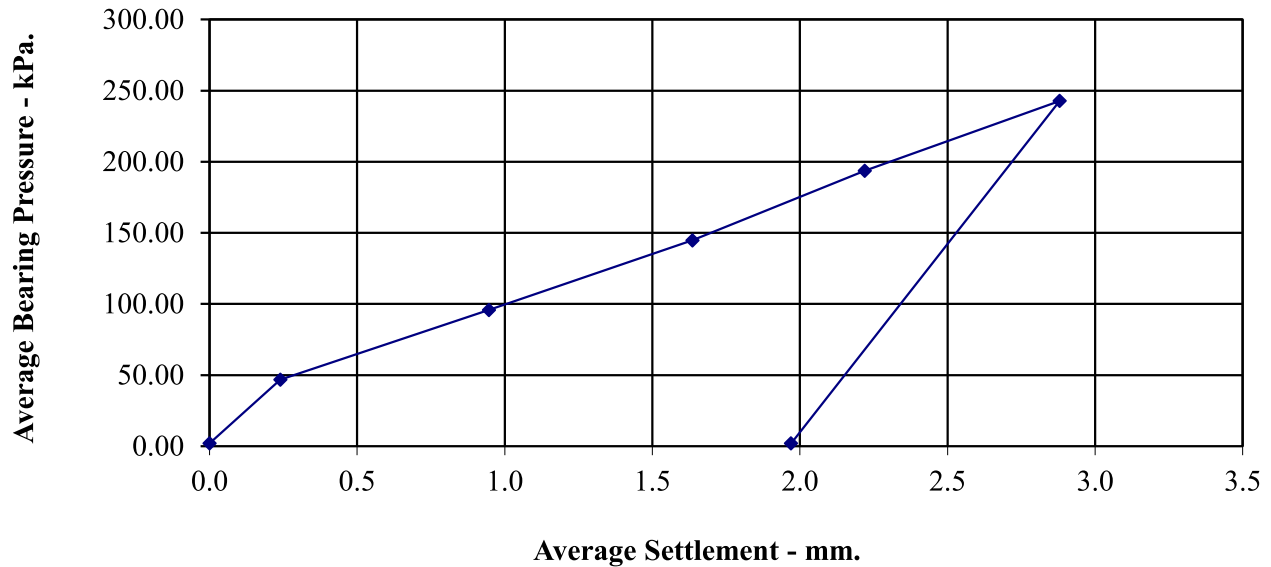
242.67

Maximum Deformation (mm):

2.88

Description:

Type 1 Sub Base



Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4

Incorporating IAN 73/06

Date of Test 3-Feb-21

Test Position TP1

Depth (m) 0.35

Description Type 1 Sub Base

Maximum Deflection 2.88 mm

Deflection required for CBR value 1.25 mm

Load at 1.25mm 117 kN/m²

Plate diameter 455 mm

Conversion factor for plate diameter 0.629

K₇₆₂(modulus of subgrade reaction)
calculated using 1.25mm settlement 59.0 kN/m²/mm

CBR Value 11.3 %



Didsbury Park, Manchester

Contract No:

PSL21/1039

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 03-Feb-21

Test Position: TP2

Depth (m): 0.35

Plate Area (m²): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

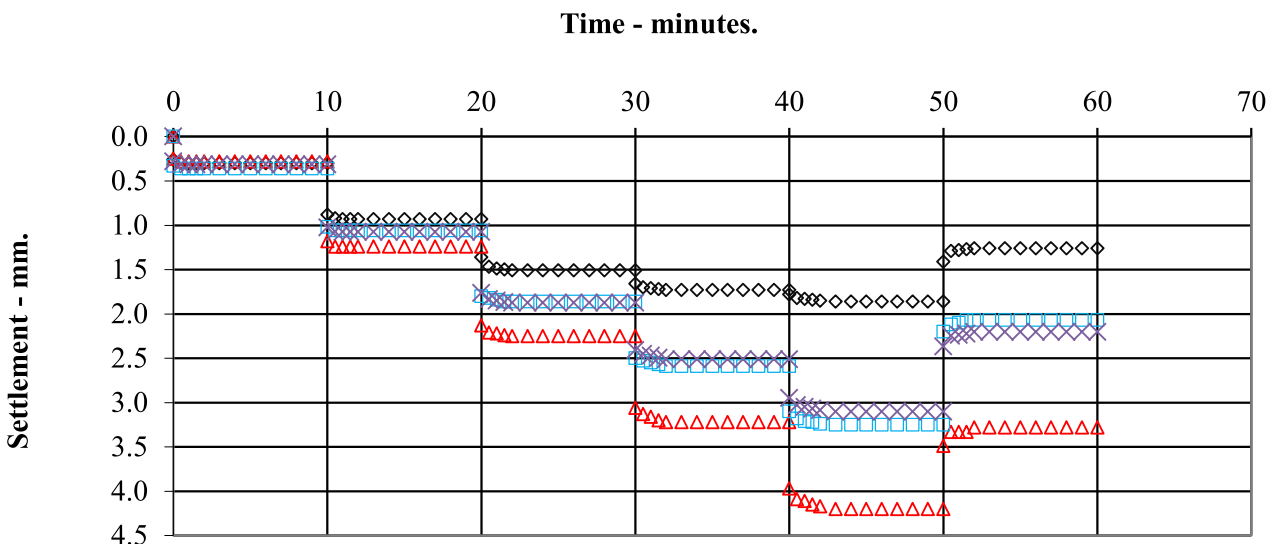
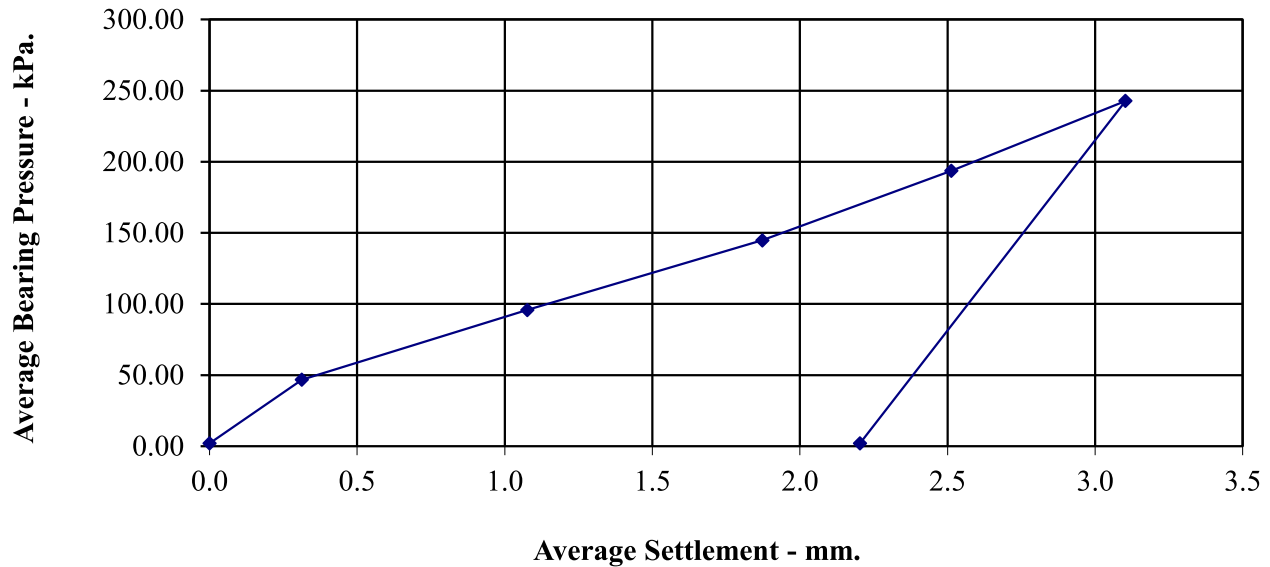
242.67

Maximum Deformation (mm):

3.10

Description:

Brown sandy clayey GRAVEL.



◇ Settlement Gauge 1 △ Settlement Gauge 2 □ Settlement Gauge 3 × Average Settlement



Didsbury Park, Manchester

Contract No:

PSL21/1039

Client Ref:

Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4

Incorporating IAN 73/06

Date of Test 3-Feb-21

Test Position TP2

Depth (m) 0.35

Description Brown sandy clayey GRAVEL.

Maximum Deflection 3.10 mm

Deflection required for CBR value 1.25 mm

Load at 1.25mm 106 kN/m²

Plate diameter 455 mm

Conversion factor for plate diameter 0.629

K₇₆₂(modulus of subgrade reaction)
calculated using 1.25mm settlement 53.6 kN/m²/mm

CBR Value 9.6 %



Didsbury Park, Manchester

Contract No:

PSL21/1039

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 03-Feb-21

Test Position: TP3

Depth (m): 0.35

Plate Area (m2): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

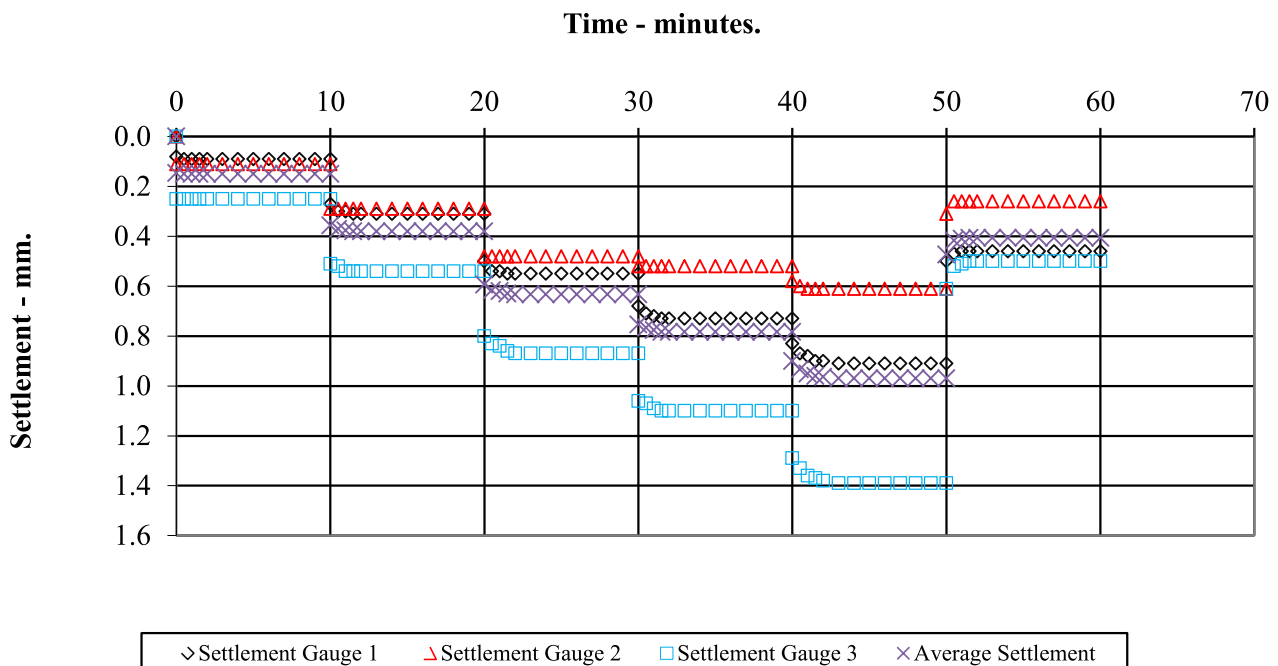
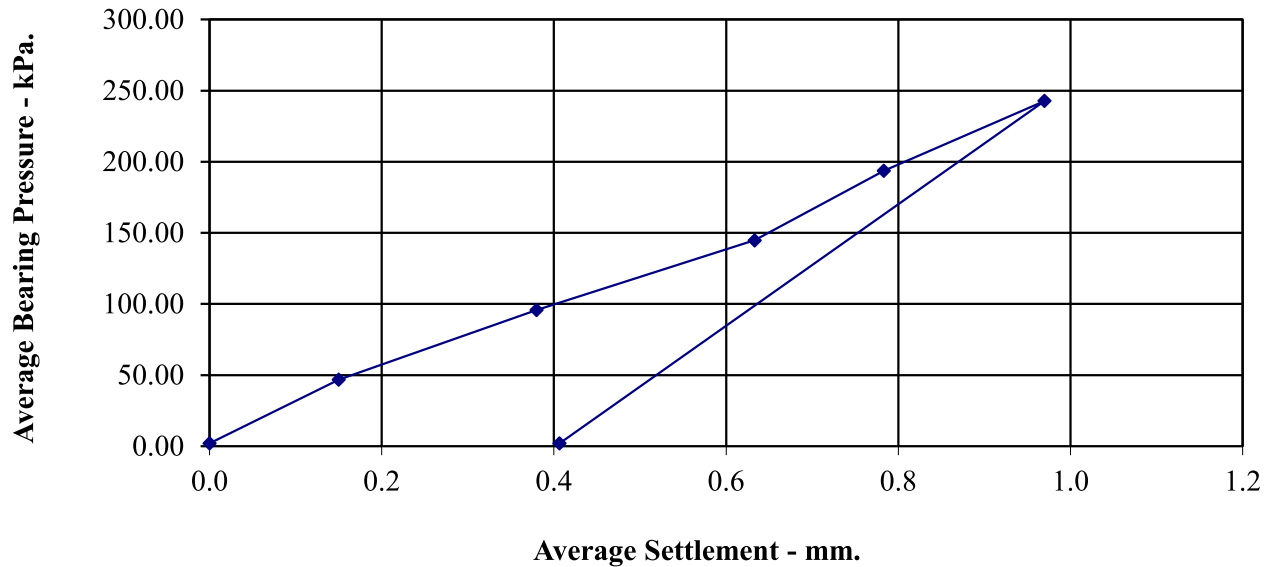
242.67

Maximum Deformation (mm):

0.97

Description:

Brown slightly clayey SAND.



Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4

Incorporating IAN 73/06

Date of Test	3-Feb-21	
Test Position	TP3	
Depth (m)	0.35	
Description	Brown slightly clayey SAND.	
Maximum Deflection	0.97	mm
Deflection required for CBR value	1.25	mm
Load at 0.97mm	243	kN/m ²
Plate diameter	455	mm
Conversion factor for plate diameter	0.629	
K ₇₆₂ (modulus of subgrade reaction) calculated using 1.25mm settlement	> 122.1	kN/m ² /mm
CBR Value	> 39.9	%



Didsbury Park, Manchester

Contract No:

PSL21/1039

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 03-Feb-21

Test Position: TP4

Depth (m): 0.35

Plate Area (m²): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

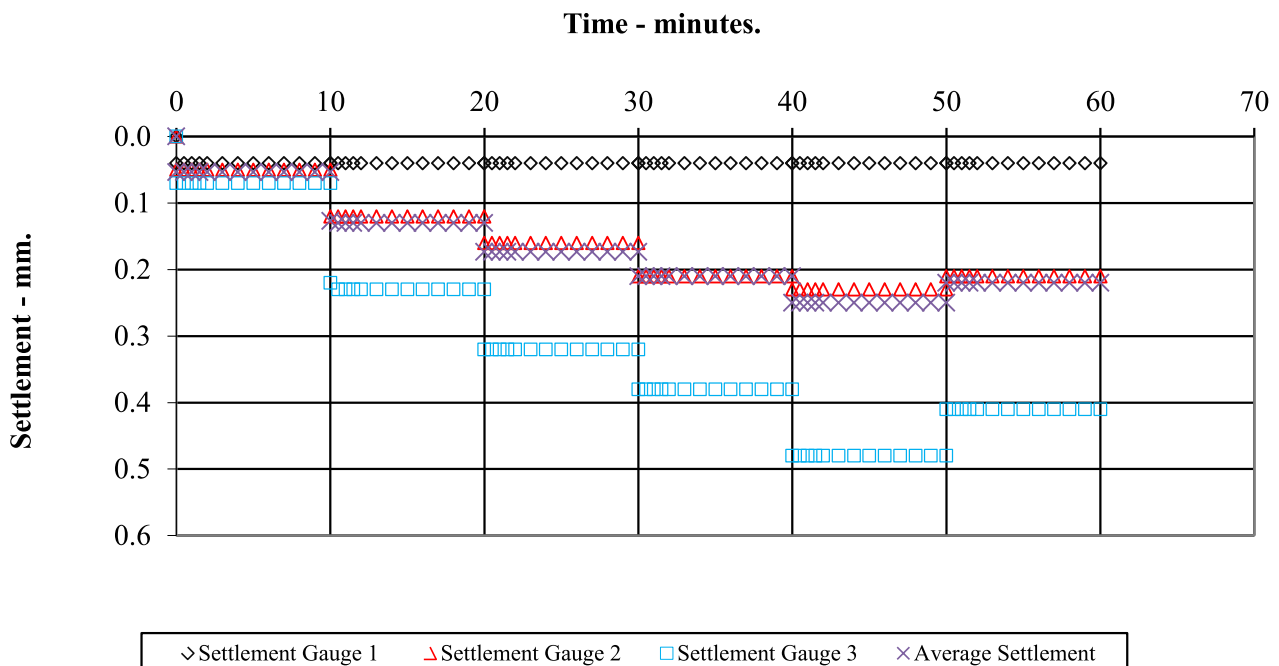
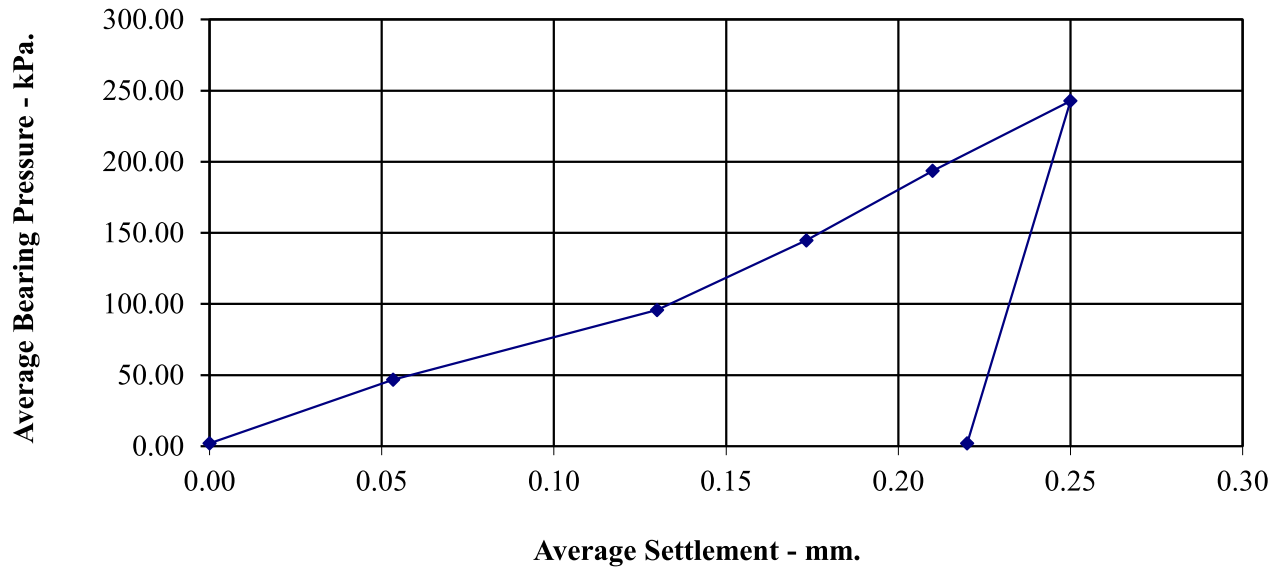
242.67

Maximum Deformation (mm):

0.25

Description:

Brown gravelly sandy CLAY.



Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4

Incorporating IAN 73/06

Date of Test 3-Feb-21

Test Position TP4

Depth (m) 0.35

Description Brown gravelly sandy CLAY.

Maximum Deflection 0.25 mm

Deflection required for CBR value 1.25 mm

Load at 0.25mm 243 kN/m²

Plate diameter 455 mm

Conversion factor for plate diameter 0.629

K₇₆₂(modulus of subgrade reaction)
calculated using 1.25mm settlement > 122.1 kN/m²/mm

CBR Value > 39.9 %



Didsbury Park, Manchester

Contract No:

PSL21/1039

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 03-Feb-21

Test Position: TP5

Depth (m): 0.35

Plate Area (m²): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

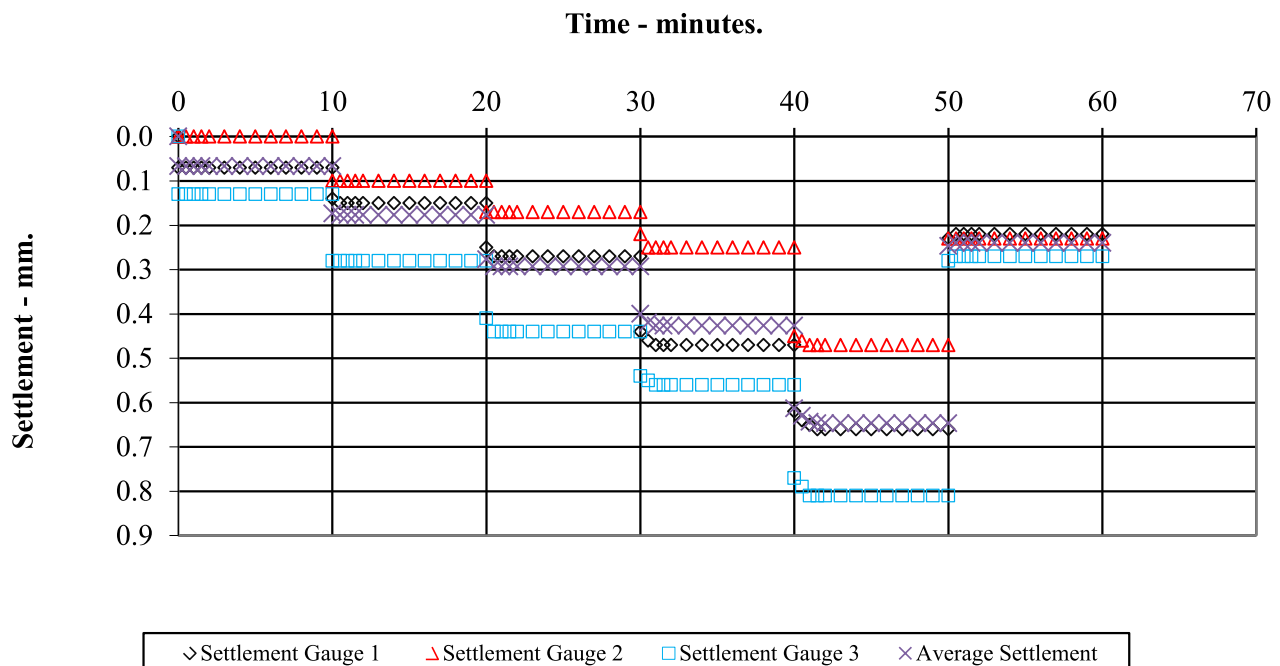
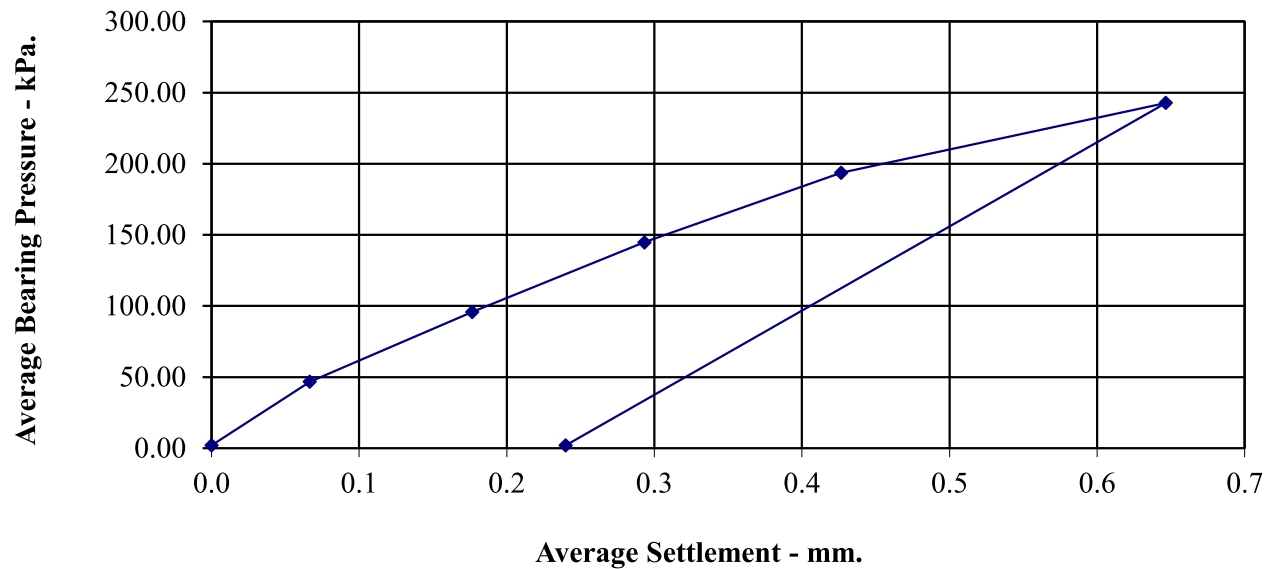
242.67

Maximum Deformation (mm):

0.65

Description:

Brown gravelly sandy CLAY.



Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4

Incorporating IAN 73/06

Date of Test 3-Feb-21

Test Position TP5

Depth (m) 0.35

Description Brown gravelly sandy CLAY.

Maximum Deflection 0.65 mm

Deflection required for CBR value 1.25 mm

Load at 0.65mm 243 kN/m²

Plate diameter 455 mm

Conversion factor for plate diameter 0.629

K₇₆₂(modulus of subgrade reaction)
calculated using 1.25mm settlement > 122.1 kN/m²/mm

CBR Value > 39.9 %



Didsbury Park, Manchester

Contract No:

PSL21/1039

Client Ref:

VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

Date of Test: 03-Feb-21

Test Position: TP6

Depth (m): 0.35

Plate Area (m²): 0.1625971

Type of Kentledge: Wheeled

Maximum Applied Pressure (kPa):

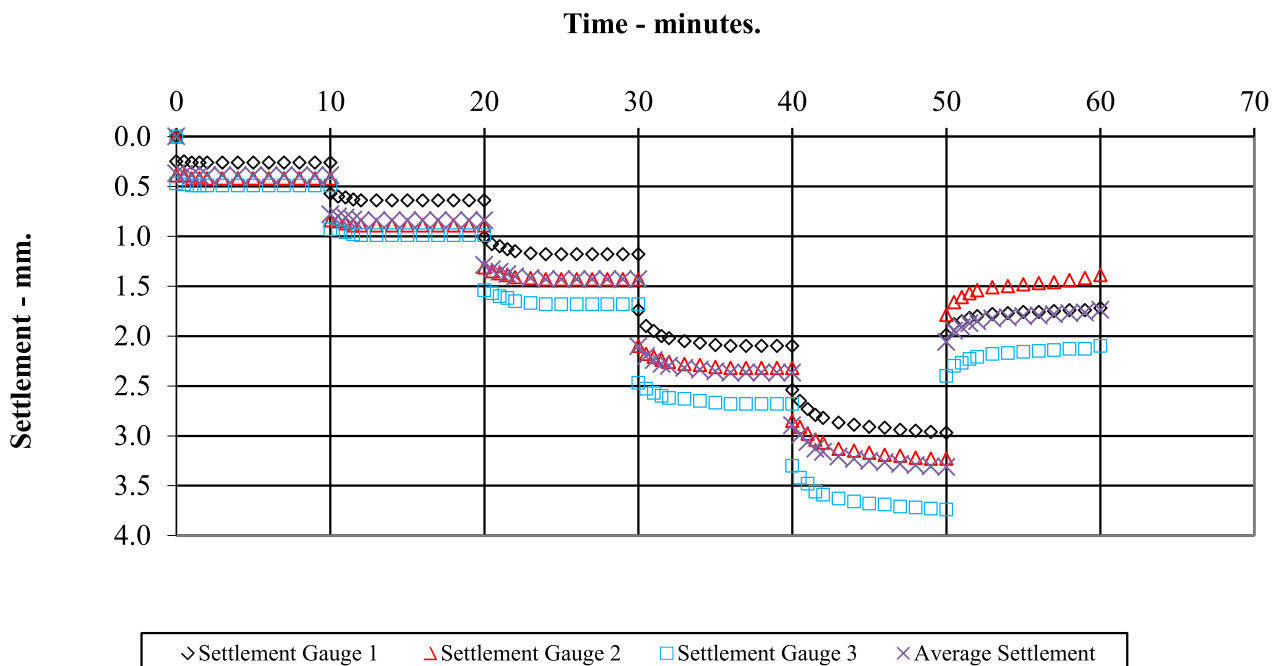
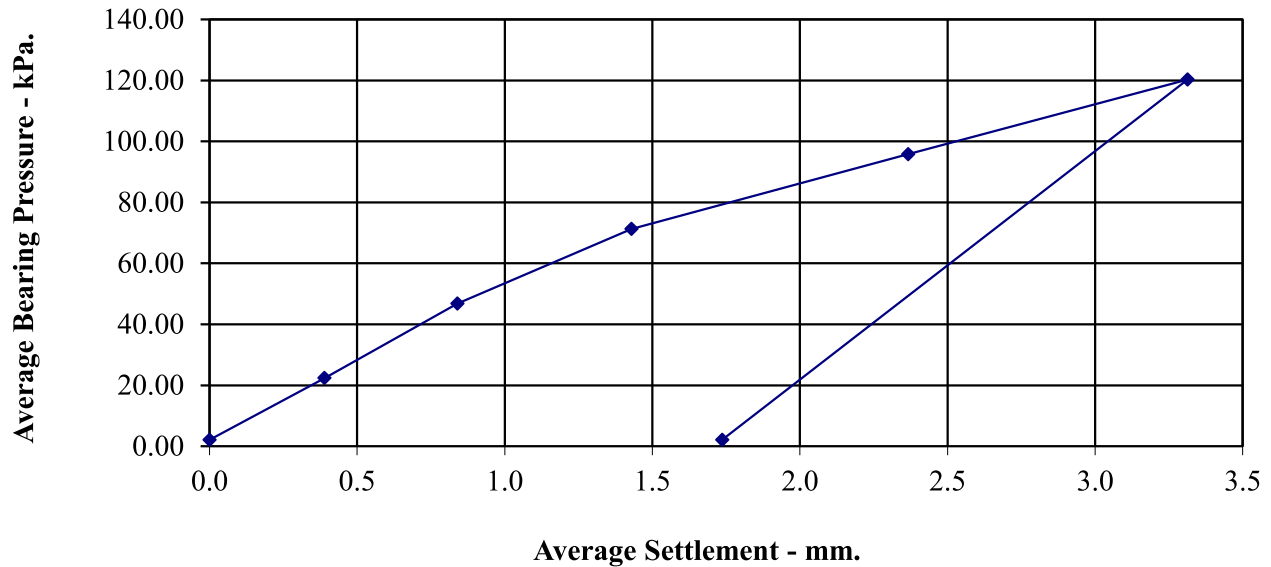
120.28

Maximum Deformation (mm):

3.31

Description:

Brown gravelly sandy CLAY.



Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4

Incorporating IAN 73/06

Date of Test 3-Feb-21

Test Position TP6

Depth (m) 0.35

Description Brown gravelly sandy CLAY.

Maximum Deflection 3.31 mm

Deflection required for CBR value 1.25 mm

Load at 1.25mm 64 kN/m²

Plate diameter 455 mm

Conversion factor for plate diameter 0.629

K₇₆₂(modulus of subgrade reaction)
calculated using 1.25mm settlement 32.1 kN/m²/mm

CBR Value 3.9 %



Didsbury Park, Manchester

Contract No:

PSL21/1039

Client Ref:

APPENDIX 8 - Soil Percolation Testing Results

SOIL PERCOLATION TEST

Sheet 1 of 2

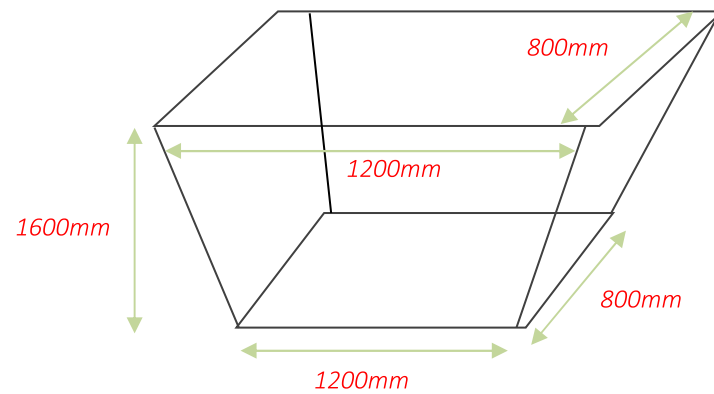
Date of Test: 04/02/2021

POSITION: IP3
TEST 1

Weather: Overcast

Engineer: C. Hastings
Checked: R Wyatt

Trial Pit Measurements



Pit Depth (mm):	1600
Pit Details:	Open with no stone filling
Groundwater Level:	NGW

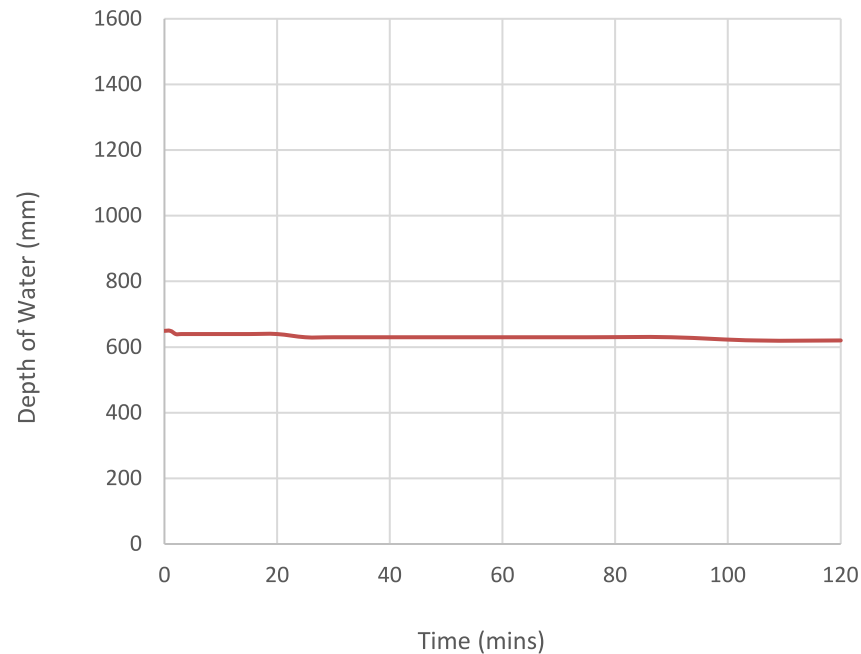
Test Data

Time Elapsed (mins)	Depth to Water Level (mm)
0	950
1	950
2	960
3	960
5	960
10	960
15	960
20	960
25	970
30	970
40	970
50	970
60	970
75	970
90	970
105	980
120	980

SOIL PERCOLATION TEST

POSITION: IP3
TEST 1

Depth vs Time



Volume of Pit (m ³)	1.536
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.624

Compliance Check:

Water Level at 75% effective depth (mm)	487.5
Water Level at 25% effective depth (mm)	162.5

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	650
Water Level 2	620
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.0288

Discharge Area (m ²)	3.5
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Soil Infiltration Rate (m/min)	6.857E-05
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Soil Infiltration Rate (m/sec)	1.14E-06
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SOIL PERCOLATION TEST

Sheet 1 of 2

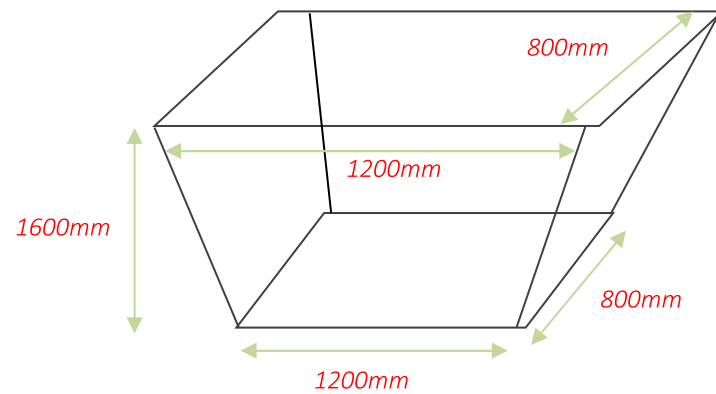
Date of Test: 04/02/2021

POSITION: IP3
TEST 2

Weather: Overcast

Engineer: C. Hastings
Checked: R Wyatt

Trial Pit Measurements



Test Data

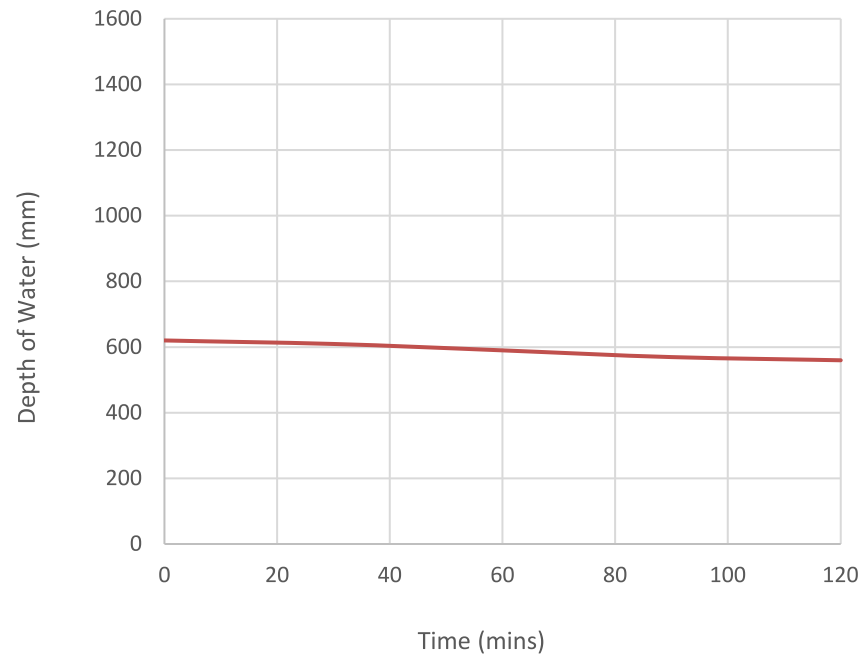
Time Elapsed (mins)	Depth to Water Level (mm)
0	980
30	990
60	1010
90	1030
120	1040

Pit Depth (mm):	1600
Pit Details:	Open with no stone filling
Groundwater Level:	NGW

SOIL PERCOLATION TEST

POSITION: IP3
TEST 2

Depth vs Time



Volume of Pit (m ³)	1.536
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.5952

Compliance Check:

Water Level at 75% effective depth (mm)	465
Water Level at 25% effective depth (mm)	155

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	620
Water Level 2	560
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.0576

Discharge Area (m ²)	3.32
----------------------------------	------

Soil Infiltration Rate (m/min)	0.0001446
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Soil Infiltration Rate (m/sec)	2.41E-06
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SOIL PERCOLATION TEST

Sheet 1 of 2

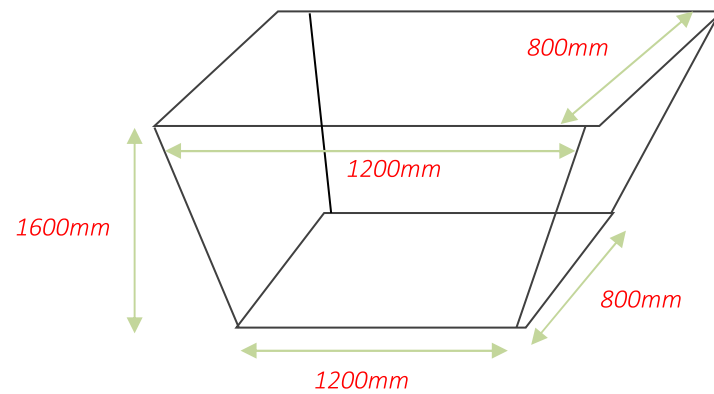
Date of Test: 04/02/2021

POSITION: IP3
TEST 3

Weather: Very cold

Engineer: C. Hastings
Checked: R Wyatt

Trial Pit Measurements



Test Data

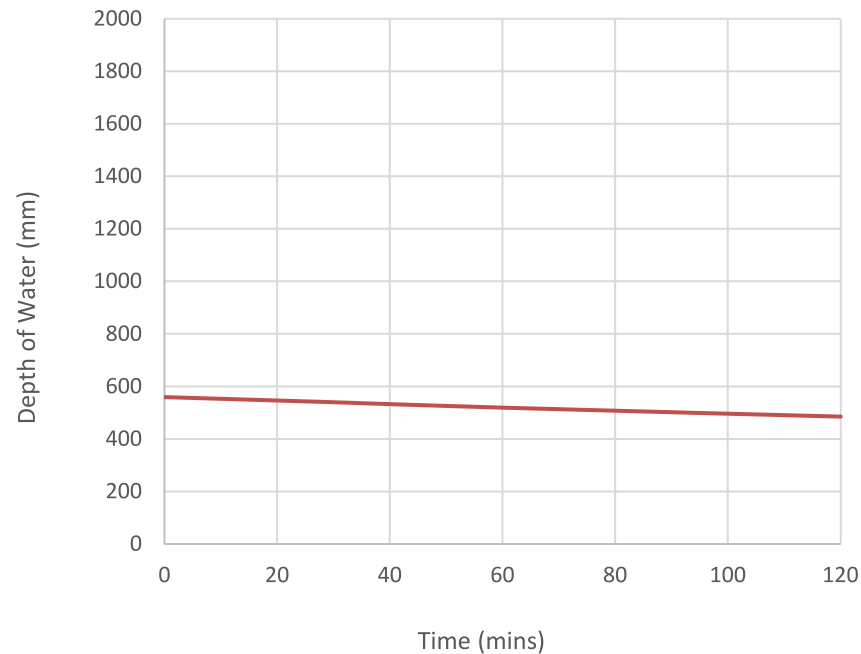
Time Elapsed (mins)	Depth to Water Level (mm)
0	1040
30	1060
60	1080
120	1115

Pit Depth (mm):	1600
Pit Details:	Open with no stone filling
Groundwater Level:	NGW

SOIL PERCOLATION TEST

POSITION: IP3
TEST 3

Depth vs Time



Volume of Pit (m ³)	1.536
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.5376

Compliance Check:

Water Level at 75% effective depth (mm)	420
Water Level at 25% effective depth (mm)	140

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	560
Water Level 2	485
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.072

Discharge Area (m ²)	3.05
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Soil Infiltration Rate (m/min)	0.0001967
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Soil Infiltration Rate (m/sec)	3.28E-06
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SOIL PERCOLATION TEST

Sheet 1 of 2

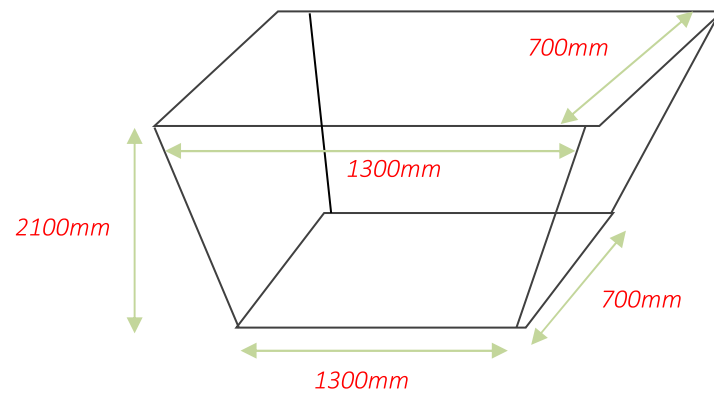
Date of Test: 04/02/2021

POSITION: TP03
TEST 1

Weather: Overcast

Engineer: C. Hastings
Checked: R Wyatt

Trial Pit Measurements



Pit Depth (mm):	2100
Pit Details:	Open with no stone filling
Groundwater Level:	NGW

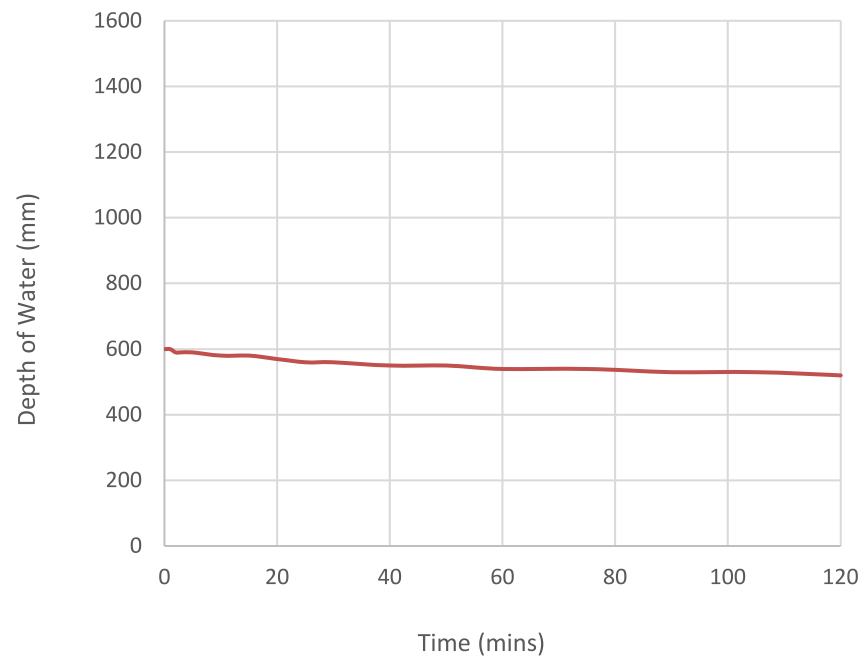
Test Data

Time Elapsed (mins)	Depth to Water Level (mm)
0	1500
1	1500
2	1510
3	1510
5	1510
10	1520
15	1520
20	1530
25	1540
30	1540
40	1550
50	1550
60	1560
75	1560
90	1570
105	1570
120	1580

SOIL PERCOLATION TEST

POSITION: TP03
TEST 1

Depth vs Time



Volume of Pit (m ³)	1.911
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.546

Compliance Check:

Water Level at 75% effective depth (mm)	450
Water Level at 25% effective depth (mm)	150

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	600
Water Level 2	520
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.0728

Discharge Area (m ²)	3.15
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Soil Infiltration Rate (m/min)	0.0001926
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Soil Infiltration Rate (m/sec)	3.21E-06
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SOIL PERCOLATION TEST

Sheet 1 of 2

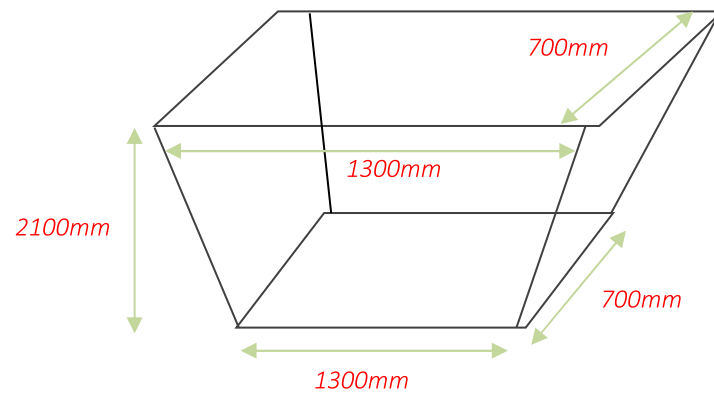
Date of Test: 04/02/2021

POSITION: TP03
TEST 2

Weather: Overcast

Engineer: C. Hastings
Checked: R Wyatt

Trial Pit Measurements



Test Data

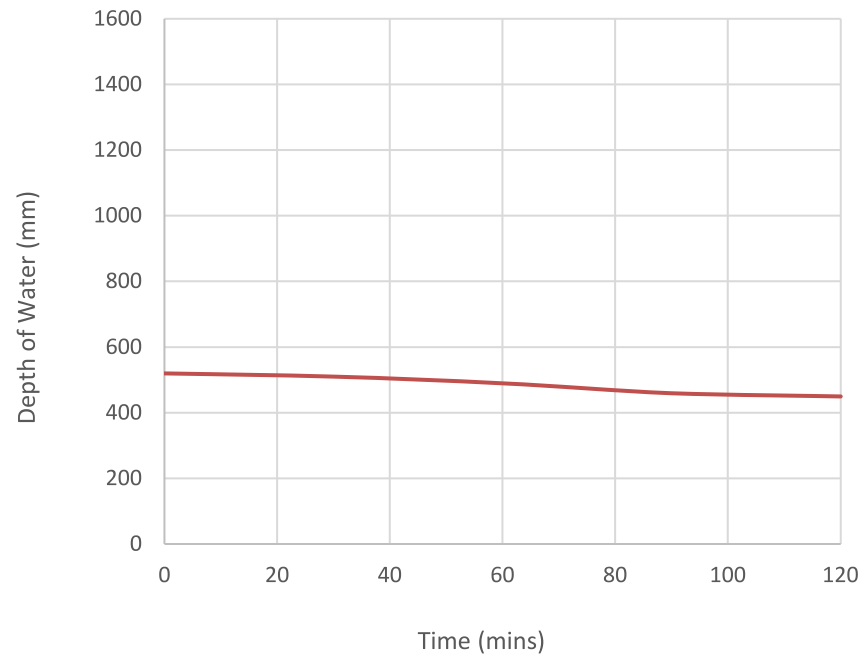
Time Elapsed (mins)	Depth to Water Level (mm)
0	1580
30	1590
60	1610
90	1640
120	1650

Pit Depth (mm):	2100
Pit Details:	Open with no stone filling
Groundwater Level:	NGW

SOIL PERCOLATION TEST

POSITION: TP03
TEST 2

Depth vs Time



Volume of Pit (m ³)	1.911
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.4732

Compliance Check:

Water Level at 75% effective depth (mm)	390
Water Level at 25% effective depth (mm)	130

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	520
Water Level 2	450
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.0637

Discharge Area (m ²)	2.85
----------------------------------	------

Soil Infiltration Rate (m/min)	0.0001863
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Soil Infiltration Rate (m/sec)	3.10E-06
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SOIL PERCOLATION TEST

Sheet 1 of 2

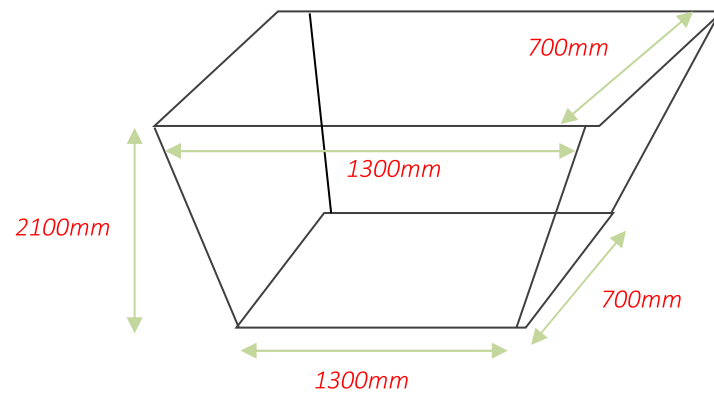
Date of Test: 04/02/2021

POSITION: TP03
TEST 3

Weather: Overcast

Engineer: C. Hastings
Checked: R Wyatt

Trial Pit Measurements



Test Data

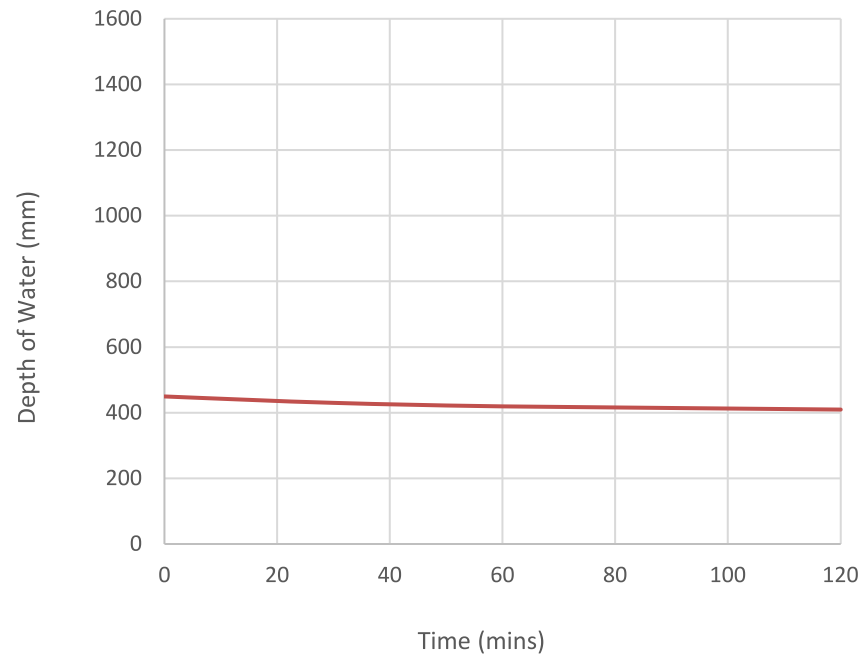
Time Elapsed (mins)	Depth to Water Level (mm)
0	1650
30	1670
60	1680
120	1690

Pit Depth (mm):	2100
Pit Details:	Open with no stone filling
Groundwater Level:	NGW

SOIL PERCOLATION TEST

POSITION: TP03
TEST 3

Depth vs Time



Volume of Pit (m ³)	1.911
Void Ratio of Infill	1
Volume of Infill (m ³)	N/A
Volume of Water in Pit (m ³)	0.4095

Compliance Check:

Water Level at 75% effective depth (mm)	337.5
Water Level at 25% effective depth (mm)	112.5

Test not BRE 365 compliant with BRE 365 - insufficient time to drain past 25% effective depth

Soil Infiltration Rate Calculation

Water Level 1	450
Water Level 2	410
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m ³)	0.0364

Discharge Area (m ²)	2.63
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Soil Infiltration Rate (m/min)	0.0001153
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Soil Infiltration Rate (m/sec)	1.92E-06
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APPENDIX 9 – QORA Screening Values

Proposed End Use	Unit	Residential with Plant Uptake			Commercial			Source
SOM	%	1	2.5	6	1	2.5	6	
Arsenic	mg/kg	32	32	32	640	640	640	SGVs
Beryllium	mg/kg	1.7	1.7	1.7	12	12	12	LQM S4ULs
Boron (water soluble)	mg/kg	290	290	290	240000	240000	240000	LQM S4ULs
Cadmium	mg/kg	10	10	10	230	230	230	SGVs
Chromium (Total)	mg/kg	910	910	910	8600	8600	8600	LQM S4ULs
Chromium (VI)	mg/kg	21	21	21	49	49	49	DEFRA C4SLs
Copper	mg/kg	2400	2400	2400	68000	68000	68000	LQM S4ULs
Lead	mg/kg	200	200	200	2300	2300	2300	DEFRA C4SLs
Organic Mercury	mg/kg	1.2	1.2	1.2	26	26	26	LQM S4ULs
Nickel	mg/kg	130	130	130	1800	1800	1800	SGVs
Selenium	mg/kg	350	350	350	13000	13000	13000	SGVs
Vanadium	mg/kg	410	410	410	9000	9000	9000	LQM S4ULs
Zinc	mg/kg	3700	3700	3700	730000	730000	730000	LQM S4ULs
Aliphatic EC 5 - 6	mg/kg	42	78	160	3200 (304) ^{sol}	5900 (558) ^{sol}	12000 (1150) ^{sol}	LQM S4ULs
Aliphatic EC 6 - 8	mg/kg	100	230	530	7800 (144) ^{sol}	17000 (322) ^{sol}	40000 (736) ^{sol}	LQM S4ULs
Aliphatic EC 8 - 10	mg/kg	27	65	150	2000 (78) ^{sol}	4800 (190) ^{sol}	11000 (451) ^{vap}	LQM S4ULs
Aliphatic EC 10 - 12	mg/kg	130 (48) ^{vap}	330 (118) ^{vap}	760 (283) ^{vap}	9700 (48) ^{sol}	23000 (118) ^{vap}	47000 (283) ^{vap}	LQM S4ULs
Aliphatic EC 12 - 16	mg/kg	1100 (24) ^{sol}	2400 (59) ^{sol}	4300 (142) ^{sol}	59000 (24) ^{sol}	82000 (59) ^{sol}	90000 (142) ^{sol}	LQM S4ULs
Aliphatic EC 16 - 35	mg/kg	65000 (8.48) ^{f, sol}	92000 (21) ^{f, sol}	110000 ^f	1600000 ^f	1700000 ^f	1800000 ^f	LQM S4ULs
Aliphatic EC 35 - 44	mg/kg	65000 (8.48) ^{f, sol}	92000 (21) ^{f, sol}	110000 ^f	1600000 ^f	1700000 ^f	1800000 ^f	LQM S4ULs
Aromatic EC 5 - 7	mg/kg	70	140	300	26000 (1220) ^{sol}	46000 (2260) ^{sol}	86000 (4710) ^{sol}	LQM S4ULs
Aromatic EC 7 - 8	mg/kg	130	290	660	56000 (869) ^{vap}	110000 (1920) ^{vap}	180000 (4360) ^{vap}	LQM S4ULs
Aromatic EC 8 - 10	mg/kg	34	83	190	3500 (613) ^{vap}	8100 (1500) ^{vap}	17000 (3580) ^{vap}	LQM S4ULs
Aromatic EC 10 - 12	mg/kg	74	180	380	16000 (364) ^{sol}	28000 (899) ^{sol}	34000 (2150) ^{sol}	LQM S4ULs
Aromatic EC 12 - 16	mg/kg	140	330	660	36000 (169) ^{sol}	37000	38000	LQM S4ULs
Aromatic EC 16 - 21	mg/kg	260 ^f	540 ^f	930 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs
Aromatic EC 21 - 35	mg/kg	1100 ^f	1500 ^f	1700 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs
Aromatic EC 35 - 44	mg/kg	1100 ^f	1500 ^f	1700 ^f	28000 ^f	28000 ^f	28000 ^f	LQM S4ULs
Benzene	mg/kg	0.33	0.33	0.33	95	95	95	SGVs
Toluene	mg/kg	610	610	610	4400	4400	4400	SGVs
Ethyl Benzene	mg/kg	350	350	350	2800	2800	2800	SGVs
Xylene - o	mg/kg	250	250	250	2600	2600	2600	SGVs
Xylene - m	mg/kg	240	240	240	3500	3500	3500	SGVs
Xylene - p	mg/kg	230	230	230	3200	3200	3200	SGVs
MTBE (methyl tert-butyl)	mg/kg	49	84	160	7900	13000	24000	CL:AIRE 2010
Acenaphthene	mg/kg	210	510	1100	84000 (57) ^{sol}	97000 (141) ^{sol}	100000	LQM SAULs
Acenaphthylene	mg/kg	170	420	920	83000 (86.1) ^{sol}	97000 (212) ^{sol}	100000	LQM S4ULs
Anthracene	mg/kg	2400	5400	11000	520000	540000	540000	LQM S4ULs
Benz(a)anthracene	mg/kg	7.2	11	13	170	170	180	LQM S4ULs
Benzo(a)pyrene	mg/kg	2.2	2.7	5*	35	35	77*	DEFRA C4SL*/LQM
Benzo(b)fluoranthene	mg/kg	2.6	3.3	3.7	44	44	45	LQM S4ULs
Benzo(ghi)perylene	mg/kg	320	340	350	3900	4000	4000	LQM S4ULs
Benzo(k)fluoranthene	mg/kg	77	93	100	1200	1200	1200	LQM S4ULs
Chrysene	mg/kg	15	22	27	350	350	350	LQM S4ULs
Dibenz(ah)anthracene	mg/kg	0.24	0.28	0.3	3.5	3.6	3.6	LQM S4ULs
Fluoranthene	mg/kg	280	560	890	23000	23000	23000	LQM S4ULs
Fluorene	mg/kg	170	400	860	63000 (30.9) ^{sol}	68000	71000	LQM S4ULs
Indeno(123-cd)pyrene	mg/kg	27	36	41	500	510	510	LQM S4ULs
Naphthalene	mg/kg	2.3 ^f	5.6 ^f	13 ^f	190 ^f (76.4) ^{sol}	460 ^f (183) ^{sol}	1100 ^f (432) ^{sol}	LQM S4ULs
Phenanthrene	mg/kg	95	220	440	22000	22000	23000	LQM S4ULs
Pyrene	mg/kg	620	1200	2000	54000	54000	54000	LQM S4ULs

Proposed End Use	Unit	Residential with Plant Uptake			Commercial			Source
SOM	%	1	2.5	6	1	2.5	6	
Phenol	mg/kg	420	420	420	3200	3200	3200	SGVs
Chlorophenols	mg/kg	0.87 ^g	2	4.5	3500	4000	4300	LQM S4ULs
Pentachlorophenol	mg/kg	0.22	0.52	1.2	400	400	400	LQM S4ULs
Carbon disulphide	mg/kg	0.14	0.29	0.62	11	22	47	LQM S4ULs
Hexachlorobutadiene	mg/kg	0.29	0.7	1.6	31	66	120	LQM S4ULs
1,1,1,2 Tetrachloroethane	mg/kg	1.6	3.4	7.5	270	550	1100	LQM S4ULs
1,1,1 Trichloroethane	mg/kg	8.8	18	39	660	1300	3000	LQM S4ULs
Trichloroethene	mg/kg	0.016	0.034	0.075	1.2	2.6	5.7	LQM S4ULs
Tetrachloromethane	mg/kg	0.026	0.056	0.13	2.9	6.3	14	LQM S4ULs
1,2-Dichloroethane	mg/kg	0.0071	0.011	0.019	0.67	0.97	1.7	LQM S4ULs
Chloroethene (Vinyl)	mg/kg	0.00064	0.00087	0.0014	0.059	0.077	0.12	LQM S4ULs
Trichloromethane	mg/kg	0.91	1.7	3.4	99	170	350	LQM S4ULs
Tetrachloroethene	mg/kg	0.18	0.39	0.9	19	42	95	LQM S4ULs
Hexachlorobenzene	mg/kg	1.8 (0.2) ^{vsp}	3.3 (0.5) ^{vsp}	4.9	110 (0.2) ^{vsp}	120	120	LQM S4ULs
Pentachlorobenzene	mg/kg	5.8	12	22	640 (43) ^{sol}	770 (107) ^{sol}	830	LQM S4ULs
1,2,4,5-Tetrachlorobenzene	mg/kg	0.33	0.77	1.6	42 (19.7) ^{sol}	72 (49.1) ^{sol}	96	LQM S4ULs
1,2,3,5-Tetrachlorobenzene	mg/kg	0.66	1.69	3.7	49 (39.4) ^{vsp}	120 (98.1) ^{vsp}	240 (235) ^{vsp}	LQM S4ULs
1,2,3,4-Tetrachlorobenzene	mg/kg	15	36	78	1700 (122) ^{vsp}	3080 (304) ^{vsp}	4400 (728) ^{vsp}	LQM S4ULs
1,3,5-Trichlorobenzene	mg/kg	0.33	0.81	1.9	23	55	130	LQM S4ULs
1,2,4-Trichlorobenzene	mg/kg	2.6	6.4	15	220	530	1300	LQM S4ULs
1,2,3-Trichlorobenzene	mg/kg	1.5	3.6	8.6	102	250	590	LQM S4ULs
1,4-dichlorobenzene	mg/kg	61 ^f	150 ^f	350 ^f	4400 ^f (224) ^{vsp}	10000 ^f (540) ^{vsp}	25000 ^f (1280) ^{vsp}	LQM S4ULs
1,3-dichlorobenzene	mg/kg	0.4	1	2.3	30	73	170	LQM S4ULs
1,2-Dichlorobenzene	mg/kg	23	55	130	2000 (571) ^{sol}	4800 (1370) ^{sol}	11000 (3240) ^{sol}	LQM S4ULs
Chlorobenzene	mg/kg	0.46	1	2.4	56	130	290	LQM S4ULs
Gamma-	mg/kg	0.06	0.14	0.33	67	69	70	LQM S4ULs
Beta-	mg/kg	0.085	0.2	0.46	65	65	65	LQM S4ULs
Alpaha -	mg/kg	0.23	0.55	1.2	170	180	180	LQM S4ULs
Beta -Endosulfan	mg/kg	7	17	39	6300 (0.00007) ^{vsp}	7800 (0.0002) ^{vsp}	8700	LQM S4ULs
Alpha-Endosulfan	mg/kg	7.4	18	41	5600 (0.003) ^{vsp}	7400 (0.007) ^{vsp}	8400 (0.016) ^{vsp}	LQM S4ULs
Dichlorvos	mg/kg	0.032	0.066	0.14	140	140	140	LQM S4ULs
Atrazine	mg/kg	3.3	7.6	17.4	9300	9400	9400	LQM S4ULs
Dieldrin	mg/kg	0.97	2	3.5	170	170	170	LQM S4ULs
Aldrin	mg/kg	5.7	6.6	7.1	170	170	170	LQM S4ULs
HMX	mg/kg	5.7	13	26	110000	110000	110000	LQM S4ULs
2,4,6-Trinitrotoulene	mg/kg	1.6	3.7	8.1	1000	1000	1000	LQM S4ULs
RDX	mg/kg	120	250	540	210000	210000	210000	LQM S4ULs

^{sol} S4UL exceeds the solubility saturation limit (which is presented in brackets)^{vsp} S4ULs presented exceeds the vapour saturation limit, which is presented in brackets^f For naphthalene, the S4UL is based on a comparison of inhalation exposure with the TDI_{inhal} for localised affects^f S4UL based on comparison of inhalation exposure with inhalation TDI for localised effects^{dir} S4ULs based on a threshold protective direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustration only)

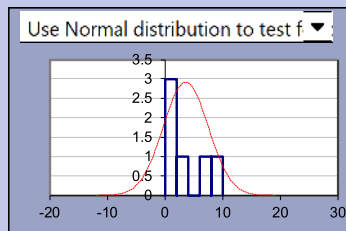
APPENDIX 10 - Statistical Analysis

Test Results

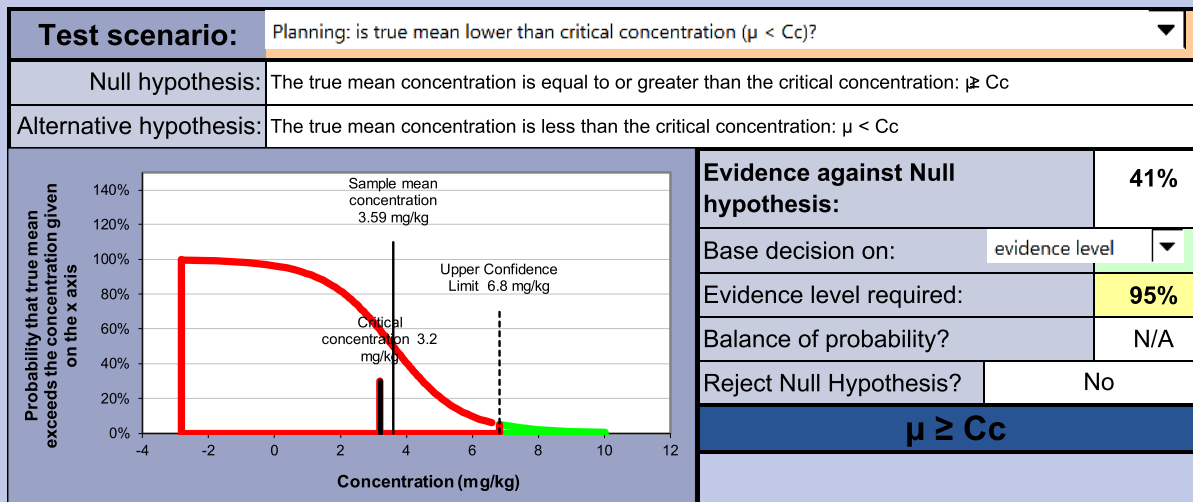
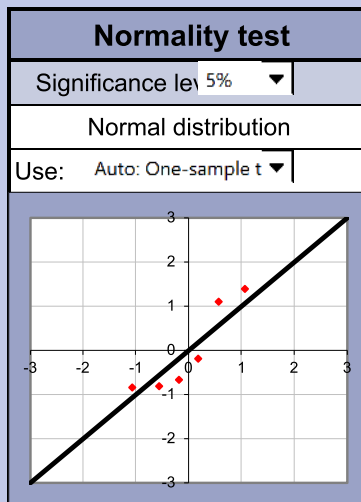
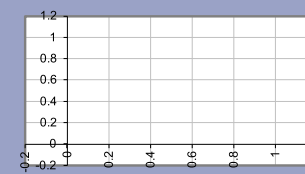
Client/client ref: Civic Engineers Site ref: Didsbury Point
Project ref: 20064 Data description:

Date: 01-Apr-2021
User details: RW

Dataset	Benzo(a)pyrene (mg/kg)
Sample mean, $\bar{x}$ (mg/kg)	3.5933
Sample standard deviation, s	3.903
Sample size, n	6
Critical concentration, C_c (mg/kg)	3.2



Outliers & non-detects	
Outliers present?	NO
Significance level	5%
Outliers removed?	0
Non-detects	0



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[Go to outlier test](#)

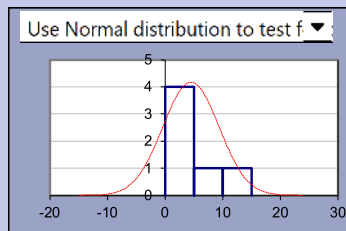
[Go to normality test](#)

Test Results

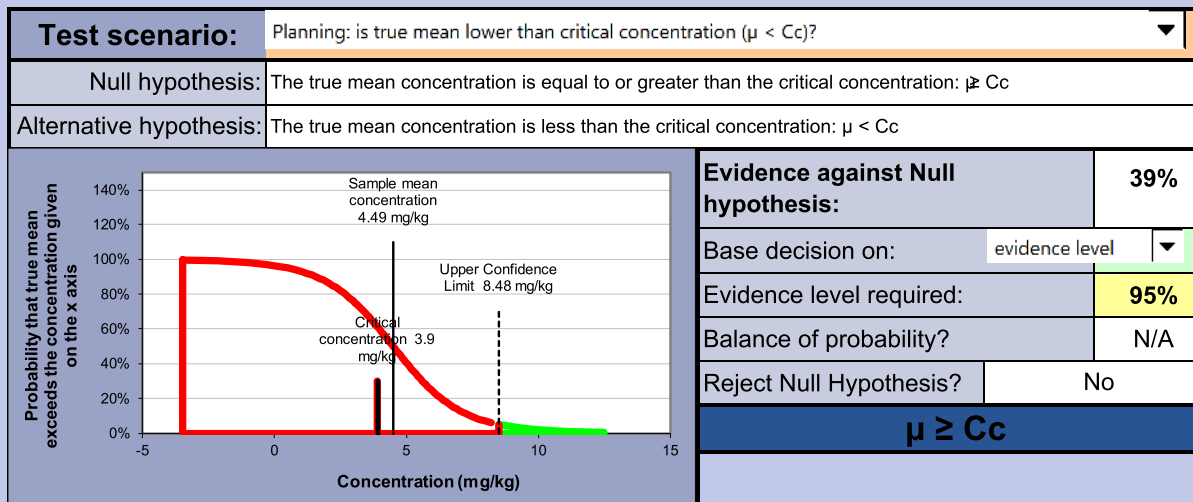
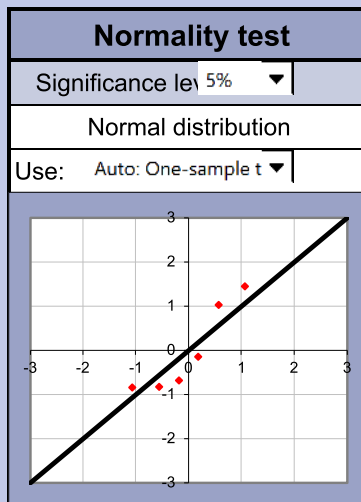
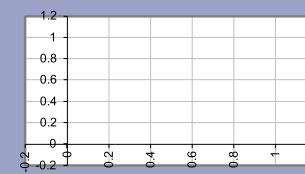
Client/client ref: Civic Engineers Site ref: Didsbury Point
Project ref: 20064 Data description:

Date: 01-Apr-2021
User details: RW

Dataset	Benzo(b)fluoranthene (mg/kg)
Sample mean, $\bar{x}$ (mg/kg)	4.4933
Sample standard deviation, s	4.8468
Sample size, n	6
Critical concentration, C_c (mg/kg)	3.9



Outliers & non-detects	
Outliers present?	NO
Significance level	5%
Outliers removed?	0
Non-detects	0



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[Back to summary](#)

[Go to outlier test](#)

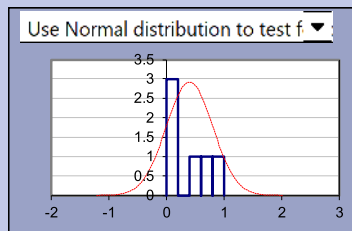
[Go to normality test](#)

Test Results

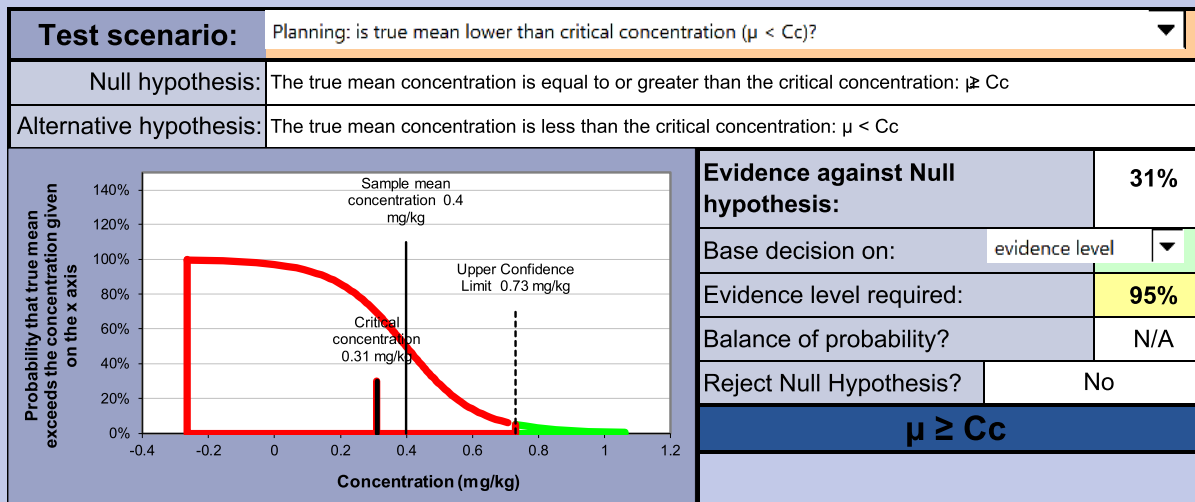
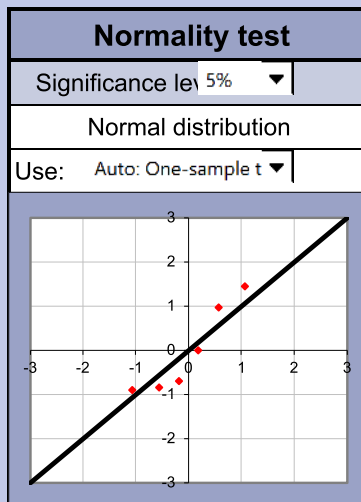
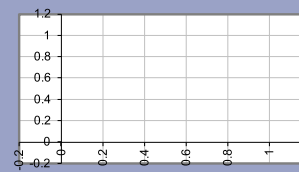
Client/client ref: Civic Engineers Site ref: Didsbury Point
Project ref: 20064 Data description:

Date: 01-Apr-2021
User details: RW

Dataset	Dibenzo(ah)anthracene (mg/kg)
Sample mean, $\bar{x}$ (mg/kg)	0.3983
Sample standard deviation, s	0.403
Sample size, n	6
Critical concentration, C_c (mg/kg)	0.31



Outliers & non-detects	
Outliers present?	NO
Significance level	5%
Outliers removed?	0
Non-detects	0



Back to data

Back to summary

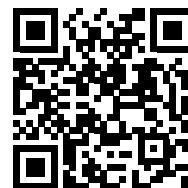
Go to outlier test

Go to normality test



APPENDIX 11 - HazWasteOnline Classification Report

Waste Classification Report



MU4NR-4UFUN-DKQKF

Job name

EMT-21-1759-Batch-1-File-1

Description/Comments

Project

GRO-20064

Site

Didsbury Point

Related Documents

#	Name	Description
1	EMT-21-1759-Batch-1-File-1.hwol	.hwol file used to create the Job

Waste Stream Template

Waste Stream template not used when importing the .hwol file

Classified by

Name:
Sam Flaherty
Date:
09 Apr 2021 15:57 GMT
Telephone:
0800 1613730

Company:
Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE

HazWasteOnline™ Training Record:

Course	Date
Hazardous Waste Classification	-
Advanced Hazardous Waste Classification	-

Report

Created by: Sam Flaherty
Created date: 09 Apr 2021 15:57 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	BH2-03/02/2021-0.50m		Non Hazardous		2
2	BH4-04/02/2021-0.50m		Non Hazardous		4
3	BH5-05/02/2021-0.50m		Non Hazardous		6
4	TP02-03/02/2021-0.50m		Non Hazardous		8
5	TP04-04/02/2021-1.80m		Non Hazardous		10
6	IP3-04/02/2021-0.50m		Non Hazardous		12

Appendices

	Page
Appendix A: Classifier defined and non CLP determinands	14
Appendix B: Rationale for selection of metal species	15
Appendix C: Version	16

Classification of sample: BH2-03/02/2021-0.50m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH2-03/02/2021-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
8.1%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.1% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number										
1		arsenic { arsenic }			1	3.1	mg/kg		2.868	mg/kg	0.000287 %		✓	
		033-001-00-X	231-148-6	7440-38-2										
2		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	0.6	mg/kg		0.555	mg/kg	0.0000555 %		✓	
		048-001-00-5												
3		copper { dicopper oxide ; copper (I) oxide }			1	10	mg/kg	1.126	10.415	mg/kg	0.00104 %		✓	
		029-002-00-X	215-270-7	1317-39-1										
4		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	63	mg/kg		58.279	mg/kg	0.00583 %		✓	
		082-001-00-6												
5		mercury { mercury }			7	0.4	mg/kg		0.37	mg/kg	0.000037 %		✓	
		080-001-00-0	231-106-7	7439-97-6										
6		nickel { nickel }			7	5.9	mg/kg		5.458	mg/kg	0.000546 %		✓	
		028-002-00-7	231-111-4	7440-02-0										
7		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD	
		034-001-00-2	231-957-4	7782-49-2										
8		zinc { zinc oxide }				27	mg/kg	1.245	31.089	mg/kg	0.00311 %		✓	
		030-013-00-7	215-222-5	1314-13-2										
9		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD	
		024-001-00-0	215-607-8	1333-82-0										
10		naphthalene				0.06	mg/kg		0.0555	mg/kg	0.00000555 %		✓	
		601-052-00-2	202-049-5	91-20-3										
11		acenaphthylene				0.42	mg/kg		0.389	mg/kg	0.0000389 %		✓	
			205-917-1	208-96-8										
12		acenaphthene				2.15	mg/kg		1.989	mg/kg	0.000199 %		✓	
			201-469-6	83-32-9										
13		fluorene				2.12	mg/kg		1.961	mg/kg	0.000196 %		✓	
			201-695-5	86-73-7										

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	phenanthrene	201-581-5	85-01-8		15.23 mg/kg		14.089 mg/kg	0.00141 %	✓	
15	anthracene	204-371-1	120-12-7		6.77 mg/kg		6.263 mg/kg	0.000626 %	✓	
16	fluoranthene	205-912-4	206-44-0		26.37 mg/kg		24.394 mg/kg	0.00244 %	✓	
17	pyrene	204-927-3	129-00-0		21.94 mg/kg		20.296 mg/kg	0.00203 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		10.07 mg/kg		9.315 mg/kg	0.000932 %	✓	
19	chrysene	601-048-00-0	205-923-4		9.39 mg/kg		8.686 mg/kg	0.000869 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		9.04 mg/kg		8.363 mg/kg	0.000836 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		5.19 mg/kg		4.801 mg/kg	0.00048 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.98 mg/kg		0.907 mg/kg	0.0000907 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		5.13 mg/kg		4.746 mg/kg	0.000475 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		11.52 mg/kg		10.657 mg/kg	0.00107 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		4.48 mg/kg		4.144 mg/kg	0.000414 %	✓	
26	pH		PH		8.94 pH		8.94 pH	8.94 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		21.8 mg/kg	1.462	29.474 mg/kg	0.00295 %	✓	
Total:								0.0261 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Classification of sample: BH4-04/02/2021-0.50m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH4-04/02/2021-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
15.5%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15.5% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic }			1	4.3	mg/kg		3.723	mg/kg	0.000372 %	✓	
		033-001-00-X	231-148-6	7440-38-2									
2		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }					0.3	mg/kg		0.26	mg/kg	0.000026 %	✓
		048-001-00-5											
3		copper { dicopper oxide ; copper (I) oxide }			1	19	mg/kg	1.126	18.521	mg/kg	0.00185 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
4		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }					29	mg/kg		25.108	mg/kg	0.00251 %	✓
		082-001-00-6											
5		mercury { mercury }			7	0.2	mg/kg		0.173	mg/kg	0.0000173 %	✓	
		080-001-00-0	231-106-7	7439-97-6									
6		nickel { nickel }					11.3	mg/kg		9.784	mg/kg	0.000978 %	✓
		028-002-00-7	231-111-4	7440-02-0									
7		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
8		zinc { zinc oxide }					58	mg/kg	1.245	62.505	mg/kg	0.00625 %	✓
		030-013-00-7	215-222-5	1314-13-2									
9		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
10		naphthalene					1.35	mg/kg		1.169	mg/kg	0.000117 %	✓
		601-052-00-2	202-049-5	91-20-3									
11		acenaphthylene				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<LOD
			205-917-1	208-96-8									
12		acenaphthene					1.73	mg/kg		1.498	mg/kg	0.00015 %	✓
			201-469-6	83-32-9									
13		fluorene				1.34	mg/kg		1.16	mg/kg	0.000116 %	✓	
			201-695-5	86-73-7									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	phenanthrene	201-581-5	85-01-8		9.01 mg/kg		7.801 mg/kg	0.00078 %	✓	
15	anthracene	204-371-1	120-12-7		3.1 mg/kg		2.684 mg/kg	0.000268 %	✓	
16	fluoranthene	205-912-4	206-44-0		13.71 mg/kg		11.87 mg/kg	0.00119 %	✓	
17	pyrene	204-927-3	129-00-0		11.83 mg/kg		10.242 mg/kg	0.00102 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		5.59 mg/kg		4.84 mg/kg	0.000484 %	✓	
19	chrysene	601-048-00-0	205-923-4		5.83 mg/kg		5.048 mg/kg	0.000505 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		7.9 mg/kg		6.84 mg/kg	0.000684 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		5.43 mg/kg		4.701 mg/kg	0.00047 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.79 mg/kg		0.684 mg/kg	0.0000684 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		5.43 mg/kg		4.701 mg/kg	0.00047 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		9.46 mg/kg		8.19 mg/kg	0.000819 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		3.68 mg/kg		3.186 mg/kg	0.000319 %	✓	
26	pH		PH		8.56 pH		8.56 pH	8.56 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		45.4 mg/kg	1.462	57.45 mg/kg	0.00574 %	✓	
Total:								0.0254 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Classification of sample: BH5-05/02/2021-0.50m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH5-05/02/2021-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
17.1%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17.1% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		arsenic { arsenic }			1	4.9 mg/kg		4.184 mg/kg	0.000418 %		
		033-001-00-X	231-148-6	7440-38-2							
2		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	0.2 mg/kg		0.171 mg/kg	0.0000171 %		
		048-001-00-5									
3		copper { dicopper oxide ; copper (I) oxide }			1	14 mg/kg	1.126	13.461 mg/kg	0.00135 %		
		029-002-00-X	215-270-7	1317-39-1							
4		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	21 mg/kg		17.933 mg/kg	0.00179 %		
		082-001-00-6									
5		mercury { mercury }			1	0.1 mg/kg		0.0854 mg/kg	0.00000854 %		
		080-001-00-0	231-106-7	7439-97-6							
6		nickel { nickel }			7	14.2 mg/kg		12.126 mg/kg	0.00121 %		
		028-002-00-7	231-111-4	7440-02-0							
7		selenium { selenium }				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2							
8		zinc { zinc oxide }				39 mg/kg	1.245	41.455 mg/kg	0.00415 %		
		030-013-00-7	215-222-5	1314-13-2							
9		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0							
10		naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3							
11		acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8							
12		acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9							
13		fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	phenanthrene	201-581-5	85-01-8		0.41 mg/kg		0.35 mg/kg	0.000035 %	✓	
15	anthracene	204-371-1	120-12-7		0.11 mg/kg		0.0939 mg/kg	0.0000939 %	✓	
16	fluoranthene	205-912-4	206-44-0		0.83 mg/kg		0.709 mg/kg	0.0000709 %	✓	
17	pyrene	204-927-3	129-00-0		0.76 mg/kg		0.649 mg/kg	0.0000649 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		0.4 mg/kg		0.342 mg/kg	0.0000342 %	✓	
19	chrysene	601-048-00-0	205-923-4		0.39 mg/kg		0.333 mg/kg	0.0000333 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.42 mg/kg		0.359 mg/kg	0.0000359 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		0.28 mg/kg		0.239 mg/kg	0.0000239 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.06 mg/kg		0.0512 mg/kg	0.00000512 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		0.28 mg/kg		0.239 mg/kg	0.0000239 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.53 mg/kg		0.453 mg/kg	0.0000453 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.21 mg/kg		0.179 mg/kg	0.0000179 %	✓	
26	pH		PH		8.66 pH		8.66 pH	8.66 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		53.7 mg/kg	1.462	67.024 mg/kg	0.0067 %	✓	
Total:								0.0162 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Classification of sample: TP02-03/02/2021-0.50m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP02-03/02/2021-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
19.5%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.5% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic }			1	13.6	mg/kg		11.381	mg/kg	0.00114 %	✓	
		033-001-00-X	231-148-6	7440-38-2									
2		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	8.4	mg/kg		7.029	mg/kg	0.000703 %	✓	
		048-001-00-5											
3		copper { dicopper oxide ; copper (I) oxide }			1	72	mg/kg	1.126	67.836	mg/kg	0.00678 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
4		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	123	mg/kg		102.929	mg/kg	0.0103 %	✓	
		082-001-00-6											
5		mercury { mercury }			7	0.4	mg/kg		0.335	mg/kg	0.0000335 %	✓	
		080-001-00-0	231-106-7	7439-97-6									
6		nickel { nickel }			7	23.3	mg/kg		19.498	mg/kg	0.00195 %	✓	
		028-002-00-7	231-111-4	7440-02-0									
7		selenium { selenium }			1	1	mg/kg		0.837	mg/kg	0.0000837 %	✓	
		034-001-00-2	231-957-4	7782-49-2									
8		zinc { zinc oxide }			1.245	320	mg/kg	1.245	333.313	mg/kg	0.0333 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
9		chromium in chromium(VI) compounds { chromium(VI) oxide }			1.923	<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
10		naphthalene			0.85	0.85	mg/kg		0.711	mg/kg	0.0000711 %	✓	
		601-052-00-2	202-049-5	91-20-3									
11		acenaphthylene			<0.3	<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<LOD
			205-917-1	208-96-8									
12		acenaphthene			0.84	0.84	mg/kg		0.703	mg/kg	0.0000703 %	✓	
			201-469-6	83-32-9									
13		fluorene			0.54	0.54	mg/kg		0.452	mg/kg	0.0000452 %	✓	
			201-695-5	86-73-7									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	phenanthrene	201-581-5	85-01-8		4.58 mg/kg		3.833 mg/kg	0.000383 %	✓	
15	anthracene	204-371-1	120-12-7		0.97 mg/kg		0.812 mg/kg	0.0000812 %	✓	
16	fluoranthene	205-912-4	206-44-0		5.86 mg/kg		4.904 mg/kg	0.00049 %	✓	
17	pyrene	204-927-3	129-00-0		5.64 mg/kg		4.72 mg/kg	0.000472 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		3.5 mg/kg		2.929 mg/kg	0.000293 %	✓	
19	chrysene	601-048-00-0	205-923-4		3.29 mg/kg		2.753 mg/kg	0.000275 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		2.87 mg/kg		2.402 mg/kg	0.00024 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		1.71 mg/kg		1.431 mg/kg	0.000143 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.4 mg/kg		<0.4 mg/kg	<0.00004 %		<LOD
23	benzo[ghi]perylene	205-883-8	191-24-2		2.03 mg/kg		1.699 mg/kg	0.00017 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		3.8 mg/kg		3.18 mg/kg	0.000318 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		1.48 mg/kg		1.238 mg/kg	0.000124 %	✓	
26	pH		PH		8.82 pH		8.82 pH	8.82 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		44.3 mg/kg	1.462	54.182 mg/kg	0.00542 %	✓	
Total:								0.063 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Classification of sample: TP04-04/02/2021-1.80m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP04-04/02/2021-1.80m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
16.7%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number										
1		arsenic { arsenic }			1	8.3	mg/kg		7.112	mg/kg	0.000711 %	✓		
		033-001-00-X	231-148-6	7440-38-2										
2		cadmium {  cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	0.2	mg/kg		0.171	mg/kg	0.0000171 %	✓		
		048-001-00-5												
3		copper { dicopper oxide ; copper (I) oxide }			1	21	mg/kg	1.126	20.26	mg/kg	0.00203 %	✓		
		029-002-00-X	215-270-7	1317-39-1										
4		lead {  lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	46	mg/kg		39.417	mg/kg	0.00394 %	✓		
		082-001-00-6												
5		mercury { mercury }			7	0.4	mg/kg		0.343	mg/kg	0.0000343 %	✓		
		080-001-00-0	231-106-7	7439-97-6										
6		nickel { nickel }			7	13.5	mg/kg		11.568	mg/kg	0.00116 %	✓		
		028-002-00-7	231-111-4	7440-02-0										
7		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD	
		034-001-00-2	231-957-4	7782-49-2										
8		zinc { zinc oxide }				57	mg/kg	1.245	60.796	mg/kg	0.00608 %	✓		
		030-013-00-7	215-222-5	1314-13-2										
9		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD	
		024-001-00-0	215-607-8	1333-82-0										
10		naphthalene				0.06	mg/kg		0.0514	mg/kg	0.00000514 %	✓		
		601-052-00-2	202-049-5	91-20-3										
11		acenaphthylene				0.06	mg/kg		0.0514	mg/kg	0.00000514 %	✓		
			205-917-1	208-96-8										
12		acenaphthene				0.7	mg/kg		0.6	mg/kg	0.00006 %	✓		
			201-469-6	83-32-9										
13		fluorene				0.29	mg/kg		0.249	mg/kg	0.0000249 %	✓		
			201-695-5	86-73-7										

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	phenanthrene	201-581-5	85-01-8		3.01 mg/kg		2.579 mg/kg	0.000258 %	✓	
15	anthracene	204-371-1	120-12-7		0.78 mg/kg		0.668 mg/kg	0.0000668 %	✓	
16	fluoranthene	205-912-4	206-44-0		3.33 mg/kg		2.853 mg/kg	0.000285 %	✓	
17	pyrene	204-927-3	129-00-0		2.79 mg/kg		2.391 mg/kg	0.000239 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		1.04 mg/kg		0.891 mg/kg	0.0000891 %	✓	
19	chrysene	601-048-00-0	205-923-4		1.02 mg/kg		0.874 mg/kg	0.0000874 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.99 mg/kg		0.848 mg/kg	0.0000848 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		0.61 mg/kg		0.523 mg/kg	0.0000523 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.12 mg/kg		0.103 mg/kg	0.0000103 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		0.57 mg/kg		0.488 mg/kg	0.0000488 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.22 mg/kg		1.045 mg/kg	0.000105 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.48 mg/kg		0.411 mg/kg	0.0000411 %	✓	
26	pH		PH		11.22 pH		11.22 pH	11.22 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		59.4 mg/kg	1.462	74.393 mg/kg	0.00744 %	✓	
Total:								0.023 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Classification of sample: IP3-04/02/2021-0.50m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
IP3-04/02/2021-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
9%	Entry:
(dry weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic }			1	2.4	mg/kg		2.202	mg/kg	0.00022 %	✓	
		033-001-00-X	231-148-6	7440-38-2									
2		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }			1	1.3	mg/kg		1.193	mg/kg	0.000119 %	✓	
		048-001-00-5											
3		copper { dicopper oxide ; copper (I) oxide }			1	12	mg/kg	1.126	12.395	mg/kg	0.00124 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
4		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	33	mg/kg		30.275	mg/kg	0.00303 %	✓	
		082-001-00-6											
5		mercury { mercury }			1	0.4	mg/kg		0.367	mg/kg	0.0000367 %	✓	
		080-001-00-0	231-106-7	7439-97-6									
6		nickel { nickel }			7	5.2	mg/kg		4.771	mg/kg	0.000477 %	✓	
		028-002-00-7	231-111-4	7440-02-0									
7		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
8		zinc { zinc oxide }				57	mg/kg	1.245	65.091	mg/kg	0.00651 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
9		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
10		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
11		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
12		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
13		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	phenanthrene	201-581-5	85-01-8		0.29 mg/kg		0.266 mg/kg	0.0000266 %	✓	
15	anthracene	204-371-1	120-12-7		0.08 mg/kg		0.0734 mg/kg	0.00000734 %	✓	
16	fluoranthene	205-912-4	206-44-0		0.63 mg/kg		0.578 mg/kg	0.0000578 %	✓	
17	pyrene	204-927-3	129-00-0		0.59 mg/kg		0.541 mg/kg	0.0000541 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		0.37 mg/kg		0.339 mg/kg	0.0000339 %	✓	
19	chrysene	601-048-00-0	205-923-4		0.33 mg/kg		0.303 mg/kg	0.0000303 %	✓	
20	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.34 mg/kg		0.312 mg/kg	0.0000312 %	✓	
21	indeno[123-cd]pyrene	205-893-2	193-39-5		0.22 mg/kg		0.202 mg/kg	0.0000202 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.04 mg/kg		0.0367 mg/kg	0.00000367 %	✓	
23	benzo[ghi]perylene	205-883-8	191-24-2		0.23 mg/kg		0.211 mg/kg	0.0000211 %	✓	
24	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.43 mg/kg		0.394 mg/kg	0.0000394 %	✓	
25	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.17 mg/kg		0.156 mg/kg	0.0000156 %	✓	
26	pH		PH		9.02 pH		9.02 pH	9.02 pH		
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		18.3 mg/kg	1.462	24.538 mg/kg	0.00245 %	✓	
Total:								0.0146 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

CLP index number: 033-001-00-X

Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans

Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)

Additional Hazard Statement(s): Carc. 1A H350

Reason for additional Hazards Statement(s):

29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

cadmium compounds, with the exception of cadmium sulposelenide ($x\text{CdS.yCdSe}$), reaction mass of cadmium sulphide with zinc sulphide ($x\text{CdS.yZnS}$), reaction mass of cadmium sulphide with mercury sulphide ($x\text{CdS.yHgS}$), and those specified elsewhere in this Annex

CLP index number: 048-001-00-5

Description/Comments: Worst Case: IARC considers cadmium compounds Group 1; Carcinogenic to humans

Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)

Additional Hazard Statement(s): Carc. 1A H350

Reason for additional Hazards Statement(s):

29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

CLP index number: 082-001-00-6

Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A

Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)

Additional Hazard Statement(s): Carc. 1A H350

Reason for additional Hazards Statement(s):

03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4 H302, Acute Tox. 1 H330, Acute Tox. 1 H310, Eye Irrit. 2 H319, STOT SE 3 H335, Skin Irrit. 2 H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2 H319, STOT SE 3 H335, Skin Irrit. 2 H315, Aquatic Acute 1 H400, Aquatic Chronic 1 H410, Aquatic Chronic 2 H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1 H400, Aquatic Chronic 1 H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4 H302, Eye Irrit. 2 H319, STOT SE 3 H335, Carc. 2 H351, Skin Sens. 1 H317, Aquatic Acute 1 H400, Aquatic Chronic 1 H410, Skin Irrit. 2 H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2 H319, STOT SE 3 H335, Skin Irrit. 2 H315, Skin Sens. 1 H317, Aquatic Acute 1 H400, Aquatic Chronic 1 H410

▪ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

▪ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

▪ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

▪ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

▪ **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

▪ **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

Appendix B: Rationale for selection of metal species

arsenic {arsenic}

Arsenic results not speciated.

cadmium {cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex}

Cadmium results not speciated.

copper {dicopper oxide; copper (I) oxide}

Copper results not speciated.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Lead results not speciated.

mercury {mercury}

Mercury results not speciated.

nickel {nickel}

Nickel results not speciated.

selenium {selenium}

Selenium results not speciated.

zinc {zinc oxide}

Zinc results not speciated.

chromium in chromium(VI) compounds {chromium(VI) oxide}

Chromium(VI) compounds not speciated.

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Chromium (III) compounds not speciated.

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.1, May 2018**

HazWasteOnline Classification Engine Version: 2021.77.4714.9046 (18 Mar 2021)

HazWasteOnline Database: 2021.77.4714.9046 (18 Mar 2021)

This classification utilises the following guidance and legislation:

WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2019 - UK: 2019 No. 720 of 27th March 2019

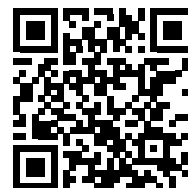
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

Waste Classification Report



89ALX-6JPGB-X64GC

Job name

EMT-21-1759-Batch-2-File-1

Description/Comments

Project

GRO-20064

Site

Didsbury Point

Related Documents

#	Name	Description
1	EMT-21-1759-Batch-2-File-1.HWOL	.hwol file used to create the Job

Waste Stream Template

Waste Stream template not used when importing the .hwol file

Classified by

Name:
Sam Flaherty
Date:
09 Apr 2021 15:58 GMT
Telephone:
0800 1613730

Company:
Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE

HazWasteOnline™ Training Record:

Course	Date
Hazardous Waste Classification	-
Advanced Hazardous Waste Classification	-

Report

Created by: Sam Flaherty
Created date: 09 Apr 2021 15:58 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	BH01-09/02/2021-8.50m		Non Hazardous		2
2	BH01-09/02/2021-19.20m		Non Hazardous		3
3	BH01-09/02/2021-22.50m		Non Hazardous		4
4	BH02-09/02/2021-4.50m		Non Hazardous		5
5	BH02-09/02/2021-11.50m		Non Hazardous		6
6	BH02-09/02/2021-18.50m		Non Hazardous		7

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Appendix A: Classifier defined and non CLP determinands	8
Appendix B: Rationale for selection of metal species	8
Appendix C: Version	8

Classification of sample: BH01-09/02/2021-8.50m



Non Hazardous Waste

Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH01-09/02/2021-8.50m	Chapter:
	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	● pH				8.34 pH		8.34 pH	8.34 pH		
			PH							
Total:								0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH01-09/02/2021-19.20m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
BH01-09/02/2021-19.20m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	● pH				8.26 pH		8.26	pH	8.26 pH		
Total:									0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH01-09/02/2021-22.50m



Non Hazardous Waste

Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH01-09/02/2021-22.50m	Chapter:
	Entry:
	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	● pH				8.86 pH		8.86 pH	8.86 pH		
			PH							
Total:								0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH02-09/02/2021-4.50m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
BH02-09/02/2021-4.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	● pH				8.31 pH		8.31	pH	8.31 pH		
Total:									0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH02-09/02/2021-11.50m



Non Hazardous Waste

Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
BH02-09/02/2021-11.50m	Chapter:
	Entry:
	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	● pH				10.99 pH		10.99 pH	10.99 pH		
			PH							
Total:								0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: BH02-09/02/2021-18.50m

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
BH02-09/02/2021-18.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	● pH				8.42 pH		8.42	pH	8.42 pH		
Total:									0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Appendix A: Classifier defined and non CLP determinands

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

Appendix B: Rationale for selection of metal species

None used in this classification

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.1, May 2018**
HazWasteOnline Classification Engine Version: 2021.77.4714.9046 (18 Mar 2021)
HazWasteOnline Database: 2021.77.4714.9046 (18 Mar 2021)

This classification utilises the following guidance and legislation:

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WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

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9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

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The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2019 - UK: 2019 No. 720 of 27th March 2019

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

APPENDIX 12 - Relevant Legislative Background

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

- 1) Significant harm is being caused or there is a significant possibility of such harm being caused;
- 2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- **Source** - substances that are potential contaminants or pollutants that may cause harm;
- **Pathway** - a potential route by which contaminants can move from the source to the receptor;
- **Receptor** - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below however the list is not exhaustive:

- CLR11 – Model Procedures;
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003);
- Brownfields – Managing the development of previously developed land – A client's guide, CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002;
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002;

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;

APPENDIX 13 - Limitations

Limitations

This contract was completed by Groundtech Consulting on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with due skill and care, taking into consideration the project brief provided, project objectives, agreed scope of works, prevailing site conditions and budget allocation.

Other than that defined in the paragraph above, Groundtech Consulting provides no other accountability or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted industry practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Groundtech Consulting. A third party who relies on this report, does so at their own and sole risk and no liability to such parties is provided by Groundtech Consulting.

It is the understanding of Groundtech Consulting that this report is to be used for the intended purpose as set out in the introduction. The purpose was instrumental in determining the scope and level of the services provided. Should the purpose of the report or the proposed end use of the site change, this report will no longer be directly applicable, and its validity readdressed. No reliance upon the report in the revised situation should be assumed by the client without the permission of Groundtech Consulting.

The report was written in 2021, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change and should be investigated if there is any significant delay in acting on the findings of this report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions in this report should not be relied upon in the future without the written confirmation from Groundtech Consulting that it is safe to do so.

The observations and conclusions outlined in this report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting.

Groundtech Consulting are not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The services provided are based upon Groundtech Consulting observations of existing physical conditions at the site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and Groundtech Consulting assume the information to be correct.

No responsibility can be accepted for errors for third party information presented in this report. Groundtech Consulting were not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Groundtech Consulting are not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable due to its heterogeneous properties and as investigation exploratory locations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. Geo-Environmental testing was carried out for a limited number of parameters [as stipulated in the contract] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.



The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawings provided in this report are not meant to be an accurate base plan, but are preliminary and used to present the general relative locations of features on, and surrounding, the site.

