

ST. NICHOLAS WASTEWATER TREATMENT WORKS (WWTW)

Ground Investigation Report & Geo- environmental Assessment

APRIL 2023

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Ground Investigation Report & Geoenvironmental Assessment

St Nicholas WWTW

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1. INTRODUCTION

1.1. Terms of Reference

Arcadis Consulting (UK) Limited (Arcadis) has been commissioned by Welsh Water, 'the Client' to design an intrusive ground investigation and prepare a Ground Investigation Report and Geoenvironmental Assessment to support the detailed design and construction for the proposed development at St. Nicholas Wastewater Treatment Works (WWTW), South Wales ('the Site').

The Ground investigation has been completed by CC Ground Investigations who were instructed by Morgan Sindall PLC to complete the works. The ground investigation was designed by Arcadis and was carried out to determine the ground conditions in accordance with Eurocode 7 (EN 1997-2:2007) (Ref 1), the Code of Practice for Site Investigations (BS 5930:2015 +A1:2020) (Ref 2) and Investigation of Potentially Contaminated Sites (BS 10175:2017+A2:2017) (Ref 4).

The purpose of this report is to assess the data from the ground investigation undertaken by CC Ground Investigation in relation to the proposed development.

1.2. Proposed Development

The proposed development is to expand the existing wastewater treatment works with construction of a lifting pumping station D/S, alkalinity dosing kiosk D/S, layby for screening skip, 30m³ sludge holding tank, MCC and kiosk, aerated reed bed, reed bed blower and LCP kiosk, FE sample chamber and monitoring chamber, HST desludge pumps (D/A/S), recirculation pumping station D/S, Ø5 humus settlement tanks, HST distribution chamber, washwater booster set, biofilter distribution chamber, PST desludge pumps (D/S), new access road and associated infrastructure.

A proposed development plan is presented on Drawing B10181-0AG964-ZZ-ZZ-M3-JB-DI0186, presented in Appendix A. If any alterations are made to the proposed development, the conclusions and recommendations outlined within this report will need to be re-assessed.

1.3. Scope of Report

This report presents a summary and interpretation of the development-specific ground investigation undertaken at the site and presents indicative recommendations for the design of the proposed development.

The purpose of the ground investigation is to determine the suitability for the proposed development and to aid in the design of foundations and to identify typical near surface site conditions in terms of geology and contamination in accordance with recommended guidance including LC:RM (Ref 3), BS10175 (Ref 4), BS5930 (Ref 2) and (EN 1997-2:2007) (Ref 1).

This report includes:

- A summary of the physical and environmental setting of the site;
- A summary of historical ground investigations available at the site;

- Conceptual site model for the site;
- A summary of the site-specific ground investigation, in-situ and laboratory test results;
- A summary of ground and groundwater conditions recorded in the site-specific ground investigation;
- Derivation of soil and rock engineering parameters;
- An assessment of the geotechnical engineering aspects of the site in consideration of the proposed development activity;
- An assessment of the geo-environmental chemical test and monitoring data;
- A preliminary waste classification;
- Conclusions and recommendations to inform the proposed development; and
- A site-specific Geotechnical Risk Register.

1.4. Sources of Information

A list of the available information is presented below and should be read in conjunction with this report.

The assessment and recommendations made in this report are based upon the following documents which should be referred to for factual data:

- Arcadis – Phase 1 Geo-environmental Desk Study Report (ref: B10181-0AG964-ZZ-ZZ-RP-GA-DE0119, dated June 2022) (Ref 5)
- CC Ground Investigations Ltd – Factual Report – St. Nicholas WWTW (ref: C7806 A0002, dated 20th February 2023) (Appendix B).

1.5. Geotechnical Category

The geotechnical category of a project depends on the complexity of the proposed geotechnical works and the geotechnical risk implications to health and safety. Guidance on geotechnical categories is given in BS EN 1997-2:2007 (Ref 1). Under the guidance, Geotechnical Categories of 1, 2 or 3 can be assigned to projects where Category 1 is the lowest, for small and relatively simple, and Category 3 is the highest, for the largest and most complex projects. With reference to the existing project information (outlined in this report) and in accordance with the guidance provided in BS EN 1997-2:2007 (Ref 1) the scheme is considered to be Geotechnical Category 2 which BS EN 1997-1 defines as:

‘Projects which include conventional types of geotechnical structures, earthworks and activities, with no exceptional geotechnical risks, unusual or difficult ground conditions or loading conditions. Designs for Category 2 should normally include quantitative geotechnical data and analysis to ensure that the fundamental requirements are satisfied. Routine procedures for field and laboratory testing and for design and execution may be used.’

1.6. Limitations and Expectations

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This report has been compiled from several sources, which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. The report is based on information available at the time of writing. Additional information may become available in the future which may have a bearing on the conclusions of this report and for which Arcadis cannot be held responsible.

Ground investigations by nature only reveal a small percentage of the ground conditions present beneath the site. The possibility of significant variation in ground conditions existing between sampling locations cannot be discounted. Soil borne gas and groundwater conditions are based on observations made at the time of the investigation and during subsequent monitoring visits and may be subject to significant variation due to atmospheric, seasonal, or other effects.

Eurocode 7 EN 1997-2:2007 (Ref 1) identifies the requirement of a ground investigation report, which shall form part of the Geotechnical Design Report. This is a Ground Investigation Report and does not constitute a Geotechnical Design Report.

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2. PHYSICAL AND ENVIRONMENTAL SETTING

The following provides a summary of information from the Arcadis Desk Study Report (Ref 5) which is pertinent to the completion of this report and is summarised in Table 2.1 below.

Table 2.1: Summary of the physical and environmental setting.

The Site is located within St Nicholas, Vale of Glamorgan, approximately 11km west of Cardiff. The Ordnance Survey National Grid Reference for the approximate centre of the site is 308831, 173283 and the nearest Postcode is CF5 6TB.

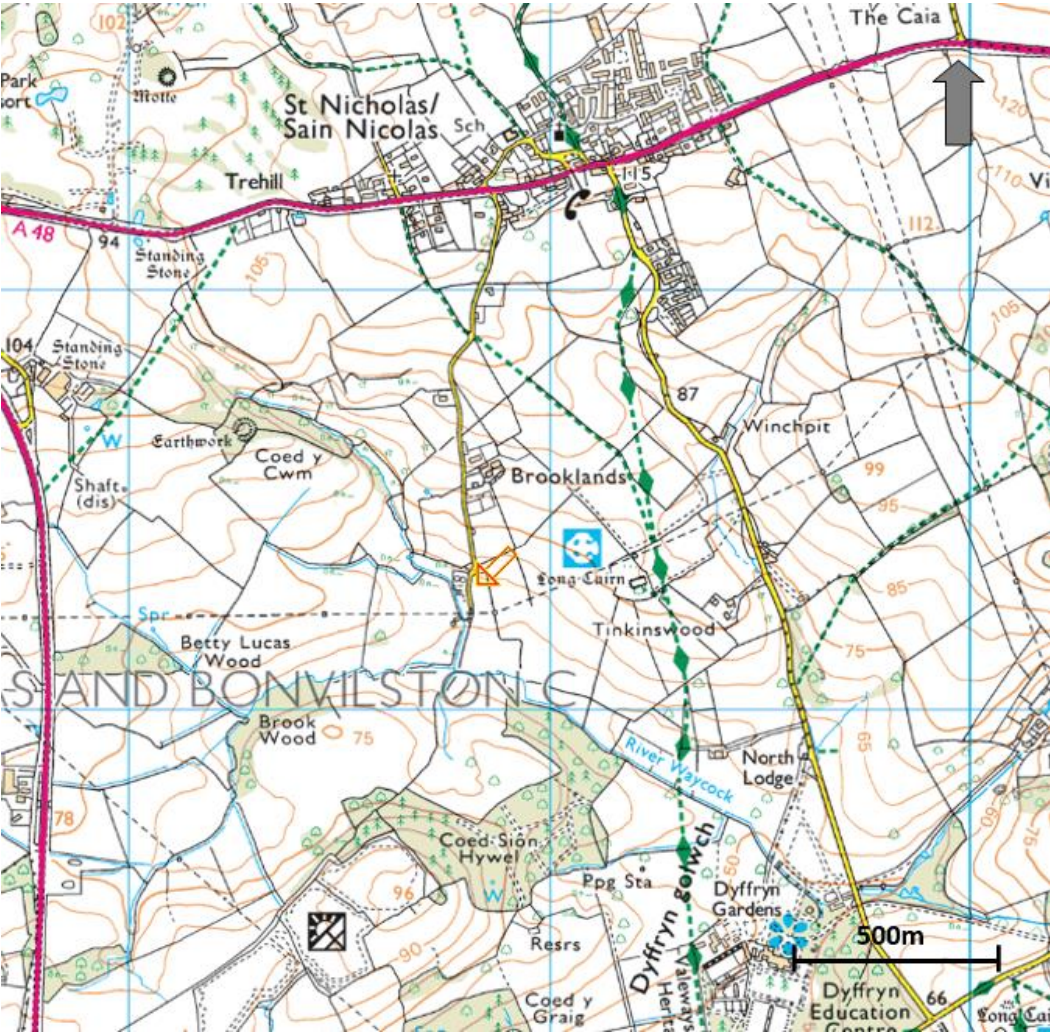


Figure 1 - Site location, source Streetmap.co.uk 2023 (Ref 6)

Site Description	The site consists of an agricultural field with hedgerow along the northern and eastern boundaries, and semi-mature trees and a drainage ditch along the western boundary. A high voltage overhead power line runs east to west in the south of the site, with an electrical pylon adjacent to the southeast corner. The topography of the site slopes downwards towards to the south.
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	<p>The wider area consists predominately of agricultural land, with St Nicholas Wastewater Treatment Plant adjacent to the west boundary comprising one primary tank, three sludge holding tanks, two biological filters, and one settlement tank.</p>
Summary of the Site History and Surrounding Area	<p>Onsite:</p> <p>The site was undeveloped agricultural land with a road running through orientated north to south until circa 1973 when a pylon was built in the southeast corner. Circa 1989 a sewage works is developed on the western edge of the site. No further changes were noted onsite since this time.</p> <p>Offsite:</p> <p>The earliest OS maps dated 1879 show the site mostly surrounded by field and farmland within a 500m radius. A road runs north to south directly west of the site and a group of buildings is 50m southwest. Circa 1989 a sewage works is developed immediately adjacent to the western site boundary. There are no further significant changes since this time.</p>
Geology	<p>Artificial - Not shown on the BGS map or the Groundsure report within 500m of the site. However, historical boreholes show tarmac to be present on the western border of the site. This is most likely to be the remnants of an old road.</p> <p>Superficial deposits – The BGS map and Groundsure report shows there to be Alluvium, consisting of clay, silt, sand, and gravel on the southern section of the site, which can be associated with the River Waycock and its tributaries.</p> <p>Solid geology – The BGS map and Groundsure report indicate the bedrock geology of the Site consists of predominantly of the Mercia Mudstone Group (Marginal Facies), which typically consists of conglomerate or breccia. Blue Anchor Formation bedrock can be found in a small portion of the southwest corner of the Site, consisting of mudstones and siltstones.</p> <p>The site is not located within any coal bearing strata and is therefore not expected to be at risk from coal mining related hazards.</p>

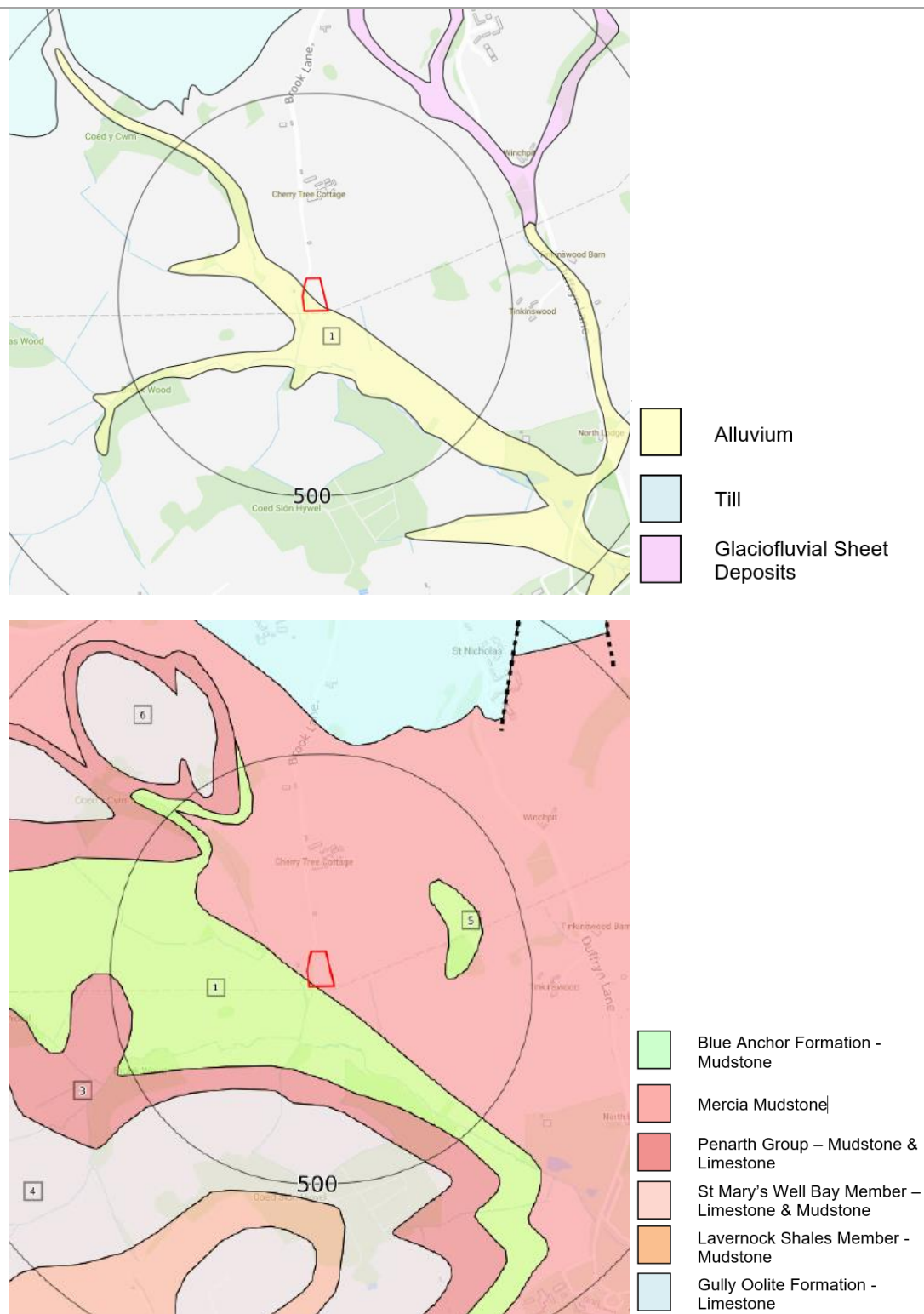


Figure 2 – Extract from Groundsure Report showing site geology – Superficial (above) and Bedrock (below)

Mining	<p>The site is not in a coal mining area. The Groundsure report included within the Arcadis Desk Study notes there to have been no historic surface ground workings onsite. The closest is a pond 149m southwest dated 1898.</p>
Geotechnical Hazards	<p>The desk study identifies the following risk levels:</p> <ul style="list-style-type: none"> • Shrink swell clays – negligible in the north eastern half of the site and very low in the south west half of the site. • Running sands – negligible in the north eastern half, low in the south western half. • Compressible deposits – negligible in the north eastern half, moderate in the south western half, likely to be due to the Alluvial deposits. • Collapsible deposits – negligible in the south west, very low in the north east. • Landslides – negligible in the north east, very low in the south west. • Ground dissolution of soluble rocks associated with the Mercia Mudstone Group – very low in the north east, low in the south west.
Hydrogeology	<p>The Alluvium deposits have been classed as a Secondary A Aquifer, the Mercia Mudstone Group bedrock is classified as a Principal aquifer, and the Blue Anchor Formation is a Secondary B aquifer.</p> <p>The site is not located within a groundwater Source Protection Zone (SPZ).</p> <p>Based on the wider site topography it is likely that the regional groundwater will flow southeast.</p> <p>No groundwater abstractions were listed within 250m of the site.</p>
Hydrology	<p>The closest river is located 16m west of the site and forms part of the River Waycock. However, during the site walkover, this feature was noted to be completely dry and thus not a water source. The report also states that there are 2 ponds located within 500m of the site. The closest pond being 149m southwest, and the second pond being 212m northwest.</p> <p>No surface water abstractions were listed within 250m of the site.</p> <p>The site is noted to not be at risk of flooding from rivers and the sea. The high risk of surface water flooding is a return period of 1 in 1000 years with a maximum modelled depth between 0.1 and 0.3m.</p> <p>There is one licensed discharge consent within 250m of the site, 86m west. This licence is for the existing WWTW and discharges into the River Waycock approximately 150m south of the existing WWTW. The effluent type of this feature is sewage discharges of final/treated effluent and the status is effective (issue date 26/06/2009).</p>
Landfills / Waste facilities	<p>No historical or registered landfills or waste management facilities are recorded within 500m of the site.</p>

Environmental Designations	There are two designated ancient woodlands within 250m of the site, the closest being of unknown name 211m to the south. No other statutory ecological features have been identified within 250m of the site.
Unexploded Ordnance (UXO)	The site was deemed to be at a low risk from unexploded ordnance.
Radon	The site is situated in an area where less than 3-5% of properties exceed the radon action level and basic radon protection measures are required.
Current and Historical Industries	Pylon 8m south and an active sewage works 65m west.

3. PRELIMINARY CONCEPTUAL SITE MODEL

The basis of contaminated land assessment is examination of Source-Pathway-Receptor relationships, to inform a preliminary Conceptual Site Model (CSM). The CSM highlights potential pollutant linkages and the risks associated with them. Development of the CSM has thus been undertaken in accordance with current UK guidance for contaminated land assessment and remediation (Land Contamination: Risk Management (LC:RM) (Ref 3). This defines a risk based “suitable for use” approach to delivery of redevelopment on brownfield land.

A source and a pathway to receptors (i.e., a pollutant linkage) must be present for there to be a risk.

The potential sources, pathways and receptors have been determined below and then further assessed via screening of the collected laboratory data, against appropriate human health and environmental protection criteria.

3.1. Potential Sources of Contamination

On-site and off-site contaminative sources have been identified. Potential sources associated with the site are detailed below in Table 3.1 based upon revised information obtained from Arcadis Desk Study Report (Ref 5).

Table 3.1: Potential Sources of Contamination

Potential Sources	Period of Activity	Contaminants
On-site		
Made Ground associated with the old, covered road	Circa 1879	Metals, polycyclic hydrocarbons (coal tar), sulphates
Natural geology	Current	Radon and sulphates
Off-site		
Existing sewage works (Located adjacent to the western site boundary)	Circa 1989	Metals, metalloids and their compounds; inorganic compounds; acids/alkalis, organic compounds; micro-organisms (pathogens), methane, carbon dioxide.

3.2. Potential Pathways

Potential pathways are the routes that link the receptor to the contamination. The potential pathways for the site are summarised in Table 3.2.

Table 3.2: Identified Potential Contamination Pathways

Receptor	Pathways
Human health (Future site users, visitors)	Accidental ingestion of contaminants within soil, water and dust. Inhalation of dusts, vapours or hazardous ground gas. Dermal contact with contaminants in soil, water and dust.
Controlled waters (groundwater & surface waters)	Leaching of contaminants from Made Ground and vertical migration into groundwater. Horizontal migration of contaminants in groundwater into surface water and/ or other groundwater. Surface water runoff into controlled water body.
Infrastructure	Direct contact of buildings, services or foundations with contaminants in the soil and shallow groundwater. Migration and accumulation of ground gas which may lead to an explosive risk within confined spaces of buildings or services.

3.3. Potential Receptors

The potential receptors are detailed below and take into consideration the future land use of the site which is understood to remain in use as a WWTW (i.e., a commercial/ industrial land use).

1. Human Health

- Current and future workers, maintenance contractors and visitors.

2. Controlled Waters

- Groundwater beneath the site: There are Secondary A (superficial) and Principal (bedrock) Aquifers beneath the site.
- Surface water –Multiple inland rivers within 200m from site located west, south, southeast, and east.

3. Infrastructure

- Underground structures, foundations, services (concrete).

Contamination risks to construction workers (including visiting maintenance workers) are not appraised by chronic (long term) exposure human health risk assessments. There are no appropriate published criteria applicable to assessment of potential risks to construction workers. The potential risks should be addressed by a Site-specific construction workers risk assessment and implementation of appropriate health and safety measures (such as Personal Protective Equipment), to adequately mitigate any potential risks. All works

should be conducted in accordance with the CDM Regulations (2015) or any other relevant guidance. The risk to construction workers has, therefore, not been considered further in this assessment.

4. POTENTIAL GEOTECHNICAL HAZARDS

A summary of the potential geotechnical hazards and the associated potential constraints identified within the Arcadis Desk Study are detailed within Table 4.1 below.

Table 4.1: Summary of Geotechnical Hazards and Potential Constraints

Hazard	Details
Sulphatic deposits in underlying geology	Bedrock geology consists predominantly of Mercia Mudstone Group with some Blue Anchor Formation on site; therefore, potential for high sulphate levels.
Variable depth to competent bearing stratum.	Compressible strata and uneven settlement hazards are possibly present
Dissolution features	Potential for dissolution features due to possible presence of gypsum within the Mercia Mudstone Group.
Bedrock at shallow depth	No superficial deposits mapped in the northern half of the site.
Sloping ground	Site slopes to the towards the south.
Surface water features	Nearby ponds and streams (i.e., River Waycock south of site)
Existing and Proposed Trees	Cluster of semi-mature trees on the western boundary.
Soft ground	Alluvial deposits mapped across the southwest half of the site.
Shallow groundwater	Anticipated shallow groundwater due to site setting.

5. GROUND INVESTIGATION

5.1. Introduction

The ground investigation was undertaken to investigate the contamination regime as well as the soil and groundwater conditions on site for the proposed development at St. Nicholas WWTW.

The proposed development structures are outlined in Section 1.2 of this report, with a copy of the proposed development plan presented in Appendix A. The Factual Ground Investigation Report is presented in Appendix B. The following sections provide detail on the scope of ground investigation work carried out.

5.2. Boreholes

4 No. boreholes were advanced onsite, details of construction type and final depth of the boreholes are presented in Table 5.1. A plan of the exploratory holes undertaken is included within the Factual Report presented in Appendix B.

Table 5.1: Summary of Exploratory Boreholes

Location ID	Hole Type	Drilling dates	Final Depth (m bgl)	Final Depth (m AOD)	Termination Reason
BH102	DS/RC	05/12/22 – 06/12/22	7.60	57.84	5m of competent bedrock recovered
BH103	DS/RC	01/12/22 – 03/12/22	13.90	48.58	5m of competent bedrock recovered
BH104	DS/RC	28/11/22 – 29/11/22	14.80	47.67	5m of competent bedrock recovered
BH105	DS/RC	30/11/22 – 01/12/22	8.70	55.87	5m of competent bedrock recovered

Notes: DS/RC = Dynamic sample with rotary coring follow on

Provisional target borehole depths were provided in the Ground Investigation Specification as 15m bgl (and to confirm 5m of competent rock head). Bedrock was encountered at a shallower depth than originally expected and therefore boreholes were terminated short of 15m, however the 5m competent rock head termination criteria was still achieved.

5.3. Trial Pits

10 No. machine excavated trial pits and 3 No. hand dug trial pits were completed on site; details of construction type and final depth of the trial pits are presented in Table 5.2.

Table 5.2: Summary of Trial Pits

Location ID	Hole Type	Drilling dates	Final Depth (m)	Final Depth (m AOD)	Termination Reason
TP106	TP	30/11/22	2.60	59.80	Pit instability
TP107	TP	01/12/22	2.50	59.83	Pit instability
TP108	TP	01/12/22	3.20	58.83	Pit instability
TP109	TP	28/11/22	2.20	59.72	Pit instability
TP110	TP	28/11/22	2.30	60.45	Pit instability
TP111	TP	29/11/22	2.10	60.69	Pit instability
TP113	TP	29/11/22	2.00	63.74	Refusal on hard stratum
TP114	TP	30/11/22	2.70	61.78	Refusal on hard stratum
TP115	TP	29/11/22	2.00	60.97	Pit instability
TP116	TP	30/11/22	2.00	60.38	Pit instability
HP101	HDTP	02/12/22	0.70	63.87	Refusal on hard stratum
HP103	HDTP	02/12/22	1.00	63.87	Target depth
HP104	HDTP	01/12/22	1.00	62.72	Target depth

Notes

TP = Machine Excavated Trial Pit, HDTP = Hand Dup Trial Pit

5.4. In-Situ Testing

5.4.1. Standard Penetration Tests

Standard penetration tests (SPT) were carried out during the progression of the boreholes. The range of uncorrected SPT N value results in each borehole and the Energy Ratio Er for the trip hammer used in each borehole are presented in Table 5.3 and are presented in more detail in relation to the ground model in Section 7.

Table 5.3: Summary of SPT test results by borehole and ER

Borehole Reference	SPT N (Range) - Uncorrected	Energy Efficiency Ratio Er %
BH102	16 - >50	66
BH103	21 - >50	66
BH104	14 - >50	66
BH105	26 - >50	66

5.4.2. Dynamic Cone Penetration Tests

7 No. Dynamic Cone Penetration Tests (DCP) were carried out to refusal which was encountered at depths ranging from 0.17 – 3.21m bgl. The results are presented in the Factual Report in Appendix B.

5.4.3. Permeability Tests

Variable head permeability tests were undertaken on 2 No. boreholes in-situ during drilling, the recorded permeabilities are documented and presented in Table 5.4.

Table 5.4: Permeability Test Results

Exploratory Hole Reference	Test Type	Test Section top (m)	Test Section base (m)	Permeability
BH102	RH	3.00	6.60	1.0E-06 ms ⁻¹
BH103	RH	0.50	3.00	6.0E-07 ms ⁻¹
BH104	RH	2.00	5.00	2.6E-07 ms ⁻¹
BH105	RH	2.00	5.00	2.3E-06 ms ⁻¹

Notes: RH = Rising Head

5.5. Installations

Installations to enable long term groundwater and ground gas monitoring of the site were constructed in the boreholes, details of which are summarised in Table 5.5.

Table 5.5: Summary of Installations and Response Zones

Exploratory Hole Reference	Installation Type	Response Zone Top (mbgl)	Response Zone Base (mbgl)	Strata
BH102	SP50	3.00	6.00	Mudstone
BH103	SP50	0.50	3.00	Superficial Clay
BH104 (deep)	SP50	2.00	5.00	Superficial Clay and weathered mudstone
BH104 (shallow)	SP19	0.20	0.50	Made Ground
BH105	SP50	2.00	5.00	Mudstone

Notes: SP19 = Standpipe of 19mm diameter, SP50 = Standpipe of 50mm diameter

5.6. Geotechnical Laboratory Testing

Geotechnical laboratory tests were undertaken on selected disturbed and undisturbed soil samples obtained during the ground investigation. Table 5.6 below summarises the testing types and quantities undertaken.

Table 5.6: Summary of Geotechnical Laboratory Testing

Test	Method	No. of determinations
Water Content	BS1377: Part 2: 1990, 3.2	22
Atterberg Limits	BS1377: Part 2: 1990, 3.2, 4.3/4, 5.3, 5.4	19
Particle Size Distributions (wet sieve)	BS1377: Part 2: 1990, 9.2 & 9.4	22
Particle Size Distributions (pipette)	BS1377: Part 2: 1990, 9.4	14
Shear Vane	BS1377: Part 7: 1990	2
One Dimensional Consolidation	BS1377: Part 5: 1990, 3	2
Remoulded CBR	BS1377: Part 4: 1990	8
Undrained Shear Strength (Triaxial)	BS1377: Part 7: 1990, 8	2
Unconfined Compressive Strength (ISRM)	ISRM suggested methods, pp 111-116, 1981	6

Test	Method	No. of determinations
Point Load Strength (ISRM) axial and diametral tests	ISRM suggested methods, 2007	16
BRE SD1 chemical testing suite	Methods in accordance with BRE SD1	13

5.7. Contamination Laboratory Testing

A range of geo-environmental tests were undertaken on soil, prepared soil leachate and groundwater samples obtained from site during the ground investigation.

Soil samples were tested for pH, metals, cyanides, Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG), Polycyclic Aromatic Hydrocarbons (PAH), phenols and WAC (Waste Acceptance Criteria).

Groundwater samples were tested for metals, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), TPHCWG, benzene toluene ethylbenzene and xylene (BTEX), PAH, phenols and pH.

The results are shown within the Factual Report included as Appendix B.

5.8. Groundwater and Gas Monitoring

Gas and groundwater monitoring was undertaken during the works on the following dates:

- 14th December 2022
- 5th January 2023
- 13th January 2023
- 24th January 2023.

Gas results were measured with a Gas Analyser GA5000. Groundwater samples were also collected with a low flow peristaltic pump on the 2nd visit (5th January 2023) and sent for laboratory analysis. Wells were purged prior to sampling whereby 3x the groundwater volume of the well was removed and allowed to naturally recharge. Water parameters were also recorded with a smarTROLL multi-parameter probe.

The full methodology and results of the monitoring and groundwater sampling are attached within the Factual Report (Appendix B) and are discussed in Sections 9.3 and 9.4 of this report.

6. GROUND AND GROUNDWATER CONDITIONS

6.1. Stratigraphy

The stratigraphy recorded is Made Ground / Topsoil, underlain by strata interpreted as cohesive Glacial deposits (absent in the north-eastern corner of the site), over strata of the Mercia Mudstone Group (weathered in the upper few metres and recovered predominantly as a medium dense to dense mudstone gravel). The ground conditions recorded at the site are similar to that anticipated in the Arcadis Desk Study (Ref 5), however Alluvium was not identified onsite. Although not mapped in the immediate area, the superficial clay recorded has been interpreted as cohesive Glacial Deposits. The strength and compressibility data for this unit indicate a predominantly firm to stiff clay and this unit does not display properties typically associated with normally consolidated Alluvium.

The following ground model is based upon information relating to ground conditions encountered on site during the ground investigation works. Exploratory hole logs and their location plans are included within the Factual Report (Appendix B).

6.1.1. Assigned Geological Units

The geological units have been selected to provide a simplified and workable ground model for practical engineering use. Table 6.1 defines the unit code for each stratum unit to allow the reader to establish some level of reference when reading through the subsequent sections of this report.

Table 6.1: Assigned Geological Units

Stratum	Unit Code	Unit Description
Made Ground	MG	Made Ground
Topsoil	TS	Topsoil
Cohesive Glacial Deposits	GL-C	Cohesive Glacial Deposits
Mercia Mudstone Group	MM-W	Mercia Mudstone Group - Weathered
	MM	Mercia Mudstone Group - Unweathered

Further detail on the stratigraphy recorded in the ground investigation is provided in Table 6.2 below.

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Table 6.2: Ground Conditions Summary

Strata	Unit Code (See also Table 6.1)	Description	Top Level of Stratum m bgl (m AOD)	Thickness (m)
Made Ground	MG	<p><u>Made Ground – with anthropogenic material</u></p> <p>Predominantly light brown gravelly sandy CLAY with frequent roots and rootlets, rare orange staining and gravel of limestone, mudstone, brick, concrete, and siliceous material, with occasional fabric pieces.</p> <p>Brown clayey GRAVEL of brick, concrete, limestone, mudstone and siliceous material with cobbles of limestone and occasional metal pieces (BH104, TP106, TP107, TP108, TP114).</p> <p><i>Identified in BH104, TP106, TP107, TP108, TP111, TP114, TP116.</i></p>	<p>0.00</p> <p>(61.33 – 64.48)</p>	0.40 – 1.00
		<p><u>Made Ground – without anthropogenic material (interpreted as disturbed natural soils)</u></p> <p>Soft brown slightly gravelly slightly sandy CLAY with gravel of limestone, mudstone, siliceous material and frequent roots and rootlets. Similar log descriptions to the topsoil.</p> <p>Occasionally, Made Ground was described as dark brown clayey GRAVEL of limestone, mudstone and silicious materials with frequent roots and rootlets (HP104).</p> <p><i>Identified in BH103, BH105, HP101, HP103, HP104, TP109, TP110, TP113, TP115.</i></p>	<p>0.00</p> <p>(60.62 – 65.74)</p>	0.10 – 1.30
Topsoil	TS	<p><u>Topsoil</u></p> <p>Soft brown slightly sandy slightly gravelly CLAY with frequent roots and fine to medium gravel of limestone, mudstone and siliceous material.</p> <p><i>Recorded in BH102, BH103 and BH105 only.</i></p>	<p>0.00 – 0.40</p> <p>(62.38 - 65.44)</p>	0.20 – 0.70

Strata	Unit Code (See also Table 6.1)	Description	Top Level of Stratum m bgl (m AOD)	Thickness (m)
Cohesive Glacial Deposits	GL-C	<p><u>Cohesive Glacial Deposits</u></p> <p>The stratum was generally described as firm to stiff, reddish brown, greyish brown and orangish brown sandy gravelly CLAY with rare roots and rootlets, gravel of limestone, mudstone and siliceous material and occasional cobbles.</p> <p><i>Recorded in all locations excluding the hand pits, BH102, BH105 and TP113 in the northeast of the site.</i></p>	0.10 – 1.30 (60.62 – 63.78)	0.40 - 2.40
Mercia Mudstone Group	MM-W	<p><u>Mercia Mudstone Group - Weathered</u></p> <p>Recovered predominantly as medium dense to dense light brown or reddish brown and grey sandy clayey GRAVEL of mudstone, sandstone and siliceous material with occasional cobbles.</p> <p><i>Recorded in all locations except HP101, HP104, TP114 and TP115.</i></p>	0.30 – 3.20 (59.28 - 65.44)	1.00 – 4.15 *where fully proven
	MM	<p><u>Mercia Mudstone Group - Unweathered</u></p> <ul style="list-style-type: none"> Extremely weak reddish brown locally yellowish-brown MUDSTONE. Discontinuities are sub-horizontal and sub-vertical extremely closely spaced planar rough with clay infill and frequent orange staining. Moderately weak locally reddish-brown MUDSTONE with closely interbedded light grey limestone. Discontinuities are sub horizontal medium spaced planar smooth with occasional orange staining and occasional grey clay infill. Strong light brownish grey coarse-grained SILTSTONE. Widely interbedded with weak dark grey mudstone. Discontinuities are sub-horizontal medium spaced undulating rough with 	1.30 – 6.80 (55.67 - 64.14)	6.30 - 8.00 (*extent not proven)

Strata	Unit Code (See also Table 6.1)	Description	Top Level of Stratum m bgl (m AOD)	Thickness (m)
		<p>dark grey clay smear, orange staining and frequent black specks. Encountered beneath mudstone in BH103 only.</p> <ul style="list-style-type: none"> Strong light grey SANDSTONE. Discontinuities are widely spaced undulating rough with rare clay smearing and occasional orange staining. Encountered beneath mudstone in BH105 only. <p><i>Only encountered in BH102 - BH105.</i></p>		

6.2. Groundwater

A groundwater strike was recorded at 1.10m bgl in BH103 during intrusive investigation works, with water seepages also recorded between 0.60m and 2.60m bgl in some trial pits. There were likely to be groundwater strikes in the other boreholes, but they may have been masked by the water flush used to facilitate the drilling.

Follow-up groundwater monitoring was undertaken on four occasions between the 14th December 2022 and 13th January 2023. During monitoring, rest groundwater levels were recorded at depths ranging from ground level to 5.63m bgl. Groundwater monitoring results are summarised in Table 6.3.

Table 6.3: Summary of post fieldwork groundwater monitoring

Exploratory Hole References	Min. Monitored Depth m bgl / m AOD	Max. Monitored Depth m bgl / m AOD	Unit
BH102	0.68 / 64.76	5.63 / 59.81	MM
BH103	0.00 / 62.48	2.94 / 59.54	MG / TS / GL-C
BH104 (Deep)	0.51 / 61.96	0.81 / 61.66	MG / GL-C
BH105	0.20 / 64.37	4.58 / 59.99	MG / TS / MM

The groundwater strike in BH103 appears to be within a very gravelly layer within the Glacial Deposits. This groundwater strike and the groundwater seepages observed in the trial pits are likely to be representative of localised perched volumes within the Made Ground and Glacial Deposits. Fluctuations are seen in the resting groundwater levels recorded in the monitoring wells; the groundwater table is most likely sat within the Mercia Mudstone bedrock, confined by the overlying cohesive Glacial deposits.

6.3. Olfactory/Visual Contamination Evidence

No visual or olfactory evidence of contamination was recorded during the ground investigation.

6.4. Observational Engineering Geological Model

Geological cross sections of the site along with a cross section location plan are presented below as Figures 3 - 5. These figures, including the local topography and assigned geological units may be used to develop geotechnical ground models for preliminary design of the site.

Nonetheless, reference should be made to the nearest exploratory hole logs for design to ensure that the most representative ground model is adopted for each design.



Figure 3 – Extract of CC Ground Investigation Site Plan from Factual Report (Appendix B) with location of Cross Section Lines (white)

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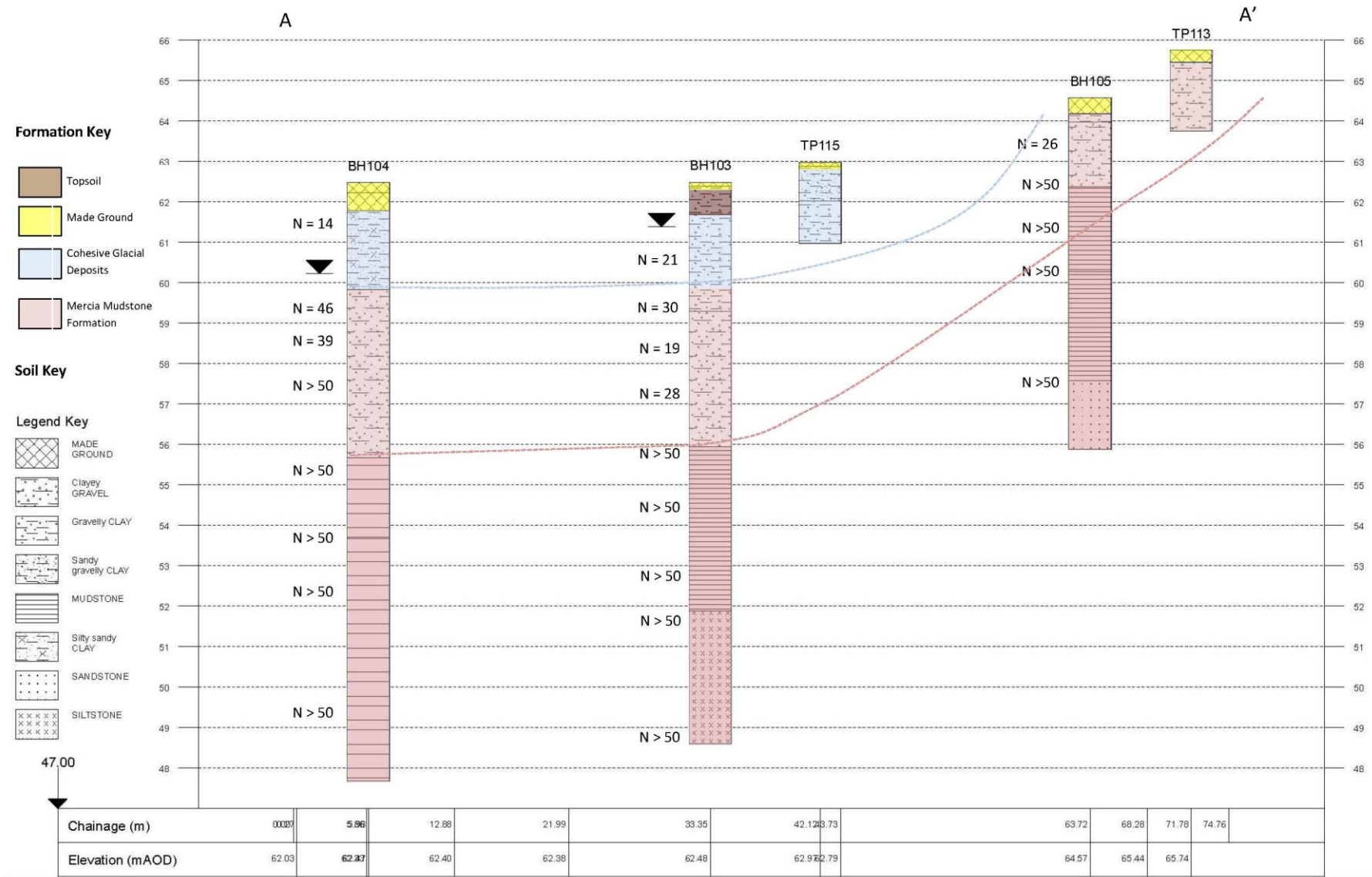


Figure 4 – Cross Section. Vertical Scale 1:125, Horizontal Scale 1:404.

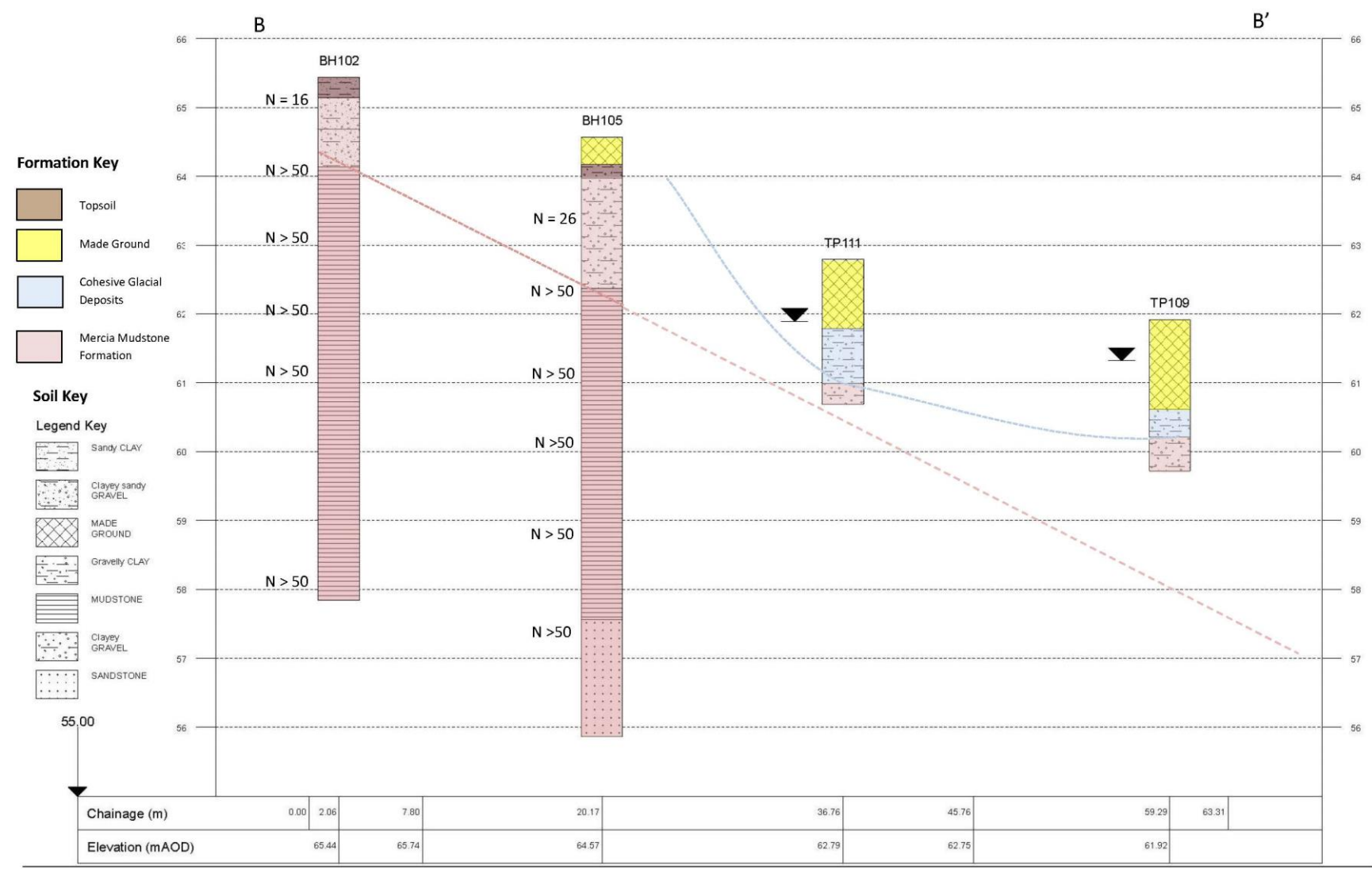


Figure 5 – Cross Section. Vertical Scale 1:72, Horizontal Scale 1:342.

7. ENGINEERING PARAMETERS

7.1. Parameter Derivation Methodology

Empirical relationships and correlations used for parameter derivation are presented below.

7.1.1. Standard Penetration Test (SPT)

SPT N values have been corrected based on the SPT Energy Ratios presented in Table 5.3 to calculate SPT N₆₀ values.

7.1.2. Undrained Shear Strength

The undrained shear strength value has been derived based on direct measurements from laboratory and field hand vane tests and correlation from SPT data.

Correlation of undrained shear strength from SPT N values considers the correlations between SPT N₆₀ value and plasticity in accordance with guidance from Stroud 1974 (Ref. 7), whereby $c_u = f_1 \times N_{60}$.

Based on the plasticity index (Ip) values for the cohesive Glacial soils, a typical value of 35% indicates an f_1 factor of 4.5. This value has been used to derive the undrained shear strength from N₆₀.

7.1.3. Effective Shear Strength

Fine grained soils (Silts and Clays)

The typical constant volume effective angle of shearing resistance (ϕ'_{cv}) has been estimated in accordance with BS 8004:2015+A1:2020 (Ref. 8) Section 4.3.1.4.8, and the correlation with plasticity index tests whereby $\phi'_{cv,k} = (42^\circ - 12.5 \log_{10}(Ip))$ for $5\% \leq Ip < 100\%$.

The peak angle of shearing resistance has been estimated considering the degree of over consolidation (OCR) and the range of angle of dilation $0 \leq \phi'_{dil} \leq 4$ in addition to the constant volume angle. The contribution from soil dilatancy is known to increase with a fine soils over consolidation ratio. An OCR of 2 has been determined for the cohesive Glacial soils from the one-dimensional consolidation testing. Therefore, a dilatancy contribution of 1° has been assumed for the lightly over consolidated soil.

The drained cohesion (c') of the cohesive soils is assumed to be 0kPa.

Coarse grained soils (sands and gravels)

With reference to BS 8004:2015+A1:2020 Section 4.3.1.3.5, the constant volume of effective angle of shearing resistance ($\phi'_{cv,k}$) has been estimated from

$$\phi'_{cv,k} = 30^\circ + \phi'_{ang} + \phi'_{PSD}$$

Where $\phi'_{ang} + \phi'_{PSD}$ are contributions from the angularity of the particles and the soil's particle size distribution. A review of the available soil descriptions and particle size distribution results indicates that the weathered Mercia Mudstone Group strata comprises angular to subrounded gravel. Therefore, subrounded should be taken as the minimum angularity on balance, and the angularity contribution should be taken as 0° . The PSDs indicate a high uniformity coefficient suggesting a gap graded material. Therefore ϕ'_{PSD} should be taken as 0° . As the fines content of the coarse soil generally exceeds 25%, it should be assumed that there is no contribution to the peak effective angle of shearing resistance from soil dilatancy as per BS

8004:2015+A1:2020 Section 4.3.1.3.9.

7.1.4. Elastic Moduli

Fine grained soils (Silts and Clays)

The drained Poisson's ratio (ν') for cohesive and granular soils have been based on Table 3.11 extracted from Budhu (2015) (Ref. 9). A value of 0.25 has been chosen for the cohesive Glacial soils based on their description as a firm to stiff clay and a value of 0.30 has been chosen for the Mercia Mudstone Group Strata based on their description as medium dense weathered gravel. The undrained Poisson's ratio (ν_u) for cohesive soils is equal to 0.5.

The undrained Young's Modulus (E_u) of cohesive materials has been estimated from the relationship developed between E_u/c_u ratio, derived from the f plasticity index value and over consolidation ratio (OCR) after Jamiolkowski et al, in CIRIA 760 (Ref. 10).

The undrained Young's Modulus (E_u) for cohesive materials has also been estimated based on the correlation with SPT N value according to CIRIA, 1995 (Ref. 11).

The drained Young's Modulus (E') of the cohesive material has been estimated from E_u using the following equation.

$$E_u = \frac{(1+\nu_u)}{(1+\nu)} E'$$

Coarse grained soils (sands and gravels)

For granular soils, the drained Young's Modulus (E') has been derived using guidance from CIRIA 143 (Ref. 11) whereby $E' = 1.5 \times N_{60}$. A conservative approach has been considered for granular soils to its heterogeneous composition.

Mercia Mudstone Group

The Rock mass Modulus ($E_{Rockmass}$) has been calculated from available Rock Quality Designation (RQD) data and Unconfined Compressive Strength (UCSi) using the equation below after Hobbs (Ref. 12).

$$E_{Rockmass} = j \times Mr \times UCS_i$$

Where:

j = Rockmass factor based on RQD

Mr = Modulus Ratio

UCSi has been taken direct from UCS test results but also from correlation with point load test results.

7.1.5. Coefficient of Volume Compressibility

The coefficient of volume compressibility (m_v) has been determined directly from one dimensional consolidation testing.

m_v has also been calculated based on the correlation for firm to stiff soils with SPT N value by Stroud and Butler (1975) (Ref. 13) using the equation below with f_2 found by correlation with plasticity index.

$$m_v = 1 / (f_2 N) \text{ (m}^2\text{/MN)}$$

7.2. Geotechnical Test Results

This section summarises the available in-situ and laboratory data for each assigned geological unit as defined in Section 6.1.

7.2.1. Topsoil

It is assumed that any topsoil present at the site will be stripped, stockpiled and tested for potential later use in landscaping of the site.

No Geotechnical assessment of the Topsoil has been carried out as it is assumed to be removed prior to construction.

7.2.2. Made Ground - Cohesive

A summary of the available in-situ and laboratory test results for the cohesive Made Ground are presented in Table 7.1.

Table 7.1: MG-C summary of In-situ and Laboratory Results

Parameter	Number of Results	Range of results and derived parameters	Comment
SPT N ₆₀	-	-	-
Natural Moisture Content (%)	1	22	-
Plasticity Index (%)	1	22	-
Modified Plasticity Index (%)	1	11.6	-
Particle Size Distribution (% passing)	1	Cobbles: 0 Gravel: 41 Sand: 18 Silt: 24 Clay: 17	-
Bulk Density (Mg/m ³) (compacted) <i>From CBR Testing</i>	1	1.90	From remoulded CBRs

Dry Density (Mg/m ³) (compacted) <i>From CBR Testing</i>	1	1.48	-
Laboratory CBR Value (%)			Samples were tested as compacted samples and were not soaked.
<i>Top</i>	1	1.30	
<i>Bottom</i>	1	1.10	

7.2.3. Made Ground - Granular

A summary of the available in-situ and laboratory test results for the granular Made Ground are presented in Table 7.2.

Table 7.2: MG-G summary of In-situ and Laboratory Results

Parameter	Number of Results	Range of results	Comment
SPT N ₆₀	-	-	-
Natural Moisture Content (%)	2	3.8 – 9.3	-
Particle Size Distribution (% passing)	2	Cobbles: 0 Gravel: 56 - 61 Sand: 18 - 19 Silt and Clay: 21 - 25	-
Bulk Density (Mg/m ³) <i>From CBR Testing</i>	1	2.04	From remoulded CBRs
Dry Density (Mg/m ³) <i>From CBR Testing</i>	1	1.71	-
Laboratory CBR Value (%)	1	2.00	Samples were tested as compacted samples and were not soaked.
<i>Top</i>	1	3.30	

Bottom			
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7.2.4. Cohesive Glacial Deposits (GL-C)

A summary of the available in-situ, laboratory test results and derived parameters for the cohesive Glacial Deposits are presented in Table 7.3.

Table 7.3: Cohesive Glacial Deposits summary of In-situ and Laboratory Results

Parameter	Number of Results	Range of results	Comment
SPT N ₆₀	2	15 - 22	See Figures C1 & C2 – Appendix C.
Natural Moisture Content (%)	14	13 - 39	-
Plasticity Index (%)	14	17 - 43	-
Particle Size Distribution (% passing)	11	Cobbles: 0 - 17 Gravel: 0 - 58 Sand: 5 - 22 Silt and Clay: 42 - 95	-
Bulk Density (Mg/m ³)			
From CBR Testing	4	1.91 – 2.12	From remoulded CBRs
From Undrained Triaxial Test	2	1.85 - 1.89	
Dry Density (Mg/m ³)			
From CBR Testing	4	1.48 – 1.80	From remoulded CBRs
From Undrained Triaxial Test	2	1.40 – 1.47	
Laboratory CBR Value (%)			
Top	4	1.60 – 8.50	Samples were tested as compacted samples and were not soaked.
Bottom	4	1.80 – 7.20	
Undrained Shear Strength (kN/m ²)			
From SPT	2	63 – 95	See Figure C3. Triaxial testing was carried out on disturbed samples remoulded in the laboratory. The undrained shear
From Undrained Triaxial Test	2	10 - 40	
From Laboratory hand shear vane	2	35 – 73	

<i>From In-situ hand shear vane</i>	12	43 – 112	strength results of these tests should be considered as possibly significantly below those values likely to be present within undisturbed in-situ material
Effective cohesion (kN/m ²)	-	0	No results available, assumed to be 0 kN/m ² .
Effective Shear Strength Angle of Internal Friction (ϕ') (°)			-
<i>From PI</i>	14	22 - 27	
Undrained Youngs Modulus (Eu) (kN/m ²)			
<i>Based on Cu</i>	4	24 – 86	-
<i>Based on N₆₀</i>	2	17 - 24	
Drained Youngs Modulus (E') (kN/m ²)	6	13.8 - 71.8	-
Coefficient of volume compressibility (M _v) (m ² /MN)			M _v calculated for pressure range equivalent to sample overburden pressure plus 100kN/m ² .
<i>From 1D Consolidation</i>	2	0.20 – 0.24	
<i>From SPT and PI</i>	14	0.10 – 0.12	

7.2.5. Mercia Mudstone Group – Weathered (MM-W)

A summary of the available in-situ, laboratory test results and derived parameters for the MM-W are presented in Table 7.4.

Table 7.4: MM-W summary of In-situ and Laboratory Results.

Parameter	Number of Results	Range of results	Comment
SPT N ₆₀	9	17 - 53	See Figures C1 & C2 – Appendix C.
Natural Moisture Content (%)	1	14	-
Plasticity Index (%)	1	19	-

Particle Size Distribution (% passing)	7	Cobbles: 0 - 45 Gravel: 16 - 67 Sand: 13 - 25 Silt and Clay: 6 - 42	Fines generally >25%.
Bulk Density (Mg/m ³) <i>From CBR Testing</i>	2	2.05 – 2.13	From remoulded CBRs
Dry Density (Mg/m ³) <i>From CBR Testing</i>	2	1.70 – 1.88	-
Laboratory CBR Value (%)			
<i>Top</i>	2	3.30 – 32.10	From remoulded CBRs
<i>Bottom</i>	2	3.80 – 32.10	
Effective cohesion (kN/m ²)	-	0	No results available, assumed to be 0 kN/m ²
Effective Shear Strength Angle of Internal Friction (ϕ') (°)	-	30.0	From $\phi'_{cv,k} = 30^\circ + \phi'_{ang} + \phi'_{PSD}$
Drained Youngs Modulus (E') (kN/m ²)	9	26 - 79	-

7.2.6. Mercia Mudstone Group - Unweathered (MM)

A summary of the available in-situ, laboratory test results and derived parameters for the MM are presented in Table 7.5.

Table 7.5: MM summary of In-situ and Laboratory Results.

Parameter	Number of Results	Range of results	Comment
SPT N ₆₀	22	53	See Figures C1 & C2 – Appendix C.
RQD (%)	23	0 - 100	-
Water Content (%)	6	3.3 – 23.0	-
Bulk Density (Mg/m ³) <i>From UCS Testing</i>	6	2.55 – 2.62	-

Dry Density (Mg/m ³) <i>From UCS Testing</i>	6	2.44 – 2.54	-
Point load I _{s50} (MPa)	30	0.8 – 6.2	2no. results have been identified as outliers to the data set and have been removed.
UCS (MPa) from point load correlations	30	9.6 – 74.4	Equivalent UCS values using relationship $UCS = I_{s50} \times f$. The point load values have been factored by a value of 12, an average value derived from UCS/PL correlation at similar depths.
UCS (MPa) from laboratory test	6	20.1 – 32.6	See Figures C4 & C5 – Appendix C.

7.3. Summary of Geotechnical Parameters

The geotechnical parameters have been derived using the information above taken from the Ground Investigation Factual Report and are summarised in the table below.

Made Ground is not included in the table as sufficient data is not available for parameter derivation.

Table 7.6: Typical Geotechnical Parameters

	GL-C	MM-W	MM
	Cohesive Glacial Deposits	Weathered Mercia Mudstone Group	Mercia Mudstone Group
SPT 'N ₆₀ '	16	29	53
Unit Weight (kN/m ³) - Above Water	17	19	24
Unit Weight (kN/m ³) - Below Water	18	20	24
Plasticity Index (I _p)	35	-	-
Undrained Shear Strength c _{u,k} (kPa)	60	-	-

Constant Volume Effective Angle of Shearing Resistance $\phi'_{cv,k} (^{\circ})$	24.0	30.0	30.0 ¹
Peak Effective Angle of Shearing Resistance $\phi'_{p,k} (^{\circ})$	25.0	30.0	30.0 ¹
Effective Cohesion c'_k (kPa)	0	0	20 ²
K_0^5	0.42	0.29	0.13
Coefficient of volume compressibility, m_v (m ² /MN)	0.19	-	-
Point Load (Is^{50}) (MPa)	-	-	16.9
Unconfined Compressive Strength (MPa)	-	-	16.0
Undrained Young's Modulus E_u (MN/m ²)	18	-	-
Undrained Poisson's Ratio ν_u	0.50	-	-
Drained Young's Modulus E' (MN/m ²)	15	43	240
Drained Poisson's Ratio ν'	0.25	0.30	0.30
CBR (%)	3	7	-

Note: values are based on laboratory and in-situ results presented in Section 7.2 or have been derived based on the methodology presented in Section 7.1.2, unless otherwise specified

¹ Based on typical effective stress parameters for a Grade I-II Mercia Mudstone, presented on Table 7.1 CIRIA 570, 2001 (Ref. 14).

² Based on typical effective stress parameters for Mercia Mudstone, presented on Table 7.1 CIRIA 570, 2001. Conservative value adopted between weathering grades III and I-II.

³ OCR determined from e-log σ' plots from one dimensional consolidation testing.

⁴ Mercia Mudstone is typically heavily over consolidated (HOC), however a conservative value has been assumed at the lower bound of HOC given the shallow depth of the strata.

⁵ At rest earth pressure coefficient K_0 determined from Equation 9.1 in BS EN 1997-1:2004+A1:2013 (Ref. 15).

7.4. Design Groundwater Level

Groundwater monitoring was undertaken on four occasions between the 14th December 2022 and 13th January 2023. During monitoring, rest groundwater levels were recorded at depths ranging from ground level to 5.63m bgl.

A full year of monitoring has not been completed, therefore given the shallow groundwater levels recorded during monitoring, it is recommended that a groundwater level for permanent works design be equivalent to ground level.

8. PRELIMINARY GEOTECHNICAL ASSESSMENT

8.1. Introduction

The proposed structures comprise a mixture of circular and rectangular structures. The majority of these are to be founded at or near existing ground level, except for the pumping stations, filter bed and HST slabs, which extend to depths of between 2.5 to 5.2m bgl. Structural bearing stresses have been provided which range from 7kN/m² (inlet screen slab) to 187.5kN/m² (HST slab). Maximum allowable settlements are indicated to vary between 10-15mm and 25mm for the structures.

The proposed finished levels are yet to be finalised. However, it is assumed that the general layout will work with existing ground levels, and therefore significant earthworks are not anticipated within the site. Should design plans change it is recommended that this assessment be revisited.

8.2. Foundation Recommendations

The foundation types for the proposed construction are dependent upon the size of the structures, the anticipated loads, the underlying ground and groundwater conditions and the serviceability limit state.

A preliminary foundation assessment for the key anticipated structures is provided below.

8.2.1. Shallow Foundations

Shallow foundations are likely to be feasible for all of the proposed new structures, either strip footings or pad foundations bearing within the weathered Mercia Mudstone Group strata at shallow depths in the north-eastern corner of the site, or within the firm to stiff cohesive Glacial soils at depths generally between 1 – 1.5m bgl (61.5 – 62m AOD) across the rest of the site. Made Ground is not considered a suitable founding stratum for any of the moderately loaded structures. For the lighter-loaded structures (kiosks, inlet screen slab, MCC slab), Made Ground should be examined to see if it can be left in-situ with a compacted granular fill of nominal thickness (~0.5m), to be confirmed in the design.

Preliminary calculations using equation 27 from BS8004:2015+A1:2020 (Ref. 8) indicates a bearing resistance of 100kN/m² can be expected from the cohesive Glacial soils which are described as firm to stiff clay with a typical undrained shear strength of 60kPa. This assumes a settlement limit of 25mm. The cohesive Glacial soils have a low to medium volume change potential and may be susceptible to volume change due to changes in moisture content such as that caused by trees. Detailed foundation design should consider new and existing tree zones of influence. It should be noted that drained bearing capacity will be addressed during detailed design.

Guidance within CIRIA 570 (Ref 14) suggests a minimum presumed bearing resistance for the unweathered Mercia Mudstone would be approximately 250kN/m² with an assumed grade III weathering. This value represents the lower range for weathering grade III.

Detailed foundation settlement assessment should be carried out once foundation sizes / spacing are further defined and taking account any additional special requirements (e.g., for rotating plant or pipe connections)

for each individual structure as required. It is recommended that foundations for each structure should be within consistent strata to reduce the effect of differential settlement.

If the proposed structures are lightly loaded and have no stringent settlement requirements (e.g., total settlement $\leq 25\text{mm}$ for rotating plant, pipe connections or settlement limits between individual slabs), then raft foundations could also be suitable to support the proposed structures. If raft foundations are to be used, the foundation for each structure should be assessed in relation to the structure specific serviceability limits, such as limits for total and differential settlement taking account of any additional special requirements (e.g., for rotating plant or pipe connections) for each individual structure as required.

Raft foundations should be founded on a constant stratum and not placed over any buried obstructions that may induce excess differential settlement or hogging strain across the foundation.

Any localised loose / soft Made Ground or soft cohesive Glacial soils below the raft foundation should be excavated and replaced with a well compacted engineered fill.

8.2.2. Pile Foundations

Piled foundations are not likely to be required for stability given the ground conditions present. From the current anticipated serviceability limits of the structures, these may be achievable with shallow foundations (with localised excavations of soft material where required). If any serviceability limits were to become more stringent then piled foundations may be required for the moderately loaded structures.

Detailed pile designs (in terms of pile type, depths, and method of installation) are dependent upon the required working loads and should be undertaken in conjunction with a reputable, specialist, piling contractor, ideally with local experience.

8.2.3. Pumping Stations

Several pumping stations are proposed. The PS base slab and the Tops PS base slab are to be founded 4.6m bgl and 3.75m bgl respectively.

Given the proposed founding depths, the foundation levels would be placed within the unweathered Mercia Mudstone Group strata. Guidance within CIRIA 570 (Ref 14) suggests a presumed bearing resistance of approximately 250kN/m^2 would be appropriate for the weathered strata of the Mercia Mudstone Group.

The foundations for the structures should be assessed in relation to the structure's serviceability limits, such as limits for total and differential settlement taking account of any additional special requirements (e.g., for rotating plant or pipe connections) for each individual structure as required. It is recommended that foundations be within consistent strata to reduce the effect of differential settlement.

8.2.4. Buoyancy

Given the suggested design groundwater level of 0.0m bgl, the effect of buoyancy will need to be considered in the design. From the currently anticipated sizes and loadings, this would likely be mitigated using an extension of the structure base slab to act as a shear key. Tension piles are not likely to be required, but this should be confirmed during detailed design.

The structural design of the filter bed foundation slab will need to be designed to resist the buoyant pressures present in the unrestrained middle of the slab without tension piles."

Its proposed depth is on the boundary of the Mercia Mudstone, so it may require some localised excavation of any present Glacial Till to form a consistently stiff formation response for the structural design of the slab.

8.3. Earthworks

8.3.1. Excavations

Excavations will likely be required for foundations, pumping station shafts and infrastructure. Minor excavations may be required for roads. Excavations will encounter Topsoil (TS), Made Ground (MG), cohesive Glacial soils (GL-C) and may encounter weathered Mercia Mudstone Group strata (MM-W) dependent on the depth of any proposed below ground structures.

Open excavations in these conditions are likely to be feasible below groundwater only where appropriate dewatering measures are put in place prior to commencement of excavation and where there is sufficient space to batter back side slopes to a stable angle. Where there is insufficient space to batter side slopes to an appropriate angle then an appropriate temporary shoring or retaining system will be required.

Consideration should be given in design for the potential water pressure, including uplift forces, that the characteristic groundwater level may apply to any proposed temporary or permanent works.

8.3.2. Excavatability

Based upon the ground investigation works undertaken, including excavation of trial pits with JCB 3CX excavator, it is anticipated that excavation of the cohesive Glacial soils, and uppermost weathered Mercia Mudstone will be possible with a backhoe or front-loading excavator to a depth of around 2.5 - 3m bgl. Provision for hard break out should be made for any excavations which extend beneath this depth, and those which will encounter bedrock.

7.3.2. Material Reuse

Topsoil and excavated Made Ground should be stockpiled and tested for potential reuse.

According to the Manual of Contract Document for Highways Works, Volume 1, Specification for Highway Works, Series 600 Earthworks (MCHW, Series 600), any cohesive natural soils will likely be suitable for reuse on site as Class 2 (general Fill), Class 4 (Fill to Landscaped Areas) and Class 7 (Selective Cohesive Fill).

The excavated materials should be separated on site and tested in accordance with MCHW Series 600 or the project earthworks specification prior to any reuse to confirm suitability. Unsuitable materials could potentially be treated on site to comply with MCHW Series 600 or the project earthworks specification or disposed of offsite to an appropriate waste disposal facility. See also Section 11 for chemical suitability of materials for reuse and off-site disposal should this be required.

7.3.3. Filling and Compaction

Engineering fill will likely be required for general earthworks (i.e., general site levelling) and backfill to retaining walls, excavations for foundations and any other locations, as appropriate. There may also be a requirement for landscape fill for the development.

The potential for reuse of excavated materials is discussed in Section 7.3.2.

The placement and compaction of site won or imported materials should be in accordance with MCHW Series 600 or the project earthworks specification. Table 6/1 of MCHW Series 600 provides guidance on material acceptability and compaction requirements while Appendix 6/2 of the same document provides guidance for dealing with unacceptable materials.

8.4. Temporary and Permanent Retaining Walls

The type of support required is a function of a number of factors including material type, depth of excavation, groundwater level in the area of excavation, available space/imposed spatial restrictions and the proposed sequence of construction work.

For temporary support purposes sheet pile walls can typically be designed to retain relatively shallow vertical excavations within superficial deposits and very weak rock. However, for deeper excavations, secant pile retaining walls or diaphragm walls may be required to retain the excavation, limit the rate of groundwater inflow and or limit potential damage to surrounding structures/ assets. These structures, however, would not be a complete cut-off for groundwater inflow and therefore an assessment of the dewatering requirements should also be undertaken in combination with any retaining system design. To limit the bending moments within the walls, lateral support, in the form of internal struts or external anchors, could be introduced to provide additional support at critical depths down the retaining structure.

Depending on the depths of the proposed pumping station shafts, temporary secant pile or diaphragm walls may be required to enable their construction, particularly given many of the trial pits had to be terminated due to side wall stability issues.

No permanent retaining walls are planned as part of the development. However, ground retention will need to be considered for buried and part buries structures.

8.5. Groundwater Control

Any excavations below the groundwater table will require dewatering, particularly the proposed pumping station well shafts depending on their depth.

Groundwater control measures could take the form of local dewatering either by the construction of perimeter drains and sump pumping, or well point/ deep well dewatering. Guidance for dewatering requirements can be taken from CIRIA Report C515 (Ref. 9), however, a detailed assessment of the de-watering requirements including the density and depth of any well points and pumping rates should be undertaken by a specialist dewatering contractor once development proposals and construction details have been finalised.

Dewatering activities can have a significant impact on material bearing capacities and retaining wall design. Temporary retaining walls can frequently be used within the groundwater management system to provide groundwater flow inhibitors. Consequently, the dewatering design and the detailed geotechnical design of the excavations should be progressed in an integrated manner. Where relevant the designs should clearly determine at what point in the construction sequence that the proposed structures (particularly the shafts) have sufficient dead load to enable dewatering to cease.

In the detailed design, the zone of influence of a dewatering scheme should be assessed to determine if any existing structures may be affected by the groundwater drawdown.

Consideration should also be given to the appropriate methodology of pile installation and/or potential mitigation measures that may be required to allow construction of piles (if required).

8.6. Pavement

In consideration of the ground conditions encountered, and assuming final levels will largely mimic the existing, it is likely that the pavement subgrade exposed at formation levels will comprise predominantly cohesive Made Ground or Glacial soils, or weathered strata of the Mercia Mudstone Group (to the northeast).

The shallow cohesive Made Ground and Glacial soils were found to have Plasticity Index values ranging from 17% – 43% and CBRs carried out on recompacted samples of Glacial clay recorded a range of values between 1.6 – 8.5%, although generally above 3%.

In-situ DCP testing carried out in the field to the east of the site where the new road is to be constructed (DCP102 only), indicated a minimum equivalent CBR of approximately 6% to a depth of 1m bgl. In-situ DCP testing carried out within the northwest of the site around the existing facilities indicated minimum equivalent CBRs around 8% within the upper 0.5m.

For preliminary design purposes, it is recommended that new road pavement and road construction design be based upon (an estimated) CBR value of about 3-4%. This is based on the recorded Plasticity Index Values and a comparison with Table 5.1 'Equilibrium Subgrade CBR Estimation' in 1AN 73/06 (Ref 16) and supported by laboratory CBR testing. Less weight has been given to the results of the in-situ testing, as only one test was carried out within the area of the proposed new road.

Notwithstanding this, the formation at all levels should be proof-rolled prior to pavement construction, and any soft zones thus revealed should be excavated out, with the resulting excavation in-filled with appropriately compacted graded engineered granular fill.

8.7. Ground and Groundwater Aggressivity

Chemical testing of soils for concrete classification was undertaken in accordance with BRE SD1 (Ref 17). The results for all materials tested including Made Ground, cohesive Glacial soils and the weathered Mercia Mudstone indicate a design sulphate class of DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) class of AC-1 for below ground concrete.

Nevertheless, BRE SD1 does highlight Mercia Mudstone as a principal sulphate bearing strata. The BGS report on the Engineering Geology of British Rocks and Soils: Mudstones of the Mercia Mudstone Group (Ref 18) also suggests that a wide range of sulphate contents may be present within the strata resulting in sulphate classes from 1 to 5. Therefore, it may be sensible to adopt a more conservative approach with a design sulphate class DS-2, and an ACEC class of AC-2.

9. CONTAMINATION ASSESSMENT

Laboratory testing was undertaken on 8 samples of Made Ground and 4 samples of natural soils for a range of geo-environmental determinants, targeting potential sources of contamination as detailed within Table 3.1 of this report. The results are recorded within the Factual report (Appendix B).

9.1. Soil Screening Values (SSVs)

In accordance with current UK guidance and legislation, the analytical data has been compared to Generic Assessment Criteria (GAC) calculated using the CLEA model and using the exposure assumptions and toxicological input parameters prescribed in the LC:RM guidance (Ref 3) for a Tier 2 screening assessment.

Soil screening values have been taken from LQM / CIEH Suitable for Use Levels (S4ULs) for Human Health Risk Assessment (Ref 19). In the absence of a S4UL for Lead, the Category 4 Screening Level (C4SL) has been adopted (Ref 20).

Based upon the proposed end use of the site as a water treatment works, the screening criteria for a commercial end use has been used for the screening process.

Criteria relating to a soil organic matter content of 1% have been adopted for this assessment as it considered to be a more stringent worst-case scenario.

The results were compared to the GAC using the soil screening ES-DAT software. Output sheets are presented in Appendix D.

9.1.1. Averaging Area

The site has been considered as one averaging area for this assessment.

9.2. Tier 1 Screening Assessment Soils – Human Health

9.2.1. Asbestos Screen

Asbestos screening was carried out on 7 samples of Made Ground and 2 samples of natural soils. No asbestos was detected in any of the samples tested.

9.2.2. Metals, Inorganic Compounds, Polycyclic Aromatic Hydrocarbons (PAH), semi volatile organic compounds (SVOCs) and phenols

Eight Made Ground samples and 4 samples from natural soils were analysed for metals, inorganic compounds, PAHs, SVOCs and phenols. No exceedances were recorded within any of the samples tested, and the concentrations of SVOCs and phenols were below the laboratory limit of detection.

9.2.3. Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) & BTEX

Eight Made Ground samples and two from natural soil samples were analysed for TPH CWG and BTEX. All samples were reported below the recommended TPH CWG and BTEX laboratory limit of detection.

9.3. Risk to Controlled Waters

9.3.1. Water Quality Standards

To assess the groundwater in terms of their potential as a source of contamination, each contaminant concentration is compared against appropriate Water Quality Standards (WQS), such as Environmental Quality Standards (EQS) for freshwater and UK Drinking Water Standards (DWS). EQS are considered protective of surface water and DWS are protective of groundwater which may be used as a potable supply.

There are no standard guideline values for TPH in groundwater in the UK. In the absence of a specific standard, 10 µg/l is considered to be a reasonable point of reference at which TPH could be of interest (former UK Drinking Water Standard).

- The nearest surface water feature is an unnamed river located 16m west of site.
- The underlying aquifers are classed as a Secondary A and Principal.

Leachate testing was carried out on 3 samples of Made Ground and 3 samples of natural soils. 4 groundwater samples were also collected. These were screened against Water Quality Standards (WQS) to assess the potential risk to controlled waters in relation to the underlying aquifers. The results have also been compared against Drinking Water Standards (DWS) and Environmental Quality Standards for freshwater (EQS).

9.3.2. Groundwater Testing

4 groundwater samples were screened for metals, PAHs, inorganics, TPHCWG, BTEX, VOCs and phenols.

There were no exceedances recorded when screened against the DWS for groundwater samples so the risk to aquifers is considered negligible.

There were several groundwater exceedances were found when compared to the EQS and are shown in Table 9.1 below summarize the exceedances of the EQS.

Table 9.1: Groundwater Concentrations exceeding EQS

Receptor	Samples with measured contaminant concentrations in excess of the GAC	EQS GAC (µg/L)	No. exceeding	Exceedance concentration range (µg/L)
Surface Waters	Copper: BH102, BH103, BH105	1	3	1.4 – 5.2
	Nickel: BH103	4	1	6.3
	Zinc: BH103, BH105	10.9	2	11 - 17

9.3.3. Leachate Testing

Leachate testing was carried out on 3 samples of Made Ground (one containing anthropogenic materials and two not containing anthropogenic materials) and 3 samples of natural soils and screened against the WQS. Samples were tested for metals, inorganics, and phenols. There were no exceedances recorded when screened against the DWS for leachate samples so the risk to aquifers is considered negligible.

There were several marginal leachate exceedances recorded when compared to the EQS. These are shown in Table 9.2 below.

Table 9.2: Leachate Concentrations exceeding EQS

Receptor	Samples with measured contaminant concentrations in excess of the GAC	EQS GAC (µg/L)	No. exceeding	Exceedance concentration range (µg/L)
Surface Waters	Copper: All samples - BH103 at 1.0m (GL-C), BH105 at 0.5m (GL-C), TP106 at 1.0m (GL-C), TP107 at 0.5m (MG), TP110 at 0.2m (MG), TP114 at 0.5m (MG)	1.0	6	3.5 – 16.0
	Zinc: TP110 at 0.2m (MG), TP114 at 0.5m (MG)	10.9	2	12 - 13

9.3.4. Groundwater Summary

In the 4 groundwater samples assessed, copper, nickel and zinc were found to exceed the EQS protective of surface waters. All exceedances were marginal, therefore it is likely that this is representative of the local background groundwater quality in the area.

9.3.5. Leachate Summary

Copper and zinc were found within the soil leachate samples to exceed the EQS protective of surface watercourses. For copper, there were exceedances of the EQS for all samples, for both Made Ground and natural soil samples, and concentrations are similar between Made Ground and natural soils. For zinc, there were only exceedances for Made Ground, but all exceedances were marginal. Leachate analysis is also an aggressive form of testing and as such may not be representative of real-world conditions. Furthermore, the history of the site does not suggest any land uses that are likely to have produced significant metal contamination; the concentrations are likely to be representative of background conditions. The marginal soil leachate exceedances are therefore not considered to present an unacceptable risk to controlled waters.

9.4. Ground Gas

The Arcadis Desk Study (Ref 5) indicated that there is a possible risk to future site users and proposed structures from migration of ground gas generated by the off-site sewage works. A limited amount of Made Ground (up to 1.30m thick) was encountered in the ground investigation with no evidence of putrescible materials or other signs of contamination likely to generate significant volumes of ground gases.

Ground gas monitoring were undertaken by CC Ground Investigations Ltd between December 2022 and January 2023. Concentrations of methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) in % v/v and gas flow in litres per hour (l/h) were taken during each visit. The groundwater levels were also measured.

The results are presented in the Factual Report (Appendix B). Atmospheric pressure during the multiple visits was recorded between 999 and 1037 mBar.

9.4.1. General

Hydrocarbon vapour was assessed via Photo Ionisation Detection (PID) analysis of the soils during the site investigation and were recorded between 0 and 0.4 ppm; these levels are considered negligible and not of concern.

9.4.2. Preliminary Hazard Gas Assessment

Gas monitoring was carried out on four occasions as part of the groundwater monitoring events and the data is considered below.

Note that because of the very shallow water table, for most of the visits the response zones were submerged, rendering the gas results inaccurate for these visits. The data that have been omitted due to submersion are:

- BH102 Visits 2-4
- BH103 Visits 2-4
- BH104 (deep) Visits 1-4
- BH105 Visits 1 and 3.

The data from BH105 Visit 2 was also omitted because of groundwater upsurge through the tubing of the gas analyser, meaning results for this visit are also not representative of true ground gas levels.

A summary of monitoring data used in the ground gas assessment is presented below in Table 9.3. The table excludes the data from visits where response zones were submerged with groundwater as listed above.

Table 9.3: Ground gas monitoring summary

BH ID	Response Zone (m bgl)	Response Zone (m AOD)	Strata	Barometric pressure (mbar)	Flow rate (l/h)	Steady CH ₄ (%v/v)	Steady CO ₂ (%v/v)	Steady O ₂ (%v/v)	Steady H ₂ S (ppm)	Steady CO (ppm)	Depth to water (m bgl)
BH102	3.00-6.00	62.44 – 59.44	MM	999	0.0	0.0	0.6	20.2	0	5	5.63
BH103	0.50-3.00	61.98 – 59.48	GL-C	999	0.0	0.1	0.7	18.8	0	3	2.94
BH105	2.00-5.00	62.57 – 59.57	MM	1031	-0.9	0.1	0.7	21.0	0	0	2.40

A ground gas assessment has been undertaken on the remainder of the results, with reference to BS8576:2013 (Ref 23), BS8485 (Ref 24) and CIRIA C665 (Ref 25); guidance has been used which sets out the current method of undertaking gas risk assessment.

A hazardous gas flow rate (Q_{hg}) is calculated using the following equation:

$$Q_{hg} = \text{borehole flow rate (l/h)} \times \text{gas concentration (v/v \%)}$$

Steady state rates have been used in these calculations.

- Maximum Methane – 0.1 (v/v %) in BH103 and BH105
- Maximum Carbon Dioxide – 0.7 (v/v %) in BH103 and BH105
- Flow Rate – 0.1 l/h (the maximum flow rate was 0.0l/hr so a default flow rate of 0.1l/hr has been used).

Q_{hg} for methane = **0.0001 l/h**

Q_{hg} for carbon dioxide = **0.0007 l/h**

Based upon these results, the Q_{hg} of 0.0001 l/h (methane) and 0.0007 l/h (carbon dioxide), the site would be assessed as a Characteristic Situation (CS) 1, very low gas risk.

Oxygen levels were at a minimum of 18.8% and are not considered significantly depleted. No hydrogen sulphide was detected in any of the unsubmerged wells. Carbon monoxide levels were recorded at 5ppm in BH102 during the first visit only.

9.5. Radon

The site is within an area where between 3% and 5% of properties exceed the radon action level, as such, basic radon protection measures are required in areas of the development where site users will enter confined spaces, including kiosks. Protection measures should be agreed with the local authority prior to construction and designed in accordance with BRE 211 2015 (Ref 22) and may include an enhanced damp proof membrane/ radon resistant membrane in areas where confined entry is required by end users.

10. ENVIRONMENTAL RISK ASSESSMENT

10.1. Methodology

Geo-environmental assessments are required to consider the significance of potential contamination in terms of plausible contaminant source-pathway-receptor pollutant linkages. As part of this process, it is necessary to develop a conceptual model of these potential pollutant linkages by identifying the potential contamination sources, sensitive receptors, and potential exposure pathways. A risk assessment is then undertaken to determine the likelihood and significance of these potential linkages.

Risk assessment involves identifying hazards and determining their potential severity and likelihood of an impact occurring on identified receptors. Risks are generally managed by changing the receptor, isolating the sensitive receptor by intercepting or interrupting the exposure pathway, or removing the source. If no pollutant linkages are formed, there is no risk.

The following risk assessment focuses on the potential contaminants identified on the site and the proposed development of the site.

10.2. Potential Contaminants of Concern

- **Radon** – Basic radon protection measures are required, likely to comprise enhanced damp proof membrane/ radon resistant membrane in areas where entry into confined spaces is required by site users, with all joints and service penetrations suitably sealed. It is recommended that the membrane be installed by a suitably qualified specialist, and after installation a validation visit may be required. Radon protection measures must be agreed with building control.

10.3. Pollutant Linkages – Conceptual Model

The only potentially complete contaminant linkage of concern is the moderate risk to human health posed by the inhalation of radon. After the basic radon protection measures outlined in Section 9.5 have been installed, the risk is mitigated to very low.

There are no other potential contaminants of concern relating to human health, controlled waters or proposed structures, and no further work is required at this stage.

11. WASTE ASSESSMENT

EU Directives, UK Government policy and regulations require that construction waste to landfill is minimised. Where possible (of benefit to the planned development) all excavation arisings as a result of the proposed development should be re-used on the site as either engineering fill or landscaping fill. To comply with current legislation and regulations any re-use of excavated materials within the site could be undertaken via either of two routes – Environmental Permitting (formerly Waste Exemptions); or in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice. Whichever route is chosen soils must be proved certain to be used and demonstrated to be “suitable for use” in the area to be deposited. A Materials Management Plan (or method statement) should be produced during the design phase for the scheme.

Should the excavated material not be required or be physically or chemically unsuitable for use as backfill or as other engineering fill within the site, the excess material would be Waste and will need to be removed off-site. If only disposal to landfill was an option, further Waste Acceptance Criteria (WAC) testing and separation of waste for off-site disposal may be required to ensure accurate classification of material to reduce wastes sent to non-hazardous and hazardous landfill. Natural excavated arisings would be classified as inert if segregated from Made Ground materials. Inert waste would be the least expensive for disposal and the material could be more easily reused.

Eight Made Ground soil samples (four containing anthropogenic materials and four not containing anthropogenic materials) and four natural Glacial Soil samples were screened using HazWaste Online software to determine whether any excavated materials are likely to be hazardous or non-hazardous waste classifications should any such materials require off-site disposal.

All samples tested and assessed were classed as non-hazardous and would be classified as 17 05 04 (soils and stones other than those mentioned in 17.05.03) in the List of Waste (Ref 21). The results of the HazWaste assessment are included in Appendix E. Three samples included in the assessment (TP107, TP110 and TP114, all at 1.0m bgl) were not tested for TPH or BTEX. The three samples are all logged as natural Glacial soils, and there was no visual or olfactory evidence of contamination, therefore the samples have been used in the assessment and assumed not to contain elevated TPH or BTEX concentrations.

WAC testing would be required to establish whether excavated waste materials would be suitable for disposal at an inert landfill facility. A waste management facility may require testing of the actual material that is to be disposed of prior to acceptance, and there is no obligation on a landfill operator to accept the waste.

WAC testing was carried out on three samples of Made Ground and three samples of Glacial soils. The results indicate that the samples would be suitable for disposal at an off-site inert landfill facility. However, further testing will be required in the construction phase prior to actual waste disposal.

12. CONCLUSIONS AND RECOMENDATIONS

Arcadis was instructed to undertake an intrusive site investigation for the proposed development. Based upon the information outlined within this report, the following conclusions were made.

12.1. Geo-environmental

- Ground gas protection measures for radon are required where entry into confined spaces is required by end users. Protective measures should be agreed with the local authority prior to construction and are likely to comprise an enhanced damp proof/ radon resistant membrane.
- Based on the site investigation completed, no other contamination risks were identified at the site which are considered to pose an unacceptable risk to human health or controlled waters in the context of the proposed development of the site as a water treatment works.
- A watching brief is recommended during construction and if any unforeseen contamination work should be stopped immediately, and it should be tested and quantified. Any potential Asbestos Containing Materials (ACM) or other Man-Made Mineral Fibres (MMMF) should be treated as hazardous until proven otherwise.
- A waste assessment was undertaken using HazWaste online on eight samples of Made Ground and four samples of Glacial soils. All samples tested and assessed were classed as non-hazardous and would be classified as 17 05 04 (soils and stones other than those mentioned in 17.05.03). WAC testing was carried out on three samples of Made Ground and three samples of Glacial Deposits. The results indicate that the samples would be suitable for disposal at an off-site inert landfill facility. However, further testing will be required in the construction phase prior to actual waste disposal.

12.2. Geotechnical

- The ground conditions across the site were found to comprise Topsoil and Made Ground to a maximum depth of 1.30m bgl, overlying cohesive Glacial deposits (absent in the north-eastern corner of the site), over strata of the Mercia Mudstone Group (weathered in the upper few metres and recovered predominantly medium dense to dense mudstone gravel).
- During groundwater monitoring, rest groundwater levels were recorded between ground level and 5.63m bgl. A full year of monitoring has not been completed and based on the shallow levels recorded a design groundwater level of 0.0m bgl is recommended.
- Shallow foundations may be feasible for all of the proposed new structures, bearing within the weathered strata of the Mercia Mudstone Group at shallow depths in the north-eastern corner of the site, or within the firm to stiff cohesive Glacial soils at depths generally between 1 – 1.5m bgl across the rest of the site. Preliminary calculations suggest an allowable bearing resistance in the order of 100kN/m² can be expected from the cohesive Glacial soils, assuming a settlement limit of 25mm, and guidance indicates a presumed bearing resistance of approximately 250kN/m² would be appropriate

for the unweathered strata of the Mercia Mudstone Group. Drained bearing capacity will be addressed in detailed design.

- Raft foundations could also be considered for lightly loaded structures that do not have stringent settlement requirements. Where raft foundations are adopted, foundations should be founded on a constant stratum and not placed over any buried obstructions that may induce excess differential settlement or hogging strain across the foundation. Any localised loose / soft Made Ground or soft Glacial soils below the raft foundation should be excavated and replaced with a well compacted engineered fill.
- Piled foundations are not likely to be required for stability given the ground conditions present. From the current anticipated serviceability limits of the structures, these may be achievable with shallow foundations (with localised excavations of soft material where required). If any serviceability limits were to become more stringent then piled foundations may be required for the moderately loaded structures.
- Several pumping stations are proposed with foundation depths between 3.75m bgl and 4.6m bgl. Given the proposed founding depths, the foundation levels would be placed within the unweathered Mercia Mudstone Group strata where a bearing resistance of could be expected, assuming a settlement limit of 25mm.
- Given the design groundwater level of 0.0m bgl, the effect of buoyancy will need to be considered in the design. From the currently anticipated sizes and loadings, this would likely be mitigated using an extension of the structure base slab to act as a shear key. Tension piles are not likely required, but this should be confirmed during detailed design.
- Depending on the depth of the proposed pumping stations, an appropriate temporary shoring or retaining system and groundwater management may be required. It is recommended that the temporary works designer carries out a dewatering impact assessment prior to confirming the construction methodology.
- Groundwater control will be required where any excavations progress below the groundwater level.
- Excavated materials should be separated on site and tested in accordance with MCHW Series 600 or the project earthworks specification prior to any reuse to confirm suitability. Unsuitable materials could potentially be treated on site to comply with MCHW Series 600 or the project earthworks specification or disposed of offsite to an appropriate waste disposal facility.
- For preliminary design purposes, it is recommended that new road pavement and road construction design be based upon (an estimated) CBR value of about 3-4%.
- Chemical testing of soils for concrete classification was undertaken in accordance with BRE SD1. The results for all soils tested indicate a design sulphate class of DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) class of AC-1 for below ground concrete. Nevertheless, given the potential for elevated sulphates within the Mercia Mudstone, as highlighted in published literature, a

conservative approach may be warranted with the adoption of design sulphate class DS-2 and ACEC class AC-2.

A geotechnical risk register for the proposed site and development is presented in Section 13. This is considered to be a live document and should be reviewed and updated throughout further design stages.

13. RISK REGISTER

13.1. Introduction

A review of the geotechnical risks associated with the scheme has been undertaken. The risks have been evaluated using the risk evaluation matrix shown in Table 13.1.

The below matrix shall be used to help assess the impact and likelihood of a hazard before and after the proposed mitigation measures.

Table 13.1: Geotechnical Risk Matrix

Score		Impact				
		Very Low	Low	Medium	High	Very High
		1	2	3	4	5
Likelihood	Very High 5	5	10	15	20	25
	High 4	4	8	12	16	20
	Medium 3	3	6	9	12	15
	Low 2	2	4	6	8	10
	Very Low 1	1	2	3	4	5

Table 13.2 presents the geotechnical risk register.

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Table 13.2: Geotechnical Risk Register

Risk No.	Hazard Description	Potential Consequences	Location	Risk Before Control			Design Mitigation Measures to Manage the Risk	Risk After Control		
				Impact	Likelihood	Rating		Impact	Likelihood	Rating
1	Uncertainty on ground conditions and properties - limited ground investigation data and variable ground conditions.	Unexpected variation in ground conditions (e.g., soft spots leading to inadequate design or design change during construction. Total or differential settlements of foundation solutions greater than assessed using current data.	Site	4	3	12	During construction, contractor to undertake inspection of foundation formation levels with testing (e.g., hand shear vanes and plate load testing) to confirm ground conditions and material parameters are not worse than that assessed in design. Contractor to include information in a Geotechnical Feedback report in the H&S file.	4	1	5
2	Groundwater	Typically, delayed ingress into excavations. Loss of strength on water ingress. Potential for heave at base of excavations and swelling pressures and lateral thrust on excavation sides.	Site	4	3	12	Groundwater control measures are likely to be required to enable construction, particularly for construction of the pumping station shafts. During construction, Contractor is required to monitor groundwater level. Groundwater level considered for the design of geotechnical elements.	4	2	8
3	Shallow groundwater	Loss of concrete during construction of pile foundations.	Site	4	4	16	If piles are required, where these extend into saturated stratum, design to include mitigation measures, e.g., depressurisation prior to construction and or use of casing to seal off more permeable horizons.	4	2	8

Risk No.	Hazard Description	Potential Consequences	Location	Risk Before Control			Design Mitigation Measures to Manage the Risk	Risk After Control		
				Impact	Likelihood	Rating		Impact	Likelihood	Rating
4	Made Ground	Inadequate strength and settlement characteristics, inherent variability. Unsuitable for foundations/ infrastructure placement.	Site	3	3	9	Ground Investigation identified localised Made Ground. Any loose / soft Made ground below foundations should be excavated and replaced with well compacted engineered fill.	3	2	6
5	Variable ground conditions between northeast (shallow weathered bedrock) and remainder of site (cohesive Glacial deposits over weathered bedrock)	Differential settlement of infrastructure	Site	4	3	12	Recommend foundations to be placed within consistent strata. If not possible in localised areas, excavate out cohesive Glacial deposits and replace with a suitable granular engineered fill material.	4	1	4
6	Shrink swell potential of cohesive Glacial deposits near trees or hedges	Damage to foundations and underground structures	Site	4	3	12	Place foundations and underground structures out of the zone of influence of trees and hedges or deepen accordingly. If this is not possible in localised areas, excavate out cohesive Glacial soils and replace with a suitable granular engineered fill material.	4	1	4
7	Unstable excavations	Collapse of excavation during progression leading to safety risk, potential for serious injury or death of	Site	4	4	16	Excavations to be designed by appropriate temporary works designer and inspected during progression.	4	2	8

Risk No.	Hazard Description	Potential Consequences	Location	Risk Before Control			Design Mitigation Measures to Manage the Risk	Risk After Control		
				Impact	Likelihood	Rating		Impact	Likelihood	Rating
		construction workers and damage to asset under construction.					Design to include appropriate excavation support/ restraint, surface water and groundwater control where appropriate.			
8	Dewatering	Ground subsidence on site or surrounding area due to changes in effective stress in ground or loss of fines during dewatering operations.	Site and surrounding area	4	4	16	<p>If required, dewatering works designed to consider potential ground settlement on site and surrounding area, where zone of influence extends beyond site limits.</p> <p>Mitigation measures to be included in dewatering design (e.g., groundwater exclusion).</p> <p>Appropriate instrumentation and monitoring to be undertaken during construction.</p>	4	2	8
9	Construction to existing structures/ and utilities	Damage to existing structures caused by proposed construction activities.	Site	4	3	12	<p>Contractor to consider impact of works and assess possible damage mechanics to adjacent existing structures (water treatment works).</p> <p>Mitigation measures to be enabled if required.</p>	4	2	8
10	Buried services (mapped and unknown)	Damage to existing services, proposed infrastructure or injury or death of	Site	4	3	12	Requirements set out in HSE47 are to be complied with prior to breaking ground.	5	1	5

Risk No.	Hazard Description	Potential Consequences	Location	Risk Before Control			Design Mitigation Measures to Manage the Risk	Risk After Control		
				Impact	Likelihood	Rating		Impact	Likelihood	Rating
		construction workers.								
11	Potential unexpected contamination of soils or groundwater	-Harm to construction workers or wider public human health. -Risk posed to environment.	Site	4	2	8	Watching brief to be kept during construction work. If unexpected contamination is encountered, undertake detailed site-specific ground investigation of areas of potential contamination to quantify potential risk.	4	1	4
12	New construction creating new pathways from Made Ground (or other potentially contaminated soils or groundwater) into granular layers during site works.	Contamination of potential water sources.	Site	4	2	8	Contaminated soils were not detected during ground investigation. If unexpected contamination is encountered, design of excavations and foundations to include mitigation measures to maintain natural barriers between Made Ground and natural strata during drilling operations.	4	1	4
13	UXO – proposed development within Low bomb risk area.	Harm to construction workers or wider public.	Site and immediate surrounding area	4	1	4	Precautionary approach of sensitising site staff to the background UXO hazard through site inductions to be undertaken.	4	1	4
14	Potential for aggressive ground conditions	Potentially aggressive conditions for buried concrete and expansive secondary reactions.	Site	3	2	6	Lab testing indicates that buried concrete can be designed in accordance with class DS-1 ACEC class AC-1 of BRE Special Digest 1 (2005), assuming mobile groundwater is present.	3	1	3

Risk No.	Hazard Description	Potential Consequences	Location	Risk Before Control			Design Mitigation Measures to Manage the Risk	Risk After Control		
				Impact	Likelihood	Rating		Impact	Likelihood	Rating
							However conservative approach (DS-2 AC-2) may be warranted based on potential for elevated sulphates within Mercia Mudstone highlighted in published literature.			
15	Moisture Sensitivity	Loss of strength on wetting, degradation of sub formations and stockpiled materials on exposure to wet conditions. Reduction undrained shear strength	Site	3	2	6	Good site management and provision for capping and protection layers.	3	1	3

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15. STUDY LIMITATIONS

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

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

2 This report has been prepared for the sole benefit of the Client unless agreed otherwise in writing. The contents of this report may not be used or relied upon by any person other than this party without the express written consent and authorisation of Arcadis.

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

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

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

6 Whilst this report and the opinions made are correct to the best of Arcadis' belief, Arcadis cannot guarantee the accuracy or completeness of any information provided by third parties. provided by third parties. Arcadis has taken reasonable steps to ensure that the information sources used for this assessment provided accurate information and has therefore assumed this to be the case.

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

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

9 The content of this report represents the professional opinion of experienced environmental consultants. Arcadis does

not provide specialist legal or other professional advice. The advice of other professionals may be required.

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

11 If below ground intrusive investigations have been conducted as part of the scope, safe location of exploratory holes has been carried out with reference to the Arcadis ground disturbances procedure. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on Site.

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

13 Unless otherwise stated, an inspection of the Site has not been undertaken and there may be conditions present at the Site which have not been identified within the scope of this assessment.

14 Unless otherwise stated, samples from the Site (soil, groundwater, building fabric or other samples) have not been obtained.

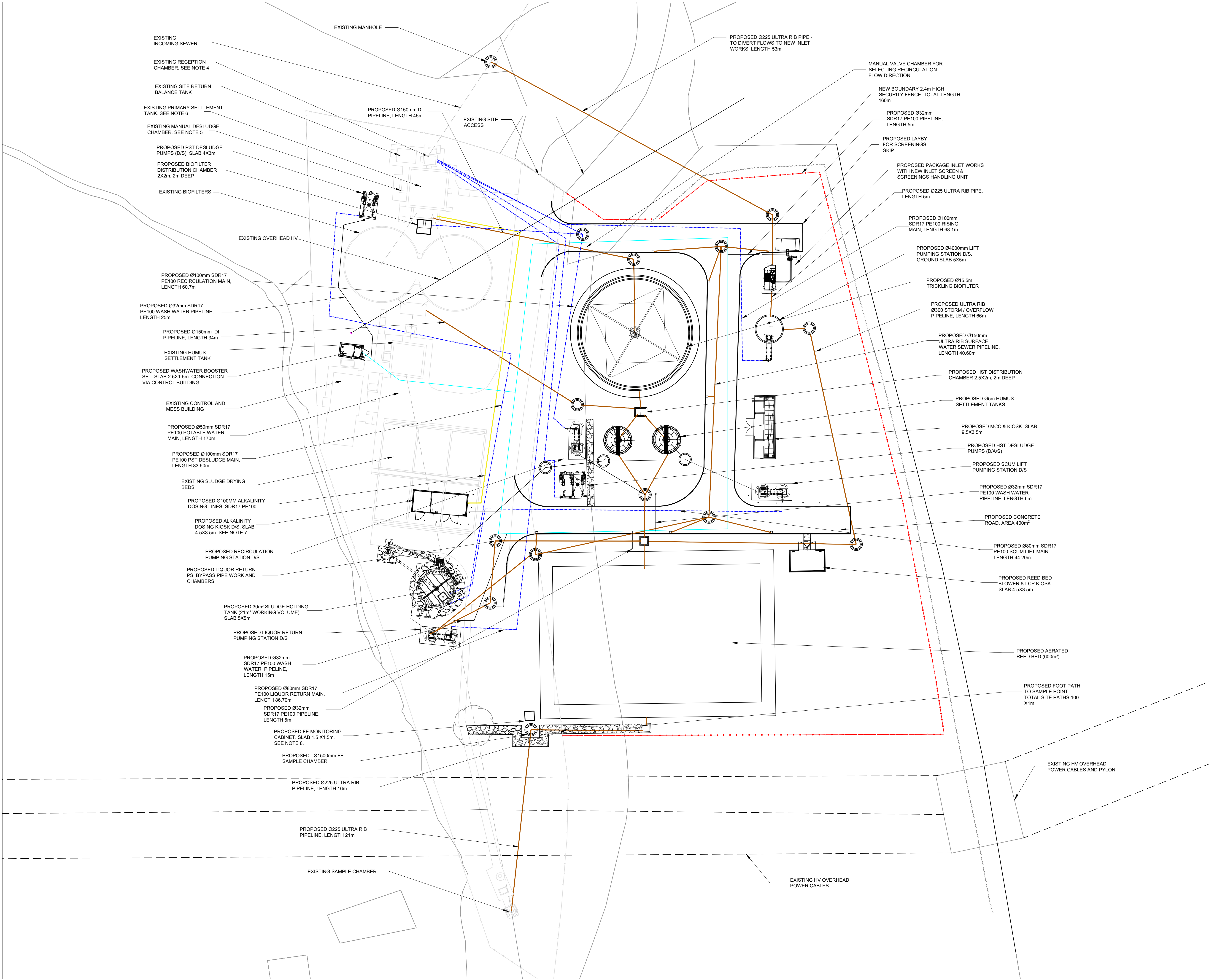
15 Arcadis has relied upon the accuracy of documents, oral information and other material and information provided by the Client and others, and Arcadis assumes no liability for the accuracy of such data, although in the event of apparent conflicts in information, Arcadis would highlight this and seek to resolve.

16 Unless otherwise stated, the scope of works has not included an environmental compliance review, health and safety compliance review, hazardous building materials assessment, interviews or contacting Local Authority, requests for information to the petroleum officer, sampling or analyses of soil, ground water, surface water, air or hazardous building materials or a chain of title review.

17 Unless otherwise stated, this assessment has considered the ongoing use of the Site and has not been prepared for the purposes of redevelopment which may act as a trigger for Site investigation and remediation works not needed for ongoing use.

APPENDIX A

Proposed Site Plan



NOTES:

A1

1.

DO NOT SCALE FROM THIS DRAWING USE FIGURED DIMENSIONS ONLY.

2.

ALL DIMENSIONS IN MILLIMETRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM (NEWLYN) UNLESS NOTED OTHERWISE.

3.

ALL COORDINATES IN RELATION TO OS NATIONAL GRID

4.

RECEPTION CHAMBER TO BE CLEARED OF ANY SOLIDS AND DEBRIS PRIOR TO WORK COMMENCING. EXISTING BAR SCREEN TO BE REMOVED AND CHAMBER TO BE INFILLED WITH MASS C16/20 CONCRETE UP TO REQUIRED INVERT LEVEL.

5.

EXISTING MANUAL DESLUDGE PIPE WORK AND VALVES TO BE REMOVED AND REPLACED.

6.

EXISTING PST WEIRS TO BE RAISED 200mm.

7.

ALKALINITY DOSING PLANT TO INCLUDE - BULK TANK, DOSING PUMP, KIOSK, INTERCONNECTING PIPE WORK, VALVES, INSTRUMENTATION AND DOSING LCP.

8.

FE MONITORING STATION TO INCLUDE - DRAIN DOWN VALVE, WASHOUT VALVE, STAINLESS STEEL WEIR, TEMPERATURE SENSOR, FEED PANEL, FEED MONITORS, KIOSK AND SAMPLE PUMP.

KEY

PROPOSED ACCESS ROAD

PROPOSED SECURITY FENCE

PUMPED MAIN

GRAVITY MAIN

POTABLE WATER RING MAIN

ALKALINITY DOSING MAIN

P04	10/01/23	DO	NOTES ADDED	CR	SP	10/01/23
P03	21/10/22	AO	UPDATES FROM TECH REVIEW	DO	SP	21/10/22
P02	27/09/22	AO	FOR INFORMATION	DO	SP	28/09/22
P01	31/05/22	AO	FOR INFORMATION	DO	SP	10/06/22
Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.

Capital Delivery Alliance

Cynghrair Cyflawni Cyfalfd

Ty Awen, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name:

ST NICHOLAS WwTW C&ID QUALITY PROJECT

Drawing Title:

SITE GENERAL ARRANGEMENT

Suitability:

FOR INFORMATION

Suitability Code

S2

Originator:

A.OSMAN

Designer:

D.OLD

Date:

28/04/22

Internal Project Number:

10048407

Scale:

1:250

Rev

P04

Drawing Number:

B10181-0AG964-ZZ-ZZ-DR-CA-DI0102

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APPENDIX B

Factual Ground Investigation Report



CC Ground Investigations Ltd

FACTUAL REPORT

Site: St. Nicholas WWTW

Client: Morgan Sindall Plc

Report ref: C7806

Status	Revision	Date	Author	Checker	Approver
Draft	A0001	10/12/2022	A.King	E Withington	
Final	A0002	20/02/2023	M. Middleton	M. Atherton	



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APPENDIX E GEO-ENVIRONMENTAL LABORATORY TEST RESULTS

APPENDIX F GAS AND GROUNDWATER MONITORING

APPENDIX G SPT CALIBRATION CERTIFICATE

1 INTRODUCTION

1.1 Instruction

This investigation was carried out by CC Ground Investigations Ltd (CCGI) on the instruction and on behalf of Morgan Sindall Plc (The Client) under the technical direction of Arcadis Consulting Ltd (the Engineer).

1.2 Objectives

The purpose of the ground investigation was to provide information to assist in the expansion of the current St. Nicholas Waste Water Treatment Works (WWTW).

This report describes the work carried out by CCGI and presents a factual account of the findings.

1.3 Scope of Works

The scope of the ground investigation was defined in the Engineer's specification, reference, T14421_B10181-0AG964-ZZ-ZZ-SP-GA-GC0149 – St. Nicholas GI Specification_A dated September 2022.

All information, comments and opinions given in this report are based on the ground conditions encountered during the site work and on the results of laboratory and field tests performed during the investigation. There may however be conditions at or adjacent to the site which have not been taken into account, such as unpredictable soil strata and water conditions between or below exploratory holes. A careful watch should be maintained during any future groundworks and the comments of this report reviewed as necessary.

This report has been prepared for Morgan Sindall Plc. This report shall not be relied upon or transferred to other parties without the written consent of CCGI. Should any information contained within this report be used by any unauthorised third party it is done so at their own risk and shall not be the responsibility of CCGI.

2 SITE INFORMATION

2.1 Site Description

The area of investigation is located at the end of Brook Lane, a single carriageway lane within the village of St. Nicholas; approximately 10km west of Cardiff.

The site is located at St. Nicholas Waste Water Treatment Works and on an agricultural field to the east of the treatment works. The southern section of the site has a high voltage overhead line running from east to west. A stream is located approximately 35m to the west. To the north of the site is Brook Lane and residential buildings.

The site is centred on the approximate National Grid Reference ST 088 733. The nearest postcode to the site is CF5 6TB. The general location of the site is presented in Appendix A.

2.2 Geology

Geological Records (British Geological Survey (BGS), Cardiff (S&D) Map 263 1: 50,000 scale) and the online BGS Geology of Britain Viewer, indicate the site to be underlain by superficial deposits of Alluvium, consisting of clay, silt, sand and gravel. The underlying solid geology is recorded as the Blue Anchor Formation and Mercia Mudstone Group.

3 GROUND INVESTIGATION

3.1 Introduction

Twenty-four exploratory holes were carried out between Monday 28th November 2022 and Wednesday 7th December 2022. All exploratory hole locations are shown on the site plan (Appendix A). The exploratory hole locations were set out by CCGI as directed by the Client on site.

Location	Hole Type	End Depth (m)	Easting	Northing	Level (mAOD)
BH102	DS/RC	7.60	308826.693	173314.386	65.44
BH103	DS/RC	13.90	308815.571	173277.971	62.48
BH104	DS/RC	14.80	308795.399	173259.199	62.47
BH105	DS/RC	8.70	308838.813	173298.068	64.57
TP106	TP	2.60	308798.574	173265.566	62.4
TP107	TP	2.50	308800.066	173255.062	62.33
TP108	TP	3.20	308801.246	173246.709	62.03
TP109	TP	2.20	308836.231	173257.962	61.92
TP110	TP	2.30	308844.922	173273.152	62.75
TP111	TP	2.10	308829.571	173279.683	62.79
TP113	TP	2.00	308836.898	173310.289	65.74
TP114	TP	2.70	308803.723	173314.171	64.48
TP115	TP	2.00	308814.831	173290.116	62.97
TP116	TP	2.00	308798.72	173277.411	62.38
HP101	HP	0.70	308798.216	173317.24	64.57
HP103	HP	1.00	308774.746	173318.767	64.87
HP104	HP	1.00	308774.606	173299.101	63.72
DCP101	DCP	0.63	308798.056	173315.768	64.3
DCP101A	DCP	0.18	308797.697	173319.595	64.8
DCP101B	DCP	0.17	308797.687	173313.01	64.22
DCP101C	DCP	0.24	308797.338	173323.569	65.09
DCP102	DCP	2.23	308838.284	173286.048	63.44
DCP103	DCP	3.21	308774.956	173319.063	64.88
DCP104	DCP	2.62	308774.971	173299.764	63.84

All fieldworks were carried out in general accordance with BS5930: 2015+A1:2020.

3.2 Rotary Boreholes

Four boreholes, referenced BH102, BH103, BH104 and BH105 (Appendix B) were formed using a track mounted Fraste SL(G) multi-purpose drilling rig. Following CAT scanning and clearance by ground penetrating radar (GPR) hand tools were used to excavate inspection pits to a maximum depth of 1.20m to check for the presence of buried services. Bulk, small disturbed and environmental soil samples were taken and retained from the inspection pits. The boreholes were then advanced using percussive sampling techniques to produce continuous disturbed samples ranging between 112mm and 83mm diameter.

On refusal of percussive sampling the boreholes were continued by rotary core drilling techniques utilising a water flush. A double-tube swivel core barrel with a semi-rigid plastic liner was utilised to recover continuous cores of 94mm diameter. Where appropriate, dynamic sampling techniques were carried out to recover dropped core or where rotary core drilling was not suitable.

Soil and rock samples were retained in semi-rigid plastic liners and where appropriate, liners were capped or taped on site to prevent moisture loss.

3.3 Undisturbed Samples

Undisturbed samples of 100mm nominal diameter were taken in suitable fine soils using a thin-walled open-tube sampler (OS-T/W – U(T)100).

Open-tube sampler apparatus conforms to the geometry set out in BS EN ISO 22475-1: 2006. Samples were dynamically driven using a drop weight (SPT hammer). The open tube samples were wax sealed on site to prevent moisture loss and cutting shoe samples retained, where appropriate.

3.4 Groundwater Monitoring

Boreholes were monitored for groundwater ingress as they were advanced. Upon encountering water, sampling was temporarily stopped to allow the level to stabilise. Water levels were also recorded at the start and finish of each shift, on completion of the borehole and are presented on the relevant log.

3.5 Installations

On completion single water monitoring standpipes were installed in boreholes BH102, BH103, and BH105. Each installation consisted of a 50mm ID HDPE slotted tube set in a filter response zone of granular filter medium. The installations were sealed above and below with a bentonite pellet seal and accessed via a valve assembly. The installations were protected at the surface by a lockable stopcock cover set in concrete. Installation details are given on the relevant borehole log.

On completion of BH104, a dual gas and water monitoring standpipe assembly was installed. The standpipe assembly consisted of a 19mm ID PVC slotted tube set in a granular filter medium and a 50mm ID HDPE slotted tube set in a filter response zone of granular filter medium. The installation was sealed above and below with a bentonite pellet seal and protected at the surface by a lockable stopcock cover set in concrete. Installation details are given on the relevant borehole log.

3.6 In-situ Testing

Standard penetration tests (SPTs) were carried out in general accordance with BS EN ISO 22476-3:2011. A split barrel or a solid cone was used depending upon the materials encountered and the split barrel samples retained as small disturbed samples. The SPT N-value was taken as the number of blows to penetrate the 300mm test drive following a 150mm seating drive. Where low penetration was recorded the seating drive was terminated at 25 blows and the test drive

completed after a further 100 blows. SPT results are summarised as uncorrected N-values on the borehole logs and in the summary table included in Appendix B. SPT hammer calibration data is presented in Appendix G.

Hand shear vane tests were carried out using a direct read Pilcon Simmons Edeco hand vane. Different vane sizes were used depending on the consistency of the soil encountered. The results are presented on the relevant exploratory hole log in Appendix B.

Photo Ionising Detector (PID) readings were undertaken on environmental samples on site. The results are presented on the relevant log and in the AGS data.

Variable head permeability testing was carried out in all the boreholes in general accordance with the procedures given in BS EN ISO 22282 Parts 1 and 2: 2012. Coefficients of permeability were calculated using the BS EN ISO 22282-2 general approach and Hvorslev's time lag method, the results are presented in Appendix F.

3.7 Trial Pits

Following CAT scanning and clearance by GPR, ten trial pits, referenced TP106 to TP111, and TP113, to TP116 (Appendix B) were excavated using a JCB 3CX mechanical excavator with a 0.60m wide backactor bucket.

Following CAT scanning and clearance by GPR, three trial pits, referenced HP101, HP103 and HP104 (Appendix B) were excavated using hand digging tools to a maximum depth of 1.00m.

Representative bulk, small disturbed and environmental soil samples were retained in airtight containers.

On completion all trial pits were backfilled with compacted arisings. The ground surface was reinstated.

3.8 Dynamic Cone Penetrometer Testing

Seven Transport research laboratory dynamic cone penetration (TRL-DCP) tests were carried out in general accordance with CS 229 Data for Pavement Assessment. Tests referenced DCP101, DCP101A, DCP101B, DCP101C, DCP102, DCP103 and DCP104 were carried out by driving a 60°, 20mm diameter steel cone into the ground using an 8kg weight dropped repeatedly from a set vertical distance of 575mm. The rate of penetration of the cone is recorded and used to estimate the CBR value of the material through published empirical relationships.

The number of blows and depth of penetration are recorded throughout the test and are presented graphically. CBR values have been calculated for predetermined increments of penetration (usually 10mm) using the following equation from TRL587 Figure 4:

$$\text{CBR} = 247\text{DCP}^{-0.98}$$

Logs along with any relevant comments on probing methodologies are presented in Appendix B.

3.9 Photographic Record

A photographic record of the trial pits, inspection pits and boreholes was maintained including photographs of trial pit profiles and spoil as well as liners recovered from boreholes.

Photographs are presented separately in Appendix C.

3.10 Surveying and Sample Storage

Subsequent to fieldwork, all exploratory hole positions were surveyed. National Grid co-ordinates and levels are presented on the relevant log.

On completion of fieldwork all samples were brought to CCGI's office for storage.

3.11 Logging

Soil and rock samples from the exploratory holes were logged by an engineering geologist in general accordance with BS5930: 2015+A1:2020, BS EN ISO 14688 [Parts 1 and 2] and BS EN ISO 14689:2017.

Soil and rock descriptions are presented in the borehole logs together with details of sampling, in-situ testing and relevant comments on drilling and trial pitting techniques. The borehole logs are presented in Appendix B.

Class 1 subsamples were taken by the engineering geologist at specified intervals from the core samples immediately on extraction of the core sample from the core barrel. The subsamples were then wrapped in plastic film, metal foil and geosock. The samples were then labelled and waxed to prevent moisture loss and the samples stored and transported to minimise sample disturbance.

3.12 Geotechnical and Geo-environmental Laboratory Testing

The following laboratory tests were carried out by Professional Soils Laboratory (UKAS No. 4043) in accordance with BS1377:1990, Parts 1 to 8 and [BRE SD1:2005], unless otherwise stated. The results are presented in Appendix D and summarised in the table below.

Table 1 Geotechnical testing

Test type	No. of tests	Remarks
Water Content	22	The results are included on the summary of soil classification tests.
Liquid and Plastic Limits	19	The results are shown on the plasticity chart and summary of soil classification tests.

Test type	No. of tests	Remarks
Particle Size Distribution (wet sieving method)	22	The fine fractions of X of these tests were further analysed using the pipette method.
Particle Size Distribution (pipette method)	14	
Remoulded CBR	8	
One Dimensional Consolidation	2	
Mutli-stage Triaxial	2	
Shear Vane	2	
Uniaxial Compressive Strength	6	ISRM Part 2
Point Load Strength	16	ISRM RTH 325-89 SR12
BRE SD1 chemical testing suite for soil and water	13	Testing carried out by Chemtech Environmental in accordance with BRE Special Digest 1.

A range of chemical tests were carried out on soil and water samples by i2 Analytical (UKAS No. 4041). Testing was carried out in accordance with ISO 17025: 2017. The results are tabulated and presented in Appendix E and summarised in the table below.

Table 2 Geo-environmental testing

Test type	No. of tests
Suite E1.1	12
Suite E1.2	9
Suite E1.3	9
Suite E1.7	6
WAC (Waste Acceptance Criteria)	6
Suite F1.1	4
Suite F1.2	4
Suite F1.3	4
Suite F1.5	4
Suite F1.6	4

3.13 Gas and Groundwater Monitoring

Four return visits have been made by CCGI to monitor gas and groundwater and take water samples at all installed boreholes.

The installations were monitored for methane, carbon dioxide, oxygen and hydrogen sulphide using a Gas Analyser GA5000 with internal flow meter. Installations were also monitored for gas flow, reported as gas flow in litres/hour. Readings were taken in general accordance with CIRIA 665 and BS 8485:2015+A1:2019.

Groundwater sampling was carried out in accordance with BS EN ISO 22475-1:2006. Prior to sampling the standpipes were developed and purged a total of 3 times the well volume or until dry. The installations were monitored and water samples collected using a low flow peristaltic pump and smarTROLL multi-parameter probe which was also used to determine when parameters were stable during sampling. Groundwater samples were taken and stored in temperature-controlled conditions. Groundwater levels were monitored using a dipmeter. Remarks on development, purging and sampling are included in Appendix F.

Gas and groundwater monitoring data is presented in Appendix F.

4 REFERENCES

British Geological Survey, Solid and Drift Sheet 263, Cardiff (S&D) Map, 1: 50,000 scale

BS 1377 Parts 1 to 9: (1990), Methods of Tests for Soils for Civil Engineering Purposes.

BS5930: 2015+A1:2020, Code of Practice for Ground Investigations.

BS 8485:2015+A1:2019, Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

BS EN ISO 14688-1:2018 Geotechnical investigation and testing. Identification and classification of soil. Part 1: Identification and description.

BS EN ISO 14688-2:2018 Geotechnical investigation and testing. Identification and classification of soil. Part 2: Principles for a classification.

BS EN ISO/IEC 14689:2017 Geotechnical investigation and testing. Identification, description and classification of rock.

BS EN ISO 17025:2017, General requirements for the competence of testing and calibration laboratories.

BS EN ISO 22476-3:2005+A1:2011 Geotechnical Investigation and Testing – Field Testing - Part 3: Standard Penetration Test.

CIRIA C665: (2007), Assessing risks posed by hazardous ground gases to buildings.

ISRM (International Society for Rock Mechanics), Part 2, Suggested Methods for Determining the Uniaxial Compressive Strength of Rock Material.

ISRM RTH 325-89 SR12, Suggested Method for Determining Point Load Strength.





TRL Report TRL587 – 2003. The correlation between the CBR value and penetrability of pavement construction materials.

APPENDIX A

Site Layout Plan



Legend

-  DS/RC Boreholes
-  Dynamic Cone Penetration (DCP)
-  Hand dug inspection pits
-  Machine dug trial pits

Notes:

Reproduced from base plan provided by Client/Engineer.

Locations indicative only.



CC Ground Investigations Ltd

Site Layout Plan

St Nicholas WWTW

Morgan Sindall PLC

Appendix A

Contract No: C7806

Drawn by:

AK

Scale:

NTS

APPENDIX B

Exploratory Hole Data

KEY TO EXPLORATORY HOLE LOGS

The logging of soils and rocks has been carried out in general accordance with BS5930: 2015+A1:2020 and BS EN ISO 14688 [Parts 1 and 2]. Where appropriate logging to CIRIA C570 or CIRIA C574 has been adopted.

Sample type

B	Large disturbed sample
C	Core run
CS	Rotary core sub-sample
D	Small disturbed sample
ES	Environmental sample
SPT	Standard penetration test carried out using split spoon (split spoon sample retained)
SPT C	Standard penetration test carried out using solid cone (no sample retained)
U70 or U100	Undisturbed sample followed by nominal dia. of sample. (Using thick-walled open-tube sampler – OS-TK/W)
UT100	Undisturbed sample followed by nominal dia. of sample. (Using thin-walled open-tube sampler – OS-T/W)
W	Water sample

Water levels

		3.00m/Dry
Initial Water Strike	Level after monitoring	Standing Level/No groundwater encountered

In situ Testing

S 30	Denotes SPT undertaken using split spoon followed by N Value (EN ISO 22476-3:2005+A1:2011)
C 30	Denotes SPT undertaken using solid cone followed by N Value (EN ISO 22476-3:2005+A1:2011)
*240	Denotes SPT where full test drive has not been completed and linearly extrapolated N value reported
**	Denotes no effective penetration (Linearly extrapolated N value > 1000)
H 30	Hand shear vane. Direct reading in kPa

Sample range

	Undisturbed sample		Core run		U(T)100 Undisturbed Samples		Rotary core sub-sample
--	--------------------	--	----------	--	-----------------------------	--	------------------------

Strata Boundaries

	Solid boundary
	Estimated boundary
	Gradational boundary

Installation Details

	Porous Tip		Screened Standpipe		Bentonite seal
	Plain standpipe		Granular response zone		Concrete
	Grout		Backfill with arisings		

Revision history

Version	Date	Author	Reviewed by	Reason for revision
V1	19/08/20	E. Withington	M. Atherton	First issue (new format)

ROTARY BOREHOLE LOG



Borehole No.

BH102

Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308827 N 173314	Hole Type DS+RC
Location: St Nicholas, Cardiff	Level: 65.44mAOD	Scale 1 : 50.00	
Client: Morgan Sindall Plc	Dates: Start: 05/12/2022 End: 06/12/2022	Logged By AK	

(m)	Water Levels	Core Run, Samples & Testing			Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result							
1		B	0.20					Grass over soft brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<10mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.	0.30	65.14	
		ES									
		B	0.50	C 16				Light brown sandy clayey sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone, sandstone and siliceous material.	(0.45)		
		D	0.50 - 0.75								
		ES	0.50								
2		SPT C	0.50 - 0.95					0.50-0.75m: Calcite gravel (<10mm).	(0.55)		
		B	0.75 - 1.30					0.50m: Medium dense.			
		B	1.30 - 2.40	C 92				Reddish brown slightly sandy clayey angular to sub-rounded fine to coarse GRAVEL of mudstone.	1.30	64.14	
		C	1.30 - 1.75					1.00-1.30m: Locally mottled light yellowish brown.			
		SPT C						1.20-1.30m: Bed of light grey fine sand.			
3		CS	2.08 - 2.21			100% 27% 12%		Extremely weak reddish brown locally yellowish brown MUDSTONE. Discontinuities are sub-horizontal and sub-vertical closely spaced planar rough with clay infill and frequent orange staining.			
		B	2.40 - 3.50	C*137				2.40-3.50m: Grey colour.			
		C	2.40 - 2.72			91% 36% 21%					
		SPT C	2.59 - 2.70								
		CS									
4		CS	3.38 - 3.50						(4.10)		
		C	3.50 - 4.00	C*375		100% 63% 51%					
		SPT C	3.50 - 3.64								
		C	4.00 - 4.50								
		CS	4.34 - 4.46	C**		100% 50% 0%					
5		C	4.50 - 5.00								
		SPT C	4.50 - 4.65			86% 71% 49%					
		C	5.00 - 6.40								
		CS	5.63 - 5.75					Weak grey locally reddish brown CALCAREOUS MUDSTONE closely interbedded with strong light grey coarse grained sandstone. Discontinuities are sub-horizontal closely to medium spaced planar smooth with occasional clay infill and frequent orangish staining.	5.40	60.04	
		CS	6.09					5.40-5.50m: Frequent intersecting sub-horizontal to sub-vertical calcite veins.			
6		C	6.09 - 6.40					5.60-5.80m: Thin bed of limestone.	(2.20)		
		CS	6.40 - 7.60			% % %					
		CS	6.40 - 6.73					6.80-6.90m: Extremely weak dark grey mudstone recovered as gravel.			
		C									
		CS									
7		C	5.00 - 6.40								
		CS	5.63 - 5.75								
		C	6.09								
		CS	6.40 - 7.60								
		CS	6.40 - 6.73								
8		C	7.42					7.40m: 2no sub-vertical calcite veins.			
		SPT C	7.42 - 7.60	C**					7.60	57.84	
		CS	7.60 - 7.63					Borehole completed at 7.60m			
		C									
		CS									

EQUIPMENT: Hand digging tools. Fraste Multi-drill SL(G) track mounted rig.

METHOD: Hand dug inspection pit: 0.00-0.50m. Dynamic sampling using a 113mm sample barrel: 0.50-1.30m. Waterflush rotary coring using T6-116 coring barrel: 1.30-7.60m.

CASING: PW to 5.90m.

GROUNDWATER: None encountered prior to using water flush.

INSTALLATION: Borehole backfilled with bentonite pellets: 6.60-7.60m. 50mm ID HDPE slotted pipe with washed gravel response zone: 3.00-6.60mm. Plain 50mm ID HDPE pipe with washed gravel response zone: 2.90-3.00m and bentonite pellet seal: 0.20-2.90m. Flush 150mm steel cover set in concrete: 0.00-0.20m. Gas valves fitted.

REMARKS: Inspection pit terminated at 0.50m due to hard strata. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.10ppm and 0.50m - 0.10ppm.

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
------	------------------	------------------	-----------------------------

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
05/12/2022 16:30	5.00	2.40	2.30
06/12/2022 08:00	5.00	2.40	3.50
06/12/2022 15:00	7.60	5.90	

ROTARY BOREHOLE LOG



Borehole No.

BH103

Sheet 1 of 2

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308816 N 173278	Hole Type DS+RC
Location: St Nicholas, Cardiff	Level: 62.48mAOD	Scale 1 : 50.00	
Client: Morgan Sindall Plc	Dates: Start: 01/12/2022 End: 03/12/2022	Logged By AK	

(m)	Water Levels	Core Run, Samples & Testing			Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result							
1		B	0.10					MADE GROUND: Grass over soft dark brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<10mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.	0.10	62.38	
		ES	0.20						(0.70)		
		B	0.50								
		ES									
		B									
2		ES	1.00					Soft orangish brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<5mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.	0.80	61.68	
		B	1.20 - 2.10								
		UT100	1.20 - 1.65					Soft reddish brown slightly gravelly slightly sandy CLAY with rare roots and rootlets (<3mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.			
		D	1.65 - 1.75					0.90m: Roots and rootlets absent.			
								1.20-3.20m: Very gravelly.	(2.40)		
3		D	2.10 - 2.20	S 21							
		B	2.20 - 3.10								
		SPT	2.20 - 2.65								
4		D	3.10 - 3.20	S 30				Dense brown slightly sandy clayey sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone and siliceous material.	3.20	59.28	
		B	3.20 - 4.10								
		SPT	3.20 - 3.65								
5		D	4.10 - 4.20	S 19				4.20m: Becoming medium dense.			
		B	4.20 - 5.10								
		SPT	4.20 - 4.65								
6		D	5.10 - 5.20	S 28				5.20-6.20m: With pockets of light yellowish brown sand (<5mm).			
		B	5.20 - 6.40								
		SPT	5.20 - 5.65					5.70m: Low cobble content. Cobbles are sub-angular of mudstone.			
								5.90-6.60m: Pockets of red clay (<5mm).			
7		C	6.60 - 8.10	C**		93%		Weak greyish brown CALCAREOUS MUDSTONE extremely closely interbedded with thin beds of weak dark grey mudstone and laminations of light grey limestone, closely interbedded with strong coarse grained conglomeritic sandstone. Clasts are angular to sub-rounded fine to medium of mudstone, limestone and quartz. Discontinuities are sub-horizontal closely to medium spaced planar smooth with infill of grey clay and orange staining with frequent black specks.	6.55	55.93	
		SPT C	6.60 - 6.66			73%					
		D	6.90 - 6.50			30%		6.60-7.00m: 2no parallel vertical calcite veins (<5mm).			
8		CS	7.60 - 7.95								

EQUIPMENT: Hand digging tools. Fraste Multi-drill SL G track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm and 98mm sample barrels: 1.20-6.60m. Waterflush rotary coring using T6-116 coring barrel: 6.60-13.90m.

CASING: PW to 6.60m.

GROUNDWATER: Water encountered at 1.10m. No rise recorded during 20minute monitoring period.

INSTALLATION 05/12/2022: Borehole backfilled with bentonite pellets: 3.00-13.90m. 50mm ID HDPE slotted pipe with washed gravel response zone: 0.50-3.00mm. Plain 50mm ID HDPE pipe with washed gravel response zone: 0.45-0.50m and bentonite pellet seal: 0.20-0.45m. Flush 150mm steel cover set in concrete:

0.00-0.20m. Gas valves fitted.

REMARKS: PID READING: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.10m - 0.20ppm, 0.20m - 0.20ppm, 0.50m - 0.10ppm and 1.00m - 0.10ppm.

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
01/12/22	1.10		1.10

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
01/12/2022 17:00	6.60	6.60	1.80
02/12/2022 08:00	6.60	6.60	1.80

ROTARY BOREHOLE LOG



Borehole No.

BH104

Sheet 1 of 2

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308795 N 173259	Hole Type DS+RC
Location: St Nicholas, Cardiff		Level: 62.47mAOD	Scale 1 : 50.00
Client: Morgan Sindall Plc		Dates: Start: 28/11/2022 End: 29/11/2022	Logged By MA/AK

(m)	Water Levels	Core Run, Samples & Testing			Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result							
1		B	0.20					MADE GROUND: Grass over brown sandy very clayey angular to sub-rounded fine to coarse GRAVEL of mudstone and limestone with low cobble content and occasional roots and rootlets <3mm. Cobbles are sub-angular of limestone.	0.25	62.22	
		ES	0.50						(0.45)		
		B	0.80	112				MADE GROUND: Firm greyish brown slightly sandy gravelly CLAY with low cobble content. Gravel is angular to sub-rounded fine to coarse brick, limestone and mudstone. Cobbles are sub-angular of limestone. Firm greyish brown mottled grey and orangish brown slightly sandy CLAY. 1.20m: Becoming stiff. 1.50-2.20m: Frequent oxidization staining	0.70	61.77	1
		H	1.00								
		ES	1.20 - 1.65	S 14							
2		SPT	1.50 - 2.00					Very dense reddish brown mottled grey very sandy clayey sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone and siliceous material with low cobble content. Cobbles are sub-rounded of reddish brown limestone. (Limited recovery). 3.20m: Dense.	(1.95)		2
		1B	2.00 - 2.20								
		B	2.20 - 3.40								
3		UT100	2.20 - 2.65						2.65	59.82	3
4		SPT	3.20 - 3.65	S 46							4
		B	3.40 - 4.70								
5		SPT C	4.00 - 4.45	C 39							5
6		D	4.70 - 4.90						(4.15)		6
		B	4.90 - 5.90	C 49							
		SPT C	4.90 - 5.35								
7		B	5.90 - 6.60	C*71				5.90m: Very dense. 6.50m: 1no cobble of sub-rounded mudstone.			7
		SPT C	5.90 - 6.26								
8		D	6.60 - 6.80					Weak grey MUDSTONE closely interbedded with thin laminations of weak limestone and with sub-vertical calcite veining (<15mm). Discontinuities are sub-horizontal closely to medium spaced planar smooth with orange brown staining. 7.00-7.70m: Reddish brown. 7.30-7.45m: Recovery non-intact.	6.80	55.67	8
		C	6.80 - 7.30								
		CS	7.13 - 7.30								
		C	7.30 - 8.80	C**							
		SPT C	7.30 - 7.37						(2.00)		

EQUIPMENT: Hand digging tools. Fraste Multi-drill SL G track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm and 98mm sample barrels: 1.20-6.800m. Waterflush rotary coring using T6-116 coring barrel: 6.80-14.80m.

CASING: PW to 6.80m.

GROUNDWATER: None encountered prior to water flush. Driller notes damp at 2.25m following UT100: 2.20-2.65m.

INSTALLATION 30/11/2022: Borehole backfilled with bentonite pellets: 5.00-14.80m. 50mm ID HDPE slotted pipe with washed gravel response zone: 2.00-5.00mm.

Plain 50mm ID HDPE pipe with washed gravel response zone: 1.90-2.00m and bentonite pellet seal: 0.50-1.90m 19mm ID UPVC slotted pipe with washed gravel response zone: 0.00-0.50m. flush 150mm steel cover set in concrete: 0.00-0.20m. Gas valves fitted.

REMARKS: PID READING: VOC concentrations monitored on ES samples using MiniRAE PID instrument: 0.20m - 0.2ppm, 0.50m - 0.0ppm, 1.00m - 0.0ppm.

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
01/12/22	2.25		

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
28/11/2022 17:00	6.80	6.60	0.60
29/11/2022 08:00	6.80	6.60	0.70

ROTARY BOREHOLE LOG



Borehole No.

BH104

Sheet 2 of 2

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308795 N 173259	Hole Type DS+RC
Location: St Nicholas, Cardiff	Level: 62.47mAOD	Scale 1 : 50.00	
Client: Morgan Sindall Plc	Dates: Start: 28/11/2022 End: 29/11/2022	Logged By MA/AK	

(m)	Water Levels	Core Run, Samples & Testing			Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result							
9		CS	8.58 - 8.80		C			7.90-8.15m: Recovery non-intact. Weak grey MUDSTONE closely interbedded with thin laminations of weak limestone and with sub-vertical calcite veining (<15mm). Discontinuities are sub-horizontal closely to medium spaced planar smooth with orange brown staining. <i>(continued from previous sheet)</i>	8.80	53.67	
		C	8.80 - 10.30	C**		100%		8.40-8.50m: 1no vertical discontinuity.			
		SPT C	8.80 - 8.90			80%		Medium strong grey to light grey locally reddish grey CALCAREOUS MUDSTONE closely interbedded with laminations of limestone with medium spaced beds of weak dark grey mudstone and vertical calcite veining (<10mm). Discontinuities are sub-horizontal close to medium spaced planar smooth with orangish brown staining and clayey infill.			
10		CS	9.37 - 9.64		C			8.80-8.95m: Recovery non-intact. 9.20-9.25m: Recovery non-intact.			
		C	10.30 - 11.80	C**		100%		10.65-10.70m: Recovery non-intact.			
		SPT C	10.30 - 10.47			67%		11.20-11.25m: Recovery non-intact. 11.30-11.80m: 2no sub-vertical parallel discontinuities infilled with calcite.			
11		CS	10.95 - 11.22		C			11.80-12.00m: 1no sub-vertical discontinuities. Possibly drilling induced.	(6.00)		
		C	11.80 - 13.30	C**		100%		12.05-12.40m: Dark grey.			
		SPT C	11.80 - 11.83			87%		12.65-12.75m: Recovered as dark grey very clayey angular to sub-angular fine to medium gravel of mudstone.			
13		CS	12.80 - 13.03		C			13.60-13.80m: 1no sub-vertical discontinuity with calcite crystal infill.			
		C	13.30 - 14.80	C**		100%		13.80-13.90m: Recovered as yellowish brown clayey angular to sub-angular fine to medium gravel of mudstone.			
		SPT C	13.30 - 13.36			43%		13.90-14.10m: 1no sub-vertical discontinuity.			
14		CS	14.62		C			14.20-14.30m: Firm light grey clay.			
		SPT C	14.80 - 14.95	C**		43%		14.30-14.40m: Dark grey			
15								14.50-14.65m: Recovered as grey reddish brown very clayey angular to sub-angular fine to medium gravel of mudstone.	14.80	47.67	
								Borehole completed at 14.80m			

Groundwater:

Date Strike Depth (m) Casing Depth (m) Depth After Observation (m)

Hole Progress:

Date Hole Depth (m) Casing Depth (m) Water Depth (m)

29/11/2022 17:00 14.80 6.80 4.15

ROTARY BOREHOLE LOG



Borehole No.

BH105

Sheet 1 of 2

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308839 N 173298	Hole Type DS+RC
Location: St Nicholas, Cardiff	Level: 64.57mAOD	Scale 1 : 50.00	
Client: Morgan Sindall Plc	Dates: Start: 30/11/2022 End: 01/12/2022	Logged By AK	

(m)	Water Levels	Core Run, Samples & Testing			Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result							
1		B	0.20					MADE GROUND: Grass over soft friable light brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<10mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material. Soft reddish brown mottled brown gravelly slightly sandy CLAY with pockets of orangish brown sand and occasional roots and rootlets (<5mm). Gravel is angular to sub-rounded fine to medium of limestone and mudstone. Reddish brown slightly sandy clayey angular to sub-angular fine to coarse GRAVEL of mudstone. 1.20-2.10m: Medium dense with low cobble content. Cobbles are sub-angular of mudstone. 1.50-2.10m: Reddish brown mottled light orangish brown gravel. Weak locally reddish brown MUDSTONE with closely interbedded light grey limestone. Discontinuities are sub-horizontal medium spaced planar smooth with occasional orange staining and occasional grey clay infill (<1mm). 2.20-3.40: Recovery non-intact.	(0.40)		
		ES	0.50						0.40	64.17	
		B							0.60	63.97	
		ES									
2		B	1.00					Weak reddish brown and grey CALCAREOUS MUDSTONE closely interbedded with strong light grey limestone and strong light grey conglomeritic sandstone. Clasts are angular to sub-rounded fine to medium of mudstone, limestone and quartz. Discontinuities are sub-horizontal medium spaced planar smooth with occasional orange staining and clay infill. 4.30-4.60m: Recovery non-intact. Recovered as gravel. 4.70m: Weak grey mudstone recovered as gravel. 5.00m: Weak grey mudstone recovered as gravel. 5.60m: Clay infill (<50mm). 5.70-5.85m: Recovery non-intact. Recovered as gravel. 6.50-6.80m: Extremely closely spaced beds of weak grey mudstone.	(1.60)		
		ES	1.20 - 2.00	C 26							
		B	1.20 - 1.65								
		SPT C									
3		D	2.00 - 2.10	C*130		50%		Strong light grey conglomeritic SANDSTONE. Clasts are angular to sub-rounded fine to medium of mudstone, limestone and quartz. Discontinuities are widely spaced undulating rough with rare clay smearing and occasional orange staining.			
		C	2.10 - 3.10			0%			2.20	62.37	
		SPT C	2.10 - 2.41			0%					
4		C	3.10 - 3.60	C*176		100%		Strong light grey conglomeritic SANDSTONE. Clasts are angular to sub-rounded fine to medium of mudstone, limestone and quartz. Discontinuities are widely spaced undulating rough with rare clay smearing and occasional orange staining.	(2.10)		
		SPT C	3.10 - 3.42			66%					
		CS	3.40 - 3.51			66%					
		C	3.60 - 4.30			75%					
5		CS	4.19 - 4.30	C*750		75%		Strong light grey conglomeritic SANDSTONE. Clasts are angular to sub-rounded fine to medium of mudstone, limestone and quartz. Discontinuities are widely spaced undulating rough with rare clay smearing and occasional orange staining.			
		C	4.30 - 5.70			43%			4.30	60.27	
		SPT C	4.30 - 4.49			29%					
6		CS	5.14 - 5.40					Strong light grey conglomeritic SANDSTONE. Clasts are angular to sub-rounded fine to medium of mudstone, limestone and quartz. Discontinuities are widely spaced undulating rough with rare clay smearing and occasional orange staining.	(2.70)		
		C	5.70 - 7.20	C*375		100%					
		SPT C	5.70 - 5.93			93%					
						43%					
7		CS	6.90 - 7.20					Strong light grey conglomeritic SANDSTONE. Clasts are angular to sub-rounded fine to medium of mudstone, limestone and quartz. Discontinuities are widely spaced undulating rough with rare clay smearing and occasional orange staining.			
		C	7.20 - 8.70	C**		100%			7.00	57.57	
		SPT C	7.20 - 7.23			100%					
		CS	7.51 - 7.88			100%			(1.70)		
8											

EQUIPMENT: Hand digging tools. Fraste Multi-drill SL G track mounted rig.

METHOD: Hand dug inspection pit: 0.00-1.20m. Dynamic sampling using 128mm sample barrel: 1.20-2.10m. Waterflush rotary coring using T6-116 coring barrel: 2.10-8.70m.

CASING: PW to 2.70m.

GROUNDWATER: None encountered prior to using water flush.

INSTALLATION: Borehole backfilled with bentonite pellets: 5.00-8.70m. 50mm ID HDPE slotted pipe with washed gravel response zone: 2.00-5.00mm. Plain 50mm ID HDPE pipe with washed gravel response zone: 1.90-2.00m and 50mm ID HDPE plain pipe with bentonite pellet seal: 0.20-1.90m. Flush 150mm steel cover set in concrete: 0.00-0.20m. Gas valve fitted.

REMARKS: PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument: 0.20m - 0.2ppm, 0.50m - 0.0ppm, 1.00m - 0.0ppm.

Groundwater:

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
------	------------------	------------------	-----------------------------

Hole Progress:

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)
30/11/2011 17:00	7.20	2.70	2.10
01/12/2022 08:00	7.20	2.70	2.30



ROTARY BOREHOLE LOG

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308839 N 173298	Hole Type DS+RC
Location: St Nicholas, Cardiff	Level: 64.57mAOD	Scale 1 : 50.00	
Client: Morgan Sindall Plc	Dates: Start: 30/11/2022 End: 01/12/2022	Logged By AK	

(m)	Water Levels	Core Run, Samples & Testing			Core Run & Sample	TCR SCR RQD	Install	Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result							
9					C			Borehole completed at 8.70m	8.70	55.87	
10											
11											
12											
13											
14											
15											
16											
17											

Groundwater:

Date Strike Depth (m) Casing Depth (m) Depth After Observation (m)

Hole Progress:

Date Hole Depth (m) Casing Depth (m) Water Depth (m)

01/12/2022 17:00 8.70 2.70

INSPECTION PIT LOG



Pit No
HP101
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308798 N 173317 Level: 64.57mAOD	Date 02/12/2022
Location: St Nicholas, Cardiff	Dimensions: 0.30m Depth 0.70m		Scale 1 : 12.5
Client: Morgan Sindall Plc			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B ES	0.20		MADE GROUND: Vegetation over dark brown clayey sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone and siliceous material with frequent roots and rootlets (<15mm).	(0.70)		
		B ES 2B	0.50 0.50 - 0.00		0.30m: Pockets of yellowish brown sand (<5mm).			
					Inspection pit completed at 0.70m	0.70	63.87	
2								

EQUIPMENT: Hand digging tools.

METHOD: Hand dug inspection pit: 0.00-0.70m.

GROUNDWATER: None encountered.

BACKFILL: Inspection pit backfilled with arisings 0.00-0.70m. Ground surface reinstated.

REMARKS: Inspection pit refused at 0.70m on hard strata with clients permission. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.20ppm and 0.50m - 0.20ppm.

INSPECTION PIT LOG



Pit No
HP103
Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308775 N 173319 Level: 64.87mAOD	Date 02/12/2022
Location: St Nicholas, Cardiff	Client: Morgan Sindall Plc	Dimensions: 0.30m Depth 1.00m	Scale 1 : 12.5
			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B ES	0.20		MADE GROUND: Grass over soft dark brown slightly sandy gravelly CLAY with frequent roots and rootlets (<5mm). Gravel is sub-angular to sub-rounded fine to coarse of limestone, mudstone and siliceous material.	(0.30)		
		B ES	0.50		Dark brown clayey slightly sandy sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone and siliceous material.	0.30 (0.70)	64.57	
		B ES	1.00		Inspection pit completed at 1.00m	1.00	63.87	
2								

EQUIPMENT: Hand digging tools.

METHOD: Hand dug inspection pit: 0.00-1.00m.

GROUNDWATER: None encountered.

BACKFILL: Inspection pit backfilled with arisings 0.00-1.00m. Ground surface reinstated.

REMARKS: PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.30ppm, 0.50m - 0.10ppm and 1.00m - 0.10ppm.



INSPECTION PIT LOG

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308775 N 173299 Level: 63.72mAOD	Date 01/12/2022
Location: St Nicholas, Cardiff	Client: Morgan Sindall Plc	Dimensions: 0.30m Depth 1.00m	Scale 1 : 12.5
			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B ES	0.20		MADE GROUND: Grass over dark brown clayey sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone and siliceous material with frequent roots and rootlets (<10mm).			
		B ES	0.50			(1.00)		
		B ES	1.00 1.00 - 0.00 1.00		0.60m: Low cobble content. Cobbles are sub-angular of limestone.			
					Inspection pit completed at 1.00m	1.00	62.72	
2								

EQUIPMENT: Hand digging tools.

METHOD: Hand dug inspection pit: 0.00-1.00m.

GROUNDWATER: None encountered.

BACKFILL: Inspection pit backfilled with arisings 0.00-1.00m. Ground surface reinstated.

REMARKS: PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.20ppm, 0.50m - 0.20ppm and 1.00m - 0.20ppm.

TRIAL PIT LOG



Pit No
TP106
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308799 N 173266 Level: 62.40m AOD	Date 30/11/2022
Location: St Nicholas, Cardiff	Client: Morgan Sindall Plc	Dimensions: 3.60m Depth 2.60m	Scale 1 : 25
		0.65m	Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (m AOD)	Legend
		No/Type	Depth (m)	Result				
1		B	0.10	103	MADE GROUND: Soft dark brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<10mm). Gravel is sub-angular to sub-rounded fine to medium of brick, concrete, limestone, mudstone and siliceous material.	0.10	62.30	
		D	0.20		MADE GROUND: Brown clayey sub-angular to sub-rounded fine to coarse GRAVEL of brick, concrete, limestone, mudstone and siliceous material.	(0.30)		
		ES			Stiff greyish brown slightly gravelly CLAY with occasional roots and rootlets (<5mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.	0.40	62.00	
		B	0.50		0.70m: Mottled orangish brown.			
		D			0.90m: Occasional pockets of orangish brown staining (<3mm).	(1.20)		
2		ES	1.00	107	1.20m: Low cobble content. Cobbles are sub-rounded of siliceous material.			
		B	1.00 - 0.00					
		D	1.00					
3		B			Brown mottled reddish brown clayey sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone and siliceous material with low cobble content. Cobbles are sub-rounded of siliceous material.	1.60	60.80	
		D	2.00			(1.00)		
					Trial pit completed at 2.60m	2.60	59.80	
4								

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: Seepage from 1.30m.

STABILITY: Trial pit unstable from 2.10m.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Trial pit terminated at 2.60m due to instability. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.10m - 0.20ppm, 0.20m - 0.20ppm, 0.50m - 0.10ppm, 1.00m - 0.00ppm and 2.00m - 0.00ppm.

TRIAL PIT LOG



Pit No
TP107
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308800 N 173255 Level: 62.33mAOD	Date 01/12/2022
Location: St Nicholas, Cardiff	Dimensions: 2.80m Depth 2.50m		Scale 1 : 25
Client: Morgan Sindall Plc			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B D ES	0.20	77	MADE GROUND: Grass over brown slightly sandy clayey angular to sub-rounded fine to coarse GRAVEL of brick, concrete, limestone, mudstone and siliceous material with frequent roots and rootlets (<10mm).	(0.80)	61.53	
		B D ES	0.50 0.50 - 0.00 0.50			0.80		
		B D ES H	1.00		Firm greyish brown gravelly CLAY with rare roots and rootlets (<3mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.	(1.10)		
					1.20m: Low cobble content. Cobbles are sub-rounded of siliceous material.			
2	↓	B D	2.00		Brown clayey sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone and siliceous material with medium cobble content. Cobbles are sub-rounded of siliceous material.	1.90 (0.60)	60.43	
					2.30m: High cobble content. Cobbles are sub-rounded of siliceous material.			
					Trial pit completed at 2.50m	2.50		
3								
4								

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: Seepage at 2.20m.

STABILITY: Trial pit unstable.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Trial pit terminated at 2.50m with clients permission due to instability. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.30ppm, 0.50m - 0.20ppm, 1.00m - 0.20ppm and 2.00m - 0.10ppm.

TRIAL PIT LOG



Pit No
TP108
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308801 N 173247 Level: 62.03mAOD	Date 01/12/2022
Location: St Nicholas, Cardiff	Dimensions: 3.40m Depth 3.20m 0.60m		Scale 1 : 25
Client: Morgan Sindall Plc			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B D	0.10		MADE GROUND: Grass over soft dark brown slightly sandy gravelly CLAY with frequent roots and rootlets (<10mm) and occasional fragments of fabric (<5mm). Gravel is sub-angular to sub-rounded fine to medium of brick, concrete, limestone, mudstone and siliceous material.	(0.20)	61.83	
		ES B D ES	0.20 0.20 - 0.00 0.20			0.20		
		B D ES H B D ES	0.70 1.00	79	Firm greenish brown mottled orangish brown gravelly CLAY with rare roots and rootlets (<3mm). Gravel is sub-angular to sub-rounded fine to coarse of limestone, mudstone and siliceous material. 1.20m: Becoming stiff.	(0.50) 0.70	61.33	
		H	1.50	104		(1.25)		
2		B D	2.00		Brown clayey sub-angular to sub-rounded fine to coarse GRAVEL of limestone, mudstone and siliceous material with medium cobble content. Cobbles are sub-rounded of siliceous material.	1.95	60.08	
						(1.25)		
3		B D	3.00		Trial pit completed at 3.20m	3.20	58.83	
4								

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: Seepage at 1.80m.

STABILITY: Trial pit unstable from 2.40m.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Difficulty excavating hard strata at 1.90m. Trial pit terminated at 3.20m with clients permission due to instability. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.10m - 0.30ppm, 0.20m - 0.20ppm, 0.70m - 0.20ppm and 1.00m - 0.20ppm.

TRIAL PIT LOG



Pit No
TP109
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308836 N 173258 Level: 61.92mAOD	Date 28/11/2022
Location: St Nicholas, Cardiff	Dimensions: 2.90m	Depth 2.20m	Scale 1 : 25
Client: Morgan Sindall Plc			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B D ES	0.20		MADE GROUND: Grass over soft light brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<10mm) and rare orange staining. Gravel is sub-rounded to rounded fine to medium of limestone, mudstone and siliceous material.			
		B ES H	0.50 0.60	31	0.50-0.70m: Occasional pockets of orangish brown sand.	(1.30)		
		B D ES	1.00	27	0.90m: Rare roots and rootlets (<3mm).			
2		B D	2.00 2.00 - 0.00 2.00		Firm reddish brown slightly gravelly CLAY with occasional black mottling. Gravel is sub-angular to sub-rounded fine to coarse of mudstone, limestone and siliceous material.	1.30 (0.40)	60.62	
					Reddish brown very clayey sub-angular to sub-rounded fine to coarse GRAVEL of mudstone and siliceous material with low cobble content of sub-rounded siliceous material.	1.70 (0.50)	60.22	
					Trial pit completed at 2.20m	2.20	59.72	
3								
4								

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: Seepage at 0.60m.

STABILITY: Trial pit unstable from 2.00m.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Trial pit terminated at 2.20m with client permission due to pit instability. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.30ppm, 0.50m - 0.20ppm, 1.00m - 0.20ppm and 2.00m - 0.10ppm.

TRIAL PIT LOG



Pit No
TP110
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308845 N 173273 Level: 62.75mAOD	Date 28/11/2022
Location: St Nicholas, Cardiff	Dimensions: 3.00m	Depth 2.30m	Scale 1 : 25
Client: Morgan Sindall Plc			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B D ES	0.20		MADE GROUND: Grass over soft light brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<10mm) and rare orangish brown staining. Gravel is sub-angular to sub-rounded fine to medium of limestone and siliceous material.	(0.90)		
		B D ES	0.50 0.50 - 0.00 0.50					
		H B D ES	0.90 1.00	43	Firm reddish brown slightly gravelly CLAY with occasional roots and rootlets (<3mm) and rare pockets of grey silt (<1mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material. 1.00m: Pockets of orangish brown sand (<5mm).	0.90	61.85	
		H	1.50	59		(0.95)		
2		B D	2.00		Reddish brown very clayey sub-angular to sub-rounded fine to coarse GRAVEL of mudstone and siliceous material with low cobble content. Cobbles are sub-rounded of siliceous material.	1.85 (0.45)	60.90	
					Trial pit completed at 2.30m	2.30	60.45	
3								
4								

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: Seepage at 0.70m.

STABILITY: Trial pit unstable.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Trial pit terminated at 2.30m due to pit instability. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.40ppm, 0.50m - 0.30ppm, 1.00m - 0.10ppm and 2.00m - 0.10ppm.

TRIAL PIT LOG



Pit No
TP111
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308830 N 173280 Level: 62.79mAOD	Date 29/11/2022
Location: St Nicholas, Cardiff	Client: Morgan Sindall Plc	Dimensions: 2.95m Depth 2.10m	Scale 1 : 25
		0.60m	Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B ES	0.20	94	MADE GROUND: Grass over soft light brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<10mm) and occasional pockets of orangish brown staining (<3mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.	(1.00)	61.79	
		B ES	0.50 0.50 - 0.00 0.50		0.80m: Reddish brown staining.	1.00		
		B ES H	1.00 1.10		Firm reddish brown slightly gravelly CLAY with rare roots and rootlets (<3mm) and frequent pockets of yellowish brown staining (<5mm).	(0.80)		
		B D	2.00		Reddish brown very clayey sub-angular to sub-rounded fine to coarse GRAVEL of mudstone and siliceous material with low cobble content. Cobbles are sub-rounded of siliceous material.	1.80 (0.30)	60.99	
2					Trial pit completed at 2.10m	2.10	60.69	
3								
4								

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: Seepage at 0.90m.

STABILITY: Trial pit unstable from 1.50m.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Trial pit terminated at 2.10m with client permission due to pit instability. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.10ppm, 0.50m - 0.10ppm, 1.00m - 0.00ppm and 2.00m - 0.00ppm.

TRIAL PIT LOG



Pit No
TP113
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308837 N 173310 Level: 65.74mAOD	Date 29/11/2022
Location: St Nicholas, Cardiff	Client: Morgan Sindall Plc	Dimensions: 2.80m Depth 2.00m	Scale 1 : 25
		0.70m	Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B D ES	0.20		MADE GROUND: Grass over friable brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<5mm). Gravel is sub-angular to sub-rounded fine to coarse of siliceous material.	(0.30)	65.44	
		B D ES	0.50 0.50 - 0.00 0.50		Reddish brown clayey sub-angular to sub-rounded fine to coarse GRAVEL of mudstone, limestone and siliceous material.	0.30		
		B D ES	1.00		0.80m: Pit becoming unstable.			
		B D ES			1.20-1.25m: Limestone gravel. Gravel is sub-angular to sub rounded fine to coarse.	(1.70)		
2		B D	2.00		Trial pit completed at 2.00m	2.00	63.74	
3								
4								

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: None encountered.

STABILITY: Trial pit unstable from 0.80m.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Slow excavation at 1.80m. Trial pit terminated at 2.00m with clients permission due to hard strata. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.30ppm, 0.50m - 0.30ppm, 1.00m - 0.10ppm and 2.00m - 0.10ppm.

TRIAL PIT LOG



Pit No
TP114
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308804 N 173314 Level: 64.48mAOD	Date 30/11/2022
Location: St Nicholas, Cardiff	Dimensions: 3.00m Depth 2.70m	0.60m	Scale 1 : 25
Client: Morgan Sindall Plc			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAOD)	Legend
		No/Type	Depth (m)	Result				
1		B D ES	0.20		MADE GROUND: Vegetation over dark brown slightly sandy clayey angular to sub-rounded fine to coarse GRAVEL of brick, concrete, limestone, mudstone and siliceous material with fragments of metal (<5mm) and frequent roots and rootlets (<10mm). 0.30m: Light brown.	(0.70)		
		B D ES	0.50			0.70	63.78	
		B D ES	1.00		Firm grey mottled orangish brown gravelly CLAY with occasional roots and rootlets (<3mm). Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.	(0.55)		
		B D	1.50		Firm orangish brown gravelly CLAY with low cobble content. Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material. Cobbles are sub-angular to sub-rounded of limestone.	1.25	63.23	
2		B D	2.00		Extremely weak reddish brown MUDSTONE recovered as clayey angular to sub-angular fine to coarse gravel of mudstone with low cobble content. Cobbles are angular to sub-angular of mudstone.	(0.65)		
		B D	2.00			1.90	62.58	
3					Trial pit completed at 2.70m	(0.80)		
						2.70	61.78	
4								

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: Seepage at 2.60m.

STABILITY: Trial pit unstable.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Difficulty excavating hard strata at 1.80m. Trial pit terminated at 2.70m with clients permission on hard strata. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.30ppm, 0.50m - 0.20ppm, 1.00m - 0.20ppm, 1.50m - 0.10ppm 2.00m - 0.00ppm and 2.70m - 0.00ppm.

TRIAL PIT LOG



Pit No
TP115
Sheet 1 of 1

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk

Project Name: St Nicholas WWTW	Project No: C7806	Co-ords: E 308815 N 173290 Level: 62.97mAOD	Date 29/11/2022
Location: St Nicholas, Cardiff	Dimensions: 2.90m Depth 2.00m		Scale 1 : 25
Client: Morgan Sindall Plc			Logged By AK

(m)	Water Levels	Samples & In Situ Testing			Description	Depth (m)	Level (mAD)	Legend
		No/Type	Depth (m)	Result				
1		B D ES	0.20 0.20 - 0.00 0.20		MADE GROUND: Grass over soft dark brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<10mm). Gravel is sub-angular to sub-rounded fine to medium of siliceous material.	0.10	62.87	
		B D ES	0.50		Soft light brown slightly gravelly slightly sandy CLAY with frequent roots and rootlets (<5mm). Gravel is sub-angular to sub-rounded fine to medium limestone, mudstone and siliceous material.	(0.85)		
		B D ES H	1.00	97	Firm reddish brown slightly gravelly CLAY with rare roots and rootlets (<3mm) and frequent pockets of yellowish brown sand. Gravel is sub-angular to sub-rounded fine to medium of limestone, mudstone and siliceous material.	0.95 (1.05)	62.02	
2		B D	2.00		1.90m: Becoming very gravelly. Trial pit completed at 2.00m	2.00	60.97	2
3								3
4								4

EQUIPMENT: JCB 3CX Mechanical Excavator.

METHOD: Trial pits excavated using 60cm bucket.

GROUNDWATER: None encountered.

STABILITY: Trial pit unstable.

BACKFILL: Trial pit backfilled with arisings and compacted with excavator bucket.

REMARKS: Trial pit terminated at 2.00m with clients permission due to instability. PID READINGS: VOC concentrations monitored on ES samples using MiniRAE PID instrument; 0.20m - 0.20ppm, 0.50m - 0.10ppm, 1.00m - 0.10ppm and 2.00m - 0.00ppm.

STANDARD PENETRATION TEST

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk



CC Ground Investigations Ltd

Client:	Morgan Sindall Plc	Contract:	C7806
Site:	St Nicholas WWTW	Checked:	KS/EW

Notes:

- 1 Test carried out in general accordance with BS EN ISO 22476: Part 3 (2005)+A1: 2011
- 2 N values have not been subjected to any correction.
- 3 Test carried out using split spoon S, solid cone C.

- 4 Where full test drive not completed, linearly extrapolated N value reported.
- 5 <1 Denotes hammer self weight penetration (sank under own weight).
- 6 ** Denotes no effective penetration.

BH	Top Depth (m)	Type	Seating Blows	Blows Main Test	Total Penetration (mm)	Casing Depth (m)	Water Depth (m)	Self-Weight Penetration (mm)	Blows 1	Blows 2	Blows 3	Blows 4	Blows 5	Blows 6	Pen 1 (mm)	Pen 2 (mm)	Pen 3 (mm)	Pen 4 (mm)	Pen 5 (mm)	Pen 6 (mm)	Spt 'N' Value	SPT Reported Result	Hammer Serial Number	Hammer Energy Ratio (%)
BH102	0.50	C	7	16	450	NA	DRY	0	4	3	2	4	4	6	75	75	75	75	75	75	16	C 16	CC20	63
BH102	1.30	C	24	92	450	NA	DRY	0	11	13	18	17	17	40	75	75	75	75	75	75	92	C 92	CC20	63
BH102	2.40	C	25	100	340	2.40	1.1	0	13	12	13	25	63		75	45	75	75	70		137	C*137	CC20	63
BH102	3.50	C	25	50	140	2.40	1.45	0	16	9	50				75	25	40				375	C*375	CC20	63
BH102	4.50	C	25	50	150	2.40	1.8	0	6	19	50				75	65	10				1500	C**	CC20	63
BH102	7.60	C	25	50	30	5.90	DRY	0	25		50				25		5				3000	C**	CC20	63
BH103	2.20	S	3	21	450	NA	1.70	0	1	2	3	4	9	5	75	75	75	75	75	75	21	S 21	CC20	63
BH103	3.20	S	15	30	450	3.20	1.00	0	6	9	9	7	6	8	75	75	75	75	75	75	30	S 30	CC20	63
BH103	4.20	S	6	19	450	4.20	DRY	0	3	3	3	4	5	7	75	75	75	75	75	75	19	S 19	CC20	63
BH103	5.20	S	15	28	450	5.20	DRY	0	8	7	7	7	6	8	75	75	75	75	75	75	27	S 28	CC20	63
BH103	6.60	C	25	100	60	6.60	2.00	0	25		100				35		25				1200	C**	CC20	63
BH103	8.10	C	25	100	100	6.60	1.45	0	25		100				70		30				1000	C**	CC20	63
BH103	9.50	C	25	50	110	6.60	1.8	0	6	19	50				75	25	10				1500	C**	CC20	63
BH103	10.60	C	25	50	70	6.60	1.35	0	25		50				65		5				300	C**	CC20	63
BH103	12.00	C	25	50	135	6.60	1.5	0	5	20	50				75	55	5				750	C**	CC20	63
BH103	13.50	C	25	50	120	6.60	1.95	0	11	14	50				75	25	20				50	C*750	CC20	63
BH104	1.20	S	3	14	450	1.20	DRY	0	1	2	2	2	3	7	75	75	75	75	75	75	14	S 14	CC20	63
BH104	3.20	S	13	46	450	3.20	DRY	0	5	8	12	11	11	12	75	75	75	75	75	75	46	S 46	CC20	63
BH104	4.00	C	21	39	450	4.00	DRY	0	8	13	12	10	9	8	75	75	75	75	75	75	39	C 39	CC20	63
BH104	4.90	C	22	49	450	4.90	DRY	0	10	12	14	12	11	12	75	75	75	75	75	75	49	C 49	CC20	63
BH104	5.90	C	18	50	360	5.90	DRY	0	6	12	20	20	10		75	75	75	75	60		71	C*71	CC20	63
BH104	7.30	C	25	100	70	6.80	1.10	0	25		100				50		20				1500	C**	CC20	63
BH104	8.80	C	25	100	100	6.80	1.65	0	25		100				50		25				1200	C**	CC20	63
BH104	10.30	C	25	100	170	6.80	2.15	0	4	21	100				75	65	30				1000	C**	CC20	63
BH104	11.80	C	25	50	30	6.80	2.45	0	25		50				25		5				3000	C**	CC20	63

STANDARD PENETRATION TEST

Telephone: 01452 739165, Fax: 01452 739220, Email: info@ccground.co.uk



CC Ground Investigations Ltd

Client:	Morgan Sindall Plc	Contract:	C7806
Site:	St Nicholas WWTW	Checked:	KS/EW

Notes:

- 1 Test carried out in general accordance with BS EN ISO 22476: Part 3 (2005)+A1: 2011
- 2 N values have not been subjected to any correction.
- 3 Test carried out using split spoon S, solid cone C.

- 4 Where full test drive not completed, linearly extrapolated N value reported.
- 5 <1 Denotes hammer self weight penetration (sank under own weight).
- 6 ** Denotes no effective penetration.

BH	Top Depth (m)	Type	Seating Blows	Blows Main Test	Total Penetration (mm)	Casing Depth (m)	Water Depth (m)	Self-Weight Penetration (mm)	Blows 1	Blows 2	Blows 3	Blows 4	Blows 5	Blows 6	Pen 1 (mm)	Pen 2 (mm)	Pen 3 (mm)	Pen 4 (mm)	Pen 5 (mm)	Pen 6 (mm)	Spt 'N' Value	SPT Reported Result	Hammer Serial Number	Hammer Energy Ratio (%)
BH104	13.30	C	25	50	60	6.80	2.80	0	25		50				50		10				1500	C**	CC20	63
BH104	14.80	C	25	50	40	6.80	4.15	0	25		50				35		5				3000	C**	CC20	63
BH105	1.20	C	11	26	450	NA	DRY	0	5	6	4	7	8	7	75	75	75	75	75	75	26	C 26	CC20	63
BH105	2.10	C	25	100	310	NA	2.3	0	22	3	10	12	63	15	75	5	75	75	75	5	130	C*130	CC20	63
BH105	3.10	C	12	100	320	2.00	2.3	0	6	6	15	55	30		75	75	75	75	20		176	C*176	CC20	63
BH105	4.30	C	22	100	190	2.70	1.55	0	6	16	100				75	75	40				750	C*750	CC20	63
BH105	5.70	C	25	100	230	2.70	1.8	0	6	19	55	45			75	75	75	5			375	C*375	CC20	63
BH105	7.20	C	25	50	30	2.70	2.1	0	25		50				15		15				1000	C**	CC20	63

CC GROUND INVESTIGATIONS LIMITED

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

SITE St Nicholas WWTW

Initial scale reading (mm) 150



Test No. DCP101

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0

No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)
1	202	52	52	5.1	2	711	561	2	166.0										
1	236	86	34	7.8	2	714	564	2	166.0										
1	253	103	17	15.4	3	720	570	2	125.2										
1	261	111	8	32.2	3	732	582	4	63.5										
1	276	126	15	17.4	3	740	590	3	94.5										
1	285	135	9	28.7	3	753	603	4	58.7										
1	302	152	17	15.4	3	769	619	5	47.9										
1	327	177	25	10.5	3	770	620	0	724.9										
1	361	211	34	7.8	3	771	621	0	724.9										
1	394	244	33	8.0	5	772	622	0	1195.9										
1	424	274	30	8.8	10	773	623	0	2358.8										
1	442	292	18	14.5	10	774	624	0	2358.8										
1	457	307	15	17.4	10	775	625	0	2358.8										
1	479	329	22	11.9	10	776	626	0	2358.8										
1	498	348	19	13.8															
1	512	362	14	18.6															
1	536	386	24	11.0															
1	567	417	31	8.5															
1	581	431	14	18.6															
1	590	440	9	28.7															
1	601	451	11	23.6															
1	613	463	12	21.6															
1	615	465	2	125.2															
2	620	470	3	100.6															
2	624	474	2	125.2															
3	638	488	5	54.6															
3	650	500	4	63.5															
3	665	515	5	51.0															
3	679	529	5	54.6															
3	690	540	4	69.1															
3	708	558	6	42.7															

REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): CBR = 247DCP-0.98.
Test refused at 0.63m.

CONTRACT

C7806

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

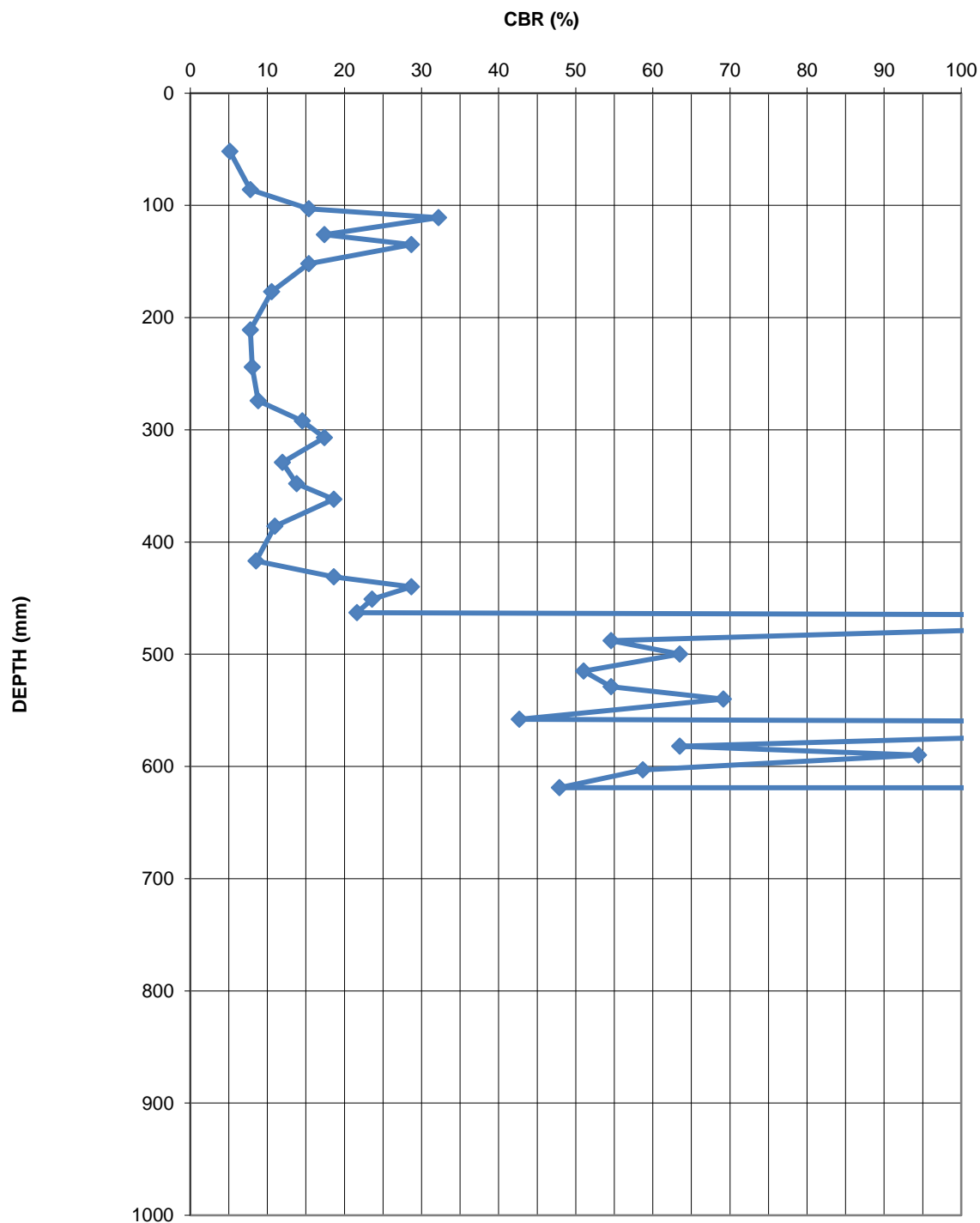
SITE St Nicholas WWTW

Initial scale reading (mm) 150

Test No. DCP101

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0



REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): $CBR = 247DCP-0.98$.
 Test refused at 0.63m.

CONTRACT**C7806**

DYNAMIC CONE PENETROMETER TESTING



Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0

[illegible]

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

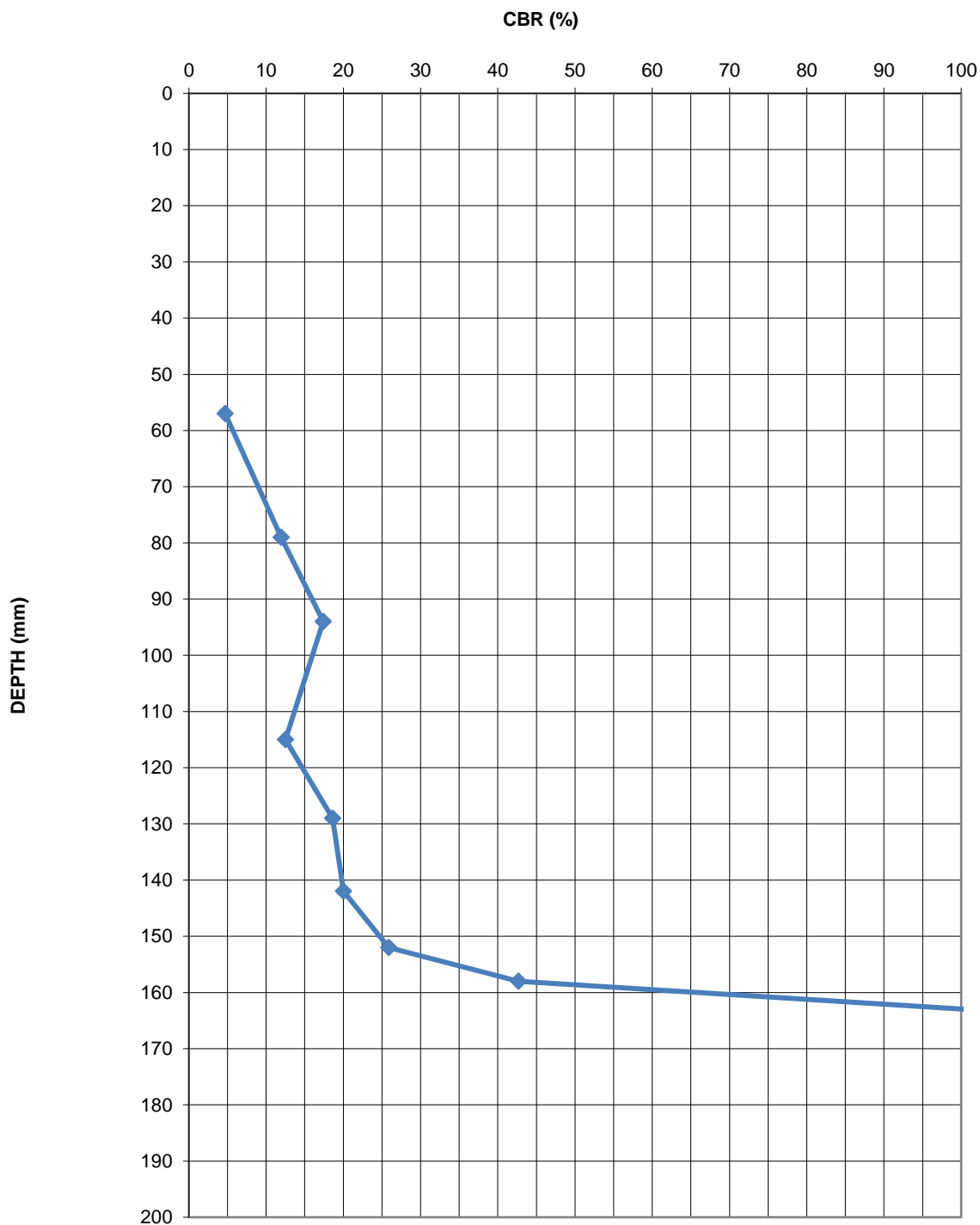
SITE St Nicholas WWTW

Initial scale reading (mm) 212

Test No. DCP101a

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0



REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): $CBR = 247DCP-0.98$.
Test refused at 0.18m.

CONTRACT

C7806

DYNAMIC CONE PENETROMETER TESTING



Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0

[illegible]

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

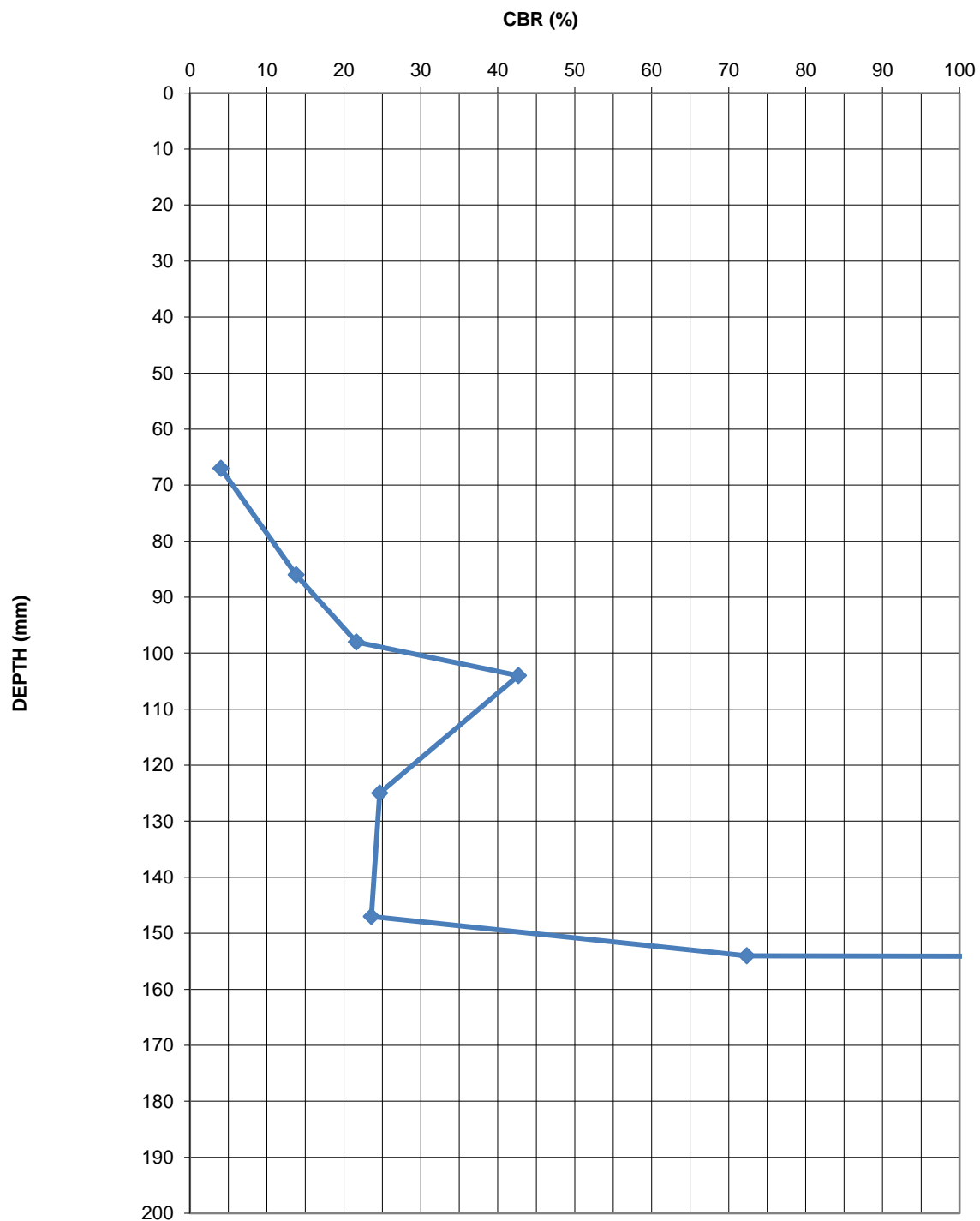
SITE St Nicholas WWTW

Initial scale reading (mm) 146

Test No. DCP101b

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0



REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): $CBR = 247DCP-0.98$.
Test refused at 0.17m.

CONTRACT

C7806

DYNAMIC CONE PENETROMETER TESTING



Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0

[illegible]

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

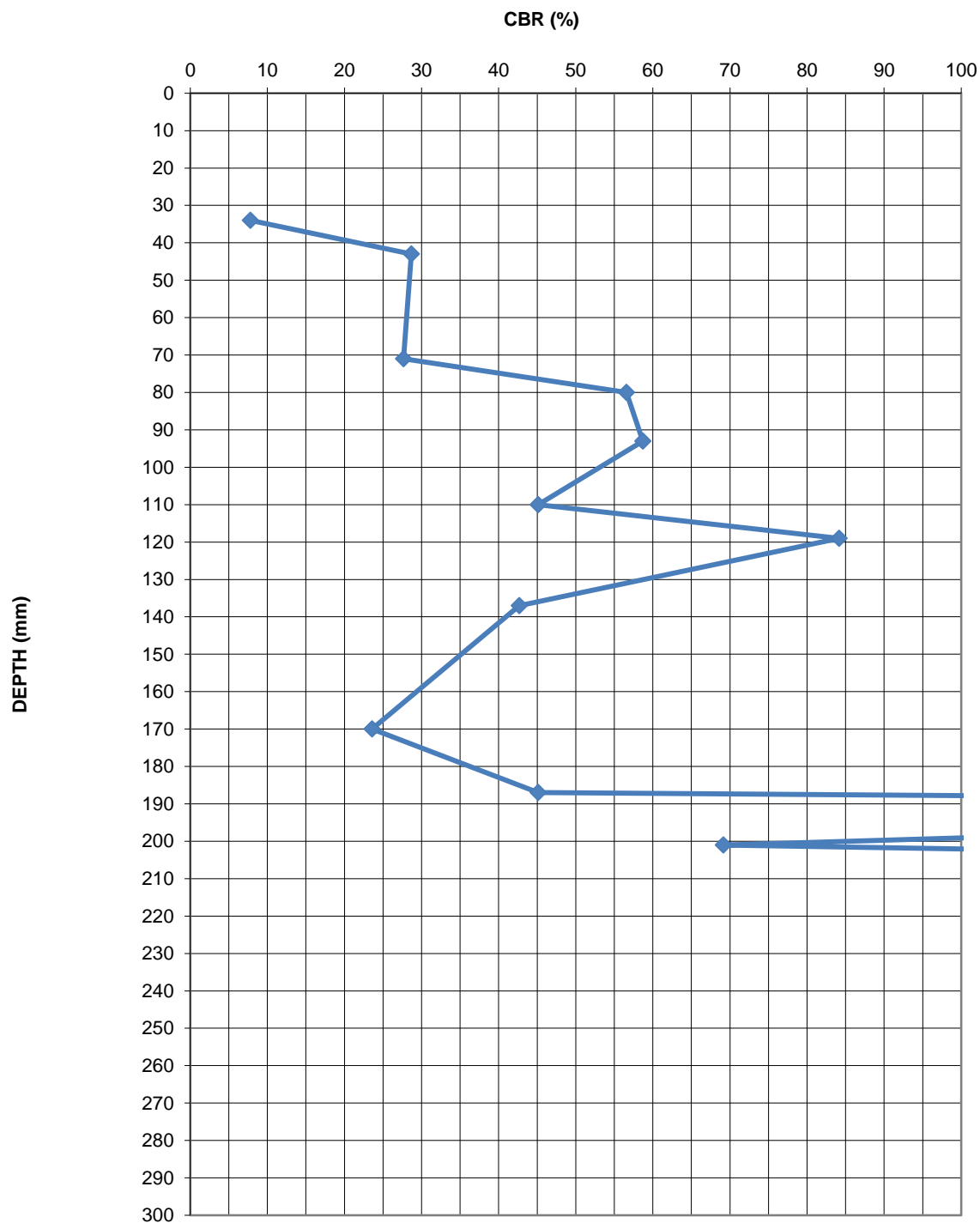
SITE St Nicholas WWTW

Initial scale reading (mm) 139

Test No. DCP101c

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0



REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): $CBR = 247DCP-0.98$.
Test refused at 0.24m.

CONTRACT

C7806

CC GROUND INVESTIGATIONS LIMITED

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

SITE St Nicholas WWTW

Initial scale reading (mm) 110



Test No. DCP102

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0

No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)
1	215	105	105	2.6	1	431	1168	19	13.8	1	365	1896	32	8.3	10	701	2232	201	1.4
1	273	163	58	4.6	1	446	1183	15	17.4	1	397	1928	1928	0.1	10	702	2233	223	1.2
1	311	201	38	7.0	1	463	1200	17	15.4	1	409	1940	1940	0.1					
1	344	234	33	8.0	1	476	1213	13	20.0	1	420	1951	1951	0.1					
1	373	263	29	9.1	1	489	1226	13	20.0	1	429	1960	1960	0.1					
1	412	302	39	6.8	1	500	1237	11	23.6	1	451	1982	1982	0.1					
1	445	335	33	8.0	1	511	1248	11	23.6	1	463	1994	1994	0.1					
1	486	376	41	6.5	1	524	1261	13	20.0	1	475	2006	2006	0.1					
1	529	419	43	6.2	1	535	1272	11	23.6	1	489	2020	2020	0.1					
1	555	445	26	10.1	1	544	1281	9	28.7	1	502	2033	2033	0.1					
1	580	470	25	10.5	1	551	1288	7	36.7	1	513	2044	2044	0.1					
1	609	499	29	9.1	2	577	1314	13	20.0	1	521	2052	2052	0.1					
1	633	523	24	11.0	2	614	1351	19	14.2	1	529	2060	2060	0.1					
1	665	555	32	8.3	1	644	1381	30	8.8	2	540	2071	1036	0.3					
1	691	581	26	10.1	1	681	1418	37	7.2	2	549	2080	1040	0.3					
1	718	608	27	9.8	1	707	1444	26	10.1	2	560	2091	1046	0.3					
1	748	638	30	8.8	1	739	1476	32	8.3	2	574	2105	1053	0.3					
1	784	674	36	7.4	1	768	1505	29	9.1	2	596	2127	1064	0.3					
1	813	703	29	9.1	1	799	1536	31	8.5	1	610	2141	2141	0.1					
1	850	740	37	7.2	1	823	1560	24	11.0	1	620	2151	2151	0.1					
1	45	782	42	6.3	1	852	1589	29	9.1	1	625	2156	2156	0.1					
1	74	811	29	9.1	1	97	1628	39	6.8	2	646	2177	1089	0.3					
1	115	852	41	6.5	1	131	1662	34	7.8	2	662	2193	1097	0.3					
1	162	899	47	5.7	1	150	1681	19	13.8	2	673	2204	1102	0.3					
1	201	938	39	6.8	1	173	1704	23	11.4	2	681	2212	1106	0.3					
1	233	970	32	8.3	1	198	1729	25	10.5	2	690	2221	1111	0.3					
1	271	1008	38	7.0	1	232	1763	34	7.8	3	696	2227	742	0.4					
1	297	1034	26	10.1	1	264	1795	32	8.3	3	697	2228	743	0.4					
1	336	1073	39	6.8	1	280	1811	16	16.3	3	698	2229	743	0.4					
1	377	1114	41	6.5	1	301	1832	21	12.5	5	699	2230	446	0.6					
1	412	1149	35	7.6	1	333	1864	32	8.3	10	700	2231	223	1.2					

REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): CBR = 247DCP-0.98.
Test refused at 2.23m.

CONTRACT

C7806

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

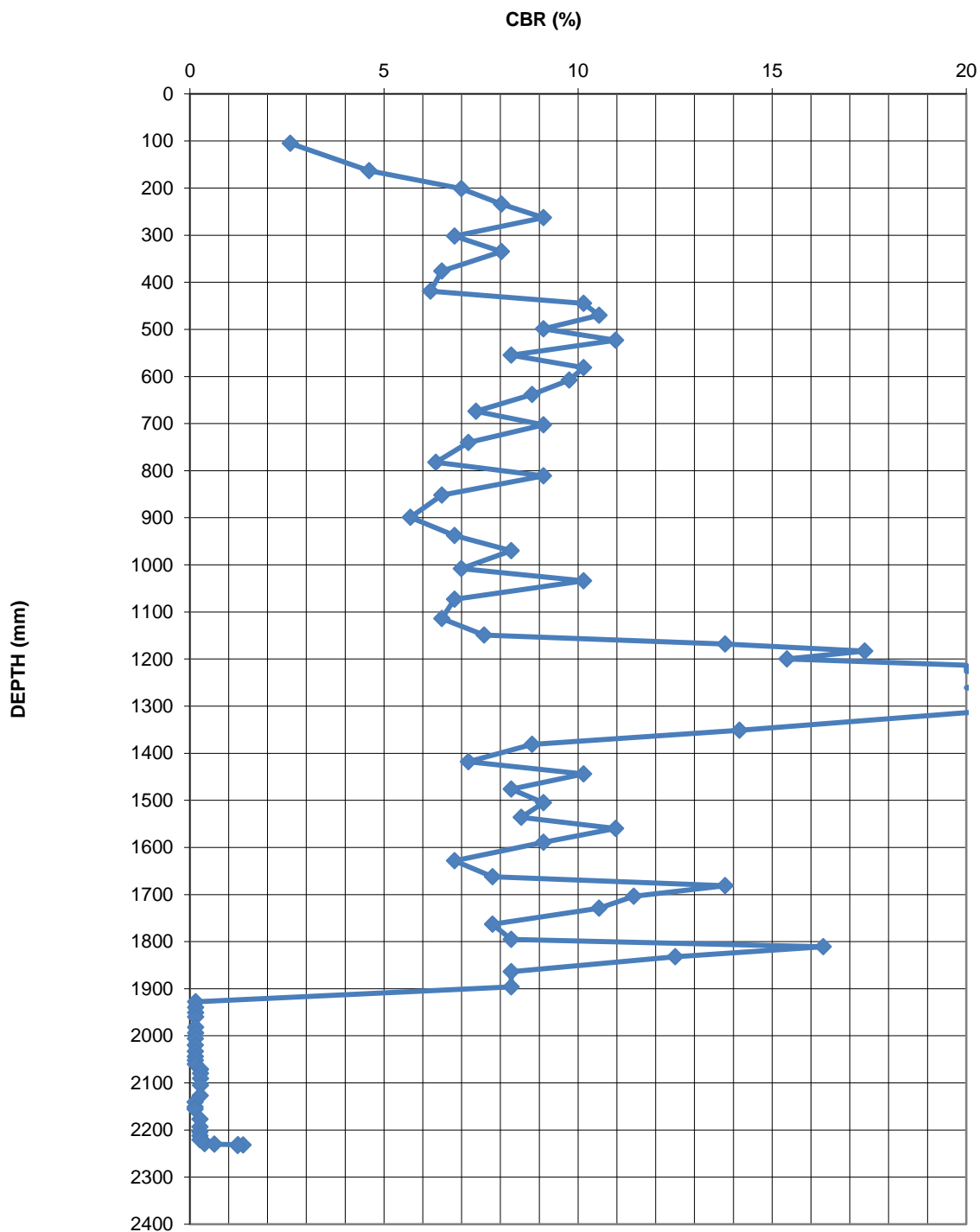
SITE St Nicholas WWTW

Initial scale reading (mm) 110

Test No. DCP102

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0



REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): $CBR = 247DCP - 0.98$.
Test refused at 2.23m.

CONTRACT

C7806

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

SITE St Nicholas WWTW

Initial scale reading (mm) 187



Test No. DCP103

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0

No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)
1	247	60	60	4.5	1	119	795	16	16.3	10	525	1201	1	273.9	1	554	2005	22	11.9
1	291	104	44	6.1	1	136	812	17	15.4	10	540	1216	2	166.0	1	580	2031	26	10.1
1	324	137	33	8.0	1	150	826	14	18.6	10	559	1235	2	131.7	1	606	2057	26	10.1
1	355	168	31	8.5	1	163	839	13	20.0	10	588	1264	3	87.0	1	637	2088	31	8.5
1	379	192	24	11.0	1	182	858	19	13.8	5	610	1286	4	57.8	1	681	2132	44	6.1
1	386	199	7	36.7	1	204	880	22	11.9	3	631	1307	7	36.7	1	740	2191	59	4.5
1	392	205	6	42.7	1	221	897	17	15.4	4	666	1342	9	29.5	1	789	2240	49	5.4
1	401	214	9	28.7	1	239	915	18	14.5	9	844	1520	20	13.3	1	832	2283	43	6.2
2	410	223	5	56.6	1	262	938	23	11.4	1	96	1547	27	9.8	1	858	2309	26	10.1
3	429	242	6	40.5	1	277	953	15	17.4	1	119	1570	23	11.4	17	367	2612	18	14.7
3	445	258	5	47.9	1	291	967	14	18.6	1	140	1591	21	12.5	6	375	2620	1	186.3
3	470	283	8	30.9	1	305	981	14	18.6	1	165	1616	25	10.5	9	387	2632	1	186.3
3	500	313	10	25.9	1	314	990	9	28.7	1	187	1638	22	11.9	15	455	2700	5	56.2
3	541	354	14	19.0	2	331	1007	9	30.3	1	210	1661	23	11.4	7	495	2740	6	44.8
2	570	383	15	18.0	2	348	1024	9	30.3	1	232	1683	22	11.9	9	506	2751	1	202.9
1	610	423	40	6.6	2	364	1040	8	32.2	1	254	1705	22	11.9	25	570	2815	3	98.3
1	638	451	28	9.4	2	372	1048	4	63.5	1	275	1726	21	12.5	20	613	2858	2	116.7
1	669	482	31	8.5	2	387	1063	8	34.3	1	296	1747	21	12.5	25	716	2961	4	61.7
1	705	518	36	7.4	2	399	1075	6	42.7	1	314	1765	18	14.5	3	741	2986	8	30.9
1	736	549	31	8.5	2	405	1081	3	84.2	1	332	1783	18	14.5	10	805	3050	6	40.1
1	779	592	43	6.2	2	411	1087	3	84.2	1	351	1802	19	13.8	6	837	3082	5	47.9
1	814	627	35	7.6	3	428	1104	6	45.1	1	370	1821	19	13.8	3	65	3108	9	29.8
1	834	647	20	13.1	3	437	1113	3	84.2	1	389	1840	19	13.8	6	95	3138	5	51.0
1	868	681	34	7.8	3	442	1118	2	149.7	1	406	1857	17	15.4	9	113	3156	2	125.2
1	13	689	8	32.2	3	450	1126	3	94.5	1	425	1876	19	13.8	25	165	3208	2	120.5
2	34	710	11	24.7	4	460	1136	3	100.6	1	443	1894	18	14.5	10	171	3214	1	407.5
2	51	727	9	30.3	4	469	1145	2	111.6	1	460	1911	17	15.4					
1	61	737	10	25.9	4	475	1151	2	166.0	1	476	1927	16	16.3					
1	75	751	14	18.6	15	491	1167	1	231.9	1	494	1945	18	14.5					
1	90	766	15	17.4	10	502	1178	1	225.0	1	514	1965	20	13.1					
1	103	779	13	20.0	10	516	1192	1	177.6	1	532	1983	18	14.5					

REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): CBR = 247DCP-0.98.

CONTRACT

C7806

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

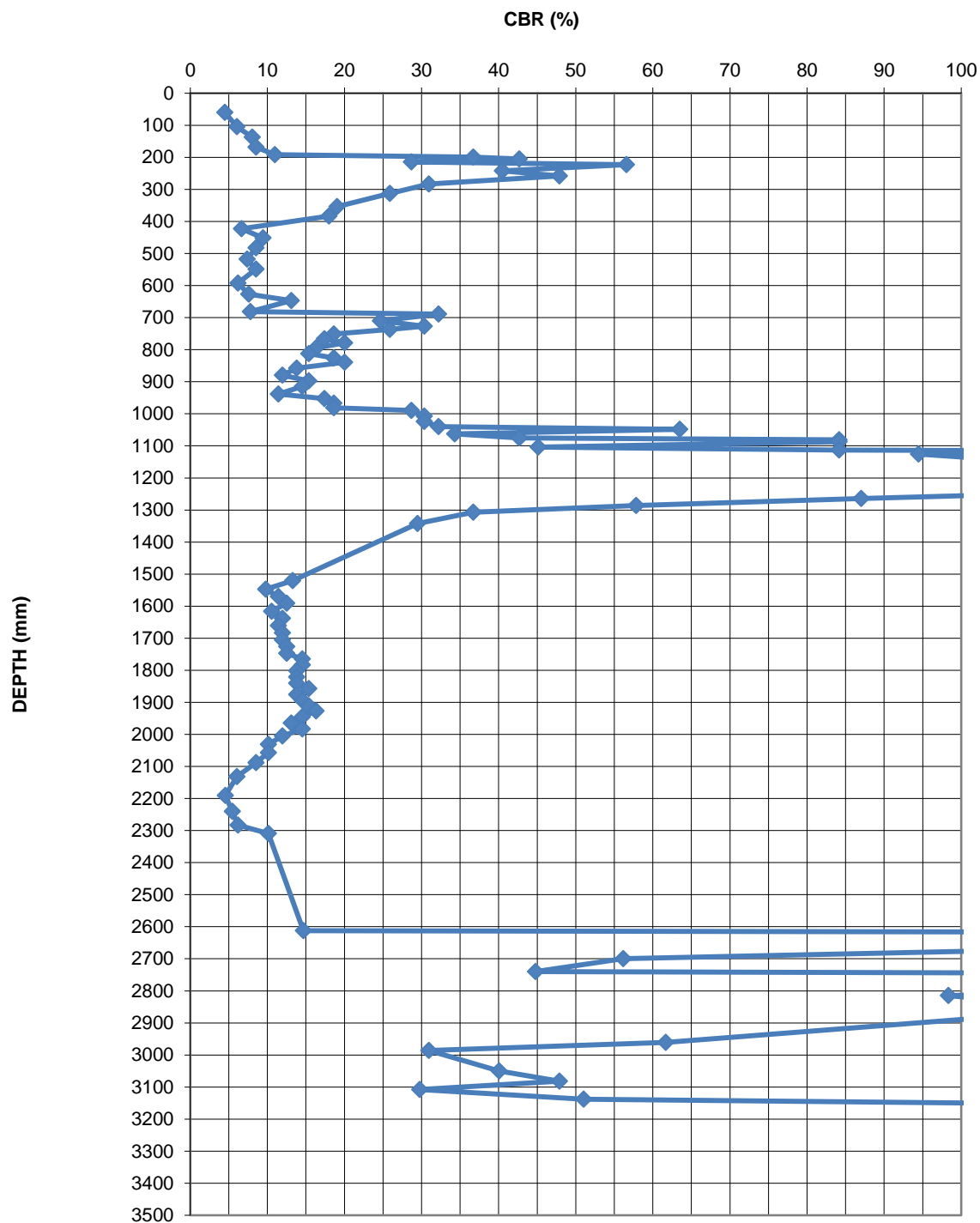
SITE St Nicholas WWTW

Initial scale reading (mm) 187

Test No. DCP103

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0

REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): $CBR = 247DCP - 0.98$.

CONTRACT

C7806

CC GROUND INVESTIGATIONS LIMITED

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

SITE St Nicholas WWTW

Initial scale reading (mm) 150



Test No. DCP104

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0

No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)	No. of Blows	Scale reading (mm)	Depth bgl (mm)	DCP (mm/blow)	CBR (%)
1	216	66	66	4.1	1	706	556	18	14.5	1	525	1177	18	14.5	1	262	2489	12	21.6
1	230	80	14	18.6	1	742	592	36	7.4	1	548	1200	1200	0.2	1	263	2490	2490	0.1
1	253	103	23	11.4	1	793	643	51	5.2	1	572	1224	1224	0.2	6	274	2501	417	0.7
1	260	110	7	36.7	1	803	653	10	25.9	1	590	1242	1242	0.2	12	310	2537	211	1.3
2	286	136	13	20.0	1	814	664	11	23.6	1	611	1263	1263	0.2	20	370	2597	130	2.1
2	348	198	31	8.5	1	828	678	14	18.6	1	636	1288	1288	0.2	6	377	2604	434	0.6
1	362	212	14	18.6	1	855	705	27	9.8	1	661	1313	1313	0.2	10	380	2607	261	1.1
1	370	220	8	32.2	3	75	727	7	35.1	1	683	1335	1335	0.2	10	386	2613	261	1.1
1	381	231	11	23.6	10	160	812	9	30.3	1	710	1362	1362	0.2	10	389	2616	262	1.1
1	393	243	12	21.6	1	176	828	16	16.3	1	733	1385	1385	0.2	10	391	2618	262	1.1
1	400	250	7	36.7	1	187	839	11	23.6	1	751	1403	1403	0.2					
1	407	257	7	36.7	1	205	857	18	14.5	1	768	1420	1420	0.2					
2	414	264	4	72.4	1	223	875	18	14.5	1	784	1436	1436	0.2					
2	432	282	9	28.7	1	249	901	26	10.1	1	802	1454	1454	0.2					
2	440	290	4	63.5	1	262	914	13	20.0	1	821	1473	1473	0.2					
2	443	293	2	166.0	1	271	923	9	28.7	1	840	1492	1492	0.2					
3	449	299	2	125.2	1	285	937	14	18.6	10	322	1739	174	1.6					
3	466	316	6	45.1	1	301	953	16	16.3	10	481	1898	190	1.4					
3	492	342	9	29.8	1	310	962	9	28.7	10	632	2049	205	1.3					
2	504	354	6	42.7	1	326	978	16	16.3	11	830	2247	204	1.3					
2	522	372	9	28.7	1	344	996	18	14.5	1	43	2270	2270	0.1					
2	540	390	9	28.7	1	358	1010	14	18.6	1	51	2278	2278	0.1					
1	555	405	15	17.4	1	375	1027	17	15.4	1	77	2304	2304	0.1					
1	563	413	8	32.2	1	399	1051	24	11.0	1	115	2342	2342	0.1					
1	580	430	17	15.4	1	409	1061	10	25.9	1	140	2367	2367	0.1					
1	592	442	12	21.6	1	426	1078	17	15.4	1	168	2395	2395	0.1					
1	611	461	19	13.8	1	444	1096	18	14.5	1	189	2416	2416	0.1					
1	629	479	18	14.5	1	460	1112	16	16.3	1	209	2436	2436	0.1					
1	654	504	25	10.5	1	476	1128	16	16.3	1	221	2448	2448	0.1					
1	670	520	16	16.3	1	492	1144	16	16.3	1	236	2463	2463	0.1					
1	688	538	18	14.5	1	507	1159	15	17.4	1	250	2477	2477	0.1					

REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): CBR = 247DCP-0.98.
Test refused at 2.62m.

CONTRACT

C7806

DYNAMIC CONE PENETROMETER TESTING

CLIENT Morgan Sindall

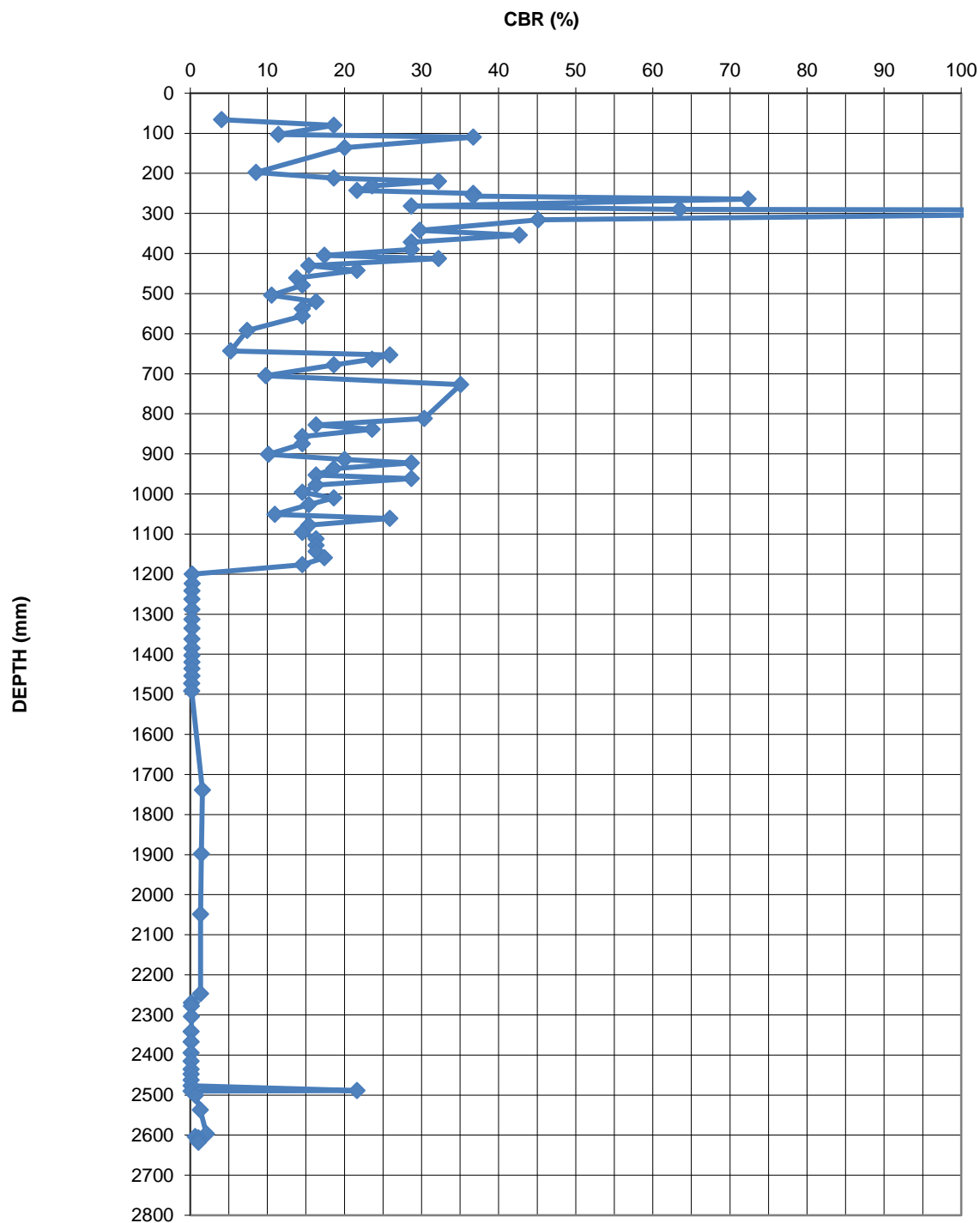
SITE St Nicholas WWTW

Initial scale reading (mm) 150

Test No. DCP104

Date: 05/12/2022

Datum - below ground level (bgl) (mm) 0



REMARKS: CBR correlation based on correlation from Figure 4 of TRL Report TRL587 (2003): $CBR = 247DCP - 0.98$.
Test refused at 2.62m.

CONTRACT

C7806

APPENDIX C

Photographs

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH102

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-0.50m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH102

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-0.50m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH102

Contract Name:

St Nicholas WWTW

Box No:

01

Client:

Morgan Sindall PLC

Depth:

0.50-3.50m

Core Photograph



CC Ground Investigations Ltd

Contract ID:	C7806	Borehole ID:	BH102
Contract Name:	St Nicholas WWTW	Box No:	02
Client:	Morgan Sindall PLC	Depth:	3.50-6.40m

Core Photograph



CC Ground Investigations Ltd

Contract ID:	C7806	Borehole ID:	BH102
Contract Name:	St Nicholas WWTW	Box No:	03
Client:	Morgan Sindall PLC	Depth:	6.40-7.60m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH103

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-1.20m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH103

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-1.20m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

BH103

Box No:

01

Depth:

1.20-5.20m

Core Photograph



CC Ground Investigations Ltd

Contract ID:	C7806	Borehole ID:	BH103
Contract Name:	St Nicholas WWTW	Box No:	02
Client:	Morgan Sindall PLC	Depth:	5.20-8.10m

Core Photograph



CC Ground Investigations Ltd

Contract ID:	C7806	Borehole ID:	BH103
Contract Name:	St Nicholas WWTW	Box No:	03
Client:	Morgan Sindall PLC	Depth:	8.10-10.60m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

BH103

Box No:

04

Depth:

10.60-13.50m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH103

Contract Name:

St Nicholas WWTW

Box No:

05

Client:

Morgan Sindall PLC

Depth:

13.50-13.90m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH104

Contract Name:

St Nicholas WWTW

Box No:

01

Client:

Morgan Sindall PLC

Depth:

1.20-4.90m

Core Photograph



CC Ground Investigations Ltd

Contract ID:	C7806	Borehole ID:	BH104
Contract Name:	St Nicholas WWTW	Box No:	02
Client:	Morgan Sindall PLC	Depth:	4.90-8.80m

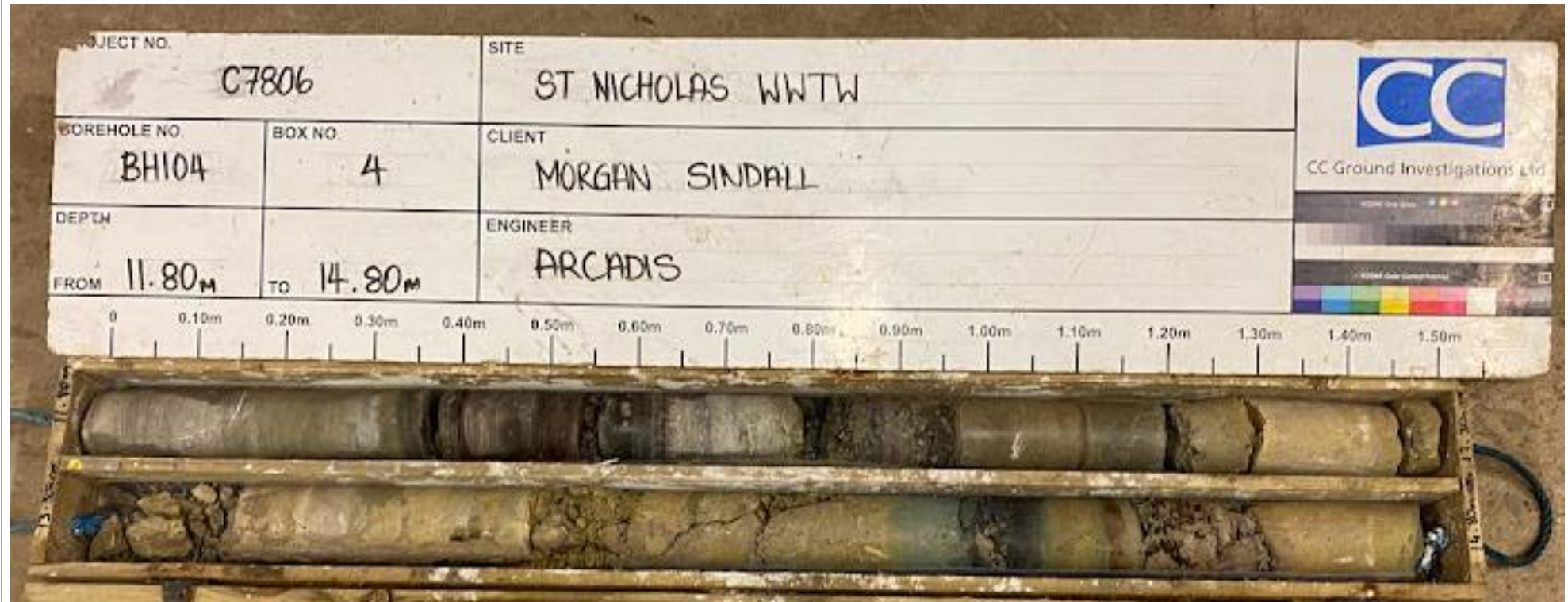
Core Photograph



CC Ground Investigations Ltd

Contract ID:	C7806	Borehole ID:	BH104
Contract Name:	St Nicholas WWTW	Box No:	03
Client:	Morgan Sindall PLC	Depth:	8.80-11.80m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH104

Contract Name:

St Nicholas WWTW

Box No:

04

Client:

Morgan Sindall PLC

Depth:

11.80-14.80m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

BH105

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-1.20m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

BH105

Box No:

N/A

Depth:

0.00-1.20m

Core Photograph



CC Ground Investigations Ltd

Contract ID:	C7806	Borehole ID:	BH105
Contract Name:	St Nicholas WWTW	Box No:	01
Client:	Morgan Sindall PLC	Depth:	1.20-4.30m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

BH105

Box No:

02

Depth:

4.30-7.20m

Core Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

BH105

Box No:

03

Depth:

7.20-8.70m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP106

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.60m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP106

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.60m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP106

Box No:

N/A

Depth:

0.00-2.60m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP106

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.60m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP107

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.50m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP107

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.50m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP107

Box No:

N/A

Depth:

0.00-2.50m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP107

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.50m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP108

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-3.20m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP108

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-3.20m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP108

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-3.20m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP109

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.20m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP109

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.20m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP109

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.20m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP109

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.20m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP110

Box No:

N/A

Depth:

0.00-2.30m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP110

Box No:

N/A

Depth:

0.00-2.30m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP110

Box No:

N/A

Depth:

0.00-2.30m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP111

Box No:

N/A

Depth:

0.00-2.10m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP111

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.10m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP111

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.10m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP113

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.00m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP113

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.00m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP113

Box No:

N/A

Depth:

0.00-2.00m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP114

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.70m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP114

Box No:

N/A

Depth:

0.00-2.70m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP114

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.70m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP115

Box No:

N/A

Depth:

0.00-2.00m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP115

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.00m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP115

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.00m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP116

Box No:

N/A

Depth:

0.00-2.00m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

TP116

Box No:

N/A

Depth:

0.00-2.00m

Trial Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

TP116

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-2.00m

Hand Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

HP101

Box No:

N/A

Depth:

0.00-0.70m

Hand Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Contract Name:

St Nicholas WWTW

Client:

Morgan Sindall PLC

Borehole ID:

HP103

Box No:

N/A

Depth:

0.00-1.00m

Hand Pit Photograph



CC Ground Investigations Ltd

Contract ID:

C7806

Borehole ID:

HP104

Contract Name:

St Nicholas WWTW

Box No:

N/A

Client:

Morgan Sindall PLC

Depth:

0.00-1.00m

APPENDIX D

Geotechnical Laboratory Test Results



LABORATORY REPORT



4043

Contract Number: PSL22/8113

Report Date: 18 January 2023
Client's Reference: C7806
Client Name: CC Ground Investigations Ltd
Unit A2 Innsworth Technology Park.
Innsworth Lane
Gloucester
GL3 1DL

For the attention of: Kelly Spear

Contract Title: St Nicholas WWTW
Date Received: 21/12/2022
Date Commenced: 21/12/2022
Date Completed: 18/1/2023

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)

T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP106		B	0.50		Brown slightly sandy CLAY.
TP106		B	2.00		Brown sandy very clayey GRAVEL.
TP111		B	1.00		Brown slightly gravelly slightly sandy CLAY.
TP113		B	1.00		Brown sandy very clayey GRAVEL of cobbles.
TP114		B	0.50		Brown sandy very clayey GRAVEL.
TP114		D	0.50		Brown sandy very clayey GRAVEL.
TP114		D	1.00		Firm brown slightly gravelly sandy CLAY.
TP114		B	1.50		Brown gravelly sandy CLAY.
TP115		B	0.50		Brown sandy CLAY.
TP115		D	0.50		Brown sandy CLAY.
TP115		B	2.00		Very soft brown slightly gravelly sandy CLAY.
TP115		D	2.00		Brown slightly gravelly sandy CLAY.
TP116		D	0.20		Brown sandy slightly clayey GRAVEL.
TP116		B	0.50		Brown gravelly slightly sandy CLAY.
TP116		D	0.50		Brown gravelly slightly sandy CLAY.
TP116		D	1.00		Brown slightly sandy CLAY.
TP116		B	2.00		Brown very sandy very clayey GRAVEL.



4043

PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8113

Client Ref:

C7806

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

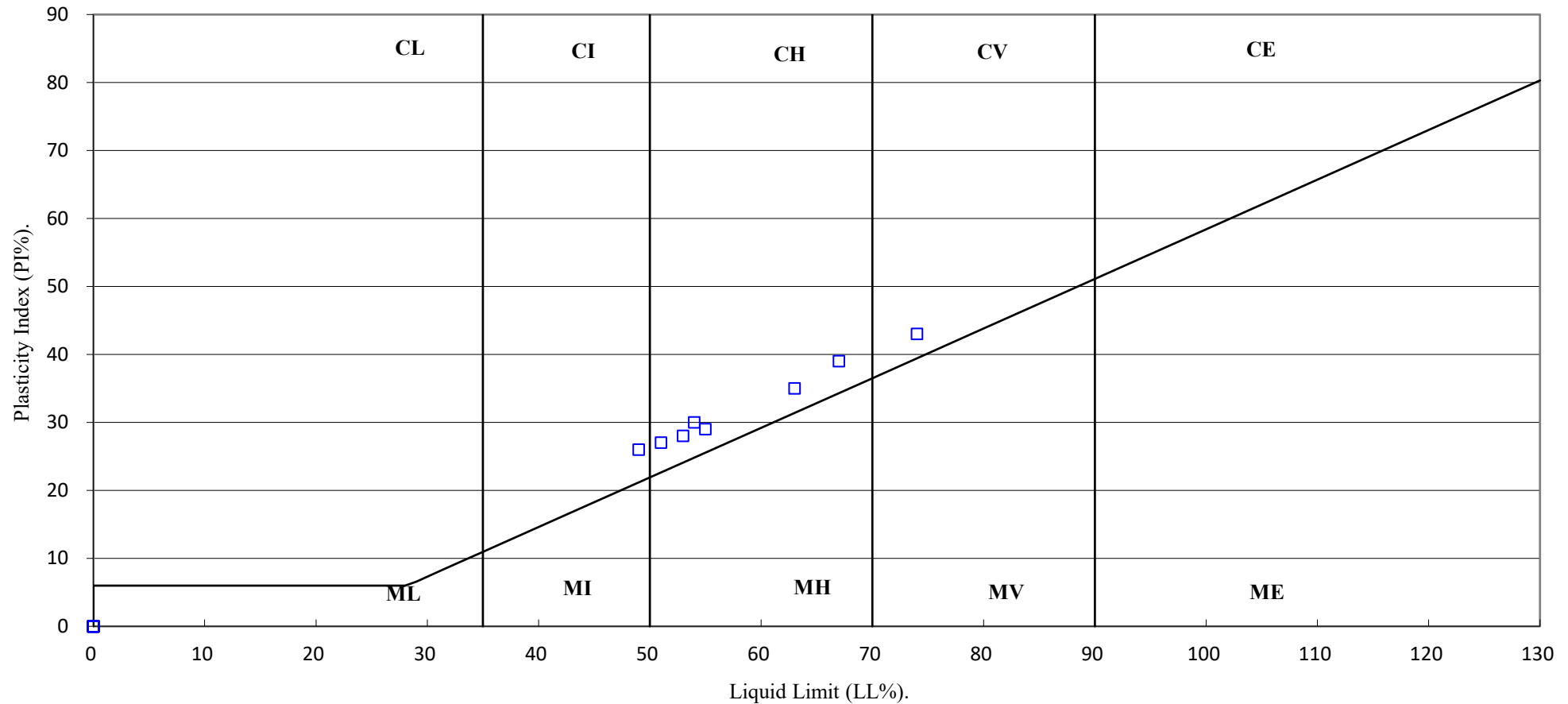
Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP106		B	0.50		27			63	28	35	100	High Plasticity CH
TP111		B	1.00		34			55	26	29	97	High Plasticity CH
TP114		D	0.50		9.3			53	25	28	35	High Plasticity CH
TP114		D	1.00		28			51	24	27	91	High Plasticity CH
TP115		D	0.50		27			54	24	30	100	High Plasticity CH
TP115		D	2.00		35			49	23	26	98	Intermediate Plasticity CI
TP116		D	0.20		3.8				NP			
TP116		D	0.50		27			67	28	39	86	High Plasticity CH
TP116		D	1.00		33			74	31	43	100	Very High Plasticity CV

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

		<p>St Nicholas WWTW</p>		Contract No:
				PSL22/8113
				Client Ref:
				C7806

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8113

Client Ref:

C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

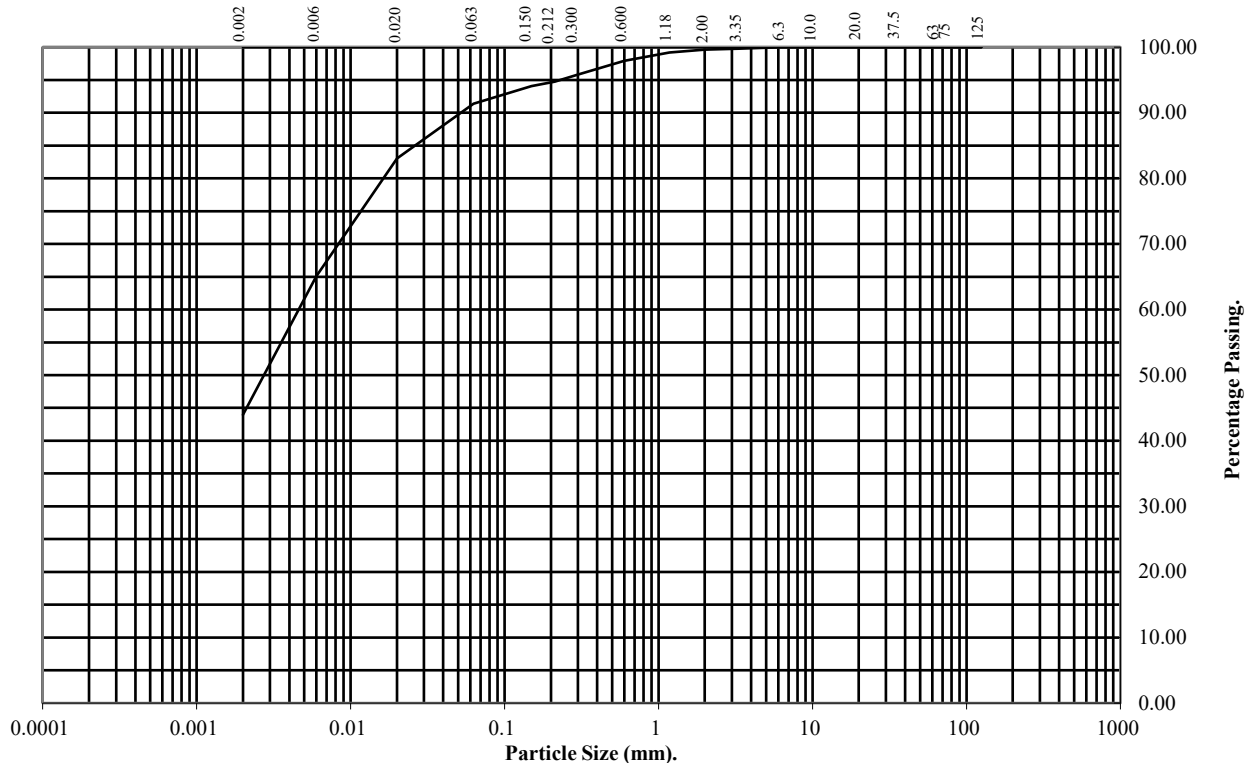
Hole Number: TP106

Top Depth (m): 0.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	98
0.3	96
0.212	95
0.15	94
0.063	91

Particle Diameter	Percentage Passing
0.02	83
0.006	65
0.002	44

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	9
Silt	47
Clay	44

Remarks:

See Summary of Soil Descriptions



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St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

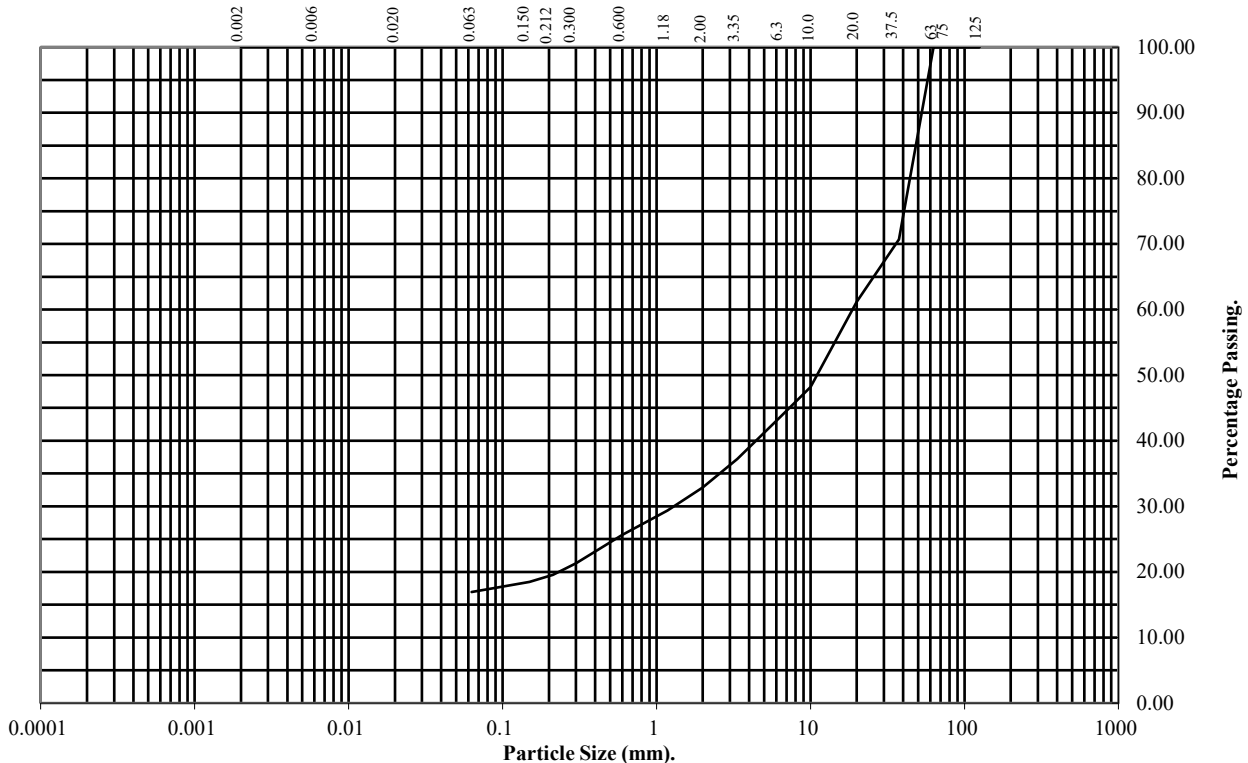
Hole Number: TP106

Top Depth (m): 2.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	71
20	61
10	48
6.3	44
3.35	37
2	33
1.18	29
0.6	26
0.3	21
0.212	20
0.15	18
0.063	17

Soil Fraction	Total Percentage
Cobbles	0
Gravel	67
Sand	16
Silt/Clay	17

Remarks:

See Summary of Soil Descriptions



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St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

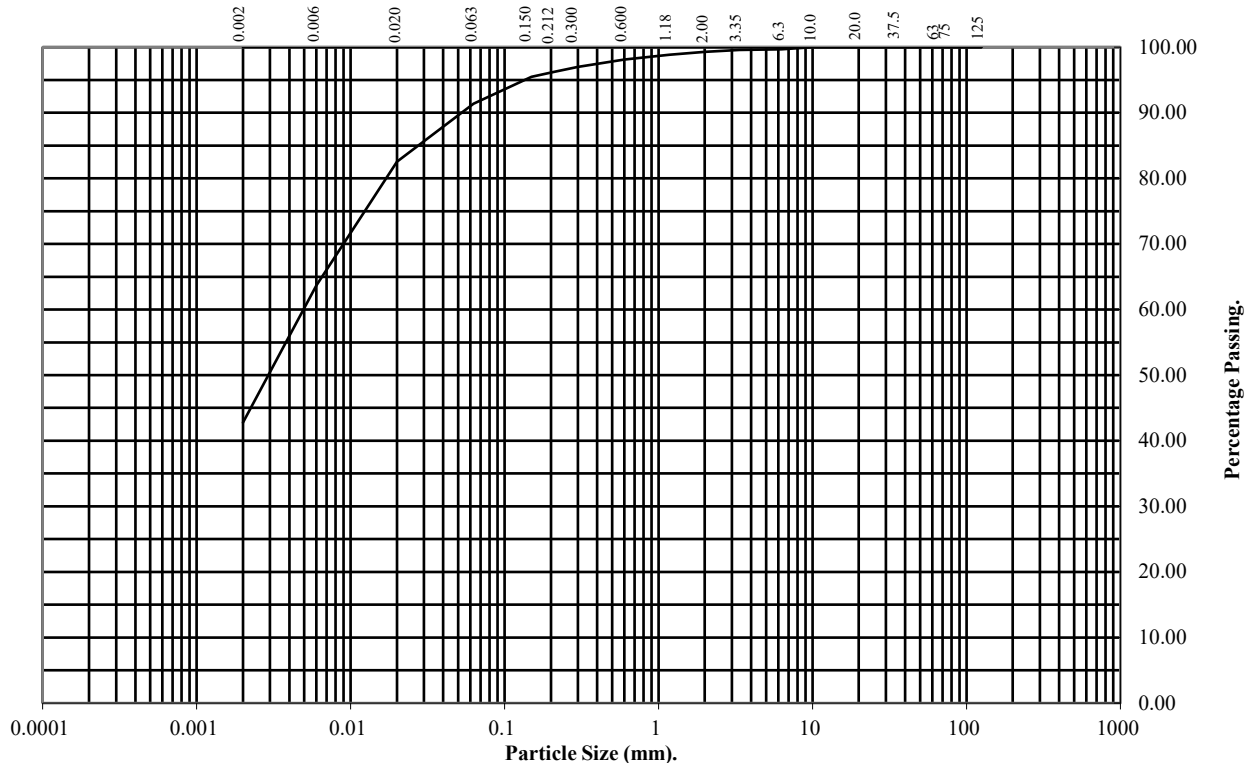
Hole Number: TP111

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	99
1.18	99
0.6	98
0.3	97
0.212	96
0.15	95
0.063	91

Particle Diameter	Percentage Passing
0.02	83
0.006	64
0.002	43

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	8
Silt	48
Clay	43

Remarks:

See Summary of Soil Descriptions



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Contract No:
PSL22/8113
Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

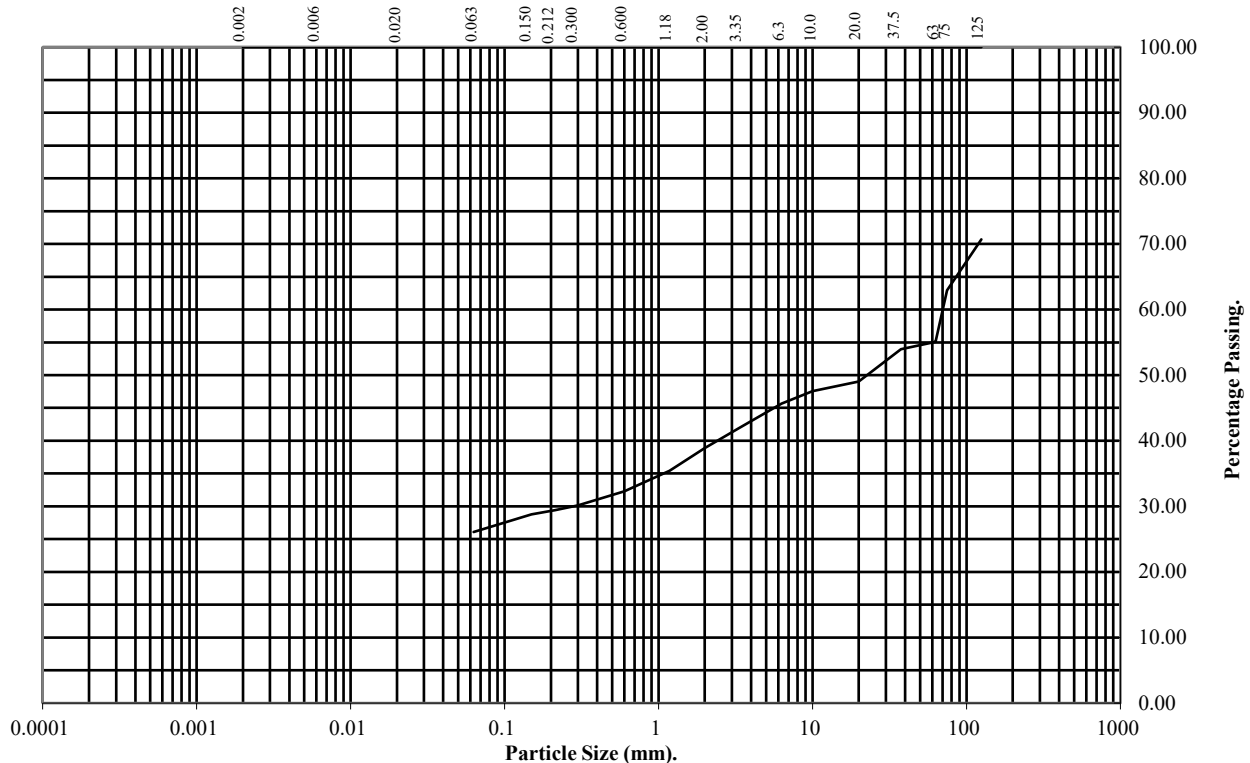
Hole Number: TP113

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	71
75	63
63	55
37.5	54
20	49
10	48
6.3	46
3.35	42
2	39
1.18	35
0.6	32
0.3	30
0.212	29
0.15	29
0.063	26

Soil Fraction	Total Percentage
Cobbles	45
Gravel	16
Sand	13
Silt/Clay	26

Remarks:

See Summary of Soil Descriptions



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Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

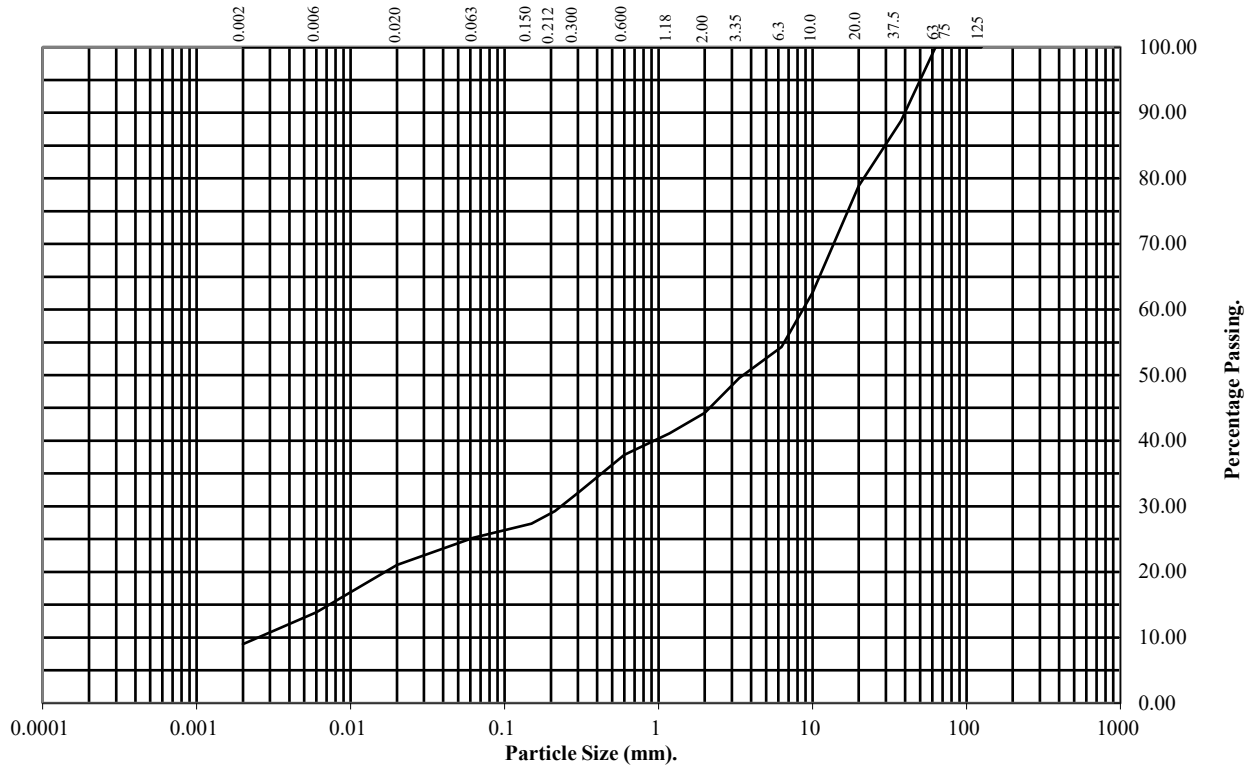
Hole Number: TP114

Top Depth (m): 0.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	89
20	79
10	63
6.3	54
3.35	50
2	44
1.18	41
0.6	38
0.3	32
0.212	29
0.15	27
0.063	25

Particle Diameter	Percentage Passing
0.02	21
0.006	14
0.002	9

Soil Fraction	Total Percentage
Cobbles	0
Gravel	56
Sand	19
Silt	16
Clay	9

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

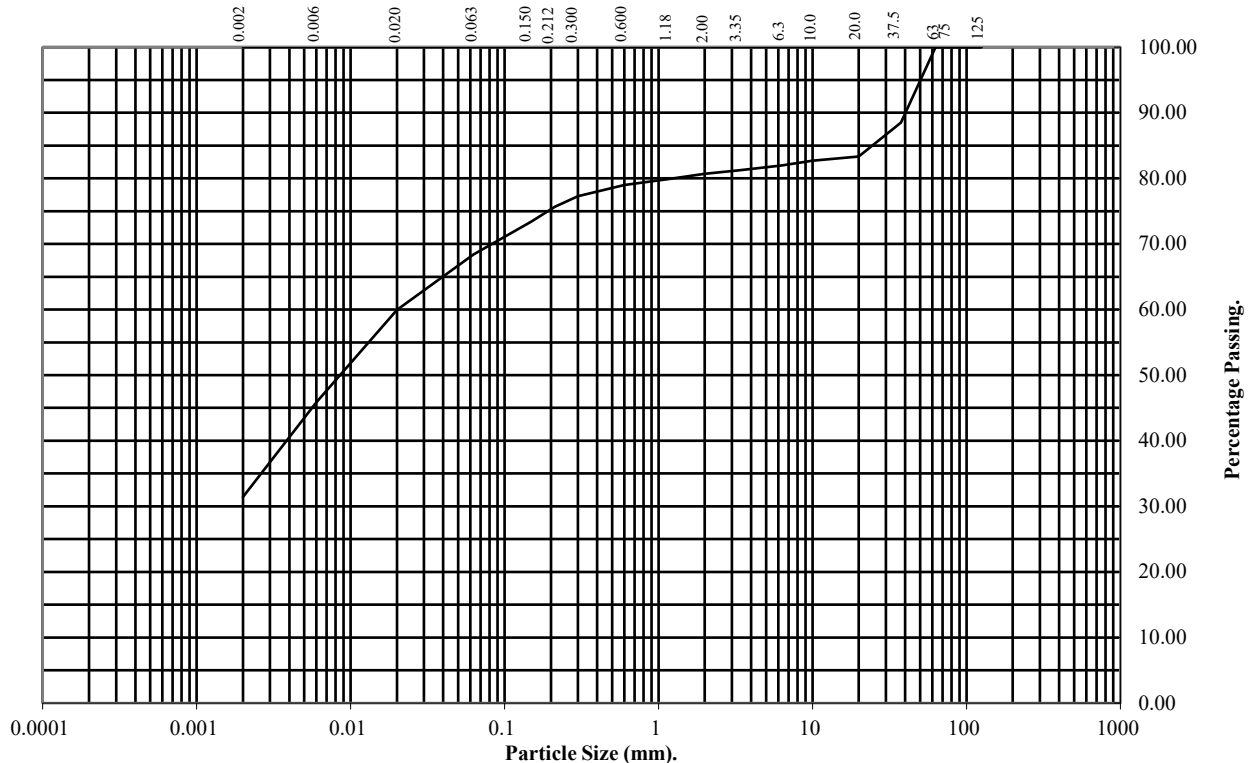
Hole Number: TP114

Top Depth (m): 1.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	89
20	83
10	83
6.3	82
3.35	81
2	81
1.18	80
0.6	79
0.3	77
0.212	76
0.15	73
0.063	68

Particle Diameter	Percentage Passing
0.02	60
0.006	46
0.002	31

Soil Fraction	Total Percentage
Cobbles	0
Gravel	19
Sand	13
Silt	37
Clay	31

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

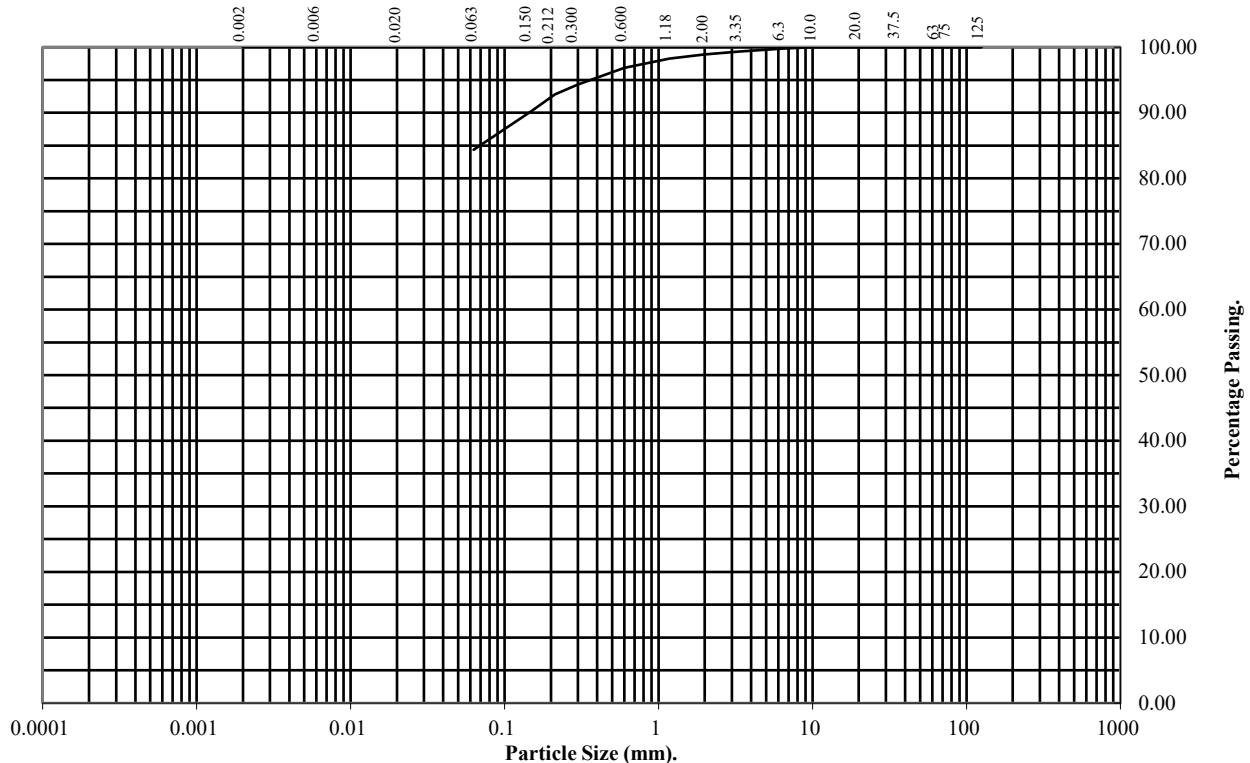
Hole Number: TP115

Top Depth (m): 2.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	99
1.18	98
0.6	97
0.3	94
0.212	93
0.15	90
0.063	84

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	15
Silt/Clay	84

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

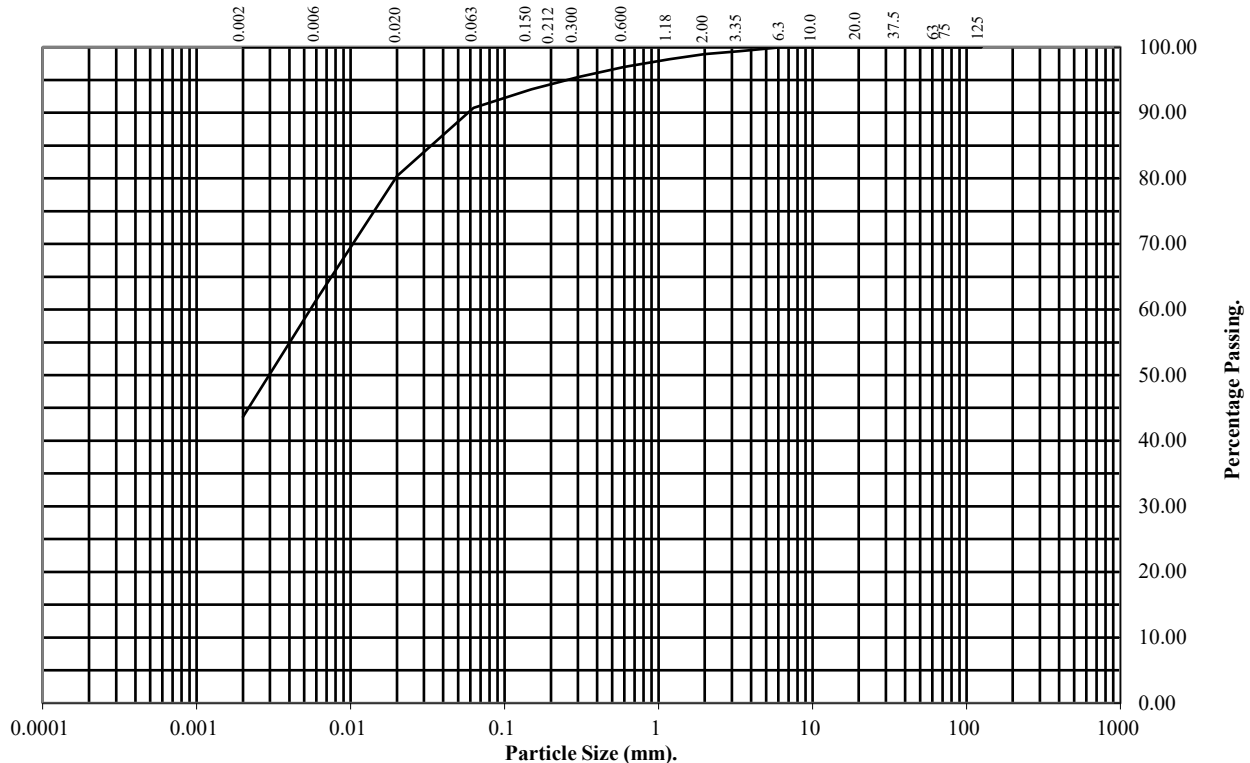
Hole Number: TP116

Top Depth (m): 0.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	99
1.18	98
0.6	97
0.3	95
0.212	94
0.15	94
0.063	91

Particle Diameter	Percentage Passing
0.02	80
0.006	61
0.002	44

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	8
Silt	47
Clay	44

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

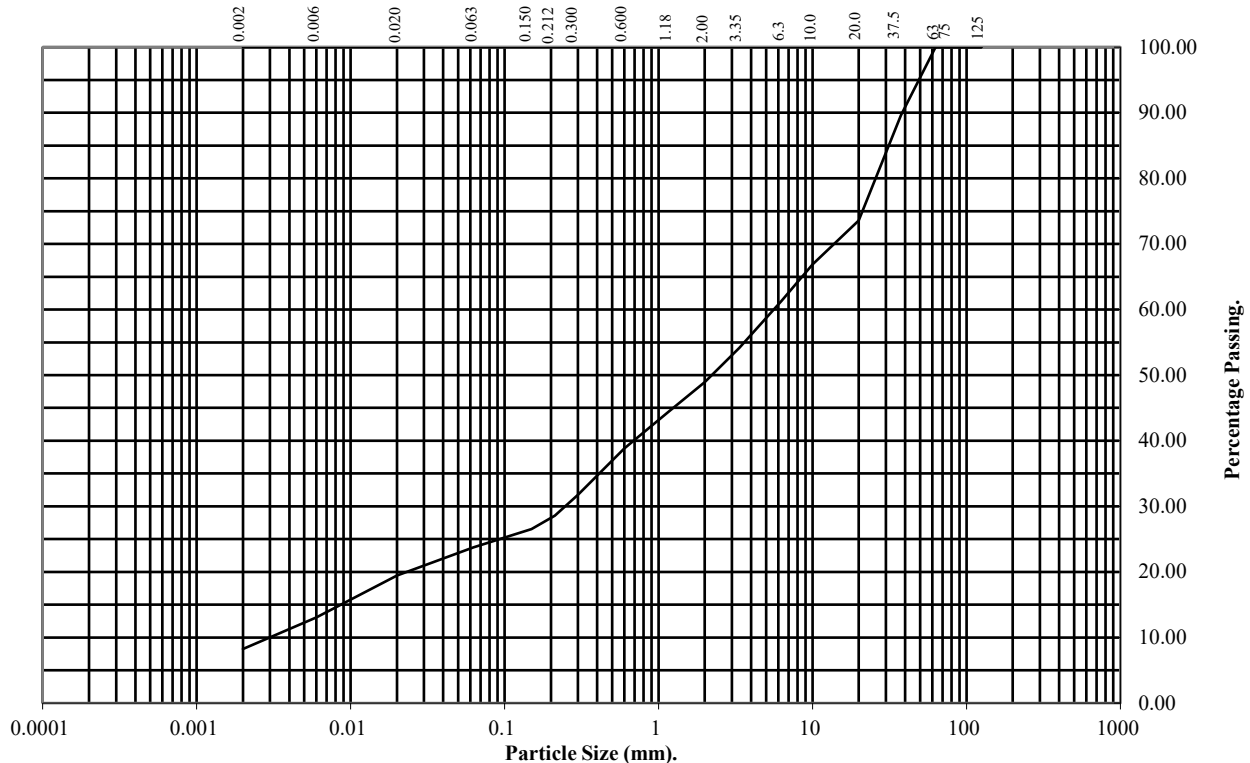
Hole Number: TP116

Top Depth (m): 2.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	90
20	74
10	67
6.3	61
3.35	54
2	49
1.18	45
0.6	39
0.3	32
0.212	29
0.15	27
0.063	24

Particle Diameter	Percentage Passing
0.02	19
0.006	13
0.002	8

Soil Fraction	Total Percentage
Cobbles	0
Gravel	51
Sand	25
Silt	16
Clay	8

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

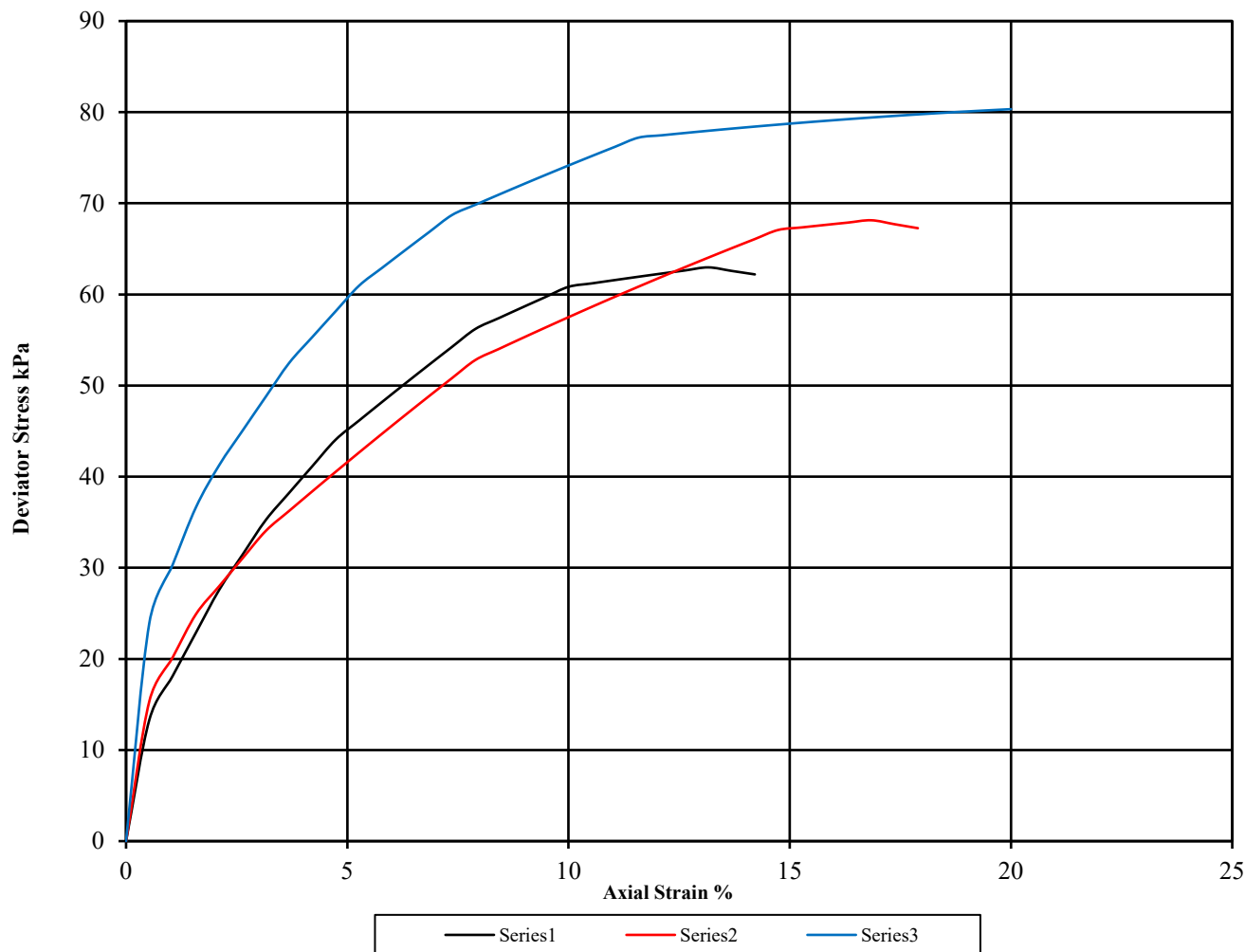
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: TP114 **Top Depth (m):** 1.00

Sample Number: **Base Depth (m):**

Sample Type: D



Diameter (mm):		Height (mm):		Test:		3x38mm Samples.				Remarks
Specimen	Specimen Depth	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	
1	1.00	28	1.89	1.47	20	63	31	13.2	Plastic	
2	1.00	27	1.90	1.49	80	68	34	16.8	Plastic	
3	1.00	28	1.89	1.48	160	80	40	20.0	Plastic	

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 9

Hole Number:

TP115

Top Depth (m):

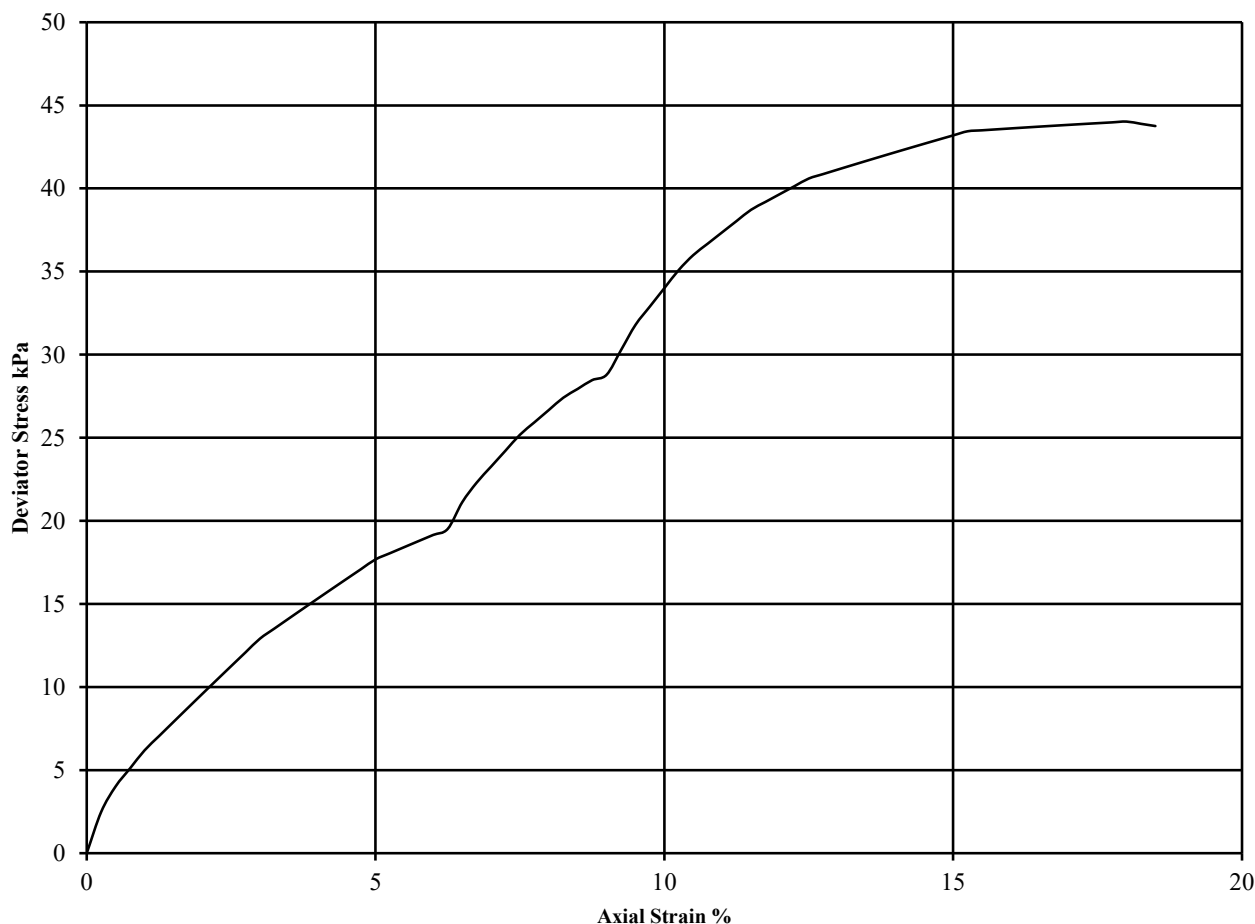
2.00

Sample Number:

Base Depth (m):

Sample Type

B



Diameter (mm):		Height (mm):			200	Test:	UU Multistage		Remarks
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Disturbed Sample Remoulded with 2.5kg effort Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick Membrane Correction applied (kPa) 0.37 0.36 0.34 See summary of soil descriptions
1	32	1.85	1.40	40	20	10	6.3		
				80	29	14	9.0		
				160	44	22	18.0	Plastic	



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8113

Client Ref:

C7806

CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

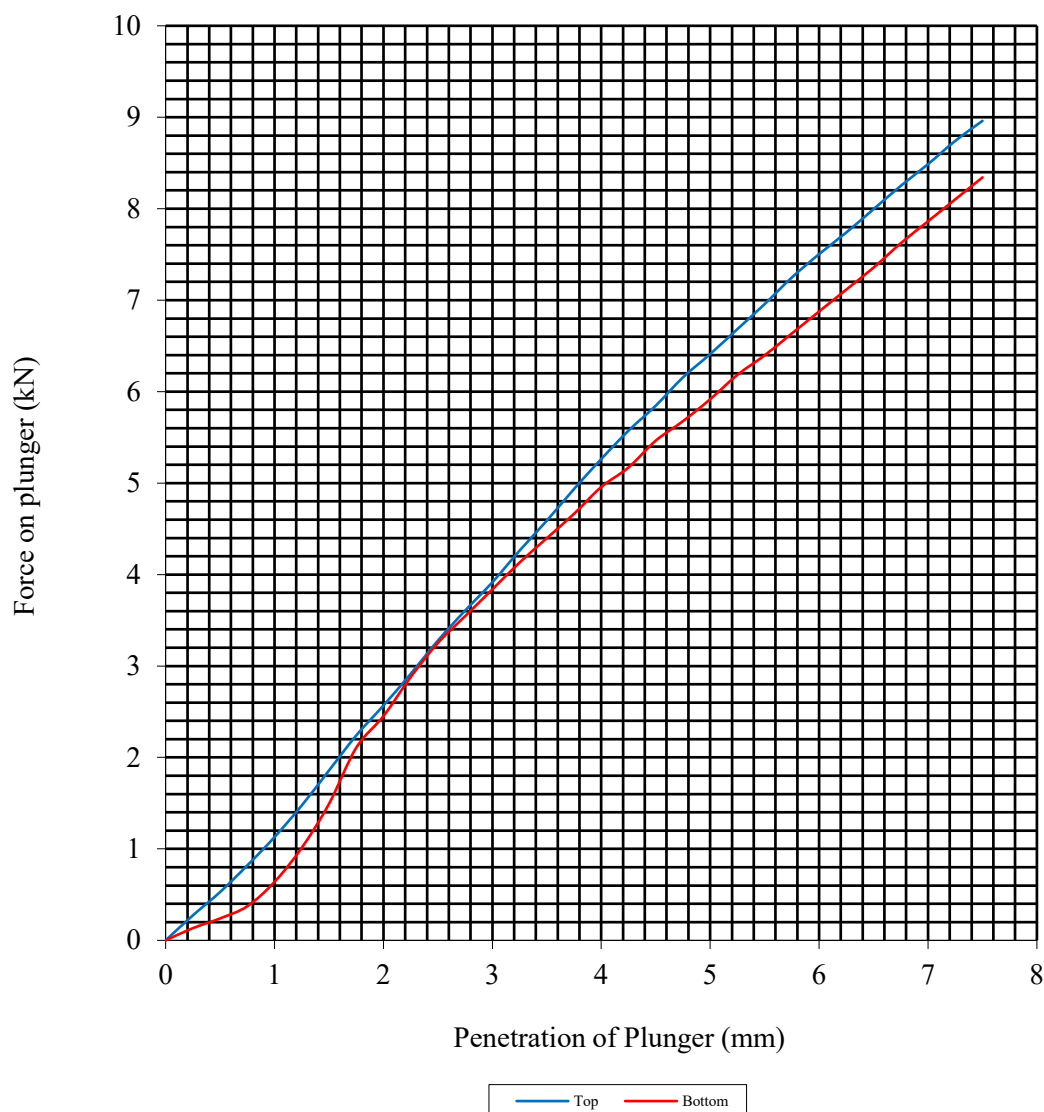
Hole Number: TP113

Top Depth (m): 1.00

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	13	Surcharge Kg:	4.00	Sample Top	13	Sample Top	32.1
Bulk Density Mg/m3:	2.13	Soaking Time hrs	0	Sample Bottom	13	Sample Bottom	29.6
Dry Density Mg/m3:	1.88	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		51					
Compaction Conditions		2.5kg					



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Contract No:
PSL22/8113
Client Ref:
C7806

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

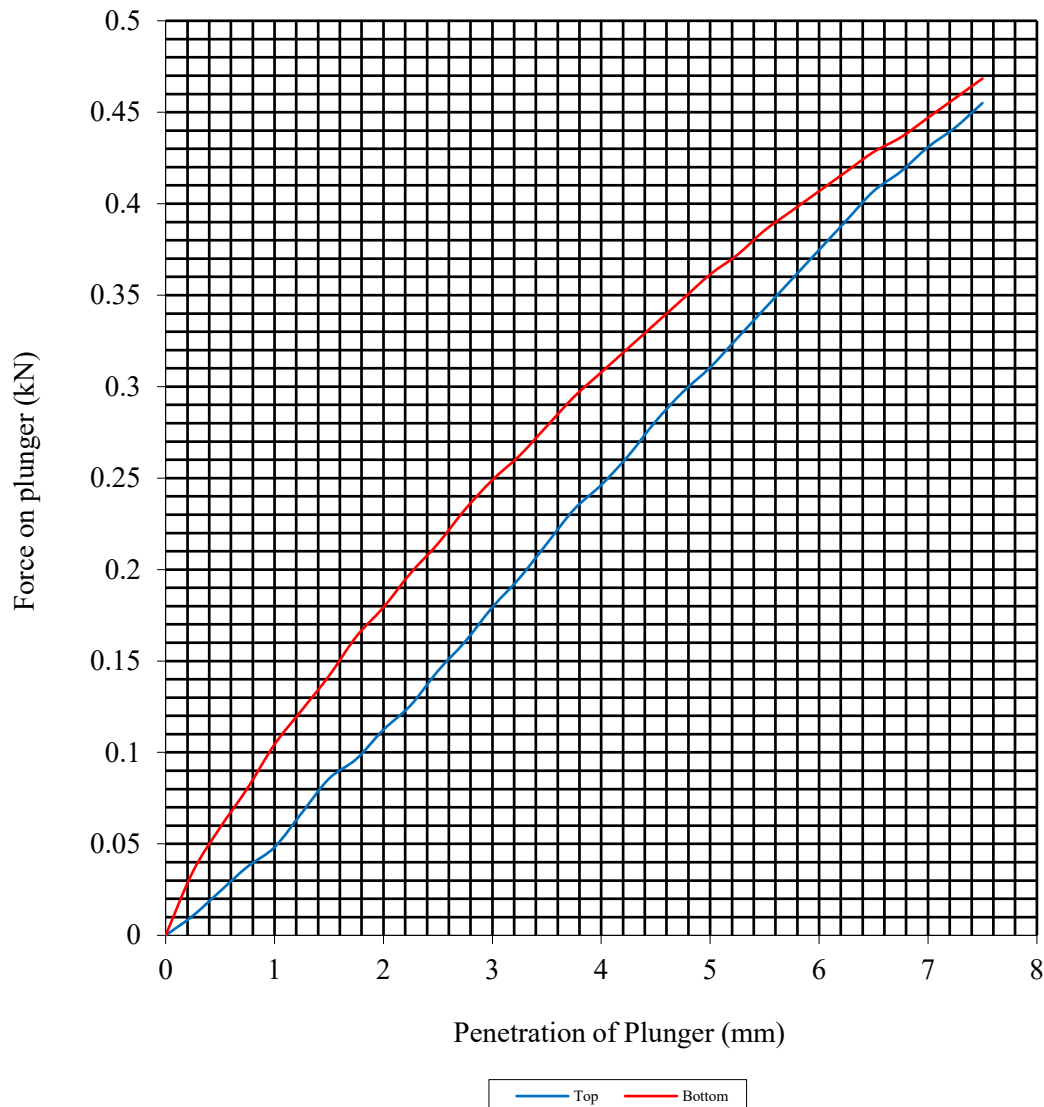
Hole Number: TP115

Top Depth (m): 0.50

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	27	Surcharge Kg:	4.00	Sample Top	27	Sample Top	1.6
Bulk Density Mg/m3:	1.94	Soaking Time hrs	0	Sample Bottom	27	Sample Bottom	1.8
Dry Density Mg/m3:	1.53	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		0					
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

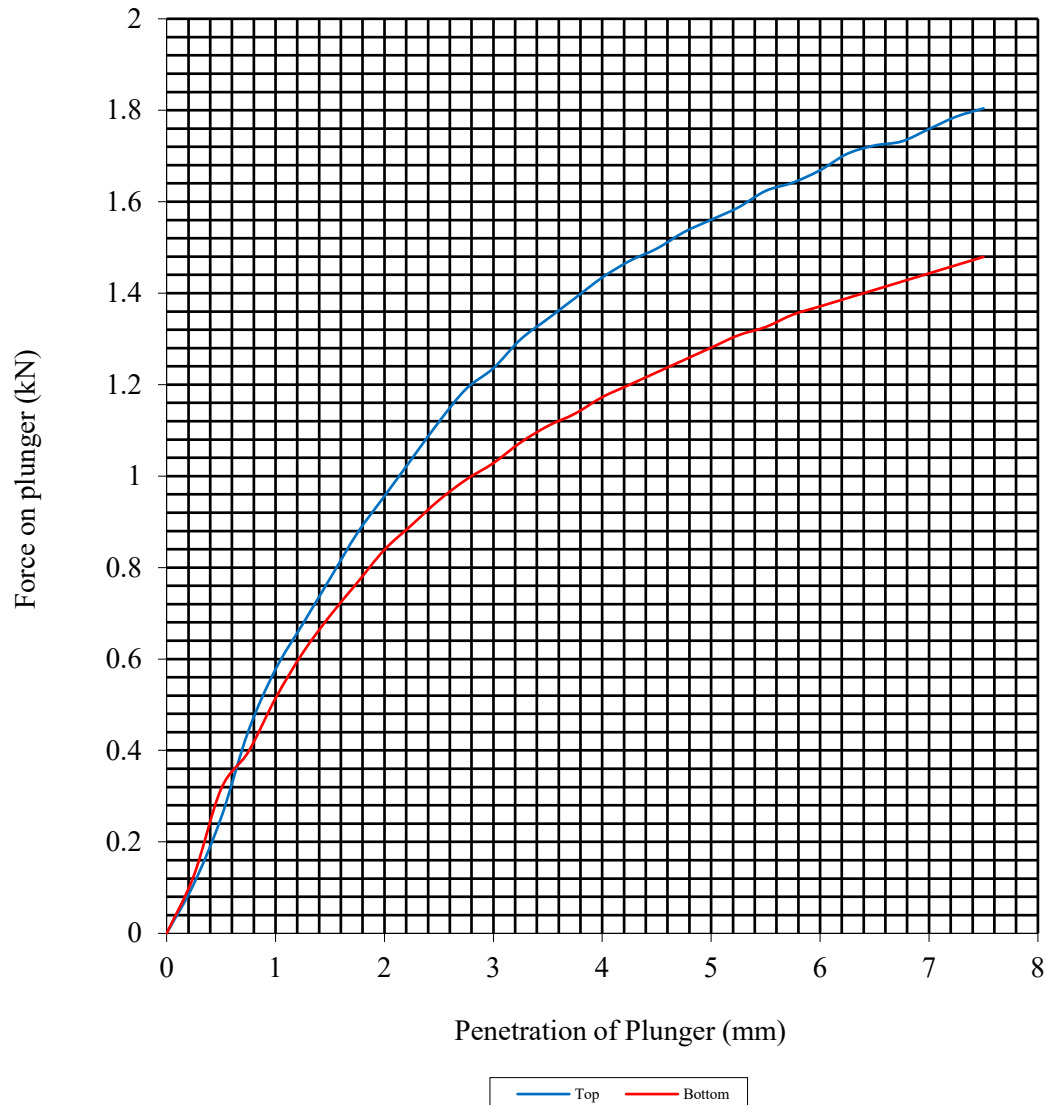
Hole Number: TP116

Top Depth (m): 0.50

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	27	Surcharge Kg:	4.00	Sample Top	27	Sample Top	8.5
Bulk Density Mg/m ³ :	1.91	Soaking Time hrs	0	Sample Bottom	27	Sample Bottom	7.2
Dry Density Mg/m ³ :	1.51	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8113
Client Ref:
C7806



ANALYTICAL TEST REPORT

Contract no: 117535

Contract name: St Nicholas WWTW

Client reference: PSL22/8113

Clients name: Professional Soils Laboratory

Clients address: 5/7 Hexthorpe Road
Doncaster
DN4 0AR

Samples received: 10 January 2023

Analysis started: 10 January 2023

Analysis completed: 16 January 2023

Report issued: 16 January 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

SOILS

Lab number			117535-1	117535-2	117535-3	117535-4	117535-5
Sample id			TP106	TP111	TP113	TP115	TP116
Depth (m)			1.00	0.50	0.50	0.20	0.50
Sample Type			B	B	B	D	B
Date sampled			-	-	-	-	-
Test	Method	Units					
pH	CE004 ^U	units	8.1	7.1	8.4	7.7	8.1
Magnesium (2:1 water soluble)	CE061	mg/l Mg	10	7.7	27	25	7.7
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	2.9	1.6	6.4	5.0	4.0
Nitrate (2:1 water soluble)	CE049 ^U	mg/l NO ₃	<1	<1	5.6	19	3.3
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	164	82	181	150	61
Sulphate (acid extractable)	CE062 ^U	mg/kg SO ₄	483	562	1081	1392	428
Sulphate (acid extractable)	CE062 ^U	% w/w SO ₄	0.05	0.06	0.11	0.14	0.04
Sulphur (total)	CE119	mg/kg S	189	286	491	771	276
Sulphur (total)	CE119	% w/w S	0.02	0.03	0.05	0.08	0.03

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Magnesium (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		1	mg/l Mg
CE049	Chloride (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l Cl
CE049	Nitrate (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l NO ₃
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	100	mg/kg SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	0.01	% w/w SO ₄
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		100	mg/kg S
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		0.01	% w/w S

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
117535-1	TP106	1.00	Y	All (NSD)
117535-2	TP111	0.50	Y	All (NSD)
117535-3	TP113	0.50	Y	All (NSD)
117535-4	TP115	0.20	Y	All (NSD)
117535-5	TP116	0.50	Y	All (NSD)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones, where applicable.



LABORATORY REPORT



4043

Contract Number: PSL22/8116

Report Date: 16 January 2023

Client's Reference: C7806

Client Name: CC Ground Investigations Ltd
Unit A2 Innsworth Technology Park.
Innsworth Lane
Gloucester
GL3 1DL

For the attention of: Kelly Spear

Contract Title: St Nicholas WWTW

Date Received: 21/12/2022

Date Commenced: 21/12/2022

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

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)

M Fennell
(Senior Technician)

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Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rberriman@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH103		B	1.00		Brown sandy CLAY.
BH103		UT100	1.20	1.65	Brown slightly sandy CLAY.
BH103		B	2.20	3.10	Brown sandy clayey GRAVEL with cobbles.
BH103		B	5.20	6.40	Brown very gravelly sandy CLAY.
BH104		B	1.00		Brown mottled grey gravelly CLAY.
BH104		B	1.50	2.00	Brown mottled grey CLAY.
BH104		D	2.00	2.20	Brown mottled grey slightly sandy CLAY.
BH104		UT100	2.20	2.65	Brown mottled grey slightly sandy CLAY.
BH104		B	5.90	6.60	Brown very sandy silty GRAVEL with many cobbles.
BH105		B	0.50		Brown slightly sandy silty CLAY.
BH105		D	2.00	2.10	Brown very gravelly sandy CLAY.



4043

PSL

Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8116

Client Ref:

C7806

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

St Nicholas WWTW

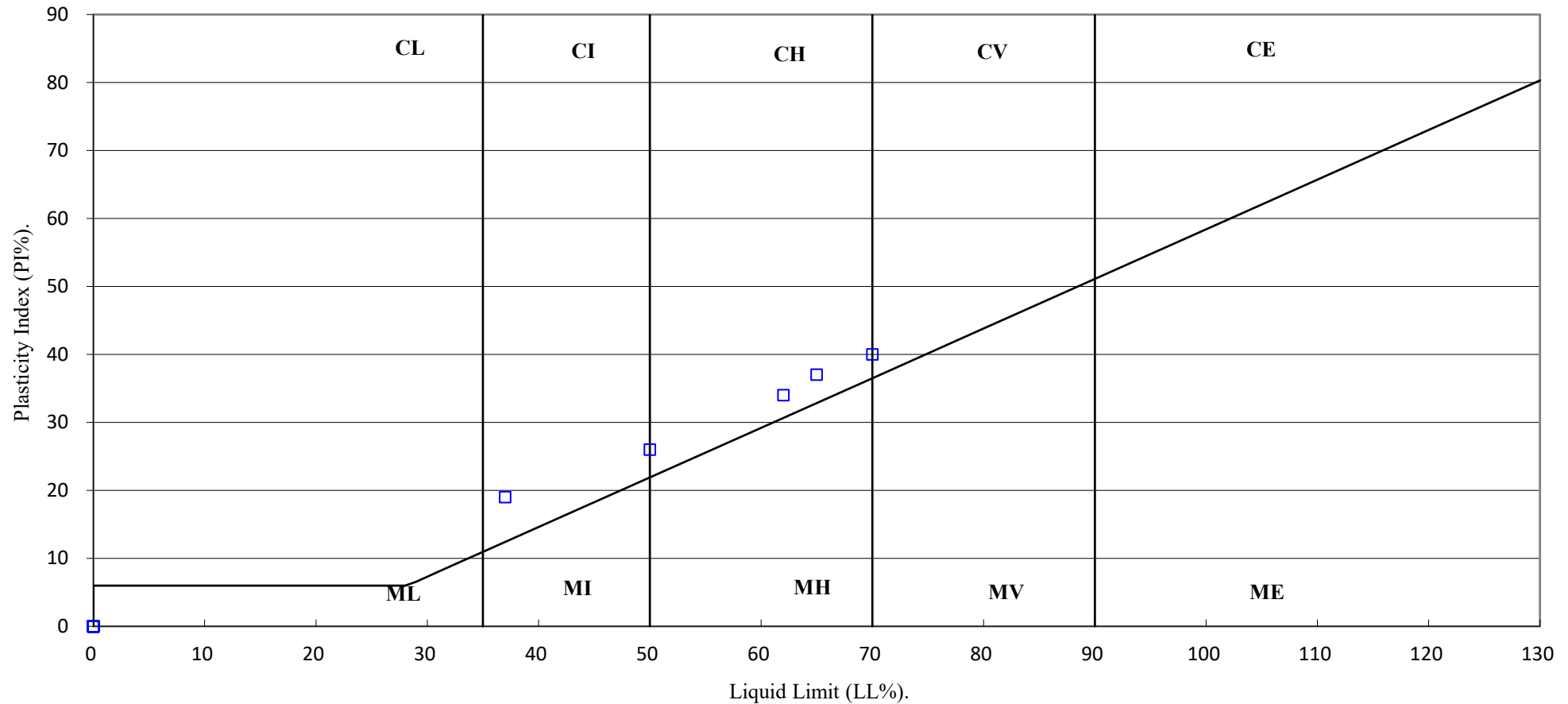
Contract No:

PSL22/8116

Client Ref:

C7806

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8116

Client Ref:

C7806

SUMMARY OF LABORATORY HAND VANES

(BS1377 : PART 7 : 1990)

[illegible]

* This test is out of our UKAS scope



St Nicholas WWTW

Contract No:

PSL22/8116

Client Ref:

C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

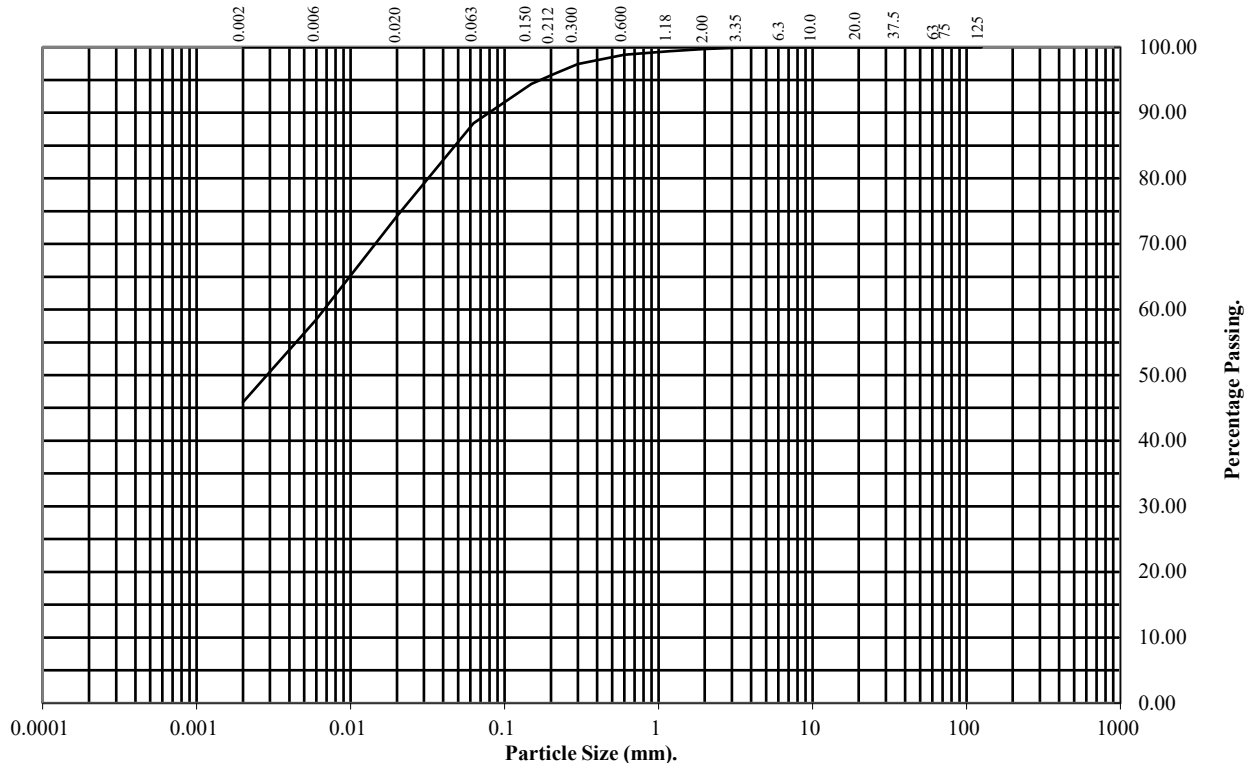
Hole Number: BH103

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	99
0.3	97
0.212	96
0.15	94
0.063	88

Particle Diameter	Percentage Passing
0.02	74
0.006	58
0.002	46

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	12
Silt	42
Clay	46

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8116
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

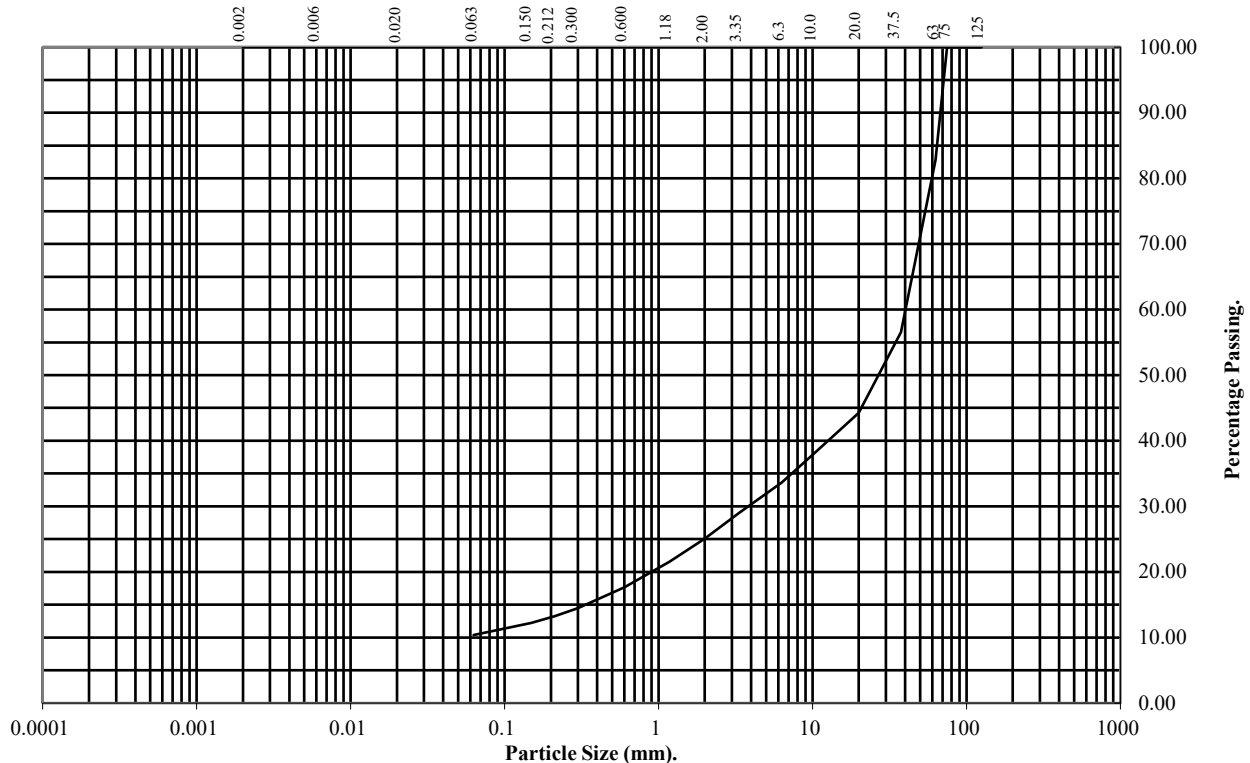
Hole Number: BH103

Top Depth (m): 2.20

Sample Number:

Base Depth(m): 3.10

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	83
37.5	57
20	44
10	38
6.3	34
3.35	29
2	25
1.18	22
0.6	18
0.3	14
0.212	13
0.15	12
0.063	10

Soil Fraction	Total Percentage
Cobbles	17
Gravel	58
Sand	15
Silt/Clay	10

Remarks:

See Summary of Soil Descriptions



PSL
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St Nicholas WWTW

Contract No:
PSL22/8116
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

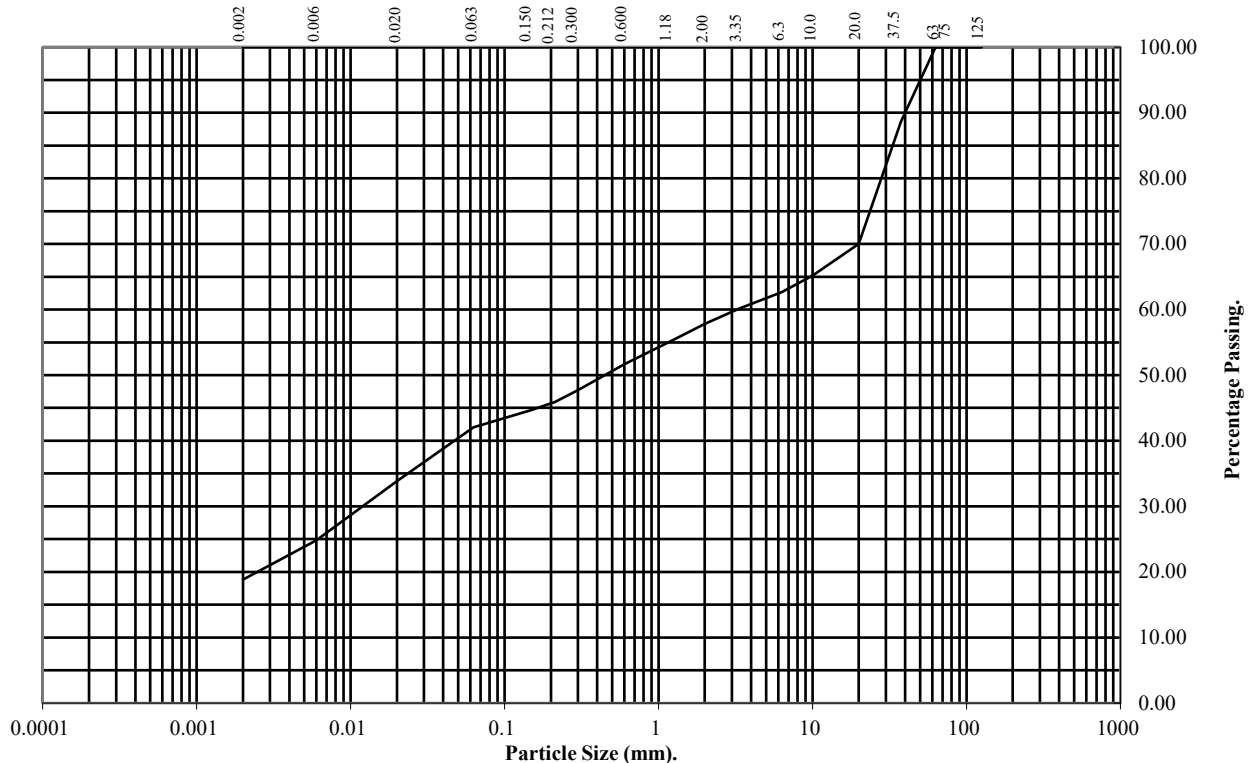
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH103 Top Depth (m): 5.20

Sample Number: Base Depth(m): 6.40

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	89
20	70
10	65
6.3	63
3.35	60
2	58
1.18	55
0.6	52
0.3	48
0.212	46
0.15	45
0.063	42

Particle Diameter	Percentage Passing
0.02	34
0.006	25
0.002	19

Soil Fraction	Total Percentage
Cobbles	0
Gravel	42
Sand	16
Silt	23
Clay	19

Remarks:

See Summary of Soil Descriptions



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St Nicholas WWTW

Contract No:
PSL22/8116
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

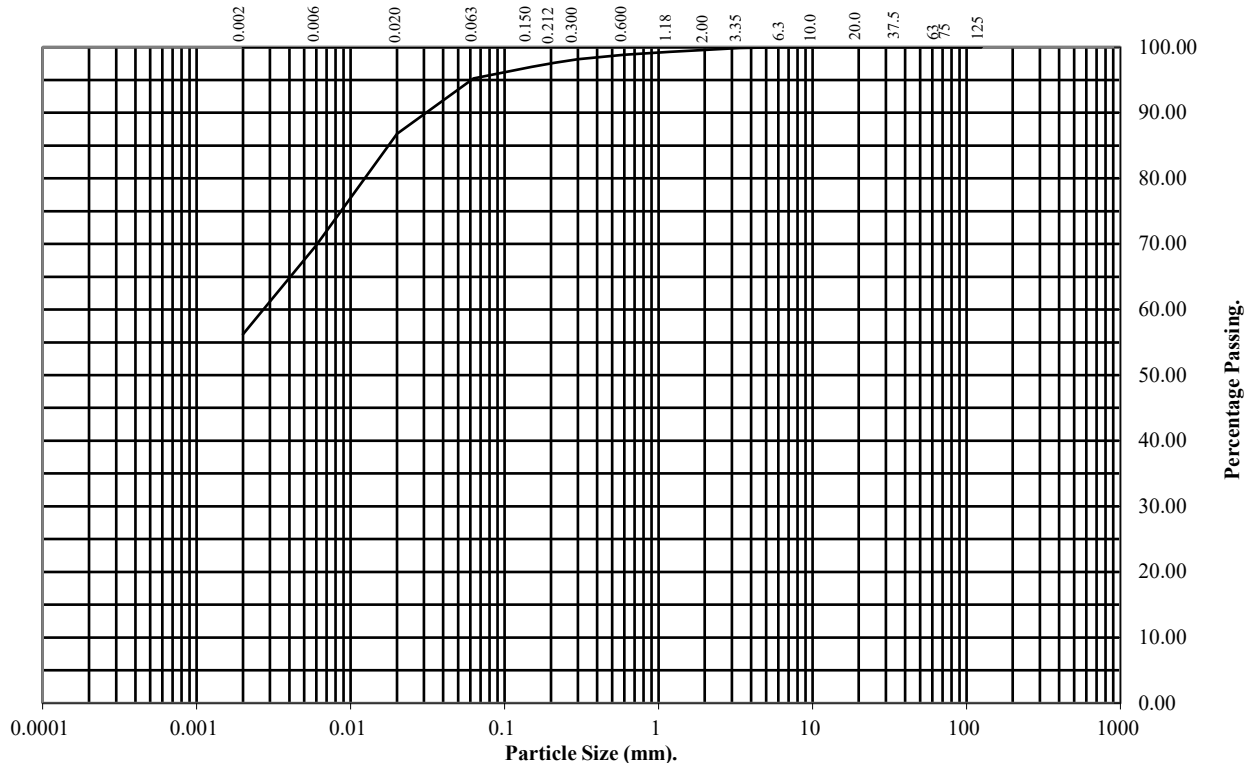
Hole Number: BH104

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	99
0.3	98
0.212	98
0.15	97
0.063	95

Particle Diameter	Percentage Passing
0.02	87
0.006	70
0.002	56

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	5
Silt	39
Clay	56

Remarks:

See Summary of Soil Descriptions



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St Nicholas WWTW

Contract No:
PSL22/8116
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

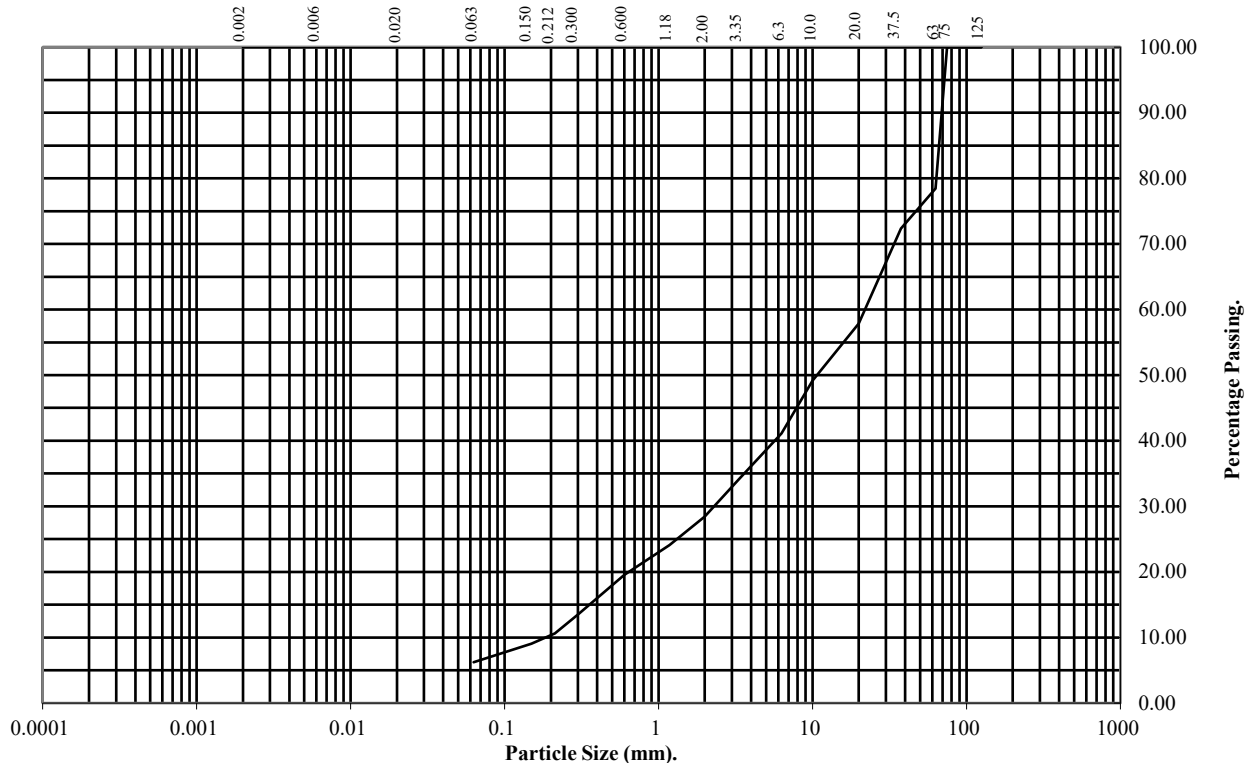
Hole Number: BH104

Top Depth (m): 5.90

Sample Number:

Base Depth(m): 6.60

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	78
37.5	72
20	58
10	49
6.3	41
3.35	34
2	28
1.18	24
0.6	20
0.3	14
0.212	11
0.15	9
0.063	6

Soil Fraction	Total Percentage
Cobbles	22
Gravel	50
Sand	22
Silt/Clay	6

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8116
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

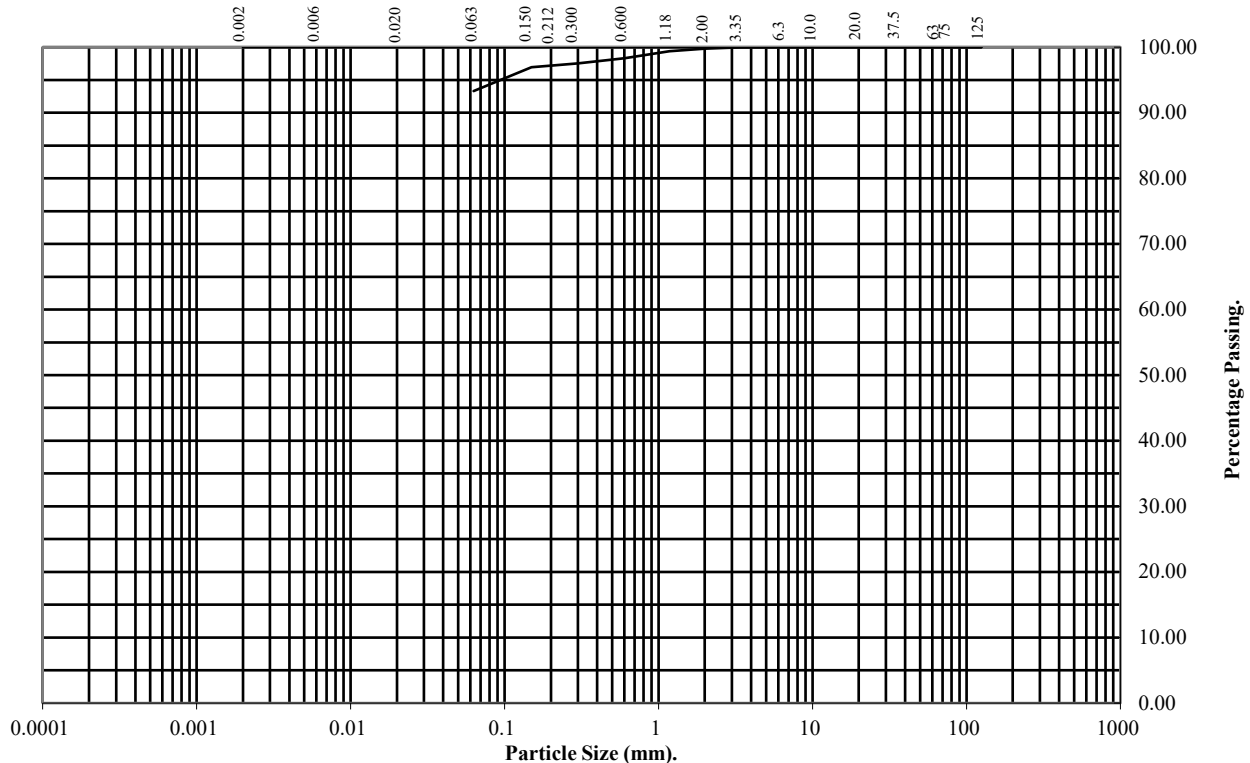
Hole Number: BH105

Top Depth (m): 0.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	98
0.3	98
0.212	97
0.15	97
0.063	93

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	7
Silt/Clay	93

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8116
Client Ref:
C7806

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

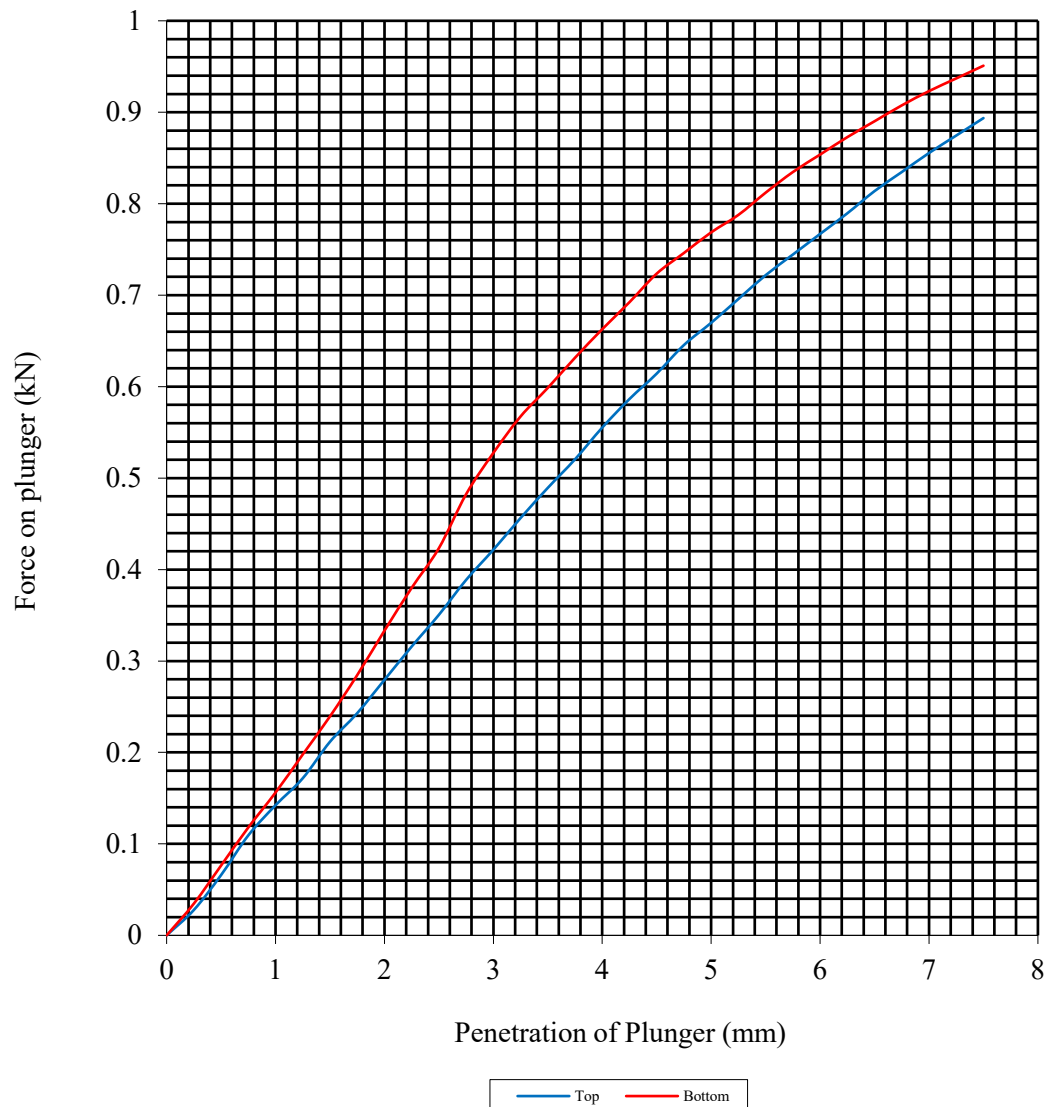
Hole Number: HP103

Top Depth (m): 1.00

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	21	Surcharge Kg:	4.20	Sample Top	21	Sample Top	3.3
Bulk Density Mg/m3:	2.05	Soaking Time hrs	0	Sample Bottom	21	Sample Bottom	3.8
Dry Density Mg/m3:	1.70	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		22					
Compaction Conditions		2.5kg					



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Contract No:
PSL22/8116
Client Ref:
C7806

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: BH103

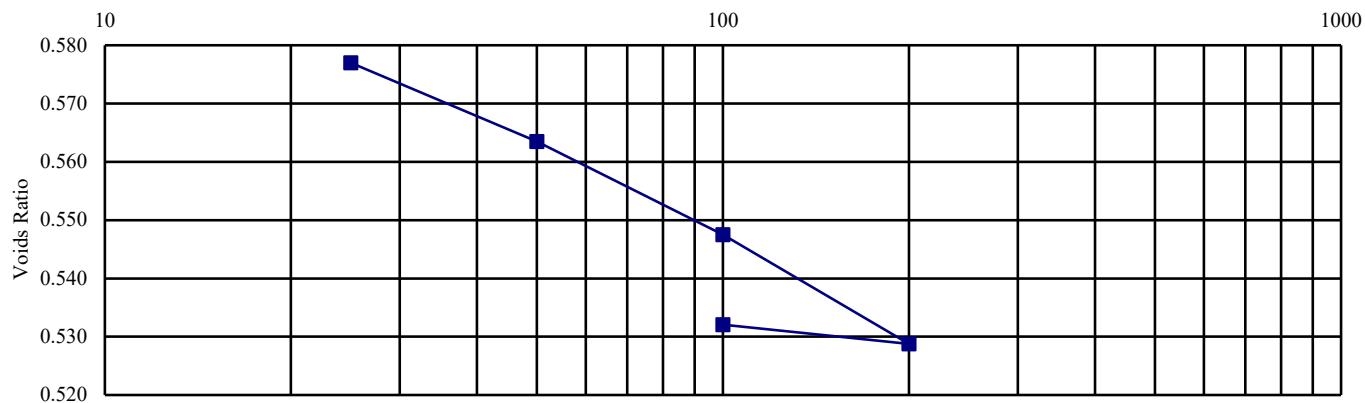
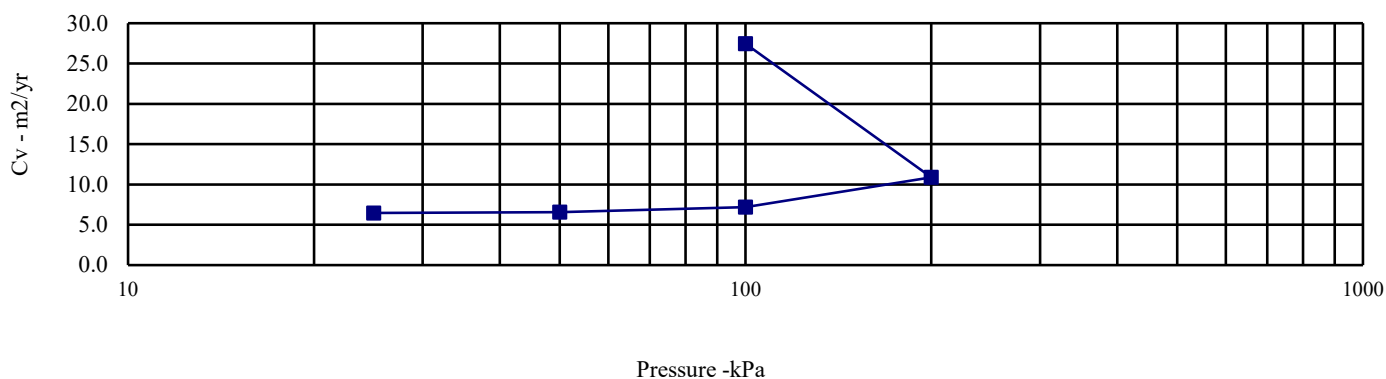
Top Depth (m): 1.20

Sample Number:

Base Depth (m) : 1.65

Sample Type: UT100

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	26	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	2.06	0	25	1.179	6.468	Method used to	
Dry Density (Mg/m3):	1.63	25	50	0.342	6.578	determine CV:	T90
Voids Ratio:	0.625	50	100	0.205	7.207	Nominal temperature	
Degree of saturation:	110.4	100	200	0.121	10.879	during test ' C:	20
Height (mm):	19.78	200	100	0.021	27.459	Remarks:	
Diameter (mm)	74.98					See summary of soil descriptions	
Particle Density (Mg/m3):	2.65						
Assumed							



St Nicholas WWTW

Contract No:
PSL22/8116
Client Ref:
C7806

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: BH104

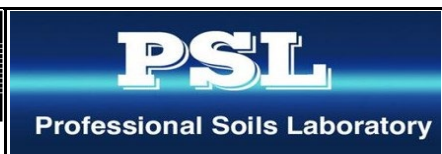
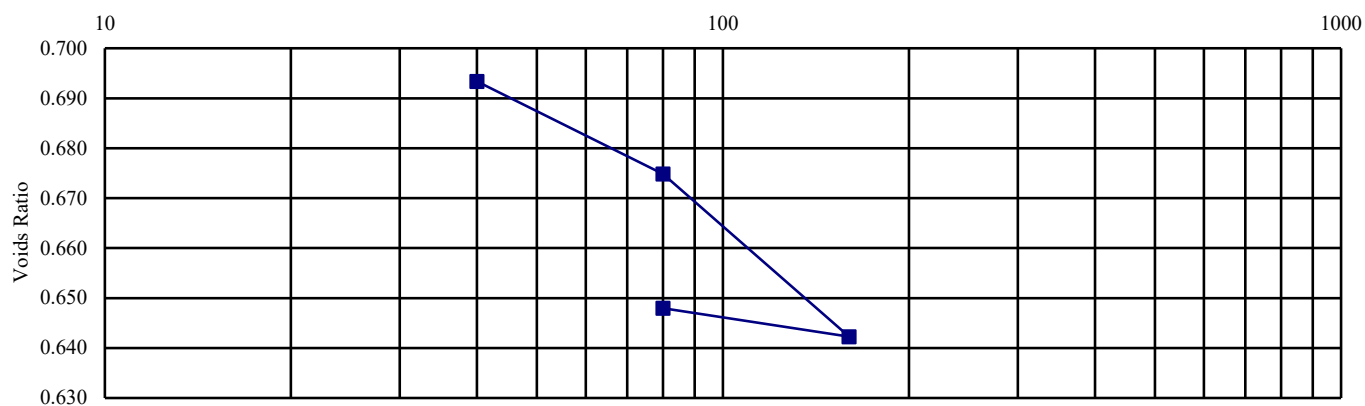
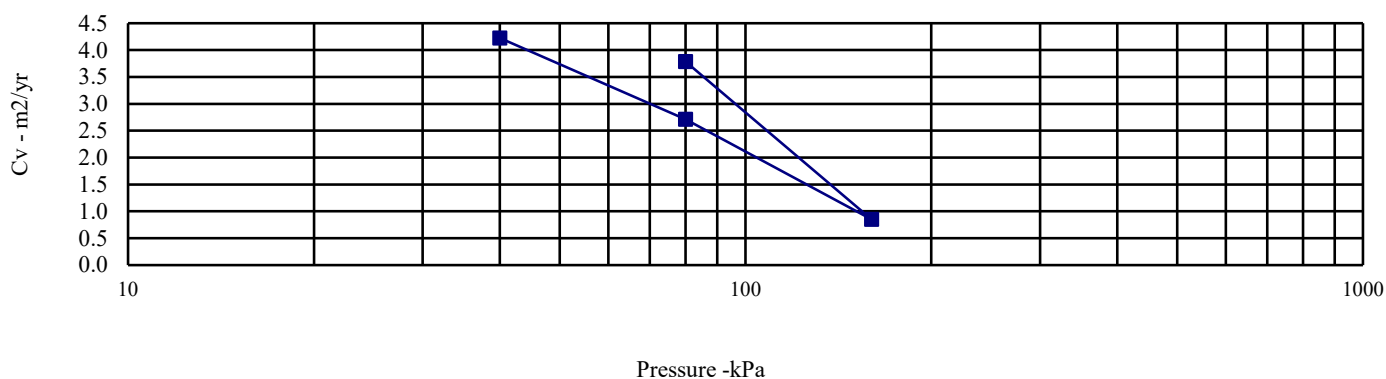
Top Depth (m): 2.20

Sample Number:

Base Depth (m) : 2.65

Sample Type: UT100

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	29	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	1.97	0	40	0.505	4.225	Method used to	
Dry Density (Mg/m3):	1.53	40	80	0.274	2.710	determine CV:	T90
Voids Ratio:	0.728	80	160	0.243	0.851	Nominal temperature	
Degree of saturation:	103.8	160	80	0.043	3.789	during test ' C:	20
Height (mm):	20.13	Remarks: See summary of soil descriptions					
Diameter (mm)	75.05						
Particle Density (Mg/m3):	2.65						
Assumed							



St Nicholas WWTW

Contract No:
PSL22/8116
Client Ref:
C7806

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 _c ²	D _c (mm)	Failure Load (P)		I _s (MPa)	Corr Fac F	I _{s50} (MPa)	Failure Type	Remarks
					W	D				(Mpa)	(kN)					
BH103	7.60		A	Perp	90	66	5940	7563.04	86.97	-	28.36	3.75	1.283	4.81	Valid	
BH103	9.72		A	Perp	90	48	4320	5500.39	74.16	-	7.24	1.32	1.194	1.57	Valid	
BH103	12.20		A	Perp	90	85	7650	9740.28	98.69	-	20.84	2.14	1.358	2.91	Valid	
BH103	13.65		A	Perp	90	48	4320	5500.39	74.16	-	8.22	1.49	1.194	1.78	Valid	
BH104	7.13		A	Perp	90	84	7560	9625.69	98.11	-	7.26	0.75	1.354	1.02	Valid	
BH104	9.37		A	Perp	90	80	7200	9167.32	95.75	-	7.44	0.81	1.340	1.09	Valid	
BH104	10.95		A	Perp	90	67	6030	7677.63	87.62	-	9.27	1.21	1.287	1.55	Valid	
BH104	12.80		A	Perp	90	47	4230	5385.80	73.39	-	9.91	1.84	1.188	2.19	Valid	
BH104	14.62		A	Perp	90	83	7470	9511.10	97.52	-	5.91	0.62	1.351	0.84	Valid	
BH105	3.40		A	Perp	90	55	4950	6302.54	79.39	-	7.01	1.11	1.231	1.37	Valid	
BH105	4.19		A	Perp	90	68	6120	7792.23	88.27	-	10.99	1.41	1.291	1.82	Valid	
BH105	5.14		A	Perp	90	56	5040	6417.13	80.11	-	4.91	0.77	1.236	0.95	Valid	
BH105	7.51		A	Perp	90	55	4950	6302.54	79.39	-	10.11	1.60	1.231	1.98	Valid	
BH105	6.90		A	Perp	80	41	3280	4176.23	64.62	-	42.27	10.12	1.122	11.36	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		St Nicholas WWTW	Contract No:
			PSL22/8116
			Client Ref:
			C7806

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)					
BH103	7.60		D	Par	-	90	8100	90.00	-	25.27	3.120	1.303	4.06	Valid	
BH103	9.72		D	Par	-	90	8100	90.00	-	6.81	0.841	1.303	1.10	Valid	
BH103	12.20		D	Par	-	90	8100	90.00	-	21.98	2.714	1.303	3.54	Valid	
BH103	13.65		D	Par	-	90	8100	90.00	-	7.41	0.915	1.303	1.19	Valid	
BH104	7.13		D	Par	-	90	8100	90.00	-	8.62	1.064	1.303	1.39	Valid	
BH104	9.37		D	Par	-	90	8100	90.00	-	6.82	0.842	1.303	1.10	Valid	
BH104	10.95		D	Par	-	90	8100	90.00	-	8.11	1.001	1.303	1.30	Valid	
BH104	12.80		D	Par	-	90	8100	90.00	-	9.02	1.114	1.303	1.45	Valid	
BH104	14.62		D	Par	-	90	8100	90.00	-	22.30	2.753	1.303	3.59	Valid	
BH105	3.40		D	Par	-	90	8100	90.00	-	5.89	0.727	1.303	0.95	Valid	
BH105	4.19		D	Par	-	90	8100	90.00	-	6.71	0.828	1.303	1.08	Valid	
BH105	5.14		D	Par	-	90	8100	90.00	-	4.99	0.616	1.303	0.80	Valid	
BH105	7.51		D	Par	-	90	8100	90.00	-	8.61	1.063	1.303	1.38	Valid	
BH105	6.90		D	Par	-	80	6400	80.00	-	33.52	5.238	1.236	6.47	Valid	

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

Par = parallel, Perp = perpendicular, U = Random



St Nicholas WWTW

Contract No:

PSL22/8116

Client Ref:

C7806

DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

[illegible]

St Nicholas WWTW

Contract No:

PSL22/8116

Client Ref:

C7806



ANALYTICAL TEST REPORT

Contract no: 117529

Contract name: St Nicholas WWTW

Client reference: PSL22/8116

Clients name: Professional Soils Laboratory

Clients address: 5/7 Hexthorpe Road
Doncaster
DN4 0AR

Samples received: 10 January 2023

Analysis started: 10 January 2023

Analysis completed: 16 January 2023

Report issued: 16 January 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

SOILS

Lab number			117529-1	117529-2
Sample id			BH104	HP101
Depth (m)			1.20-1.65	0.50
Sample Type			SPT	B
Date sampled			-	-
Test	Method	Units		
pH	CE004 ^U	units	8.2	7.9
Magnesium (2:1 water soluble)	CE061	mg/l Mg	14	6.4
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	27	2.8
Nitrate (2:1 water soluble)	CE049 ^U	mg/l NO ₃	32	<1
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	30	18
Sulphate (acid extractable)	CE062 ^U	mg/kg SO ₄	866	279
Sulphate (acid extractable)	CE062 ^U	% w/w SO ₄	0.09	0.03
Sulphur (total)	CE119	mg/kg S	535	161
Sulphur (total)	CE119	% w/w S	0.05	0.02

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Magnesium (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		1	mg/l Mg
CE049	Chloride (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l Cl
CE049	Nitrate (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l NO ₃
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	100	mg/kg SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	0.01	% w/w SO ₄
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		100	mg/kg S
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		0.01	% w/w S

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
117529-1	BH104	1.20-1.65	Y	All (NSD)
117529-2	HP101	0.50	Y	All (NSD)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones, where applicable.



LABORATORY REPORT



4043

Contract Number: PSL22/8117

Report Date: 24 January 2023
Client's Reference: C7806
Client Name: CC Ground Investigations Ltd
Unit A2 Innsworth Technology Park.
Innsworth Lane
Gloucester
GL3 1DL

For the attention of: Kelly Spear

Contract Title: St Nicholas WWTW
Date Received: 21/12/2022
Date Commenced: 21/12/2022
Date Completed: 18/1/2023

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:


A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Senior Technician)

S Eyre
(Senior Technician)


T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
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e-mail: awatkins@prosoils.co.uk
rberriman@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8117

Client Ref:

C7806

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

St Nicholas WWTW

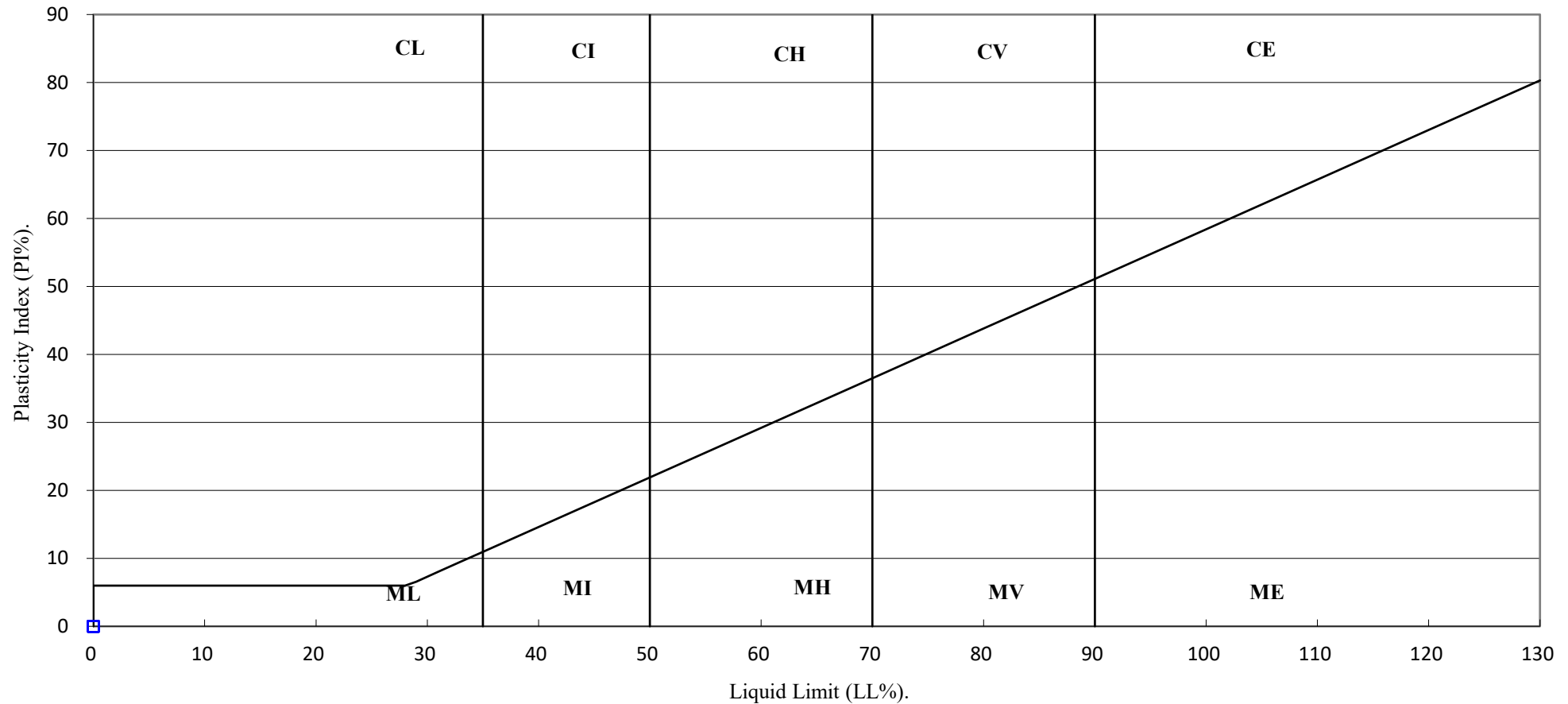
Contract No:

PSL22/8117

Client Ref:

C7806

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8117

Client Ref:

C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

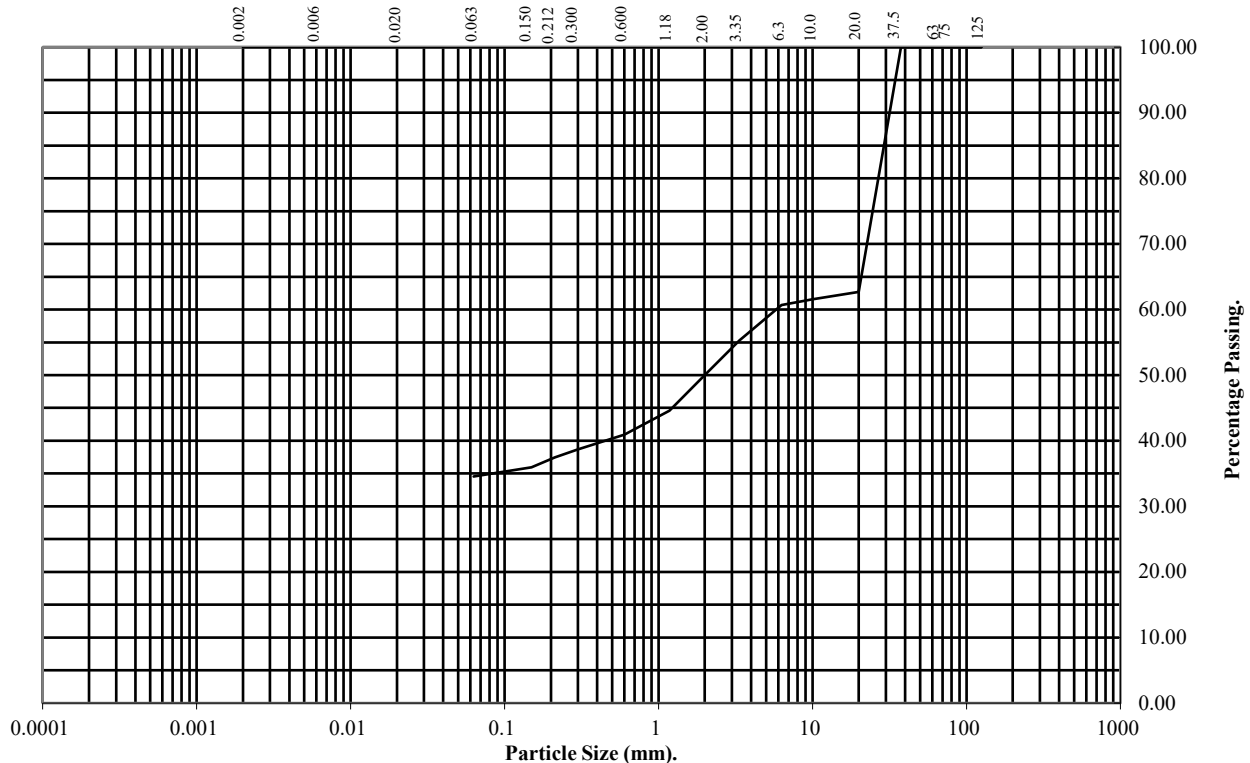
Hole Number: BH102

Top Depth (m): 0.75

Sample Number:

Base Depth(m): 1.30

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	63
10	62
6.3	61
3.35	55
2	50
1.18	45
0.6	41
0.3	39
0.212	37
0.15	36
0.063	35

Soil Fraction	Total Percentage
Cobbles	0
Gravel	50
Sand	15
Silt/Clay	35

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8117
Client Ref:
C7806

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

[illegible]

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

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



St Nicholas WWTW

Contract No:

PSL22/8117

Client Ref:

C7806

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

[illegible]

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

Par = parallel, Perp = perpendicular, U = Random



St Nicholas WWTW

Contract No:

PSL22/8117

Client Ref:

C7806

DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

[illegible]

St Nicholas WWTW

Contract No:

PSL22/8117

Client Ref:

C7806



TEST AMENDMENT NOTICE

(Please tick boxes as appropriate)

From: Jay Stringer

To:

Date: 13/1/2022

Laboratory Ref: PSL22/8117

Contract Number:

Location:

☒ BH ☐ TP Sample Number

Depth (m): 3.38

Sample Type: ☐ U ☐ B ☐ D ☐ W ☐ P ☒ C

Test/s:

QUT

The above sample cannot be tested for the following reasons:

- ☐ The Sample has not been received
- ☐ There is insufficient material for BS1377: 1990 testing
 - Maximum Grain Size (Minimum 10%): ☐ Fine ☐ Medium ☐ Coarse
 - Sample Mass (kg):
 - Required Mass (kg):

- ☐ The Sample has been previously tested.
- ☐ The Sample has been misplaced in the Laboratory.

☒ The Sample is unsuitable for testing because: ~~Sample~~ Unable to obtain Specimen more Suitable for UCS

Please advise action required:

- ☐ Perform original test on the following alternative Sample:
 - ☐ BH ☐ TP Sample Number: Depth (m):
 - Sample Type: ☐ U ☐ B ☐ D ☐ W ☐ P ☐ C
- ☐ Combine original Sample with the following sample:
 - ☐ BH ☐ TP Sample Number: Depth (m):
 - Sample Type: ☐ U ☐ B ☐ D ☐ W ☐ P ☐ C
- ☐ Perform the following alternative test/s on the original Sample
- ☐ Perform non-standard test on material available
- ☐ Take no further action.

Signed
(Project Engineer)

Date



ANALYTICAL TEST REPORT

Contract no: 117528

Contract name: St Nicholas WWTW

Client reference: PSL22/8117

Clients name: Professional Soils Laboratory

Clients address: 5/7 Hexthorpe Road
Doncaster
DN4 0AR

Samples received: 10 January 2023

Analysis started: 10 January 2023

Analysis completed: 16 January 2023

Report issued: 16 January 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

SOILS

Lab number			117528-1
Sample id			BH102
Depth (m)			0.75-1.30
Sample Type			B
Date sampled			-
Test	Method	Units	
pH	CE004 ^U	units	8.8
Magnesium (2:1 water soluble)	CE061	mg/l Mg	<1
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	7.7
Nitrate (2:1 water soluble)	CE049 ^U	mg/l NO ₃	<1
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	<10
Sulphate (acid extractable)	CE062 ^U	mg/kg SO ₄	730
Sulphate (acid extractable)	CE062 ^U	% w/w SO ₄	0.07
Sulphur (total)	CE119	mg/kg S	304
Sulphur (total)	CE119	% w/w S	0.03

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Magnesium (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		1	mg/l Mg
CE049	Chloride (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l Cl
CE049	Nitrate (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l NO ₃
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	100	mg/kg SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	0.01	% w/w SO ₄
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		100	mg/kg S
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		0.01	% w/w S

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
117528-1	BH102	0.75-1.30	Y	All (NSD)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones, where applicable.



LABORATORY REPORT



4043

Contract Number: PSL22/8115

Report Date: 18 January 2023
Client's Reference: C7806
Client Name: CC Ground Investigations Ltd
Unit A2 Innsworth Technology Park.
Innsworth Lane
Gloucester
GL3 1DL

For the attention of: Kelly Spear

Contract Title: St Nicholas WWTW
Date Received: 21/12/2022
Date Commenced: 21/12/2022
Date Completed: 18/1/2023

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)

T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
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awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8115

Client Ref:

C7806

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

St Nicholas WWTW

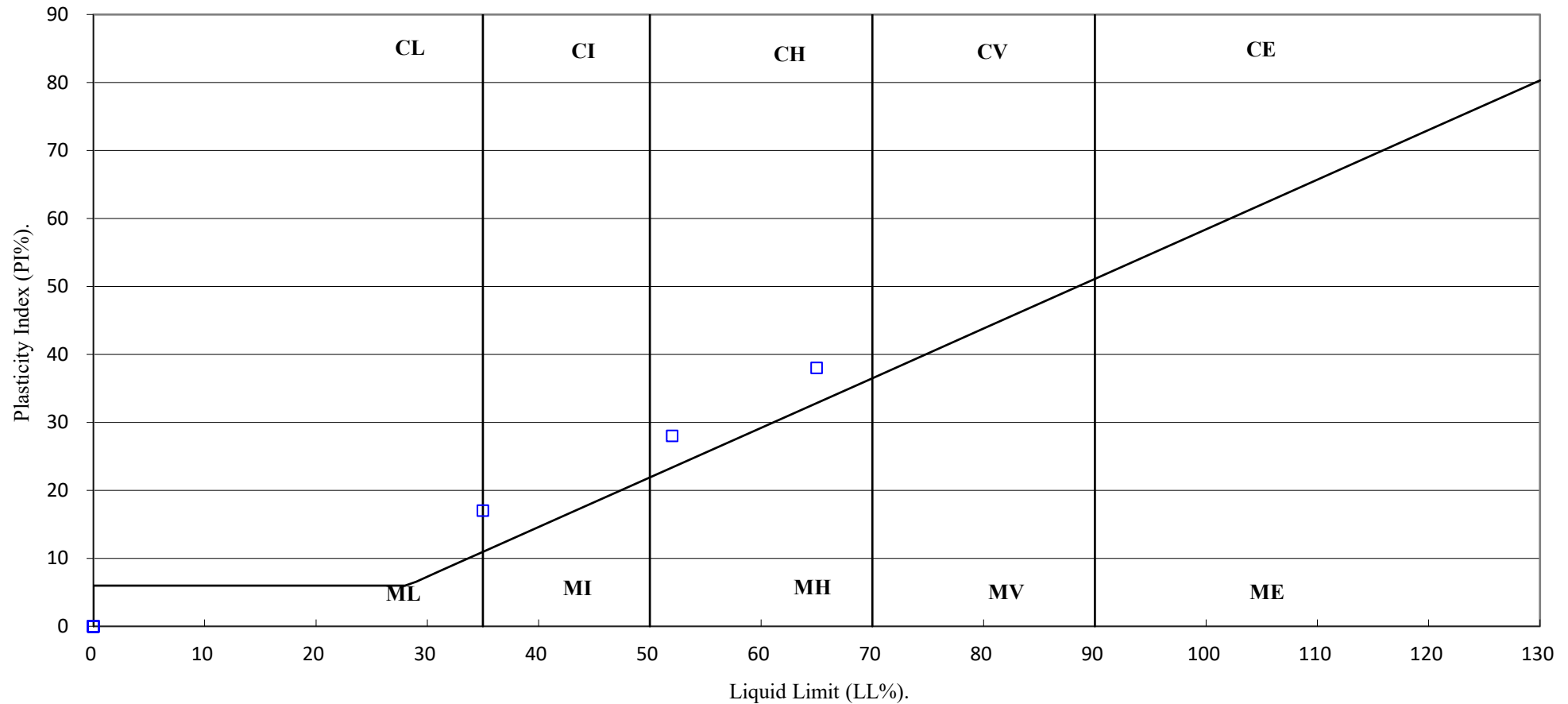
Contract No:

PSL22/8115

Client Ref:

C7806

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8115

Client Ref:

C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

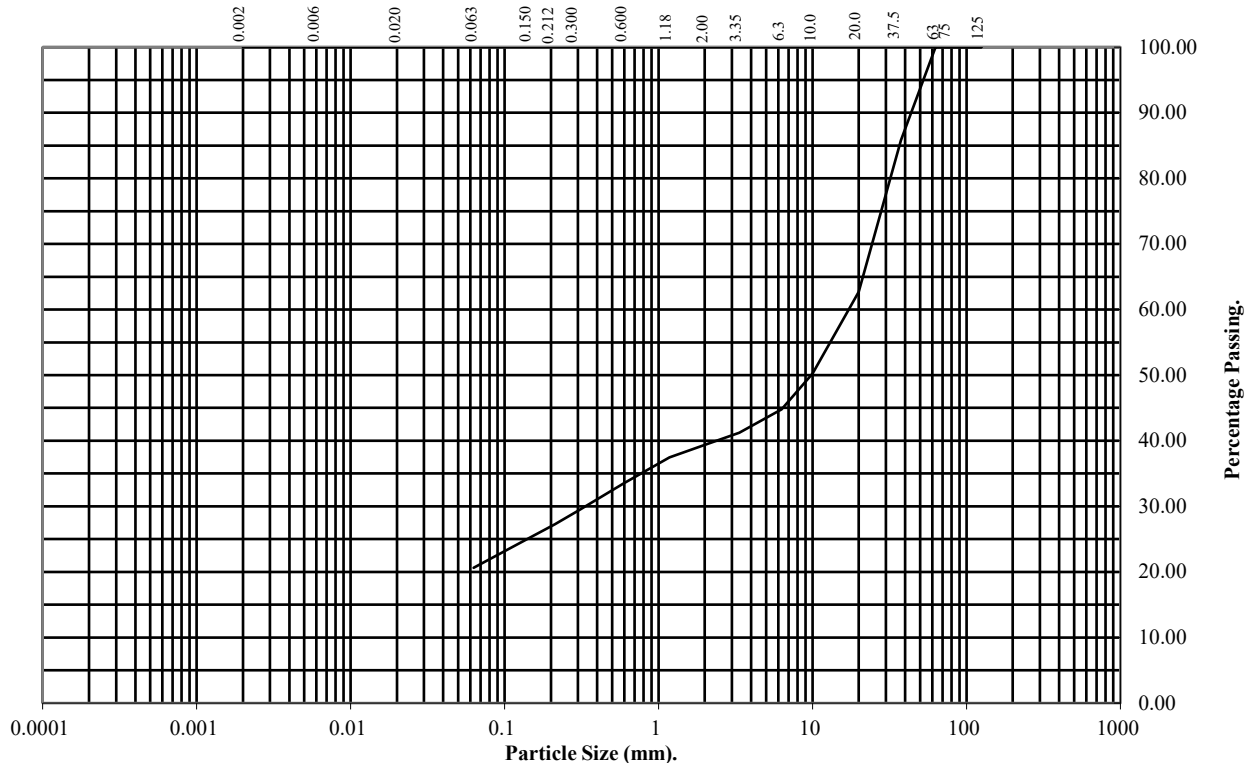
Hole Number: HP104

Top Depth (m): 0.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	86
20	63
10	50
6.3	45
3.35	41
2	39
1.18	37
0.6	34
0.3	29
0.212	27
0.15	25
0.063	21

Soil Fraction	Total Percentage
Cobbles	0
Gravel	61
Sand	18
Silt/Clay	21

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8115
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

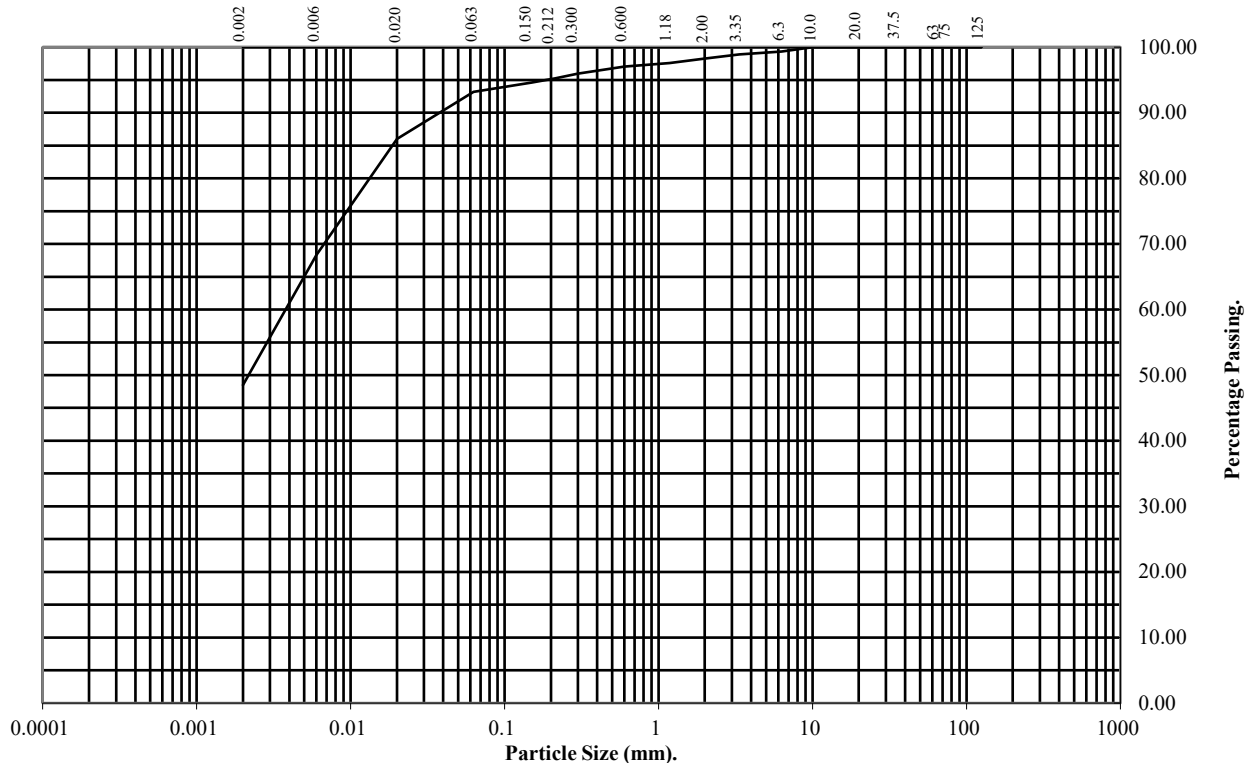
Hole Number: TP107

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	99
3.35	99
2	98
1.18	98
0.6	97
0.3	96
0.212	95
0.15	95
0.063	93

Particle Diameter	Percentage Passing
0.02	86
0.006	68
0.002	48

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	5
Silt	45
Clay	48

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8115
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

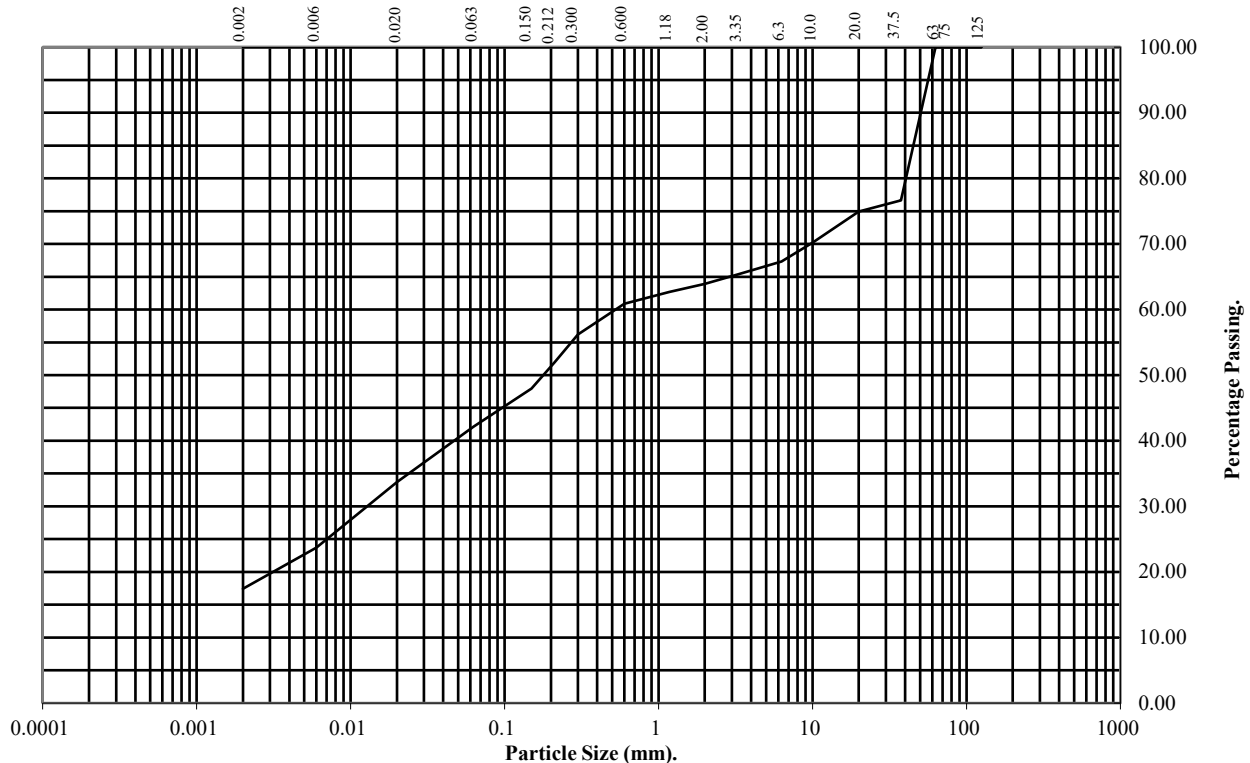
Hole Number: TP108

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	77
20	75
10	70
6.3	67
3.35	65
2	64
1.18	63
0.6	61
0.3	56
0.212	52
0.15	48
0.063	42

Particle Diameter	Percentage Passing
0.02	34
0.006	24
0.002	17

Soil Fraction	Total Percentage
Cobbles	0
Gravel	36
Sand	22
Silt	25
Clay	17

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8115
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

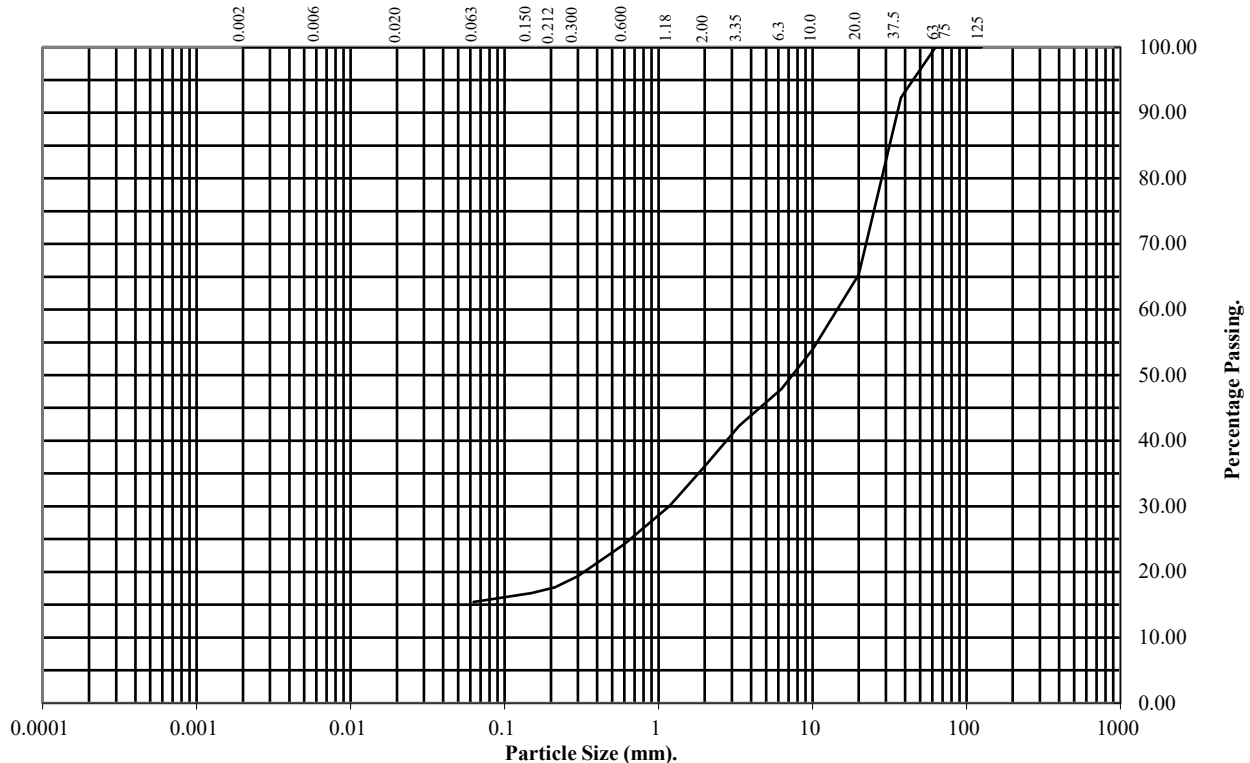
Hole Number: TP108

Top Depth (m): 3.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	92
20	65
10	54
6.3	48
3.35	42
2	36
1.18	30
0.6	24
0.3	19
0.212	18
0.15	17
0.063	15

Soil Fraction	Total Percentage
Cobbles	0
Gravel	64
Sand	21
Silt/Clay	15

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8115
Client Ref:
C7806

CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

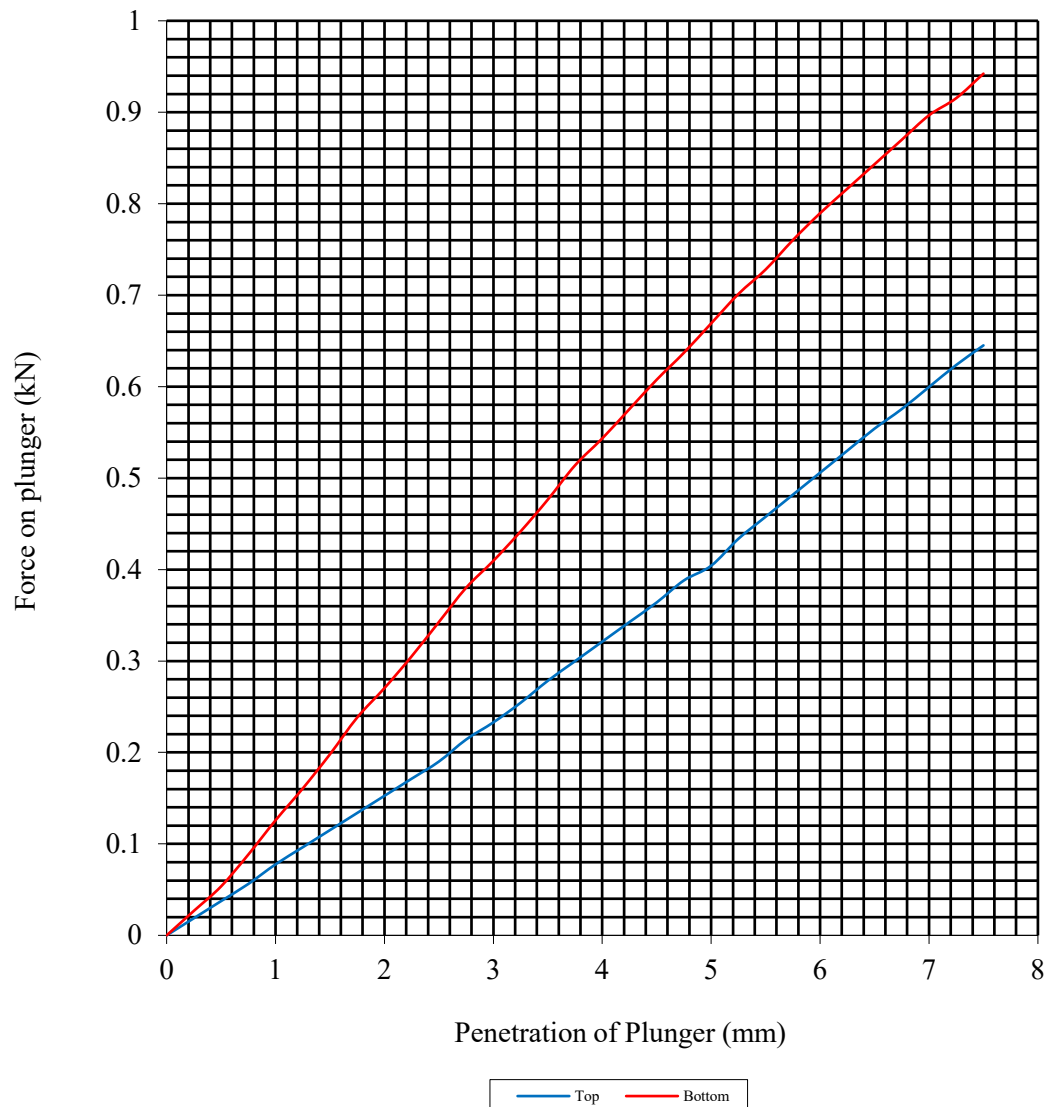
Hole Number: HP104

Top Depth (m): 0.50

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	19	Surcharge Kg:	4.20	Sample Top	19	Sample Top	2.0
Bulk Density Mg/m3:	2.04	Soaking Time hrs	0	Sample Bottom	19	Sample Bottom	3.3
Dry Density Mg/m3:	1.71	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		37					
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8115
Client Ref:
C7806

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

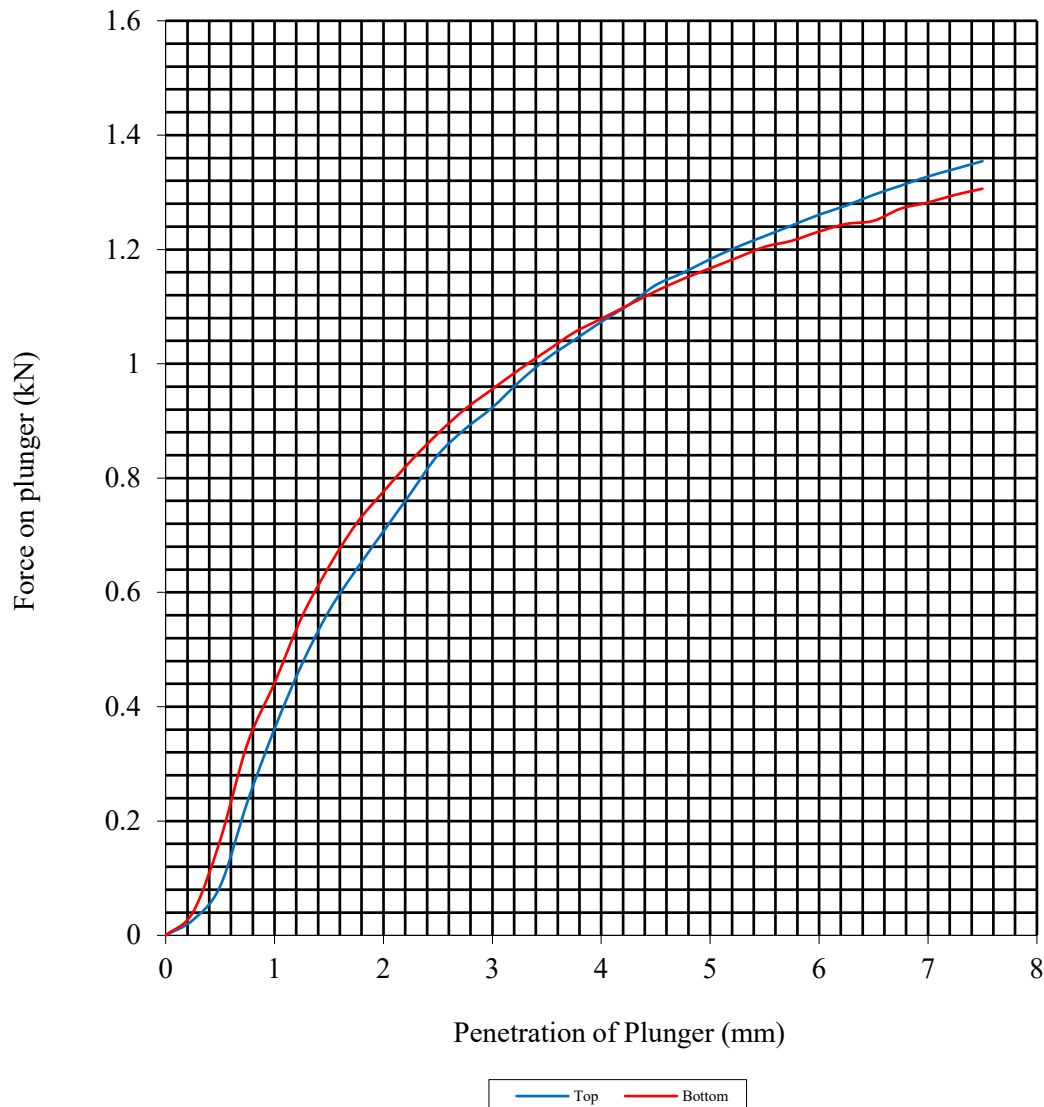
Hole Number: TP107

Top Depth (m): 1.00

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	29	Surcharge Kg:	4.20	Sample Top	29	Sample Top	6.4
Bulk Density Mg/m3:	1.91	Soaking Time hrs	0	Sample Bottom	29	Sample Bottom	6.7
Dry Density Mg/m3:	1.48	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		0					
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8115
Client Ref:
C7806

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

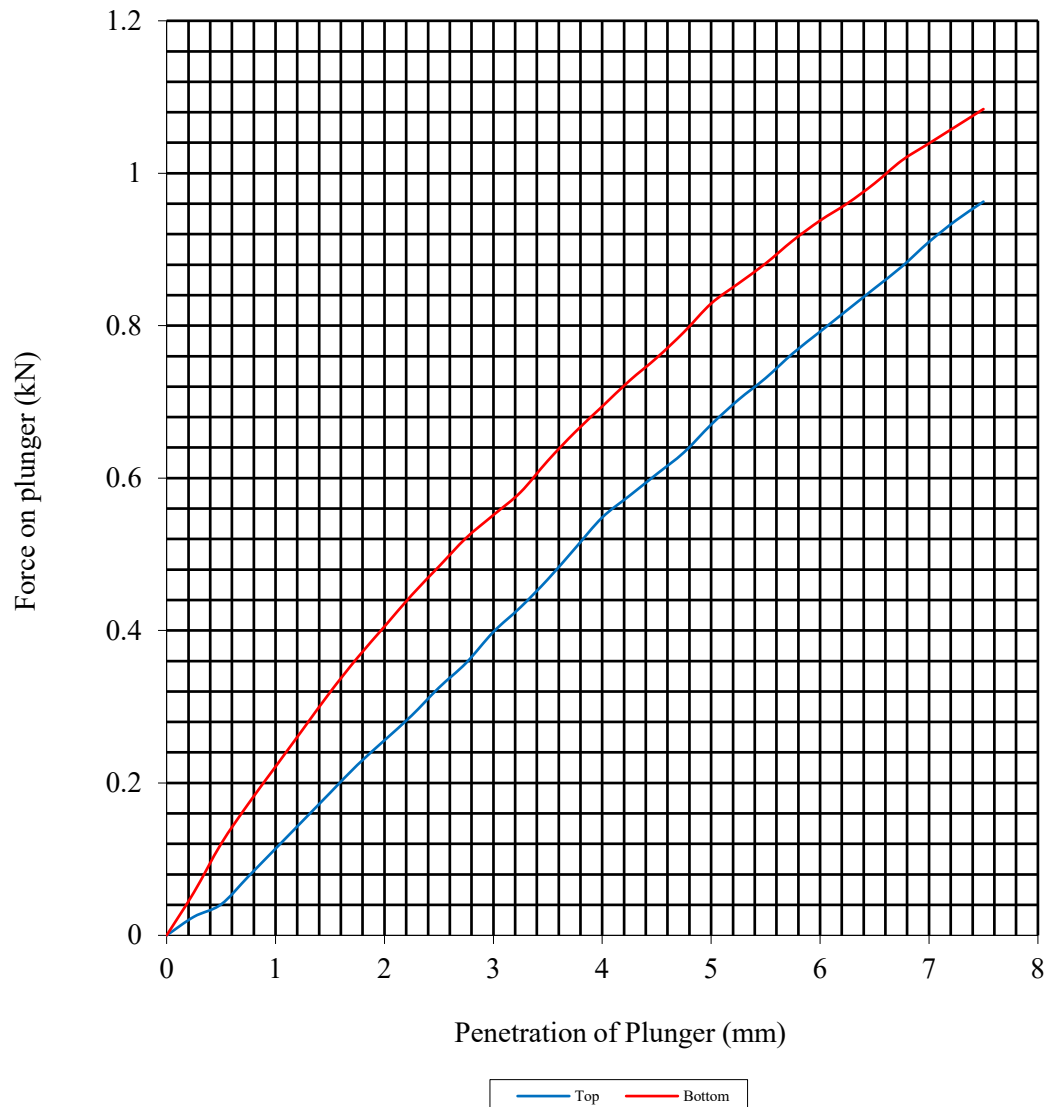
Hole Number: TP108

Top Depth (m): 0.70

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	18	Surcharge Kg:	4.20	Sample Top	18	Sample Top	3.4
Bulk Density Mg/m3:	2.12	Soaking Time hrs	0	Sample Bottom	18	Sample Bottom	4.1
Dry Density Mg/m3:	1.80	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		14					
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8115
Client Ref:
C7806



ANALYTICAL TEST REPORT

Contract no: 117526

Contract name: St Nicholas WWTW

Client reference: PSL22/8115

Clients name: Professional Soils Laboratory

Clients address: 5/7 Hexthorpe Road
Doncaster
DN4 0AR

Samples received: 10 January 2023

Analysis started: 10 January 2023

Analysis completed: 16 January 2023

Report issued: 16 January 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

SOILS

Lab number			117526-1	117526-2	117526-3
Sample id			HP104	TP107	TP108
Depth (m)			1.00	0.50	0.20
Sample Type			B	B	D
Date sampled			-	-	-
Test	Method	Units			
pH	CE004 ^U	units	8.5	8.5	8.4
Magnesium (2:1 water soluble)	CE061	mg/l Mg	7.3	6.8	5.7
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	11	11	5.0
Nitrate (2:1 water soluble)	CE049 ^U	mg/l NO ₃	4.1	1.1	5.2
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	145	26	15
Sulphate (acid extractable)	CE062 ^U	mg/kg SO ₄	465	585	316
Sulphate (acid extractable)	CE062 ^U	% w/w SO ₄	0.05	0.06	0.03
Sulphur (total)	CE119	mg/kg S	286	322	212
Sulphur (total)	CE119	% w/w S	0.03	0.03	0.02

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Magnesium (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		1	mg/l Mg
CE049	Chloride (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l Cl
CE049	Nitrate (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l NO ₃
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	100	mg/kg SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	0.01	% w/w SO ₄
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		100	mg/kg S
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		0.01	% w/w S

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
117526-1	HP104	1.00	Y	All (NSD)
117526-2	TP107	0.50	Y	All (NSD)
117526-3	TP108	0.20	Y	All (NSD)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

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Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones, where applicable.



LABORATORY REPORT



4043

Contract Number: PSL22/8114

Report Date: 18 January 2023
Client's Reference: C7806
Client Name: CC Ground Investigations Ltd
Unit A2 Innsworth Technology Park.
Innsworth Lane
Gloucester
GL3 1DL

For the attention of: Kelly Spear

Contract Title: St Nicholas WWTW
Date Received: 21/12/2022
Date Commenced: 21/12/2022
Date Completed: 18/1/2023

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)

T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
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fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8114

Client Ref:

C7806

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

St Nicholas WWTW

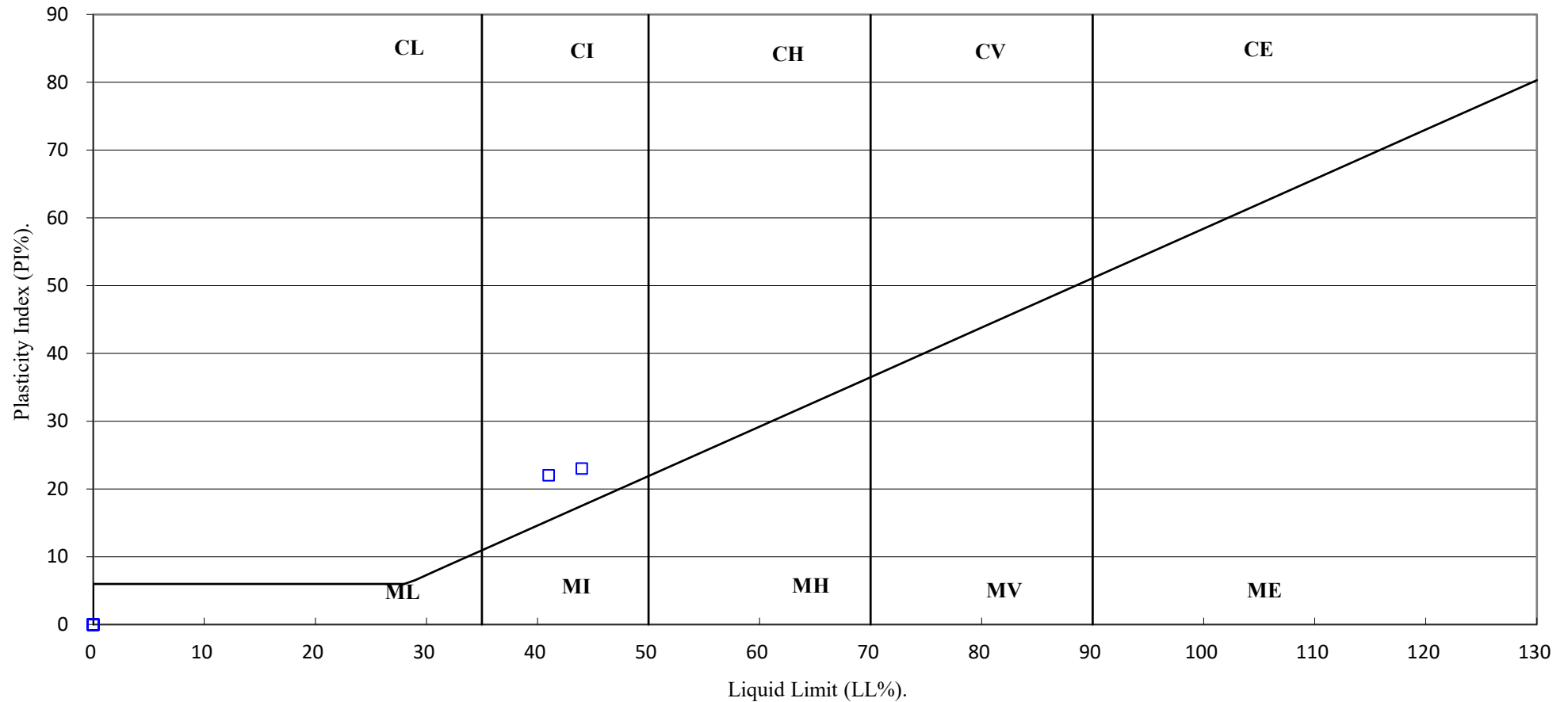
Contract No:

PSL22/8114

Client Ref:

C7806

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

St Nicholas WWTW

Contract No:

PSL22/8114

Client Ref:

C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

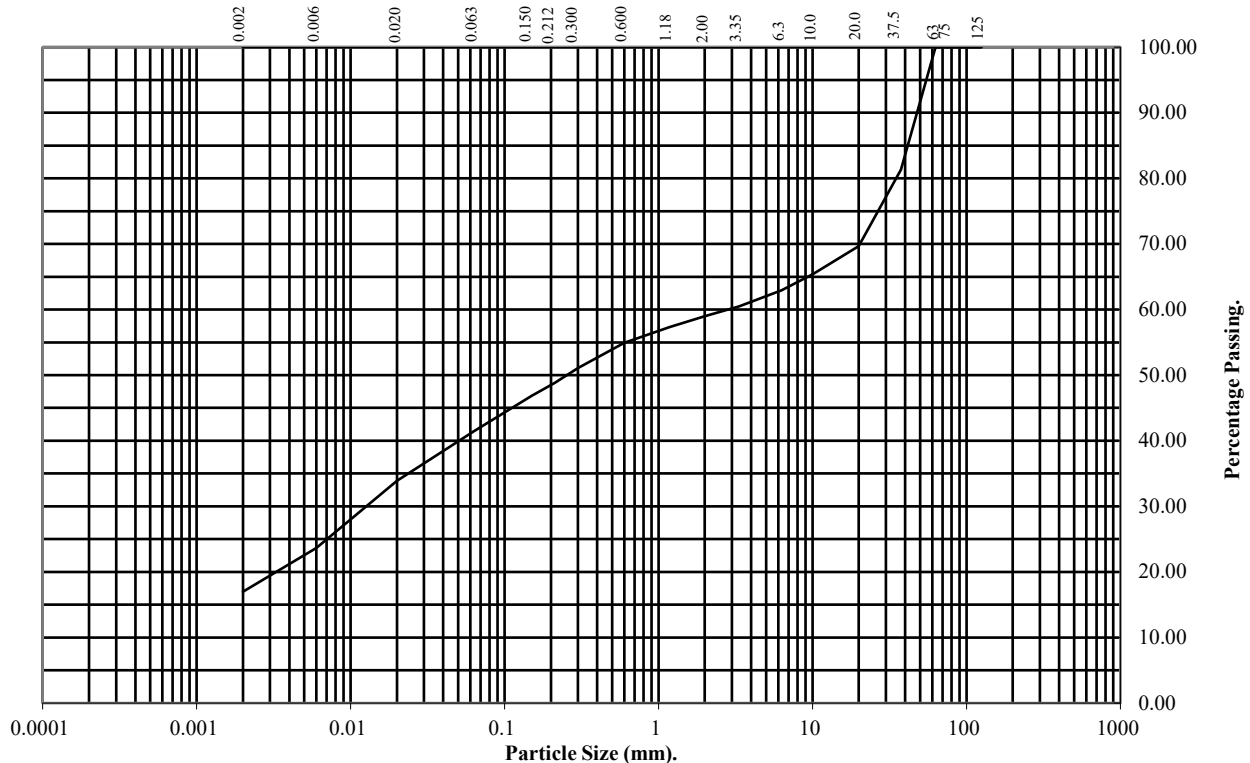
Hole Number: TP109

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	81
20	70
10	65
6.3	63
3.35	60
2	59
1.18	57
0.6	55
0.3	51
0.212	49
0.15	47
0.063	41

Particle Diameter	Percentage Passing
0.02	34
0.006	24
0.002	17

Soil Fraction	Total Percentage
Cobbles	0
Gravel	41
Sand	18
Silt	24
Clay	17

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8114
Client Ref:
C7806

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

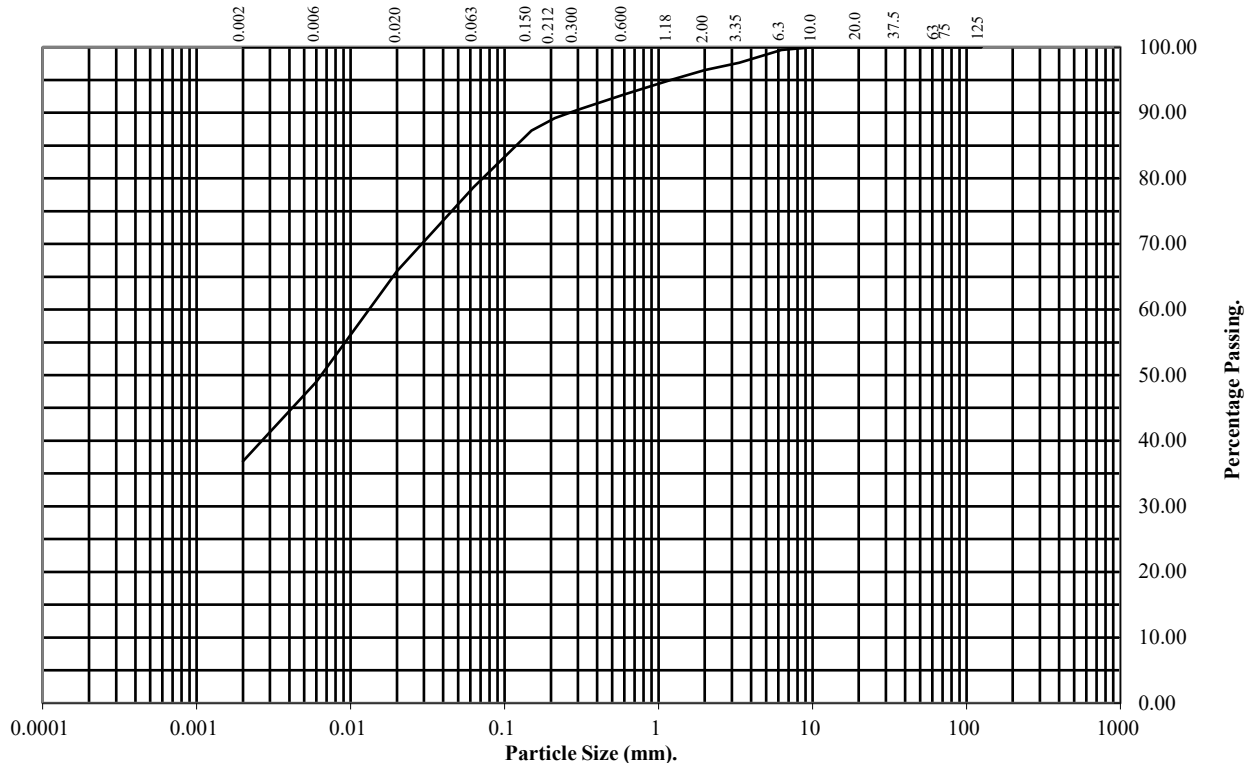
Hole Number: TP110

Top Depth (m): 1.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	98
2	96
1.18	95
0.6	93
0.3	90
0.212	89
0.15	87
0.063	79

Particle Diameter	Percentage Passing
0.02	66
0.006	49
0.002	37

Soil Fraction	Total Percentage
Cobbles	0
Gravel	4
Sand	17
Silt	42
Clay	37

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8114
Client Ref:
C7806

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

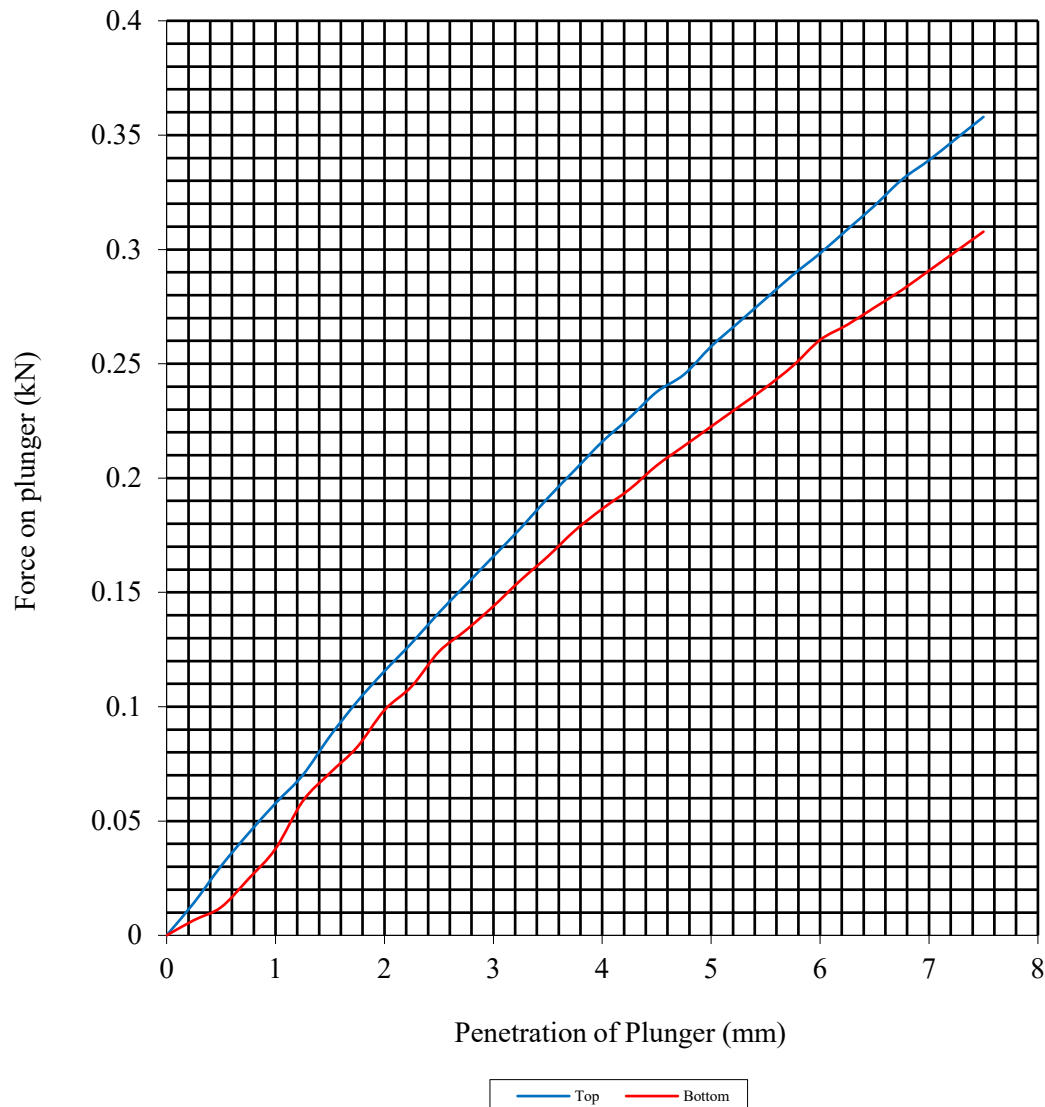
Hole Number: TP109

Top Depth (m): 0.50

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	29	Surcharge Kg:	4.20	Sample Top	29	Sample Top	1.3
Bulk Density Mg/m3:	1.90	Soaking Time hrs	0	Sample Bottom	29	Sample Bottom	1.1
Dry Density Mg/m3:	1.48	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		0					
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

St Nicholas WWTW

Contract No:
PSL22/8114
Client Ref:
C7806



ANALYTICAL TEST REPORT

Contract no: 117534

Contract name: St Nicholas WWTW

Client reference: PSL22/8114

Clients name: Professional Soils Laboratory

Clients address: 5/7 Hexthorpe Road
Doncaster
DN4 0AR

Samples received: 10 January 2023

Analysis started: 10 January 2023

Analysis completed: 16 January 2023

Report issued: 16 January 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

SOILS

Lab number			117534-1	117534-2
Sample id			TP109	TP110
Depth (m)			2.00	0.50
Sample Type			B	B
Date sampled			-	-
Test	Method	Units		
pH	CE004 ^U	units	8.3	7.6
Magnesium (2:1 water soluble)	CE061	mg/l Mg	21	11
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	11	3.6
Nitrate (2:1 water soluble)	CE049 ^U	mg/l NO ₃	<1	1.0
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	324	115
Sulphate (acid extractable)	CE062 ^U	mg/kg SO ₄	774	387
Sulphate (acid extractable)	CE062 ^U	% w/w SO ₄	0.08	0.04
Sulphur (total)	CE119	mg/kg S	341	165
Sulphur (total)	CE119	% w/w S	0.03	0.02

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Magnesium (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		1	mg/l Mg
CE049	Chloride (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l Cl
CE049	Nitrate (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l NO ₃
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	100	mg/kg SO ₄
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	0.01	% w/w SO ₄
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		100	mg/kg S
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		0.01	% w/w S

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
117534-1	TP109	2.00	Y	All (NSD)
117534-2	TP110	0.50	Y	All (NSD)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones, where applicable.

APPENDIX E

Geo-Environmental Laboratory Test Results



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Analytical Report Number : 22-10937

Project / Site name:	St Nicholas WWTW - Schedule 01	Samples received on:	30/11/2022
Your job number:	C7806	Samples instructed on/ Analysis started on:	02/12/2022
Your order number:	CCENG06576	Analysis completed by:	20/12/2022
Report Issue Number:	1	Report issued on:	20/12/2022
Samples Analysed:	4 soil samples		

Signed:

Dominika Warjan
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 22-10937
Project / Site name: St Nicholas WWTW - Schedule 01
Your Order No: CCENG06576

Lab Sample Number				2519256	2519257	2519258	2519259
Sample Reference				BH104	TP109	TP110	TP110
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.20	0.50	1.00
Date Sampled				28/11/2022	28/11/2022	28/11/2022	28/11/2022
Time Taken				1130	1220	1430	1430
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	22	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	7	21	22	23
Total mass of sample received	kg	0.001	NONE	1.5	1.5	1.5	1.5

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.5	6.7	7.1	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	2.6	< 1.0
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	2	0.4	-

Phenols by GC-MS

Phenol	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
2-Nitrophenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols (GC-MS)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0

Speciated PAHs*

Naphthalene	mg/kg	0.05	NONE	0.78	0.27	0.14	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	NONE	0.09	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	NONE	0.07	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	NONE	0.15	0.07	0.13	< 0.05
Anthracene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	NONE	0.24	0.06	< 0.05	< 0.05
Pyrene	mg/kg	0.05	NONE	0.22	0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	NONE	0.19	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	NONE	0.17	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	NONE	0.39	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	NONE	0.12	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	NONE	0.15	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	0.11	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	0.15	< 0.05	< 0.05	< 0.05

Total PAH*

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	2.83	< 0.80	< 0.80	< 0.80
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Analytical Report Number: 22-10937
Project / Site name: St Nicholas WWTW - Schedule 01
Your Order No: CCENG06576

Lab Sample Number	2519256			2519257	2519258	2519259
Sample Reference	BH104			TP109	TP110	TP110
Sample Number	None Supplied			None Supplied	None Supplied	None Supplied
Depth (m)	0.20			0.20	0.50	1.00
Date Sampled	28/11/2022			28/11/2022	28/11/2022	28/11/2022
Time Taken	1130			1220	1430	1430
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5	17	11	8.9
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.9	0.4	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	0.8	0.5	0.3
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	12	36	34	26
Copper (aqua regia extractable)	mg/kg	1	MCERTS	12	18	24	13
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	100	33	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	7.7	26	33	28
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	200	89	77

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10	< 10	-

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	-
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	-
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10	< 10	-

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

*Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted and the failure justified as having no significant impact on sample data reported.

Analytical Report Number : 22-10937

Project / Site name: St Nicholas WWTW - Schedule 01

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2519256	BH104	None Supplied	0.2	Brown loam and sand with gravel and vegetation.
2519257	TP109	None Supplied	0.2	Brown clay and loam with gravel and vegetation.
2519258	TP110	None Supplied	0.5	Brown clay and sand with gravel.
2519259	TP110	None Supplied	1	Brown clay and sand with gravel.

Analytical Report Number : 22-10937

Project / Site name: St Nicholas WWTW - Schedule 01

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Phenols, speciated, in soil, by GCMS	Determination of speciated phenols in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

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

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

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

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

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

Analytical Report Number : 22-10937

Project / Site name: St Nicholas WWTW - Schedule 01

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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



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Analytical Report Number : 22-10938

Project / Site name:	St Nicholas WWTW - Schedule 01	Samples received on:	30/11/2022
Your job number:	C7806	Samples instructed on/ Analysis started on:	02/12/2022
Your order number:	CCENG06576	Analysis completed by:	07/12/2022
Report Issue Number:	1	Report issued on:	14/12/2022
Samples Analysed:	10:1WAC sample		

Signed:

Dominika Warjan
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

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Waste Acceptance Criteria Analytical Results							
Report No:	22-10938						
					Client: CCGROUND		
Location	St Nicholas WWTW - Schedule 01						
Lab Reference (Sample Number)	2519260 / 2519261				Landfill Waste Acceptance Criteria		
Sampling Date	28/11/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP110						
Depth (m)	0.20						
Solid Waste Analysis							
TOC (%)**	1.5				3%	5%	6%
Loss on Ignition (%) **	4.7				--	--	10%
BTEX (µg/kg) **	-				6000	--	--
Sum of PCBs (mg/kg) **	-				1	--	--
Mineral Oil (mg/kg) <small>EH, ID, CU, AL</small>	-				500	--	--
Total PAH (WAC-17) (mg/kg)	-				100	--	--
pH (units)**	6.6				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	-8.4				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
	(BS EN 12457 - 2 preparation utilising end over end leaching procedure)				using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
	mg/l			mg/kg			
Arsenic *	< 0.0010			< 0.0100	0.5	2	25
Barium *	0.0104			0.0831	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0012			0.0095	0.5	10	70
Copper *	0.016			0.12	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	< 0.0004			< 0.0040	0.5	10	30
Nickel *	0.0026			0.021	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.013			0.10	4	50	200
Chloride *	0.98			7.8	800	15000	25000
Fluoride*	0.17			1.3	10	150	500
Sulphate *	0.74			5.9	1000	20000	50000
TDS*	8.9			71	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	17.8			142	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.5						
Dry Matter (%)	81						
Moisture (%)	19						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation							
* = UKAS accredited (liquid eluate analysis only)							
** = MCERTS accredited							

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

Analytical Report Number : 22-10938

Project / Site name: St Nicholas WWTW - Schedule 01

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2519260	TP110	None Supplied	0.2	Brown clay and loam with gravel and vegetation.

Analytical Report Number : 22-10938

Project / Site name: St Nicholas WWTW - Schedule 01

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

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

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

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

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture

correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

**Kelly Spear**

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Analytical Report Number : 22-11839

Project / Site name:	St Nicholas WWTW Schedule 03	Samples received on:	06/12/2022
Your job number:	C7806	Samples instructed on/ Analysis started on:	06/12/2022
Your order number:	CCENG06597	Analysis completed by:	22/12/2022
Report Issue Number:	1	Report issued on:	22/12/2022
Samples Analysed:	4 soil samples		

Signed:

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 22-11839
Project / Site name: St Nicholas WWTW Schedule 03
Your Order No: CCENG06597

Lab Sample Number				2524560	2524561	2524562	2524563
Sample Reference				TP107	TP107	TP108	BH103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.00	0.20	0.20
Date Sampled				01/12/2022	01/12/2022	01/12/2022	01/12/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	21	15	20
Total mass of sample received	kg	0.001	NONE	1.7	1.8	1.7	2

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8	7.8	7.7	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.8	-	0.8	-

Phenols by GC-MS*

Phenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
2-Chlorophenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
2-Nitrophenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols (GC-MS)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0

Speciated PAHs*

Naphthalene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	NONE	0.18	< 0.05	0.2	< 0.05
Anthracene	mg/kg	0.05	NONE	0.05	< 0.05	0.05	< 0.05
Fluoranthene	mg/kg	0.05	NONE	0.53	< 0.05	0.42	< 0.05
Pyrene	mg/kg	0.05	NONE	0.46	< 0.05	0.32	< 0.05
Benzo(a)anthracene	mg/kg	0.05	NONE	0.39	< 0.05	0.32	< 0.05
Chrysene	mg/kg	0.05	NONE	0.45	< 0.05	0.35	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	NONE	0.62	< 0.05	0.47	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	NONE	0.3	< 0.05	0.22	< 0.05
Benzo(a)pyrene	mg/kg	0.05	NONE	0.47	< 0.05	0.4	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	0.34	< 0.05	0.28	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	0.09	< 0.05	0.08	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	0.38	< 0.05	0.3	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	4.26	< 0.80	3.41	< 0.80
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Analytical Report Number: 22-11839
Project / Site name: St Nicholas WWTW Schedule 03
Your Order No: CCENG06597

Lab Sample Number				2524560	2524561	2524562	2524563
Sample Reference				TP107	TP107	TP108	BH103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.00	0.20	0.20
Date Sampled				01/12/2022	01/12/2022	01/12/2022	01/12/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	16	14	13
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	1.2	0.8	1.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	1.7	1	0.7
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	38	21	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	10	16	12	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	68	74	83	110
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	36	21	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	520	180	190

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	-	< 5.0	< 5.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	-	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	-	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	-	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	-	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	-	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	-	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	-	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	-	< 10	< 10

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

*Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted and the failure justified as having no significant impact on sample data reported.

Analytical Report Number : 22-11839

Project / Site name: St Nicholas WWTW Schedule 03

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2524560	TP107	None Supplied	0.2	Brown clay and loam with gravel and vegetation.
2524561	TP107	None Supplied	1	Brown gravelly clay with vegetation.
2524562	TP108	None Supplied	0.2	Brown clay and sand with gravel and vegetation.
2524563	BH103	None Supplied	0.2	Brown clay and sand with vegetation.

Analytical Report Number : 22-11839

Project / Site name: St Nicholas WWTW Schedule 03

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Phenols, speciated, in soil, by GCMS	Determination of speciated phenols in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

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

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

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

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

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

Analytical Report Number : 22-11839

Project / Site name: St Nicholas WWTW Schedule 03

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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

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Analytical Report Number : 22-11842

Project / Site name:	St Nicholas WWTW Schedule 03	Samples received on:	06/12/2022
Your job number:	C7806	Samples instructed on/ Analysis started on:	06/12/2022
Your order number:	CCENG06597	Analysis completed by:	16/12/2022
Report Issue Number:	1	Report issued on:	19/12/2022
Samples Analysed:	2 10:1 WAC Samples		


Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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Waste Acceptance Criteria Analytical Results

Report No:	22-11842						
				Client: CCGROUND			
Location	St Nicholas WWTW Schedule 03						
Lab Reference (Sample Number)	2524600 / 2524601			Landfill Waste Acceptance Criteria			
				Limits			
Sampling Date	01/12/2022			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID	TP107						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.5			3%	5%	6%	
Loss on Ignition (%) **	3.3			--	--	10%	
BTEX (µg/kg) **	-			6000	--	--	
Sum of PCBs (mg/kg) **	-			1	--	--	
Mineral Oil (mg/kg) <small>EH, ID, CU, AL</small>	-			500	--	--	
Total PAH (WAC-17) (mg/kg)	-			100	--	--	
pH (units)**	7.6			--	>6	--	
Acid Neutralisation Capacity (mmol / kg)	1.3			--	To be evaluated	To be evaluated	
Eluate Analysis		10:1		10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)					using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
	mg/l			mg/kg			
Arsenic *	0.0033			0.0280	0.5	2	25
Barium *	0.0523			0.439	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0017			0.015	0.5	10	70
Copper *	0.0065			0.054	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0027			0.0226	0.5	10	30
Nickel *	< 0.0003			< 0.0030	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0058			0.049	4	50	200
Chloride *	0.54			4.5	800	15000	25000
Fluoride*	0.64			5.4	10	150	500
Sulphate *	2.6			22	1000	20000	50000
TDS*	85			710	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	9.69			81.4	500	800	1000
Leach Test Information							
Stone Content (%)	31						
Sample Mass (kg)	1.9						
Dry Matter (%)	86						
Moisture (%)	14						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
* = UKAS accredited (liquid eluate analysis only)							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation							
** = MCERTS accredited							

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

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Waste Acceptance Criteria Analytical Results

Report No:	22-11842						
				Client: CCGROUND			
Location	St Nicholas WWTW Schedule 03						
Lab Reference (Sample Number)	2524602 / 2524603			Landfill Waste Acceptance Criteria			
				Limits			
Sampling Date	01/12/2022			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID	BH103						
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	0.7			3%	5%	6%	
Loss on Ignition (%) **	2.8			--	--	10%	
BTEX (µg/kg) **	-			6000	--	--	
Sum of PCBs (mg/kg) **	-			1	--	--	
Mineral Oil (mg/kg) <small>EH, ID, CU, AL</small>	-			500	--	--	
Total PAH (WAC-17) (mg/kg)	-			100	--	--	
pH (units)**	7.5			--	>6	--	
Acid Neutralisation Capacity (mmol / kg)	1.1			--	To be evaluated	To be evaluated	
Eluate Analysis		10:1		10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)					using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
	mg/l			mg/kg			
Arsenic *	0.0040			0.0317	0.5	2	25
Barium *	0.0048			0.0374	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	< 0.0004			< 0.0040	0.5	10	70
Copper *	0.0035			0.028	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	< 0.0004			< 0.0040	0.5	10	30
Nickel *	0.0003			< 0.0030	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0051			0.040	4	50	200
Chloride *	0.95			7.4	800	15000	25000
Fluoride*	0.16			1.3	10	150	500
Sulphate *	1.1			8.6	1000	20000	50000
TDS*	22			170	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	14.2			111	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.6						
Dry Matter (%)	80						
Moisture (%)	20						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
* = UKAS accredited (liquid eluate analysis only)							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation							
** = MCERTS accredited							

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

Analytical Report Number : 22-11842

Project / Site name: St Nicholas WWTW Schedule 03

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2524600	TP107	None Supplied	0.5	Brown clay and sand with vegetation and stones.
2524602	BH103	None Supplied	1	Brown clay and sand with vegetation.

Analytical Report Number : 22-11842

Project / Site name: St Nicholas WWTW Schedule 03

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025

Analytical Report Number : 22-11842

Project / Site name: St Nicholas WWTW Schedule 03

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

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

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

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

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

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



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Analytical Report Number : 22-11830

Project / Site name:	St Nicholas WWTW Schedule 02	Samples received on:	06/12/2022
Your job number:	C7806	Samples instructed on/ Analysis started on:	06/12/2022
Your order number:	CCENG06596	Analysis completed by:	16/12/2022
Report Issue Number:	1	Report issued on:	19/12/2022
Samples Analysed:	3 10:1 WAC Samples		

Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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



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Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.

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This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Waste Acceptance Criteria Analytical Results

Report No:	22-11830						
					Client:	CCGROUND	
Location	St Nicholas WWTW Schedule 02						
Lab Reference (Sample Number)	2524423 / 2524424				Landfill Waste Acceptance Criteria		
					Limits		
Sampling Date	30/11/2022			Inert Waste Landfill	Stable Non- reactive HAZARDOUS waste in non- hazardous Landfill	Hazardous Waste Landfill	
Sample ID	BH105						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	0.7			3%	5%	6%	
Loss on Ignition (%) **	3.6			--	--	10%	
BTEX (µg/kg) **	-			6000	--	--	
Sum of PCBs (mg/kg) **	-			1	--	--	
Mineral Oil (mg/kg) <small>EH, ID, CU, AL</small>	-			500	--	--	
Total PAH (WAC-17) (mg/kg)	-			100	--	--	
pH (units)**	7.4			--	>6	--	
Acid Neutralisation Capacity (mmol / kg)	0.63			--	To be evaluated	To be evaluated	
Eluate Analysis		10:1		10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)					using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
		mg/l		mg/kg			
Arsenic *	0.0019			0.0145	0.5	2	25
Barium *	0.0063			0.0475	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	< 0.0004			< 0.0040	0.5	10	70
Copper *	0.0056			0.042	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	< 0.0004			< 0.0040	0.5	10	30
Nickel *	< 0.0003			< 0.0030	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0065			0.049	4	50	200
Chloride *	0.56			4.2	800	15000	25000
Fluoride*	0.21			1.6	10	150	500
Sulphate *	1.2			8.9	1000	20000	50000
TDS*	30			230	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	13.2			99.3	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.6						
Dry Matter (%)	76						
Moisture (%)	24						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
				* = UKAS accredited (liquid eluate analysis only)			
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation				** = MCERTS accredited			

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

Analytical Report Number : 22-11830

Project / Site name: St Nicholas WWTW Schedule 02

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2524419	TP106	None Supplied	1	Brown clay and sand with gravel.
2524421	TP114	None Supplied	0.5	Brown clay and sand with gravel and stones.
2524423	BH105	None Supplied	0.5	Brown clay and sand with gravel and vegetation.

Analytical Report Number : 22-11830

Project / Site name: St Nicholas WWTW Schedule 02

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025

Analytical Report Number : 22-11830

Project / Site name: St Nicholas WWTW Schedule 02

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

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

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

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

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

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



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Analytical Report Number : 22-11825

Project / Site name:	St Nicholas WWTW Schedule 02	Samples received on:	06/12/2022
Your job number:	C7806	Samples instructed on/ Analysis started on:	06/12/2022
Your order number:	CCENG06596	Analysis completed by:	22/12/2022
Report Issue Number:	1	Report issued on:	22/12/2022
Samples Analysed:	4 soil samples		

Signed: _____

Joanna Wawrzeczko
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 22-11825

Project / Site name: St Nicholas WWTW Schedule 02

Your Order No: CCENG06596

Lab Sample Number				2524389	2524390	2524391	2524392
Sample Reference				TP106	TP114	TP114	BH105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.50	1.00	0.20
Date Sampled				30/11/2022	30/11/2022	30/11/2022	30/11/2022
Time Taken				1500	1150	1150	1000
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	81	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	6	20	20
Total mass of sample received	kg	0.001	NONE	1.4	1.6	1.7	2

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.7	8.6	7.8	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	0.8	-	1

Phenols by GC-MS*

Phenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
2-Chlorophenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
2-Nitrophenol	mg/kg	0.3	NONE	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2

Total Phenols

Total Phenols (monohydric)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols (GC-MS)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0

Speciated PAHs*

Naphthalene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05	0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	NONE	< 0.05	0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	NONE	0.15	0.34	< 0.05	< 0.05
Anthracene	mg/kg	0.05	NONE	< 0.05	0.11	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	NONE	0.35	1.3	< 0.05	< 0.05
Pyrene	mg/kg	0.05	NONE	0.27	1.1	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	NONE	0.24	1.1	< 0.05	< 0.05
Chrysene	mg/kg	0.05	NONE	0.29	1	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	NONE	0.45	1.6	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	NONE	0.12	0.73	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	NONE	0.3	1.3	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	0.2	0.77	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	0.08	0.22	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	0.24	0.74	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	2.69	10.3	< 0.80	< 0.80
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Analytical Report Number: 22-11825

Project / Site name: St Nicholas WWTW Schedule 02

Your Order No: CCENG06596

Lab Sample Number				2524389	2524390	2524391	2524392
Sample Reference				TP106	TP114	TP114	BH105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.50	1.00	0.20
Date Sampled				30/11/2022	30/11/2022	30/11/2022	30/11/2022
Time Taken				1500	1150	1150	1000
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status	

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	6.1	15	11
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	0.6	1.8	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1	0.4	1.1	0.5
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	11	25	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	15	14	13
Lead (aqua regia extractable)	mg/kg	1	MCERTS	93	34	140	61
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	8.6	27	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	190	60	180	120

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	-	< 5.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	-	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10	-	< 10

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	-	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	-	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	-	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	-	< 10
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10	-	< 10

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

*Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted and the failure justified as having no significant impact on sample data reported.

Analytical Report Number : 22-11825

Project / Site name: St Nicholas WWTW Schedule 02

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2524389	TP106	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
2524390	TP114	None Supplied	0.5	Brown clay and sand with gravel and stones.
2524391	TP114	None Supplied	1	Brown clay and sand.
2524392	BH105	None Supplied	0.2	Brown clay and loam with gravel and vegetation.

Analytical Report Number : 22-11825

Project / Site name: St Nicholas WWTW Schedule 02

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Phenols, speciated, in soil, by GCMS	Determination of speciated phenols in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Analytical Report Number : 22-11825

Project / Site name: St Nicholas WWTW Schedule 02

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

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

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

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

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

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

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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

Sample Deviation Report



Analytical Report Number : 22-11825

Project / Site name: St Nicholas WWTW Schedule 02

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

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH105	None Supplied	S	2524392	c	Total cyanide in soil	L080-PL	c
TP106	None Supplied	S	2524389	c	Total cyanide in soil	L080-PL	c
TP114	None Supplied	S	2524390	c	Total cyanide in soil	L080-PL	c
TP114	None Supplied	S	2524391	c	Total cyanide in soil	L080-PL	c

APPENDIX F

Gas and Groundwater Monitoring Data

GAS AND WATER MONITORING RECORD

Telephone: 01452 739 165 . Fax: 01452 739 220 . Email: info@CCGround.co.uk

Project Name: St. Nicholas WWTW	Project No: C7806	Co-ords: E: 308826.693 N:173314.386 Level: 65.44 mAD	Date 05/01/2023
Location: St. Nicholas, Cardiff			Logged By AK
Client: Morgan Sindall Plc			Checked By EW


Date & Time	Methane (CH ₄) (%)	Carbon Dioxide (CO ₂) (%)	Oxygen (O ₂) (%)	Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H ₂ S) (ppm)	LEL (%)	PID (VOC) (ppm)	Flow (L/hr)	Temp (C°)	Baro Pressure (mb)	Water Level (m)
Visit 1 14/12/2022 11/12/2022 12:00 12/12/2022 12:00 13/12/2022 12:00 14/12/2022 08:20 14/12/2022 08:21 14/12/2022 08:22 14/12/2022 08:23 14/12/2022 08:24 14/12/2022 08:25 14/12/2022 08:26 14/12/2022 08:27 14/12/2022 08:28 14/12/2022 08:29 14/12/2022 08:30 14/12/2022 08:31									-2	1001 1004 1005 999	
								0.0 0.0 0.0 0.0 0.0			
	0.0	0.6	19.6	6	0	0%					
	0.0	0.6	19.8	6	0	0%					
	0.0	0.6	20.0	6	0	0%					
	0.0	0.6	20.2	6	0	0%					
	0.0	0.6	20.2	5	0	0%					5.63
Visit 2 05/01/2023 02/01/2023 12:00 03/01/2023 12:00 04/01/2023 12:00 05/01/2023 10:45 05/01/2023 10:46 05/01/2023 10:47 05/01/2023 10:48 05/01/2023 10:49 05/01/2023 10:50 05/01/2023 10:51 05/01/2023 10:52 05/01/2023 10:53 05/01/2023 10:54 05/01/2023 10:55 05/01/2023 10:56									12	1018 1008 1008 1013	
								0.0 0.0 0.0 0.0 0.0			
	0.0	0.1	20.1	0	0	0%					
	0.0	0.1	20.1	0	0	0%					
	0.0	0.1	20.1	0	0	0%					
	0.0	0.1	20.1	0	0	0%					
	0.0	0.1	20.1	0	0	0%					0.98 Sampled
Visit 3 13/01/2023 10/01/2023 12:00 11/01/2023 12:00 12/01/2023 12:00 13/01/2022 09:59 13/01/2022 10:00 13/01/2022 10:01 13/01/2022 10:02 13/01/2022 10:03 13/01/2022 10:04 13/01/2023 10:05 13/01/2023 10:06									9	1006 1009 1002 1004	
								0.0 0.0 0.0 0.0 0.0			
			Vacuum created. No gas readings available.								0.68

EQUIPMENT: Soil Instruments GA5000 Portable Gas Analyser. Geotechnical Instruments Dipmeter.

INSTALLATION TYPE: 50mm ID HDPE gas monitoring standpipe. See corresponding borehole log for details.

METHOD: Gas flow measured using internal flow meter for 5 minutes. Ground gas monitored using 5 gas analyser for 5 minutes in accordance with CIRIA 665 (2007).

REMARKS: LEL value calculated only. Full set of samples obtained using low-flow methodology on completion of visit 2.

CC Ground Investigations Ltd										Borehole No. BH102	
GAS AND WATER MONITORING RECORD										Sheet 1 of 1	
Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk											
Project Name: St. Nicholas WWTW				Project No: C7806		Co-ords: E: 308826.693 N:173314.386 Level: 65.44 mAD				Date 05/01/2023	
Location: St. Nicholas, Cardiff										Logged By AK	
Client: Morgan Sindall Plc										Checked By EW	
Date & Time	Methane (CH ₄) (%)	Carbon Dioxide (CO ₂) (%)	Oxygen (O ₂) (%)	Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H ₂ S) (ppm)	LEL (%)	PID (VOC) (ppm)	Flow (L/hr)	Temp (C°)	Baro Pressure (mb)	Water Level (m)
Visit 4 24/01/2023 21/01/2023 12:00 22/01/2023 12:00 23/01/2023 12:00 24/01/2023 09:45 24/01/2023 09:46 24/01/2023 09:47 24/01/2023 09:48 24/01/2023 09:49 24/01/2023 09:50 24/01/2023 09:51 24/01/2023 09:52 24/01/2023 09:53 24/01/2023 09:54 24/01/2023 09:55								-26.0 -26.0 -26.0 -26.0 -26.0 -26.0	-2	1033 1034 1037 1031	
	0.1 0.1 0.1 0.1	0.4 0.6 0.7 0.8	20.7 20.3 20.0 19.8	0 0 0 0	0 0 0 0	0% 0% 0% 0%					2.77
<div>EQUIPMENT: Soil Instruments GA5000 Portable Gas Analyser. Geotechnical Instruments Dipmeter.</div> <div>INSTALLATION TYPE: 50mm ID HDPE gas monitoring standpipe. See corresponding borehole log for details.</div> <div>METHOD: Gas flow measured using internal flow meter for 5 minutes. Ground gas monitored using 5 gas analyser for 5 minutes in accordance with CIRIA 665 (2007).</div> <div>REMARKS: LEL value calculated only. Full set of samples obtained using low-flow methodology on completion of visit 2.</div>											

GAS AND WATER MONITORING RECORD

Telephone: 01452 739 165 . Fax: 01452 739 220 . Email: info@CCGround.co.uk

Project Name: St. Nicholas WWTW	Project No: C7806	Co-ords: E:308815.571 N:173277.971 Level: 62.48 mAD	Date 05/01/2023
Location: St. Nicholas, Cardiff			Logged By AK
Client: Morgan Sindall Plc			Checked By EW


Date & Time	Methane (CH ₄) (%)	Carbon Dioxide (CO ₂) (%)	Oxygen (O ₂) (%)	Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H ₂ S) (ppm)	LEL (%)	PID (VOC) (ppm)	Flow (L/hr)	Temp (C°)	Baro Pressure (mb)	Water Level (m)
Visit 1 14/12/2022											
11/12/2022 12:00										1001	
12/12/2022 12:00										1004	
13/12/2022 12:00										1005	
14/12/2022 09:05									-2	999	
14/12/2022 09:06								0.0			
14/12/2022 09:07								-0.1			
14/12/2022 09:08								-0.1			
14/12/2022 09:09								0.0			
14/12/2022 09:10								0.0			
14/12/2022 09:11	0.1	0.7	18.3	2	0	2%					
14/12/2022 09:12	0.1	0.7	18.4	3	0	2%					
14/12/2022 09:13	0.1	0.7	18.5	3	0	2%					
14/12/2022 09:14	0.1	0.7	18.7	3	0	2%					
14/12/2022 09:15	0.1	0.7	18.8	3	0	2%					
14/12/2022 09:16											2.94
Visit 2 05/01/2023											
02/01/2023 12:00										1018	
03/01/2023 12:00										1008	
04/01/2023 12:00										1008	
05/01/2023 11:45									12	1013	
05/01/2023 11:46											
05/01/2023 11:47											
05/01/2023 11:48											
05/01/2023 11:49		Headworks flooded to ground level. Gas monitoring not possible.									
05/01/2023 11:50											
05/01/2023 11:51											
05/01/2023 11:52											
05/01/2023 11:53											
05/01/2023 11:54											
05/01/2023 11:55											
05/01/2023 11:56											0.00 Sampled
Visit 3 13/01/2023											
10/01/2023 12:00										1006	
11/01/2023 12:00										1009	
12/01/2023 12:00										1002	
13/01/2023 09:19									9	1004	
13/01/2023 09:20				Borehole fully submerged in water.							Surface level

EQUIPMENT: Soil Instruments GA5000 Portable Gas Analyser. Geotechnical Instruments Dipmeter.

INSTALLATION TYPE: 50mm ID HDPE gas monitoring standpipe. See corresponding borehole log for details.

METHOD: Gas flow measured using internal flow meter for 5 minutes. Ground gas monitored using 5 gas analyser for 5 minutes in accordance with CIRIA 665 (2007).

REMARKS: LEL value calculated only. Full set of samples obtained using low-flow methodology on completion of visit 2.

CC Ground Investigations Ltd												Borehole No.	
GAS AND WATER MONITORING RECORD												BH103	
Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk												Sheet 1 of 1	
Project Name: St. Nicholas WWTW				Project No: C7806		Co-ords: E:308815.571 N:173277.971				Date			
Location: St. Nicholas, Cardiff								Level: 62.48 mAD				05/01/2023	
Client: Morgan Sindall Plc										Logged By		AK	
										Checked By			
Date & Time	Methane (CH4) (%)	Carbon Dioxide (CO2) (%)	Oxygen (O2) (%)	Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	LEL (%)	PID (VOC) (ppm)	Flow (L/hr)	Temp (C°)	Baro Pressure (mb)	Water Level (m)		
Visit 4 24/01/23 21/01/2023 12:00 22/01/2023 12:00 23/01/2023 12:00 24/01/2023 08:15 24/01/2023 08:16 24/01/2023 08:17 24/01/2023 08:18 24/01/2023 08:19 24/01/2023 08:20 24/01/2023 08:21 24/01/2023 08:22 24/01/2023 08:23	0.1 0.1	0.8 0.4	20.7 20.7	3 3	3 0	0% 0%		-3.2 -3.5 -2.9 -2.5 -2.0 -1.7	-2	1033 1034 1037 1031	0.38		
EQUIPMENT: Soil Instruments GA5000 Portable Gas Analyser. Geotechnical Instruments Dipmeter. INSTALLATION TYPE: 50mm ID HDPE gas monitoring standpipe. See corresponding borehole log for details. METHOD: Gas flow measured using internal flow meter for 5 minutes. Ground gas monitored using 5 gas analyser for 5 minutes in accordance with CIRIA 665 (2007). REMARKS: LEL value calculated only. Full set of samples obtained using low-flow methodology on completion of visit 2.													

GAS AND WATER MONITORING RECORD

Telephone: 01452 739 165 . Fax: 01452 739 220 . Email: info@CCGround.co.uk

Project Name: St. Nicholas WWTW	Project No: C7806	Co-ords: E:308795.399 N:173259.199 Level: 62.47 mAD	Date 05/01/2023
Location: St. Nicholas, Cardiff			Logged By AK
Client: Morgan Sindall Plc			Checked By EW

Date & Time	Methane (CH ₄) (%)	Carbon Dioxide (CO ₂) (%)	Oxygen (O ₂) (%)	Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H ₂ S) (ppm)	LEL (%)	PID (VOC) (ppm)	Flow (L/hr)	Temp (C°)	Baro Pressure (mb)	Water Level (m)
Visit 1 14/12/2022 11/12/2022 12:00 12/12/2022 12:00 13/12/2022 12:00 14/12/2022 09:20 14/12/2022 09:21 14/12/2022 09:22 14/12/2022 09:23 14/12/2022 09:24 14/12/2022 09:25 14/12/2022 09:26 14/12/2022 09:27 14/12/2022 09:28 14/12/2022 09:29 14/12/2022 09:30 14/12/2022 09:31	 0.1 0.1 0.1 0.1 0.1	 0.2 0.2 0.2 0.2 0.2	 22.5 22.5 22.6 22.6 22.6	 1 0 0 0 0	 0 0 0 0 0	 2% 2% 2% 2% 2%	 	 0.0 0.0 0.0 0.0 0.0	-2	1001 1004 1005 999	0.51
Visit 2 05/01/2023 02/01/2023 12:00 03/01/2023 12:00 04/01/2023 12:00 05/01/2023 10:00 05/01/2023 10:01 05/01/2023 10:02 05/01/2023 10:03 05/01/2023 10:04 05/01/2023 10:05 05/01/2023 10:06 05/01/2023 10:07 05/01/2023 10:08 05/01/2023 10:09 05/01/2023 10:10 05/01/2023 10:11	 0.0 0.0 0.0 0.0 0.0	 0.1 0.1 0.1 0.1 0.1	 20.0 20.0 20.0 20.0 20.0	 0 0 0 0 0	 1 1 1 1 1	 0% 0% 0% 0% 0%	 	 0.0 0.0 0.0 0.0 0.0	12	1018 1008 1008 1013	0.81 Sampled
Visit 3 13/01/2023 10/01/2023 12:00 11/01/2023 12:00 12/01/2023 12:00 13/01/2022 09:34 13/01/2022 09:35 13/01/2022 09:36 13/01/2022 09:37 13/01/2022 09:38 13/01/2022 09:39 13/01/2022 09:40	 	 	No gas readings recorded. Vacuum created.					0.0 -0.1 -0.1 -0.1 -0.1	9	1006 1009 1002 1004	0.7

EQUIPMENT: Soil Instruments GA5000 Portable Gas Analyser. Geotechnical Instruments Dipmeter.

INSTALLATION TYPE: 50mm ID HDPE gas monitoring standpipe. See corresponding borehole log for details.

METHOD: Gas flow measured using internal flow meter for 5 minutes. Ground gas monitored using 5 gas analyser for 5 minutes in accordance with CIRIA 665 (2007).

REMARKS: LEL value calculated only. Full set of samples obtained using low-flow methodology on completion of visit 2.

Sheet 1 of 1

Telephone: 01452 739 165 , Fax: 01452 739 220 , Email: info@CCGround.co.uk

Co-ords: E:308795.399 N:173259.199
Level: 62.47 mAD

Date
05/01/2023

Logged By
AK

Checked By
FW

[illegible]

REMARKS: LEL value calculated only. Full set of samples obtained using low-flow methodology on completion of visit 2.

GAS AND WATER MONITORING RECORD

Telephone: 01452 739 165 . Fax: 01452 739 220 . Email: info@CCGround.co.uk

Project Name: St. Nicholas WWTW	Project No: C7806	Co-ords: E:308838.813 N:173298.068 Level: 64.57 mAD	Date 05/01/2023
Location: St. Nicholas, Cardiff			Logged By AK
Client: Morgan Sindall Plc			Checked By EW

Date & Time	Methane (CH ₄) (%)	Carbon Dioxide (CO ₂) (%)	Oxygen (O ₂) (%)	Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H ₂ S) (ppm)	LEL (%)	PID (VOC) (ppm)	Flow (L/hr)	Temp (C°)	Baro Pressure (mb)	Water Level (m)
Visit 1 14/12/2022 11/12/2022 12:00 12/12/2022 12:00 13/12/2022 12:00 14/12/2022 08:45 14/12/2022 08:46 14/12/2022 08:47 14/12/2022 08:48 14/12/2022 08:49 14/12/2022 08:50 14/12/2022 08:51 14/12/2022 08:52 14/12/2022 08:53 14/12/2022 08:54 14/12/2022 08:55 14/12/2022 08:56									-2	1001 1004 1005 999	
	0.1	0.9	20.2	0	0	2%		0.0			
	0.1	1.0	20.2	0	0	2%		0.0			
	0.1	1.0	20.3	0	0	2%		0.0			
	0.1	1.0	20.3	0	0	2%		0.0			
	0.1	1.0	20.3	0	0	2%					4.58
Visit 2 05/01/2023 02/01/2023 12:00 03/01/2023 12:00 04/01/2023 12:00 05/01/2023 11:15 05/01/2023 11:16 05/01/2023 11:17 05/01/2023 11:18 05/01/2023 11:19 05/01/2023 11:20 05/01/2023 11:21 05/01/2023 11:22 05/01/2023 11:23 05/01/2023 11:24 05/01/2023 11:25 05/01/2023 11:26									12	1018 1008 1008 1013	
	0.0	1.5	17.9	391	1	0%		0.2			
	0.0	1.2	17.9	276	1	0%		0.2			
								0.1			
								0.1			
								0.1			
	Water level upsurge										
											0.42 Sampled
Visit 3 13/01/2023 10/01/2023 12:00 11/01/2023 12:00 12/01/2023 12:00 13/01/2022 09:04 13/01/2022 09:05 13/01/2022 09:06 13/01/2022 09:07 13/01/2022 09:08 13/01/2022 09:09 13/01/2022 09:10 13/01/2022 09:11 13/01/2022 09:12									9	1006 1009 1002 1004	
	0.0	0.1	19.9	0	0	0%		0.0			
								-3.3			
								-2.6			
								-2.1			
								-1.6			
								-1.3			
			Water level upsurge								0.2

EQUIPMENT: Soil Instruments GA5000 Portable Gas Analyser. Geotechnical Instruments Dipmeter.

INSTALLATION TYPE: 50mm ID HDPE gas monitoring standpipe. See corresponding borehole log for details.

METHOD: Gas flow measured using internal flow meter for 5 minutes. Ground gas monitored using 5 gas analyser for 5 minutes in accordance with CIRIA 665 (2007).

REMARKS: LEL value calculated only. Full set of samples obtained using low-flow methodology on completion of visit 2.

GAS AND WATER MONITORING RECORD

Telephone: 01452 739 165 . Fax: 01452 739 220 . Email: info@CCGround.co.uk

Sheet 1 of 1

Co-ords: E:308838.813 N:173298.068
Level: 64.57 mAD

Date
05/01/2023

Logged By
AK

Checked By
FW

[illegible]

REMARKS: LEL value calculated only. Full set of samples obtained using low-flow methodology on completion of visit 2.



PERMEABILITY TEST - VARIABLE HEAD

BS EN ISO 22282-2:2012

CLIENT Morgan Sindall PLC

BOREHOLE

BH102

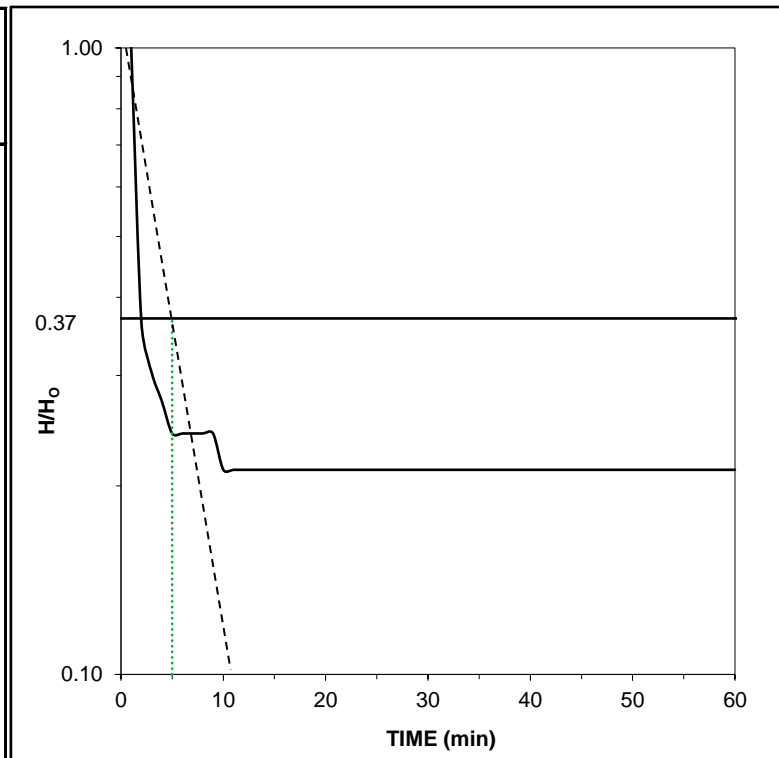
SITE St Nicholas WWTW

DEPTH RECORD

BASE OF FILTER	6.60 m	BOREHOLE DIAMETER IN TEST SECTION	0.12 m
TOP OF FILTER	3.00 m	DIAMETER OF ACCESS TUBE	0.05 m
TEST INTERVAL	3.60 m	FILTER MEDIUM	Gravel
HEIGHT OF DATUM ABOVE GROUND LEVEL	0.00 m	TYPE OF TEST	RISING
DEPTH TO STANDING WATER BELOW DATUM	2.77 m	DATE	24/01/2023

TEST RECORD

ELAPSED TIME (min)	DEPTH TO WATER BELOW DATUM (m)	HEAD (m) H	$\frac{H}{H_0}$
1.00	3.10	0.33	1.00
2.00	2.89	0.12	0.36
3.00	2.87	0.10	0.30
4.00	2.86	0.09	0.27
5.00	2.85	0.08	0.24
6.00	2.85	0.08	0.24
7.00	2.85	0.08	0.24
8.00	2.85	0.08	0.24
9.00	2.85	0.08	0.24
10.00	2.84	0.07	0.21
11.00	2.84	0.07	0.21
12.00	2.84	0.07	0.21
13.00	2.84	0.07	0.21
14.00	2.84	0.07	0.21
15.00	2.84	0.07	0.21
20.00	2.84	0.07	0.21
30.00	2.84	0.07	0.21
40.00	2.84	0.07	0.21
50.00	2.84	0.07	0.21
60.00	2.84	0.07	0.21



Hvorslev method

$$k = \frac{A}{FT}$$

Velocity graph method

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

Intake factor based on case* D

RESULTS

Hvorslev method		Velocity graph method	
Cross sectional area of access tube, A	0.0020 m ²	Cross sectional area of access tube, A	0.0020 m ²
Intake factor*, F	5.479 m	Intake factor*, F	5.479 m
Time lag, T	360 s	Variable head, H ₁	0.00 m at time, t ₁ s
		Variable head, H ₂	0.00 m at time, t ₂ s
Permeability, k	1.0E-06 ms⁻¹	Permeability, k	-- ms⁻¹

REMARKS

Test Operator: AK

CONTRACT
C7806CHECKED
EW

* See intake factors key sheet



PERMEABILITY TEST - VARIABLE HEAD

BS EN ISO 22282-2:2012

CLIENT Morgan Sindall Plc
SITE St. Nicholas WWTW

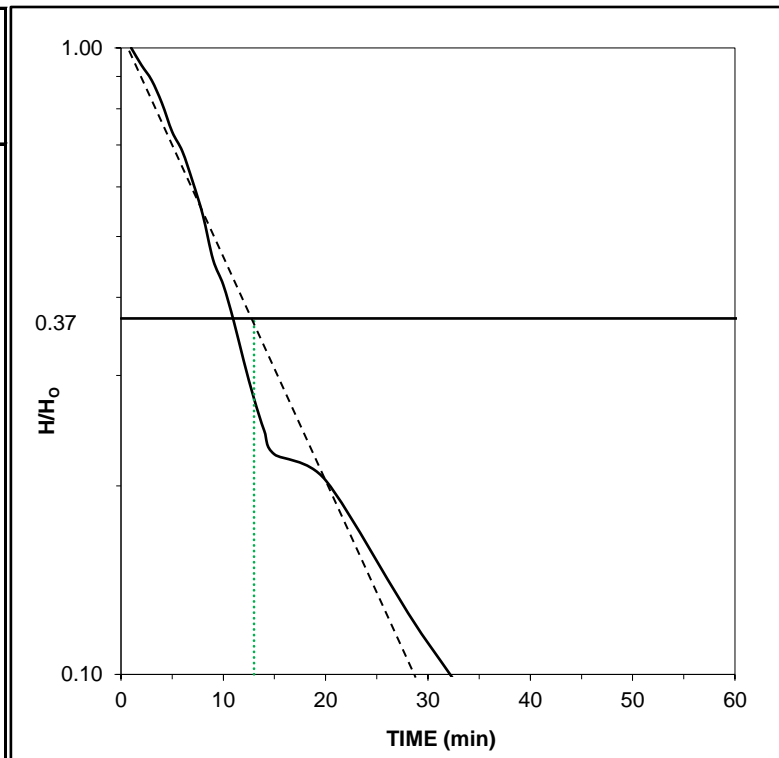
BOREHOLE BH103

DEPTH RECORD

BASE OF FILTER	3.00 m	BOREHOLE DIAMETER IN TEST SECTION	0.12 m
TOP OF FILTER	0.50 m	DIAMETER OF ACCESS TUBE	0.05 m
TEST INTERVAL	2.50 m	FILTER MEDIUM	Gravel
HEIGHT OF DATUM ABOVE GROUND LEVEL	0.00 m	TYPE OF TEST	RISING
DEPTH TO STANDING WATER BELOW DATUM	0.38 m	DATE	24/01/2023

TEST RECORD

ELAPSED TIME (min)	DEPTH TO WATER BELOW DATUM (m)	HEAD (m) H	$\frac{H}{H_0}$
1.00	1.36	0.98	1.00
2.00	1.30	0.92	0.94
3.00	1.25	0.87	0.89
4.00	1.18	0.80	0.82
5.00	1.10	0.72	0.73
6.00	1.05	0.67	0.68
7.00	0.98	0.60	0.61
8.00	0.91	0.53	0.54
9.00	0.83	0.45	0.46
10.00	0.79	0.41	0.42
11.00	0.74	0.36	0.37
12.00	0.69	0.31	0.32
13.00	0.65	0.27	0.28
14.00	0.62	0.24	0.24
15.00	0.60	0.22	0.22
20.00	0.58	0.20	0.20
30.00	0.49	0.11	0.11
40.00	0.45	0.07	0.07
50.00	0.45	0.07	0.07
60.00	0.45	0.07	0.07



Hvorslev method

$$k = \frac{A}{FT}$$

Velocity graph method

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

Intake factor based on case* D

RESULTS

Hvorslev method		Velocity graph method	
Cross sectional area of access tube, A	0.0020 m ²	Cross sectional area of access tube, A	0.0020 m ²
Intake factor*, F	4.173 m	Intake factor*, F	4.173 m
Time lag, T	780 s	Variable head, H ₁	0.00 m at time, t ₁
		Variable head, H ₂	0.00 m at time, t ₂
Permeability, k	6.0E-07 ms⁻¹	Permeability, k	-- ms⁻¹

REMARKS

Test Operator: AK

CONTRACT
C7806

CHECKED
EW

* See intake factors key sheet



PERMEABILITY TEST - VARIABLE HEAD

BS EN ISO 22282-2:2012

CLIENT Morgan Sindall Plc
SITE St. Nicholas WWTW

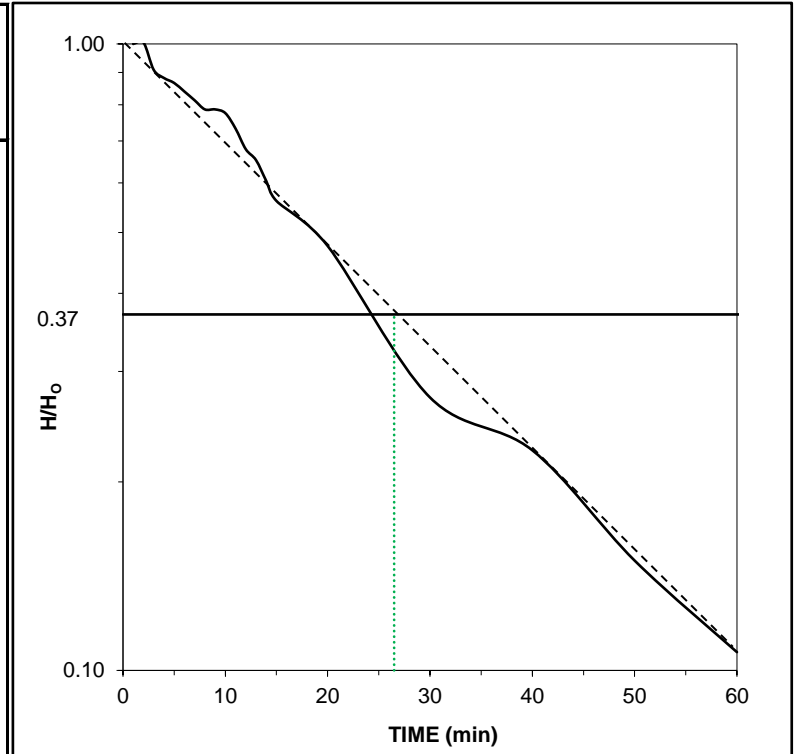
BOREHOLE BH104

DEPTH RECORD

BASE OF FILTER	5.00 m	BOREHOLE DIAMETER IN TEST SECTION	0.12 m
TOP OF FILTER	2.00 m	DIAMETER OF ACCESS TUBE	0.05 m
TEST INTERVAL	3.00 m	FILTER MEDIUM	Gravel
HEIGHT OF DATUM ABOVE GROUND LEVEL	0.00 m	TYPE OF TEST	RISING
DEPTH TO STANDING WATER BELOW DATUM	0.73 m	DATE	24/01/2023

TEST RECORD

ELAPSED TIME (min)	DEPTH TO WATER BELOW DATUM (m)	HEAD (m) H	$\frac{H}{H_0}$
1.00	2.60	1.87	1.00
2.00	2.61	1.88	1.01
3.00	2.43	1.70	0.91
4.00	2.38	1.65	0.88
5.00	2.35	1.62	0.87
6.00	2.30	1.57	0.84
7.00	2.25	1.52	0.81
8.00	2.20	1.47	0.79
9.00	2.20	1.47	0.79
10.00	2.18	1.45	0.78
11.00	2.10	1.37	0.73
12.00	2.00	1.27	0.68
13.00	1.95	1.22	0.65
14.00	1.86	1.13	0.60
15.00	1.78	1.05	0.56
20.00	1.62	0.89	0.48
30.00	1.24	0.51	0.27
40.00	1.15	0.42	0.22
50.00	1.01	0.28	0.15
60.00	0.93	0.20	0.11



Hvorslev method

$$k = \frac{A}{FT}$$

Velocity graph method

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

Intake factor based on case* D

RESULTS

Hvorslev method		Velocity graph method	
Cross sectional area of access tube, A	0.0020 m ²	Cross sectional area of access tube, A	0.0020 m ²
Intake factor*, F	4.777 m	Intake factor*, F	4.777 m
Time lag, T	1590 s	Variable head, H ₁	0.00 m at time, t ₁
		Variable head, H ₂	0.00 m at time, t ₂
Permeability, k	2.6E-07 ms⁻¹	Permeability, k	-- ms⁻¹

REMARKS

* See intake factors key sheet

Test Operator: AK

CONTRACT
C7806

CHECKED
EW



PERMEABILITY TEST - VARIABLE HEAD

BS EN ISO 22282-2:2012

CLIENT Morgan Sindall Plc
SITE St. Nicholas WWTW

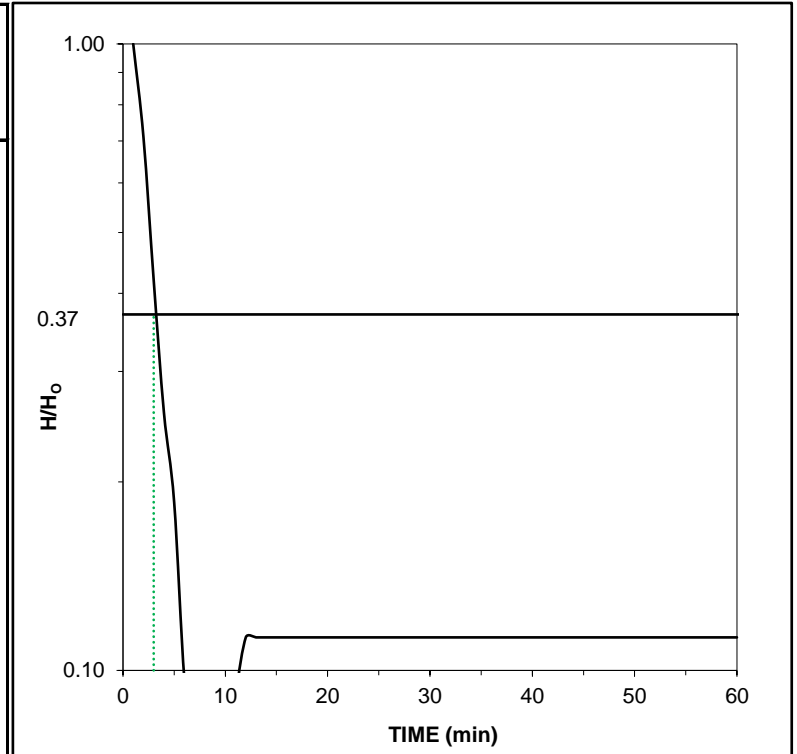
BOREHOLE BH105

DEPTH RECORD

BASE OF FILTER	5.00 m	BOREHOLE DIAMETER IN TEST SECTION	0.12 m
TOP OF FILTER	2.00 m	DIAMETER OF ACCESS TUBE	0.05 m
TEST INTERVAL	3.00 m	FILTER MEDIUM	Gravel
HEIGHT OF DATUM ABOVE GROUND LEVEL	0.00 m	TYPE OF TEST	RISING
DEPTH TO STANDING WATER BELOW DATUM	2.40 m	DATE	24/01/2023

TEST RECORD

ELAPSED TIME (min)	DEPTH TO WATER BELOW DATUM (m)	HEAD (m) H	$\frac{H}{H_0}$
1.00	3.64	1.24	1.00
2.00	3.28	0.88	0.71
3.00	2.92	0.52	0.42
4.00	2.72	0.32	0.26
5.00	2.63	0.23	0.19
6.00	2.52	0.12	0.10
7.00	2.49	0.09	0.07
8.00	2.41	0.01	0.01
9.00	2.39	0.01	0.01
10.00	2.34	0.06	0.05
11.00	2.29	0.11	0.09
12.00	2.26	0.14	0.11
13.00	2.26	0.14	0.11
14.00	2.26	0.14	0.11
15.00	2.26	0.14	0.11
20.00	2.26	0.14	0.11
30.00	2.26	0.14	0.11
40.00	2.26	0.14	0.11
50.00	2.26	0.14	0.11
60.00	2.26	0.14	0.11



Hvorslev method

$$k = \frac{A}{FT}$$

Velocity graph method

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

Intake factor based on case* D

RESULTS

Hvorslev method		Velocity graph method	
Cross sectional area of access tube, A	0.0020 m ²	Cross sectional area of access tube, A	0.0020 m ²
Intake factor*, F	4.777 m	Intake factor*, F	4.777 m
Time lag, T	180 s	Variable head, H ₁	0.00 m at time, t ₁
		Variable head, H ₂	0.00 m at time, t ₂
Permeability, k	2.3E-06 ms⁻¹	Permeability, k	-- ms⁻¹

REMARKS

Ground water level recovered to above standing water level. Permeability calculated on rise to 2.41m.


Test Operator: AB

CONTRACT
C7806


CHECKED
EW

* See intake factors key sheet


Low Flow Monitoring and Sampling

Borehole	Date	Time (Mins)	Temp (°C)	DO (mg/L)	DO SAT (%)	ORP (mV)	pH	Act Cond (µS/cm)	Baro (mbar)	Salinity (psu)	TDS (ppm)
BH102	05/01/23	10:57:00	12.34	9.05	83.38	104.98	7.61	451.60	1014.53	0.29	393.63
		10:58:00	12.66	8.54	78.70	105.51	7.44	449.82	1014.50	0.29	392.49
		10:59:00	12.92	8.49	78.21	105.46	7.37	450.74	1014.42	0.29	393.18
		11:00:00	13.12	8.47	78.10	105.90	7.34	451.16	1014.48	0.29	393.12
		11:01:00	13.30	8.45	77.84	106.65	7.33	449.79	1014.39	0.29	392.37
		11:02:00	13.43	8.45	77.94	107.30	7.32	450.81	1014.46	0.29	392.82
		11:03:00	13.54	8.45	77.96	107.87	7.31	450.68	1014.32	0.29	392.50
		11:04:00	13.64	8.45	77.96	108.50	7.31	451.40	1014.41	0.29	393.08
		11:05:00	13.73	8.45	78.01	109.08	7.30	452.66	1014.39	0.29	393.74
		11:06:00	13.83	8.44	78.10	109.50	7.30	453.58	1014.38	0.29	393.89
Remarks:											
 CC Ground Investigations Ltd			Contract Name:			St. Nicholas WWTW					
			Contract ID:			C7806					
			Client:			Welsh Water					
			Instrument used:			In-Situ Smar TROLL MP Handheld Instrument + Low Flow Sampling System. Geotech Geopump Peristaltic Pump.					


Low Flow Monitoring and Sampling

Borehole	Date	Time (Mins)	Temp (°C)	DO (mg/L)	DO SAT (%)	ORP (mV)	pH	Act Cond (µS/cm)	Baro (mbar)	Salinity (psu)	TDS (ppm)
BH103	05/01/23	11:45:00	12.63	7.53	68.80	131.70	7.28	509.31	1014.81	0.34	447.14
		11:46:00	12.89	7.06	64.25	130.82	7.21	510.17	1015.48	0.34	449.99
		11:47:00	13.06	6.94	63.17	130.44	7.18	509.28	1015.81	0.34	449.93
		11:48:00	13.22	6.92	62.87	130.28	7.16	508.69	1016.05	0.34	449.99
		11:49:00	13.31	6.88	62.54	130.05	7.16	508.63	1016.15	0.34	450.07
		11:50:00	13.40	6.86	62.27	129.78	7.15	508.66	1016.30	0.34	450.32
		11:51:00	13.49	6.83	61.98	129.51	7.15	508.56	1016.41	0.34	450.32
		11:52:00	13.54	6.83	61.98	129.53	7.15	508.68	1016.49	0.34	450.62
								Remarks:			
<div></div> <div>CC Ground Investigations Ltd</div>			Contract Name:			St. Nicholas WWTW					
			Contract ID:			C7806					
			Client:			Welsh Water					
			Instrument used:			In-Situ Smar TROLL MP Handheld Instrument + Low Flow Sampling System. Geotech Geopump Peristaltic Pump.					

Low Flow Monitoring and Sampling

Borehole	Date	Time (Mins)	Temp (°C)	DO (mg/L)	DO SAT (%)	ORP (mV)	pH	Act Cond (µS/cm)	Baro (mbar)	Salinity (psu)	TDS (ppm)
BH104	05/01/23	10:13:00	16.68	4.25	38.70	86.33	7.77	634.25	1014.92	0.42	555.32
		10:14:00	16.47	1.59	14.20	86.62	7.58	583.86	1014.85	0.39	515.90
		10:15:00	16.32	1.10	10.03	85.58	7.50	579.58	1014.88	0.38	510.57
		10:16:00	16.16	0.95	8.63	83.88	7.47	574.14	1014.89	0.38	507.63
		10:17:00	16.00	0.87	7.93	82.20	7.45	573.25	1014.90	0.38	506.97
		10:18:00	15.88	0.83	7.57	80.43	7.44	573.37	1014.87	0.38	506.49
		10:19:00	15.78	0.78	7.14	78.97	7.43	575.33	1014.87	0.38	506.79
		10:20:00	15.63	0.73	6.68	77.41	7.43	573.69	1014.87	0.38	506.27
								Remarks:			
<div></div> <div>CC Ground Investigations Ltd</div>			Contract Name:			St. Nicholas WWTW					
			Contract ID:			C7806					
			Client:			Welsh Water					
			Instrument used:			In-Situ Smar TROLL MP Handheld Instrument + Low Flow Sampling System. Geotech Geopump Peristaltic Pump.					

Low Flow Monitoring and Sampling

Borehole	Date	Time (Mins)	Temp (°C)	DO (mg/L)	DO SAT (%)	ORP (mV)	pH	Act Cond (μS/cm)	Baro (mbar)	Salinity (psu)	TDS (ppm)
BH105	05/01/23	11:25:00	12.34	9.30	85.94	126.78	7.50	464.61	1014.53	0.30	405.05
		11:26:00	12.58	6.99	63.90	121.63	7.35	469.74	1014.44	0.31	413.40
		11:27:00	12.73	6.57	59.87	120.57	7.29	469.73	1014.49	0.31	414.55
		11:28:00	12.88	6.46	58.93	120.67	7.26	470.64	1014.51	0.31	415.33
		11:29:00	12.99	6.39	58.30	120.89	7.24	470.98	1014.32	0.31	415.35
		11:30:00	13.09	6.35	57.93	121.31	7.24	471.47	1014.35	0.31	415.94
		11:31:00	13.19	6.32	57.64	121.68	7.23	471.08	1014.34	0.31	415.54
		11:32:00	13.28	6.29	57.36	121.86	7.23	472.78	1014.37	0.31	417.24
								Remarks:			
<div></div> <div>CC Ground Investigations Ltd</div>			Contract Name:			St. Nicholas WWTW					
			Contract ID:			C7806					
			Client:			Welsh Water					
			Instrument used:			In-Situ Smar TROLL MP Handheld Instrument + Low Flow Sampling System. Geotech Geopump Peristaltic Pump.					

APPENDIX G

SPT Calibration Certificate



SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005
+A1:2011

James and Milton Drilling Ltd
63 Fakenham Road
Great Ryburgh
NR21 7AW

SPT Hammer Ref: CC20..
Test Date: 26/02/2022
Report Date: 01/03/2022
File Name: CC20.spt
Test Operator: RW

Instrumented Rod Data

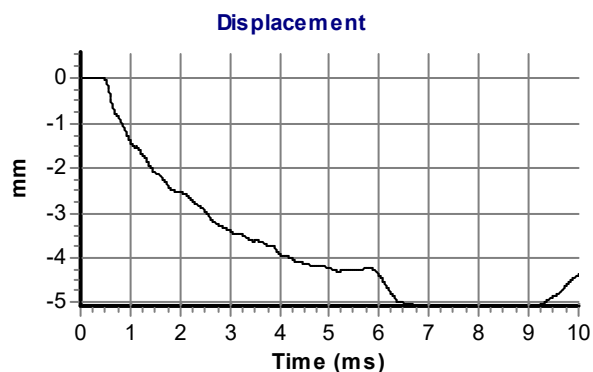
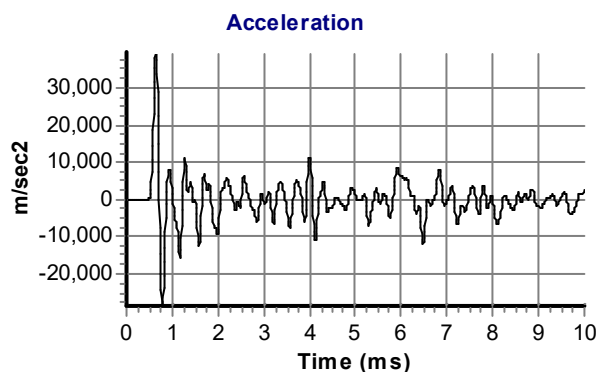
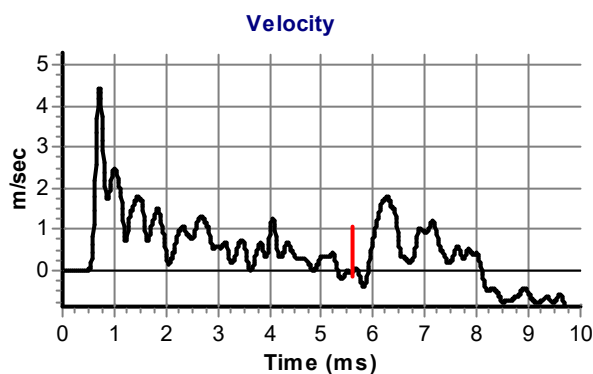
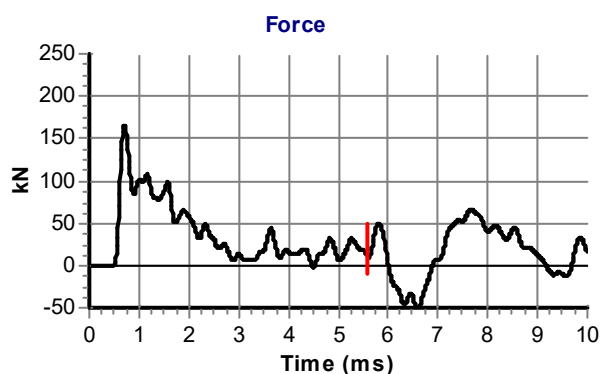
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.6
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 63177
Accelerometer No.2: 63178

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 13.7

Comments / Location

CC YARD

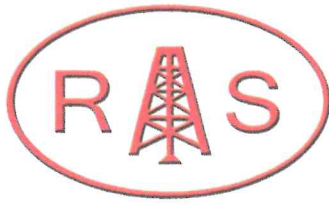


Calculations

Area of Rod A (mm^2): 983
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 299

Energy Ratio E_r (%): **63**

Signed: Richard Walter BEng (Hons)
Title: Drilling Manager (J&M Drilling Ltd)



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CERTIFICATE OF CALIBRATION AND TEST N° 6945

RIG AND SUPPLY PILCON VANE SHEAR TEST EQUIPMENT – MODEL 19.01.00

SERIAL N° DR6363

The directly indicated measurement of shear strength is within $\pm 2\%$ of the equivalent induced torque.

This unit has been calibrated against a NORBAR type 50026 torque transducer, (Serial N° 23008, Certificate N° 160699) the calibration of which is traceable to National Standards, and should be periodically returned to RIG AND SUPPLY for verification.

SIGNED

DATE

07/11/22

Customer	Environmental Science & Technology	Certificate Number	11211
Contact	Steve Goodman	Date	26/05/2022
Part Number	PGM7350	Next Calibration Due	25/05/2023
Unit Type	MiniRae Lite		
Serial Number	595-003336		
Comments:	Zero performed using carbon filter		

Gas	Span	Units	Bump Test	Units	Part Code	Cylinder LOT
Isobutylene	100.0	ppm	100.0	ppm	C006393	955-344219

Final Inspection

Does the unit power on?
Any error messages after power on?
Visual Alarms Working on Bump?
Audible Alarms Working on Bump?

Yes
No
Yes
N/A

Calibration report


ADVISORY: Please ensure a filter is used at all times.

Calibrated By	Steven Goodman	Calibration Date	26/05/2023
Signature			

APPENDIX C

Geotechnical Data Plots

FIGURE C1 SPT N (60) VS DEPTH MBGL

PROJECT DESCRIPTION	St Nicholas WWTW	
	SPT N ₆₀ VALUE VS DEPTH	
	All Materials	

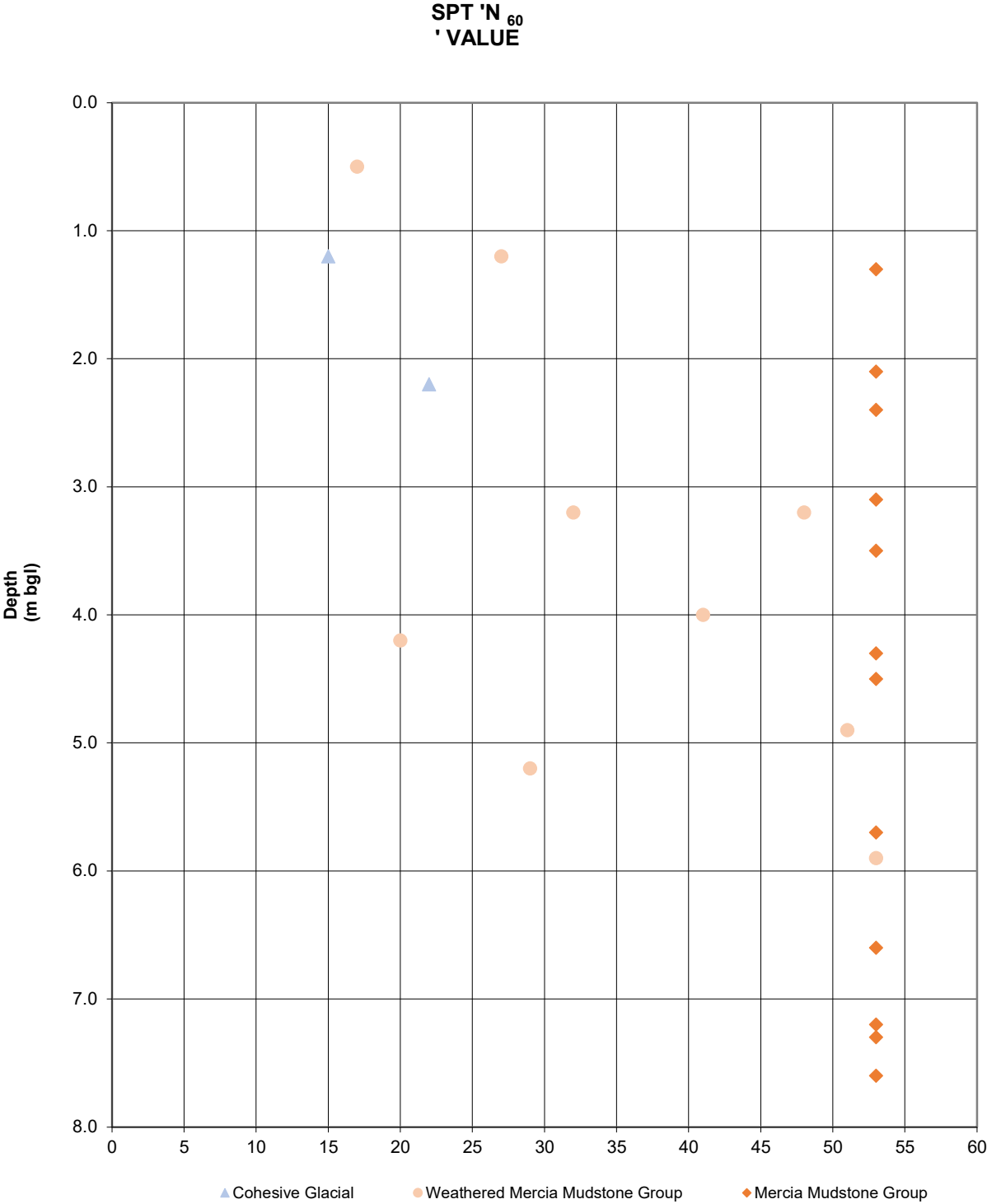


FIGURE C1

FIGURE C2 SPT N (60) VS ELEVATION MAOD

PROJECT
DESCRIPTION

St Nicholas WWTW
SPT N₆₀ VALUE VS ELEVATION

All Materials

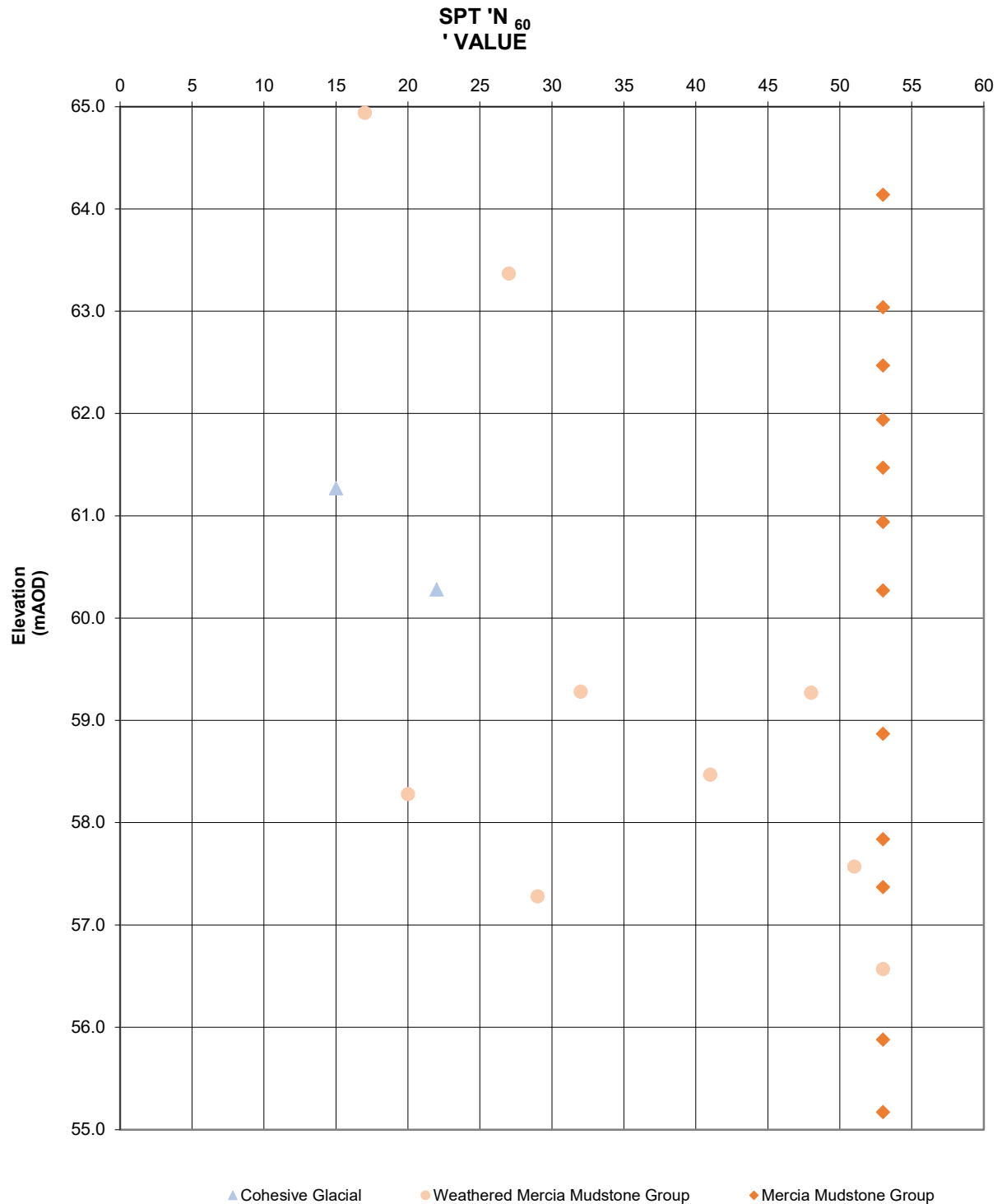


FIGURE C2

FIGURE C3 SHEAR STRENGTH VS DEPTH

PROJECT
DESCRIPTION

St Nicholas WWTW
SHEAR STRENGTH VS DEPTH
Cohesive Glacial Soils

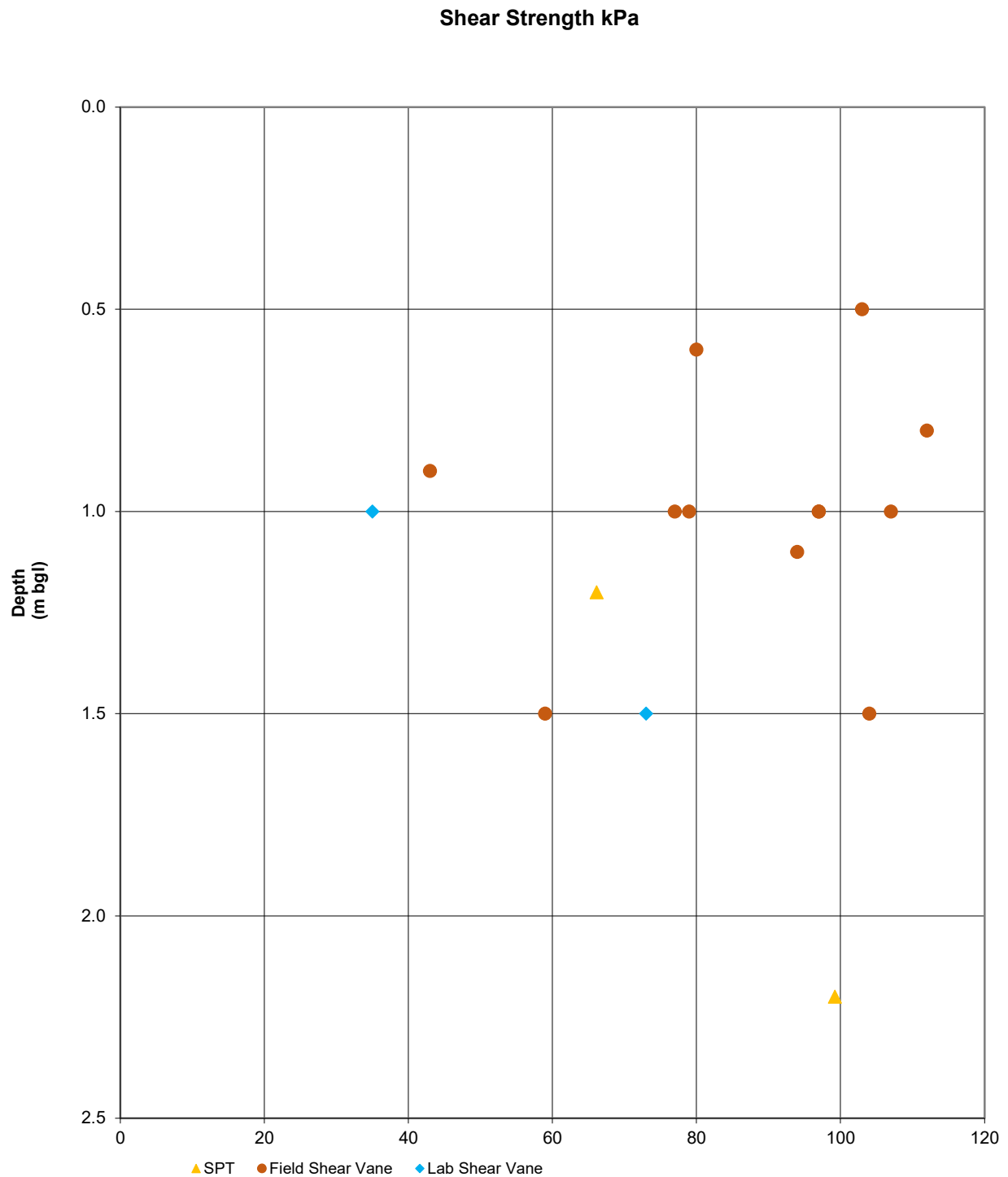


FIGURE C3

FIGURE C4 UCS VS DEPTH MBGL

PROJECT
DESCRIPTION

St Nicholas WWTW

UNIAXIAL COMPRESSIVE STRENGTH VS DEPTH

Mercia Mudstone Group

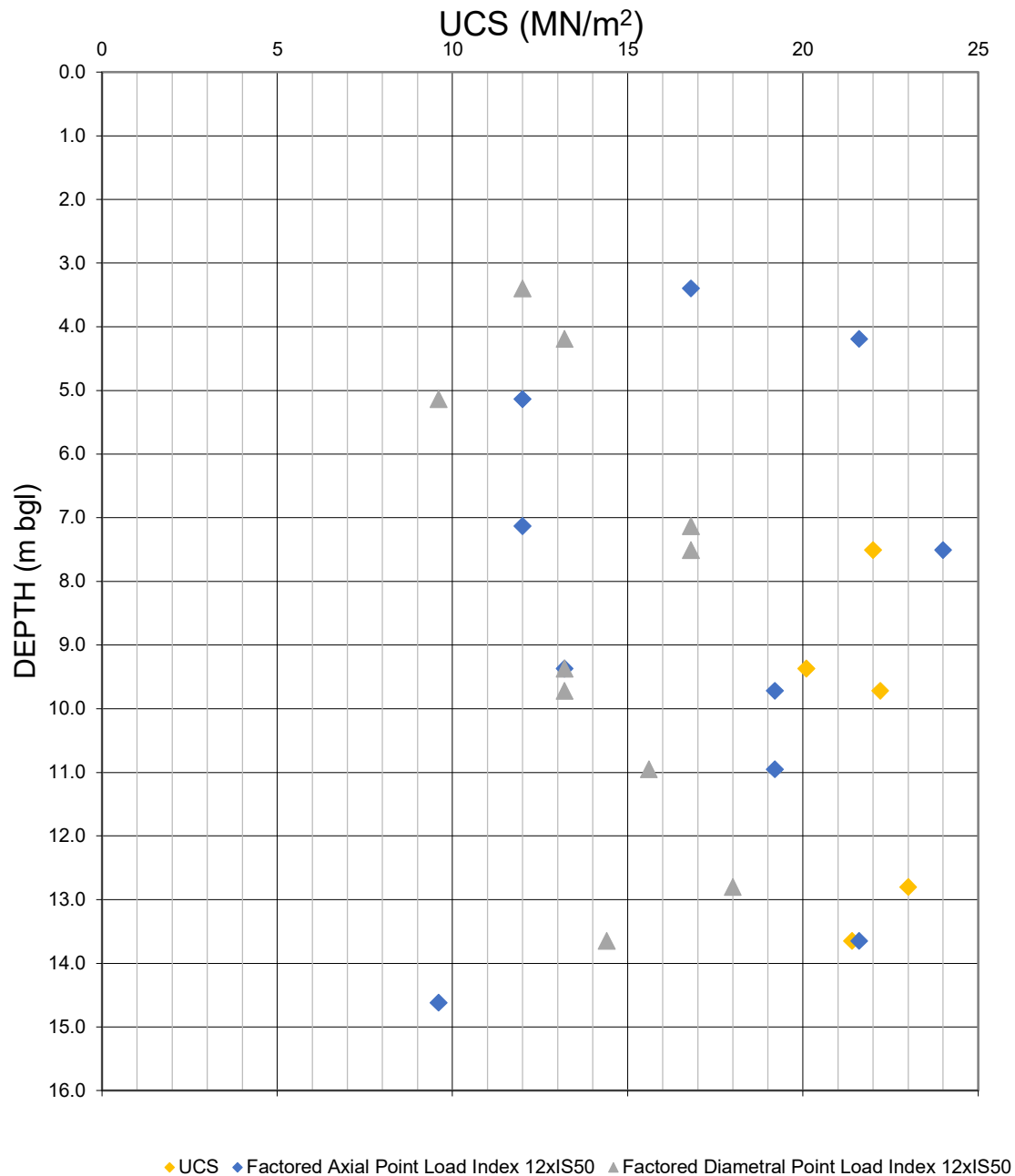



FIGURE C4

FIGURE C5 UCS VS ELEVATION MAOD

PROJECT DESCRIPTION	St Nicholas WWTW	
	UNIAXIAL COMPRESSIVE STRENGTH VS ELEVATION	
	Mercia Mudstone Group	

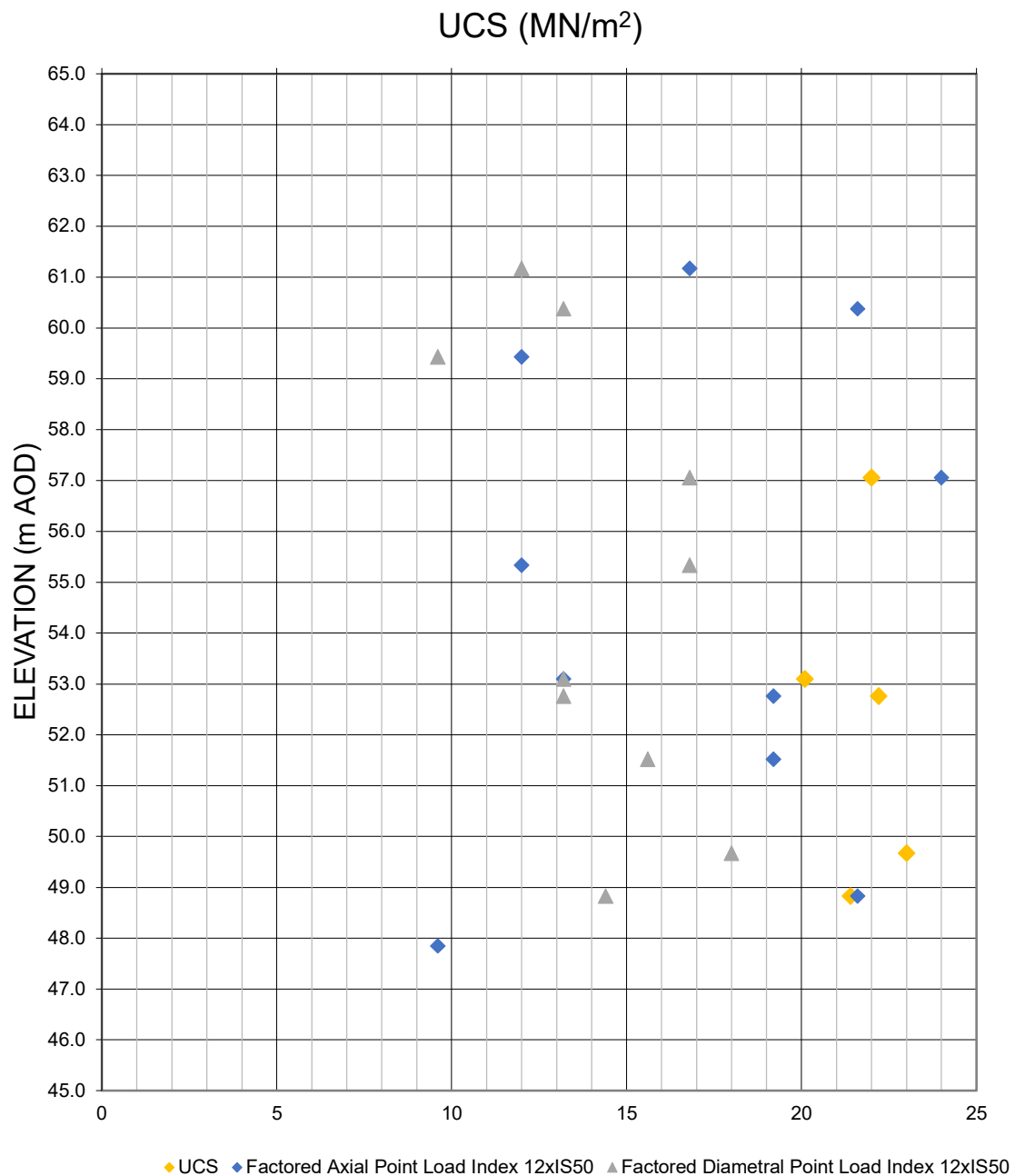


FIGURE C5

APPENDIX D
ES-DAT Output Sheets

Data Comments

#1 Brown clay and loam with gravel and vegetation.
#2 Brown clay and sand with gravel and vegetation.
#3 Brown clay and sand with vegetation and stones.
#4 Brown loam and clay with gravel and vegetation.
#5 Brown loam and sand with gravel and vegetation.
#6 Brown clay and sand with gravel and stones.
#7 Brown clay and sand with vegetation.
#8 Brown gravelly clay with vegetation.
#9 Brown clay and sand with gravel.
#10 Brown clay and sand.

https://arcadiso365-my.sharepoint.com/personal/louisa_bindi_arcadis_com/Documents/Documents/Projects/St Nicholas/Interpretative Report/Appendices/Appendix D - ES-DAT/[Leachate_Chemistry_Output_Table1.xlsm]Chemistry Output Table																						
				Field_ID	BH103	BH105	TP106	TP107	TP110	TP114												
				Location_Code	BH103	BH105	TP106	TP107	TP110	TP114												
				Sample_Depth	1	0.5	1	0.5	0.2	0.5												
				Range																		
				Sampled_Date	01/12/2022	30/11/2022	30/11/2022	01/12/2022	28/11/2022	30/11/2022												
				Matrix_Descrip	TILL	TILL	TILL	MG	MG	MG												
				tion																		
				Site_ID	WWSN	WWSN	WWSN	WWSN	WWSN	WWSN												
				Matrix_Type	Soil	Soil	Soil	Soil	Soil	Soil												
				UK Drinking Water Standards	UK Freshwater EQS						Statistical Summary											
Chem_Group	ChemName	output unit	EQL								Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline	
Metals	Antimony	µg/L	1.7	5 ^{#1}		<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	6	0	<1.7	ND	<1.7	ND	0.85	0.85	0	0	
	Arsenic	µg/L	1	10 ^{#1}	50 ^{#2}	4	1.9	1.4	3.3	<1	3.1	6	5	<1	1.4	4	2.4	2.5	1.3	0	0	
	Barium	µg/L	0.05	1300 ^{#3}		4.8	6.3	8.3	52.3	10.4	42.8	6	6	4.8	4.8	52.3	52.3	21	9.35	21	0	
	Cadmium	µg/L	0.1	5 ^{#1}	0.08 ^{#4}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6	0	<0.1	ND	<0.1	ND	0.05	0.05	0	6	
	Chromium	µg/L	0.4	50 ^{#1}	3.4 ^{#5}	<0.4	<0.4	0.5	1.7	1.2	1	6	4	<0.4	0.5	1.7	1.7	0.8	0.75	0.6	0	
	Copper	µg/L	0.7	2000 ^{#1}	1(bio) ^{#6}	3.5	5.6	5.6	6.5	16	11	6	6	3.5	3.5	16	16	8	6.05	4.6	6	
	Lead	µg/L	1	10 ^{#1}	1.2(bio) ^{#6}	<1	<1	<1	<1	<1	<1	6	0	<1	ND	<1	ND	0.5	0.5	0	0	
	Mercury	µg/L	0.5	1 ^{#1}	0.07(MAC) ^{#7}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6	0	<0.5	ND	<0.5	ND	0.25	0.25	0	6	
	Molybdenum	µg/L	0.4	70 ^{#8}		<0.4	<0.4	0.9	2.7	<0.4	1.7	6	3	<0.4	0.9	2.7	0.98	0.55	1	0	0	
	Nickel	µg/L	0.3	20 ^{#1}	4(bio) ^{#6}	0.3	<0.3	0.5	<0.3	2.6	1.3	6	4	<0.3	0.3	2.6	2.6	0.83	0.4	0.97	0	
Selenium	µg/L	4	10 ^{#1}		<4	<4	<4	<4	<4	<4	6	0	<4	ND	<4	ND	2	2	0	0		
Zinc	µg/L	0.4	3000 ^{#9}	10.9(bio) ^{#6}	5.1	6.5	5.6	5.8	13	12	6	6	5.1	5.1	13	13	8	6.15	3.5	2	2	
Inorganics	Chloride	mg/L	0.15	250 ^{#1}	250 ^{#10}	0.95	0.56	1	0.54	0.98	0.8	6	6	0.54	0.54	1	1	0.81	0.875	0.21	0	
	Fluoride	µg/L	50	1500 ^{#1}	1000 ^{#11}	160	210	300	640	170	330	6	6	160	160	640	640	302	255	179	0	
	Sulphate	mg/L	0.1	250(SO4) ^{#12}	400 ^{#10}	1.1	1.2	1.1	2.6	0.74	6.9	6	6	0.74	0.74	6.9	6.9	2.3	1.15	2.4	0	
	TDS	µg/L	4000			22,000	30,000	34,000	85,000	8900	91,000	6	6	8900	8900	91000	91000	45150	32000	34334	0	
Phenolics	Total Monohydric Phenols	µg/L	10			<10	<10	<10	<10	<10	<10	6	0	<10	ND	<10	ND	5	5	0	0	
Other	Dissolved Organic Carbon	µg/L	100			14,200	13,200	13,300	9690	17,800	9820	6	6	9690	9690	17800	17800	13002	13250	3023	0	

Env Stds Description

UK Drinking Water Standards:UK Drinking Water Standards - Water Supply (Water Quality) Regulations, 2016 [http://www.legislation.gov.uk/uksi/2016/614/pdfs/ukxi_20160614_en.pdf] plus other key CoC. To be used to assess risk to an aquifer.
UK Freshwater EQS:UK freshwater EQS Annual Average (AA) [https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit] plus other key CoC. 'UK Freshwater EQS - further assessment' provides further assessment of criteria dependent CoC.

Env Stds Comments

				Field_ID	BH103	BH105	TP106	TP107	TP110	TP114												
				Location_Code	BH103	BH105	TP106	TP107	TP110	TP114												
				Sample_Depth_Range	1	0.5	1	0.5	0.2	0.5												
				Sampled_Date_Time	01/12/2022	30/11/2022	30/11/2022	01/12/2022	28/11/2022	30/11/2022												
				Matrix_Description	TILL	TILL	TILL	MG	MG	MG												
				Site_ID	WWSN	WWSN	WWSN	WWSN	WWSN	WWSN												
				Matrix_Type	Soil	Soil	Soil	Soil	Soil	Soil												
				UK Drinking Water Standards	UK Freshwater EQS						Statistical Summary											
Chem_Group	ChemName	output unit	EQL																			
											Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline	

#1:Water Supply (Water Quality) Regulations 2016.
#2:Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.
#3:Guidelines for Drinking-water Quality, 4th Edition. WHO, 2011
#4:Water Framework Directive (Standards & Classification) Directions (England & Wales) 2015. Dissolved fraction. Lowest criteria presented (<40mg/l of CaCO3). See 'further assessment' if criteria exceeded and hardness (CaCO3) data available.
#5:Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. Dissolved Fraction. If hexavalent chromium (CrVI) data is available, a value of 4.7µg/l may be appropriate for the remaining trivalent chromium (CrIII).
#6:Water Framework Directive (Standards & Classification) Directions (England & Wales) 2015. Dissolved & bioavailable (bio) fraction plus background. M-BAT tool to assess: <http://wfd.uk.org/resources/rivers-lakes-metal-bioavailability-assessment-tool-m-bat>
#7:Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. Dissolved Fraction. MAC adopted in absence of AA value.
#8:Guidelines for Drinking-water Quality, 4th Edition. WHO, 2011. Informal value.
#9:Guidelines for Drinking-water Quality, 4th Edition. WHO, 2011. Based on taste rather than a formal guideline.
#10:Operational Targets and EQS. EA, April 2018
#11:Operational Targets and EQS. EA, April 2018. Dissolved fraction. Lowest criteria presented (<50 mg/l CaCO3). See 'further assessment' values if criteria exceeded and hardness (CaCO3) data available.
#12:Water Supply (Water Quality) Regulations 2016. As SO4.

[https://arcadiso365-my.sharepoint.com/personal/louisa_bindi_arcadis_com/Documents/Documents/Projects/St Nicholas/Interpretative Report/Appendices/Appendix D - ES-DAT/\[Water_Chemistry_Output_Table1.xlsm\]](https://arcadiso365-my.sharepoint.com/personal/louisa_bindi_arcadis_com/Documents/Documents/Projects/St Nicholas/Interpretative Report/Appendices/Appendix D - ES-DAT/[Water_Chemistry_Output_Table1.xlsm])Chemistry Output Table

				Field_ID	BH102	BH103	BH104	BH105												
				Location_Code	BH102	BH103	BH104	BH105												
				Well																
				Sampled_Date_Time	05/01/2023	05/01/2023	05/01/2023	05/01/2023												
				UK Drinking Water Standards	UK Freshwater EQS															Statistical Summary
Chem_Group	ChemName	output unit	EQL							Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline
Metals	Arsenic (Filtered)	µg/L	0.15	10 ^{#1}	50 ^{#2}	0.25	0.34	0.16	0.34	4	4	0.16	0.16	0.34	0.34	0.27	0.295	0.086	0	0
	Boron (Filtered)	µg/L	10	1000 ^{#1}	2000 ^{#3}	15	19	35	24	4	4	15	15	35	35	23	21.5	8.7	0	0
	Cadmium (Filtered)	µg/L	0.02	5 ^{#1}	0.08 ^{#4}	<0.02	0.05	0.04	<0.02	4	2	<0.02	0.04	0.05	0.05	0.028	0.025	0.021	0	0
	Chromium (hexavalent) (Filtered)	µg/L	5		3.4 ^{#5}	<5	<5	<5	<5	4	0	<5	ND	<5	ND	2.5	2.5	0	4	0
	Chromium (Filtered)	µg/L	0.2	50 ^{#1}	3.4 ^{#6}	0.4	0.3	<0.2	0.3	4	3	<0.2	0.3	0.4	0.4	0.28	0.3	0.13	0	0
	Copper (Filtered)	µg/L	0.5	2000 ^{#1}	1(bio) ^{#7}	5.2	1.4	0.7	2.5	4	4	0.7	0.7	5.2	5.2	2.5	1.95	2	3	3
	Lead (Filtered)	µg/L	0.2	10 ^{#1}	1.2(bio) ^{#7}	<0.2	<0.2	<0.2	<0.2	4	0	<0.2	ND	<0.2	ND	0.1	0.1	0	0	0
	Mercury (Filtered)	µg/L	0.05	1 ^{#1}	0.07(MAC) ^{#8}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Nickel (Filtered)	µg/L	0.5	20 ^{#1}	4(bio) ^{#7}	0.9	6.3	2.9	1.2	4	4	0.9	0.9	6.3	6.3	2.8	2.05	2.5	1	1
	Selenium (Filtered)	µg/L	0.6	10 ^{#1}		<0.6	0.8	<0.6	<0.6	4	1	<0.6	0.8	0.8	0.8	0.43	0.3	0.25	0	0
Zinc (Filtered)	µg/L	0.5	3000 ^{#9}	10.9(bio) ^{#7}	6	17	2.8	11	4	4	2.8	2.8	17	17	9.2	8.5	6.2	2	2	
Inorganics	Cyanide Total	µg/L	1	50 ^{#1}	1 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
PAH	Naphthalene	µg/L	3		2 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Naphthalene (Filtered)	µg/L	0.01		2 ^{#2}	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	0	0
	Acenaphthene (Filtered)	µg/L	0.01		No UK EQS	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	4
	Acenaphthylene (Filtered)	µg/L	0.01		No UK EQS	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	4
	Fluoranthene (Filtered)	µg/L	0.01		0.0063 ^{#2}	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	0
	Anthracene (Filtered)	µg/L	0.01		0.1 ^{#2}	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	0	0
	Phenanthrene (Filtered)	µg/L	0.01		No UK EQS	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	4
	Fluorene (Filtered)	µg/L	0.01		No UK EQS	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	4
	Chrysene (Filtered)	µg/L	0.01		No UK EQS	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	4
	Pyrene (Filtered)	µg/L	0.01		No UK EQS	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	4
	Benzo(a)anthracene (Filtered)	µg/L	0.01		No UK EQS	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	4
	Benzo(b)fluoranthene (Filtered)	µg/L	0.01	0.025 ^{#10}	See BaP ^{#11}	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	0	0
	Benzo(k)fluoranthene (Filtered)	µg/L	0.01	0.025 ^{#10}	See BaP ^{#11}	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	0	0
	Benzo(a)pyrene (Filtered)	µg/L	0.01	0.01 ^{#1}	0.00017 ^{#11}	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	0
	Dibenz(a,h,i)anthracene (Filtered)	µg/L	0.01		No UK EQS	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	4	4
	Benzo(g,h,i)perylene (Filtered)	µg/L	0.01	0.025 ^{#10}	See BaP ^{#11}	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	0	0
	Indeno(1,2,3-c,d)pyrene (Filtered)	µg/L	0.01	0.025 ^{#10}	See BaP ^{#11}	<0.01	<0.01	<0.01	<0.01	4	0	<0.01	ND	<0.01	ND	0.005	0.005	0	0	0
	PAH 16 Total	µg/L	0.16			<0.16	<0.16	<0.16	<0.16	4	0	<0.16	ND	<0.16	ND	0.08	0.08	0	0	0

				Field_ID	BH102	BH103	BH104	BH105												
				Location_Code	BH102	BH103	BH104	BH105												
				Well																
				Sampled_Date	05/01/2023	05/01/2023	05/01/2023	05/01/2023												
				Time																
				UK Drinking Water Standards	UK Freshwater EQS					Statistical Summary										
Chem_Group	ChemName	output unit	EQL							Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline
TPH CWG	>C5-C6 Aliphatics	µg/L	1	See TPH	See TPH	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	4
	>C6-C8 Aliphatics	µg/L	1	See TPH	See TPH	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	4
	>C8-C10 Aliphatics	µg/L	1	See TPH	See TPH	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	4
	>C10-C12 Aliphatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
	>C12-C16 Aliphatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
	>C16-C21 Aliphatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
	>C21-C35 Aliphatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
	Total >C5-C35 Aliphatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
	>EC5-EC7 Aromatics	µg/L	1	See TPH	See TPH	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	4
	>EC7-EC8 Aromatics	µg/L	1	See TPH	See TPH	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	4
	>EC8-EC10 Aromatics	µg/L	1	See TPH	See TPH	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	4
	>EC10-EC12 Aromatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
	>EC12-EC16 Aromatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
	>EC16-EC21 Aromatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
	>EC21-EC35 Aromatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4
Total >EC5-EC35 Aromatics	µg/L	10	See TPH	See TPH	<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	4	4	
BTEX and MTBE	Benzene	µg/L	3	1 ^{#1}	10 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Toluene	µg/L	3	700 ^{#12}	74 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Ethylbenzene	µg/L	3	300 ^{#12}	20 ^{#13}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Xylene (o)	µg/L	3	250 ^{#14}	15 ^{#15}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	MTBE	µg/L	3	15 ^{#16}	15 ^{#17}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
VOC	Styrene	µg/L	3		50 ^{#3}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	cis-1,3-dichloropropene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	trans-1,3-dichloropropene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,1,1,2-tetrachloroethane	µg/L	3		70 ^{#18}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,1,1-trichloroethane	µg/L	3	2000 ^{#19}	100 ^{#3}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,1,2,2-tetrachloroethane	µg/L	3		70 ^{#18}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,1,2-trichloroethane	µg/L	3		400 ^{#3}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,1-dichloroethane	µg/L	3	2.8 ^{#20}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,1-dichloroethene	µg/L	3	140 ^{#21}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,1-dichloropropene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0

				Field_ID	BH102	BH103	BH104	BH105												
				Location_Code	BH102	BH103	BH104	BH105												
				Well																
				Sampled_Date	Time	05/01/2023	05/01/2023	05/01/2023	05/01/2023											
				UK Drinking Water Standards	UK Freshwater EQS					Statistical Summary										
Chem_Group	ChemName	output unit	EQL					Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Exceedances	Guideline	Number of	Guideline
	1,2,4-trimethylbenzene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,2-dibromo-3-chloropropane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,2-dibromoethane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,2-dichloroethane	µg/L	3	3 ^{#1}	10 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,2-dichloropropane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,3,5-trimethylbenzene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,3-dichloropropane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	2,2-dichloropropane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	2-chlorotoluene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	4-chlorotoluene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Bromobenzene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Bromodichloromethane	µg/L	3	25 ^{#22}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Bromoform	µg/L	3	25 ^{#22}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Bromomethane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Carbon tetrachloride	µg/L	3	3 ^{#1}	12 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Chlorodibromomethane	µg/L	3	25 ^{#22}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Chloroethane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Chloroform	µg/L	3	25 ^{#22}	2.5 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Chloromethane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	cis-1,2-dichloroethene	µg/L	3	25 ^{#23}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Dibromomethane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Isopropylbenzene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	n-butylbenzene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	n-propylbenzene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	p-isopropyltoluene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	sec-butylbenzene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Trichloroethene	µg/L	3	5 ^{#24}	10 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	tert-butylbenzene	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Tetrachloroethene	µg/L	3	5 ^{#24}	10 ^{#2}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	trans-1,2-dichloroethene	µg/L	3	25 ^{#23}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Trichlorofluoromethane	µg/L	3			<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0

				Field_ID	BH102	BH103	BH104	BH105												
				Location_Code	BH102	BH103	BH104	BH105												
				Well																
				Sampled_Date	05/01/2023	05/01/2023	05/01/2023	05/01/2023												
				Time																
				UK Drinking Water Standards	UK Freshwater EQS					Statistical Summary										
Chem_Group	ChemName	output unit	EQL							Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline
VOC/SVOC	Vinyl chloride	µg/L	3	0.5 ^{#1}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	0
	1,2,3-trichlorobenzene	µg/L	3		0.13 ^{#25}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	0
	1,2,4-trichlorobenzene	µg/L	3		0.13 ^{#25}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	0
	1,2,4-trichlorobenzene (Filtered)	µg/L	0.05		0.13 ^{#25}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	1,2-dichlorobenzene	µg/L	3		6.7 ^{#26}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,2-dichlorobenzene (Filtered)	µg/L	0.05		6.7 ^{#26}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	1,3-dichlorobenzene	µg/L	3		6.7 ^{#26}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,3-dichlorobenzene (Filtered)	µg/L	0.05		6.7 ^{#26}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	1,4-dichlorobenzene	µg/L	3		6.7 ^{#26}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	1,4-dichlorobenzene (Filtered)	µg/L	0.05		6.7 ^{#26}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Chlorobenzene	µg/L	3	100 ^{#27}		<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	0	0
	Hexachlorobutadiene	µg/L	3		0.6(MAC) ^{#8}	<1	<1	<1	<1	4	0	<1	ND	<1	ND	0.5	0.5	0	4	0
	Hexachlorobutadiene (Filtered)	µg/L	0.05		0.6(MAC) ^{#8}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
SVOC	4-bromophenyl phenyl ether (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	4-nitroaniline (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2,4,5-trichlorophenol (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2,4,6-trichlorophenol (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2,4-dichlorophenol (Filtered)	µg/L	0.05		4.2 ^{#2}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2,4-dimethylphenol (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2,4-dinitrotoluene (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2,6-dinitrotoluene (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2-chloronaphthalene (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2-chlorophenol (Filtered)	µg/L	0.05		50 ^{#3}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2-methylnaphthalene (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2-methylphenol (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	2-nitrophenol (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	4-chloro-3-methylphenol (Filtered)	µg/L	0.05		40 ^{#3}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	4-chloroaniline (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	4-chlorophenyl phenyl ether (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	4-methylphenol (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Azobenzene (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0

				Field_ID	BH102	BH103	BH104	BH105												
				Location_Code	BH102	BH103	BH104	BH105												
				Well																
				Sampled_Date	05/01/2023	05/01/2023	05/01/2023	05/01/2023												
				Time																
				UK Drinking Water Standards	UK Freshwater EQS					Statistical Summary										
Chem_Group	ChemName	output unit	EQL							Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Exceedances	Guideline
	Bis(2-chloroethoxy) methane (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Bis(2-chloroethyl)ether (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Bis(2-chloroisopropyl) ether (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Butyl benzyl phthalate (Filtered)	µg/L	0.05		7.5 ^{#2}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Carbazole (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Dibenzofuran (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Diethylphthalate (Filtered)	µg/L	0.05		200 ^{#3}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Dimethyl phthalate (Filtered)	µg/L	0.05		800 ^{#3}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Di-n-butyl phthalate (Filtered)	µg/L	0.05		8 ^{#3}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Hexachlorobenzene (Filtered)	µg/L	0.05		0.05(MAC) ^{#6}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Hexachloroethane (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Isophorone (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Nitrobenzene (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
Phenolics	3/4-Methylphenol (m/p-cresol) (Filtered)	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	4	0	<0.1	ND	<0.1	ND	0.05	0.05	0	0	0
	Phenol (Filtered)	µg/L	0.05	5800 ^{#20}	7.7 ^{#2}	<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Total Phenols (Filtered)	µg/L	0.5			<0.5	<0.5	<0.5	<0.5	4	0	<0.5	ND	<0.5	ND	0.25	0.25	0	0	0
	Phenols Monohydric (Filtered)	µg/L	10			<10	<10	<10	<10	4	0	<10	ND	<10	ND	5	5	0	0	0
SVOC TIC	Anthraquinone, 9,10- (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
	Aniline (Filtered)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	4	0	<0.05	ND	<0.05	ND	0.025	0.025	0	0	0
Other	pH (Lab)	pH_Units	0	6.5-9.5 ^{#1}	6-9(MAC) ^{#26}	7.4	7.4	7.5	7.4	4	4	7.4	7.4	7.5	7.5	7.4	7.4	0.05	0	0

Env Stds Description

UK Drinking Water Standards:UK Drinking Water Standards - Water Supply (Water Quality) Regulations, 2016
[\[http://www.legislation.gov.uk/ukksi/2016/614/pdfs/ukksi_20160614_en.pdf\]](http://www.legislation.gov.uk/ukksi/2016/614/pdfs/ukksi_20160614_en.pdf) plus other key CoC. To be used to assess risk to an aquifer.
 UK Freshwater EQS:UK freshwater EQS Annual Average (AA) [\[https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit\]](https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit) plus other key CoC. 'UK Freshwater EQS - further assessment' provides further assessment of criteria dependent CoC.

Env Stds Comments

#1:Water Supply (Water Quality) Regulations 2016.
 #2:Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.
 #3:Operational Targets and EQS. EA, April 2018
 #4:Water Framework Directive (Standards & Classification) Directions (England & Wales) 2015. Dissolved fraction. Lowest criteria presented (<40mg/l of CaCO3). See 'further assessment' if criteria exceeded and hardness (CaCO3) data available.
 #5:Water Framework Directive (Standards & Classification) Directions (England & Wales) 2015. Dissolved fraction.
 #6:Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. Dissolved Fraction. If hexavalent chromium

APPENDIX E

Hazwaste Assessment

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



QQXN3-ZYSMK-WFX8T

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

St.Nicholas WWTW

Description/Comments

This assessment has been completed using the following analytical reports:

- I2. Ref: 22-10937. Dated 20/12/2022
- I2. Ref: 22-10939. Dated 22/12/2022
- I2. Ref: 22-11825. Dated 22/12/2022

No asbestos in the form of visible ACM or fibres was identified during works.

Cr(vi) was not detected above laboratory MDL, so were appropriate species assumed not be be chromates.

Three samples included within the assessment (TP07, TP10, TP14 - all at 1m bgl) were not tested for the present of TPH or BTEX. These samples are from material logged as natural, below Made Ground for which a sample is available to assess. As the logs do not indicate any visual or olfactory evidence of contamination, and samples from the Made Ground above do not indicate the presence of TPH or BTEX, these samples have been included within the waste assessment.

This is not a standalone assessment and should be read in conjunction with any associated Arcadis reporting

Project

Site

Classified by

Name: **Ryan Lindsay**
Date: **23 Feb 2023 11:51 GMT**
Telephone: **M1 3BN**

Company: **Arcadis Consulting (UK) Ltd**
Suite 1A, 4 Piccadilly Place,
Manchester

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course
Hazardous Waste Classification
Most recent 3 year Refresher

Date
18 Sep 2019
06 Dec 2022

Next 3 year Refresher due by Dec 2025

Purpose of classification

2 - Material Characterisation

Address of the waste

St Nicholas, Vale of Glamorgan

Post Code CF5 6TB

SIC for the process giving rise to the waste

42210 Construction of utility projects for fluids

Description of industry/producer giving rise to the waste

Construction of waste water treatment works

Description of the specific process, sub-process and/or activity that created the waste

removal of material to facilitate foundations and service ducts for new infrastructure

Description of the waste

Combination of Made Ground and Natural Materials

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	BH104	0.20	Non Hazardous		4
2	TP109	0.20	Non Hazardous		7
3	TP110	0.50	Non Hazardous		10
4	TP110[2]	1.00	Non Hazardous		13
5	TP106	0.20	Non Hazardous		16
6	TP114	0.50	Non Hazardous		19
7	TP114[2]	1.00	Non Hazardous		22
8	BH105	0.20	Non Hazardous		25
9	TP107	0.20	Non Hazardous		28
10	TP107[2]	1.00	Non Hazardous		31
11	TP108	0.20	Non Hazardous		34
12	BH103	0.20	Non Hazardous		37

Related documents

#	Name	Description
1	St Nicholas WWTW	waste stream template used to create this Job

Report

Created by: Ryan Lindsay

Created date: 23 Feb 2023 11:51 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	40
Appendix B: Rationale for selection of metal species	41
Appendix C: Version	42

Classification of sample: BH104

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

Sample details

Sample name:	LoW Code:
BH104	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
7%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 7% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH		PH		8.5 pH		8.5 pH	8.5 pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	0.78 mg/kg		0.729 mg/kg	0.0000729 %	✓		
15	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
16	acenaphthene	201-469-6	83-32-9		0.09 mg/kg		0.0841 mg/kg	0.00000841 %	✓		
17	fluorene	201-695-5	86-73-7		0.07 mg/kg		0.0654 mg/kg	0.00000654 %	✓		
18	phenanthrene	201-581-5	85-01-8		0.15 mg/kg		0.14 mg/kg	0.000014 %	✓		
19	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
20	fluoranthene	205-912-4	206-44-0		0.24 mg/kg		0.224 mg/kg	0.0000224 %	✓		
21	pyrene	204-927-3	129-00-0		0.22 mg/kg		0.206 mg/kg	0.0000206 %	✓		
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.19 mg/kg		0.178 mg/kg	0.0000178 %	✓		
23	chrysene	601-048-00-0	205-923-4	218-01-9	0.17 mg/kg		0.159 mg/kg	0.0000159 %	✓		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.39 mg/kg		0.364 mg/kg	0.0000364 %	✓		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.12 mg/kg		0.112 mg/kg	0.0000112 %	✓		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.15 mg/kg		0.14 mg/kg	0.000014 %	✓		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.11 mg/kg		0.103 mg/kg	0.0000103 %	✓		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		0.15 mg/kg		0.14 mg/kg	0.000014 %	✓		
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			5 mg/kg	1.895	8.853 mg/kg	0.000885 %	✓		
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	0.4 mg/kg	23.173	8.663 mg/kg	0.000866 %	✓		
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	0.5 mg/kg	1.855	0.867 mg/kg	0.0000867 %	✓		
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		12 mg/kg	1.462	16.391 mg/kg	0.00164 %	✓		
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	12 mg/kg	3.929	44.064 mg/kg	0.00441 %	✓		
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			25 mg/kg		23.364 mg/kg	0.00234 %	✓		
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
38	nickel { nickel diiodide }				7.7 mg/kg	5.324	38.315 mg/kg	0.00383 %		✓	
	028-029-00-4	236-666-6	13462-90-3								
39	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
40	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				100 mg/kg	4.398	411.021 mg/kg	0.0411 %		✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
41	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
42	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
43	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
44	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
45	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	603-181-00-X	216-653-1	1634-04-4								
46	TPH (C6 to C40) petroleum group				<20 mg/kg		<20 mg/kg	<0.002 %			<LOD
			TPH								
Total:									0.0586 %		

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: TP109

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

Sample details

Sample name:	LoW Code:
TP109	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
21%	
(dry weight correction)	

Hazard properties






None identified

Determinands



Moisture content: 21% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH				6.7 pH		6.7 pH	6.7 pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	0.27 mg/kg		0.223 mg/kg	0.0000223 %		✓	
15	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene	201-581-5	85-01-8		0.07 mg/kg		0.0579 mg/kg	0.00000579 %		✓	
19	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
20	fluoranthene	205-912-4	206-44-0		0.06 mg/kg		0.0496 mg/kg	0.00000496 %		✓	
21	pyrene	204-927-3	129-00-0		0.05 mg/kg		0.0413 mg/kg	0.00000413 %		✓	
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
23	chrysene	601-048-00-0	205-923-4	218-01-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
27	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			17 mg/kg	1.895	26.617 mg/kg	0.00266 %		✓	
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	0.9 mg/kg	23.173	17.236 mg/kg	0.00172 %		✓	
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	0.8 mg/kg	1.855	1.226 mg/kg	0.000123 %		✓	
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		36 mg/kg	1.462	43.484 mg/kg	0.00435 %		✓	
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	18 mg/kg	3.929	58.449 mg/kg	0.00584 %		✓	
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			100 mg/kg		82.645 mg/kg	0.00826 %		✓	
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
38		nickel { nickel diiodide }				26 mg/kg	5.324	114.406 mg/kg	0.0114 %	✓	
		028-029-00-4	236-666-6	13462-90-3							
39		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5							
40		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				200 mg/kg	4.398	726.93 mg/kg	0.0727 %	✓	
		030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
41		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
42		toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
43		ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
44		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
45		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
46		TPH (C6 to C40) petroleum group				<20 mg/kg		<20 mg/kg	<0.002 %		<LOD
				TPH							
Total:									0.11 %		

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: TP110

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

Sample details

Sample name:	LoW Code:
TP110	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
22%	
(dry weight correction)	

Hazard properties






None identified

Determinands





Moisture content: 22% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH				7.1 pH		7.1 pH	7.1 pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				2.6 mg/kg	1.884	4.015 mg/kg	0.000402 %	✓	
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	0.14 mg/kg		0.115 mg/kg	0.0000115 %	✓		
15	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene	201-581-5	85-01-8		0.13 mg/kg		0.107 mg/kg	0.0000107 %	✓		
19	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
20	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
21	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
23	chrysene	601-048-00-0	205-923-4	218-01-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
27	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			11 mg/kg	1.895	17.082 mg/kg	0.00171 %	✓		
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	0.4 mg/kg	23.173	7.598 mg/kg	0.00076 %	✓		
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	0.5 mg/kg	1.855	0.76 mg/kg	0.000076 %	✓		
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		34 mg/kg	1.462	40.732 mg/kg	0.00407 %	✓		
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	24 mg/kg	3.929	77.293 mg/kg	0.00773 %	✓		
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			33 mg/kg		27.049 mg/kg	0.0027 %	✓		
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
38		nickel { nickel diiodide }				33 mg/kg	5.324	144.018 mg/kg	0.0144 %	✓	
		028-029-00-4	236-666-6	13462-90-3							
39		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5							
40		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				89 mg/kg	4.398	320.832 mg/kg	0.0321 %	✓	
		030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
41		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
42		toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
43		ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
44		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
45		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
46		TPH (C6 to C40) petroleum group				<20 mg/kg		<20 mg/kg	<0.002 %		<LOD
				TPH							
Total:									0.0671 %		

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: TP110[2]

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

Sample details

Sample name:	LoW Code:
TP110[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
23%	
(dry weight correction)	

Hazard properties


None identified

Determinands


Moisture content: 23% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH				8.3 pH		8.3 pH	8.3 pH		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	phenol				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
4	2,4,5-trichlorophenol				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	604-017-00-X	202-467-8	95-95-4							
5	2,4,6-trichlorophenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-018-00-5	201-795-9	88-06-2							
6	2,4-dichlorophenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-011-00-7	204-429-6	120-83-2							
7	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-062-00-5	411-220-5								
8	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]							
9	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD
	604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]							
10	2-nitrophenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
		201-857-5	88-75-5							
11	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-014-00-3	200-431-6	59-50-7							
12	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
13	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
14	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-917-1	208-96-8								
15	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
16	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
17	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-581-5	85-01-8								
18	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-371-1	120-12-7								
19	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-912-4	206-44-0								
20	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-927-3	129-00-0								
21	benz[a]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
22	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
23	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
24	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
25	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
26	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-893-2	193-39-5								
27	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
28	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-883-8	191-24-2								
29	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				8.9 mg/kg	1.895	13.708 mg/kg	0.00137 %		✓	
	033-005-00-1										
30	boron { boron tribromide }				0.3 mg/kg	23.173	5.652 mg/kg	0.000565 %		✓	
	005-003-00-0	233-657-9	10294-33-4								
31	cadmium { cadmium sulfate }				0.3 mg/kg	1.855	0.452 mg/kg	0.0000452 %		✓	
	048-009-00-9	233-331-6	10124-36-4								
32	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
	024-017-00-8										
33	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				26 mg/kg	1.462	30.895 mg/kg	0.00309 %		✓	
		215-160-9	1308-38-9								
34	copper { copper sulphate pentahydrate }				13 mg/kg	3.929	41.527 mg/kg	0.00415 %		✓	
	029-023-00-4	231-847-6	7758-99-8								
35	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	26 mg/kg		21.138 mg/kg	0.00211 %		✓	
	082-001-00-6										
36	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
37	nickel { nickel diiodide }				28 mg/kg	5.324	121.204 mg/kg	0.0121 %		✓	
	028-029-00-4	236-666-6	13462-90-3								
38	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
39		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				77 mg/kg	4.398	275.317 mg/kg	0.0275 %	✓	
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]								
		231-793-3 [2]	7733-02-0 [2]								
Total:									0.0523 %		

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: TP106

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

Sample details

Sample name:	LoW Code:
TP106	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15%	
(dry weight correction)	

Hazard properties






None identified

Determinands





Moisture content: 15% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH		PH		8.7 pH		8.7 pH	8.7 pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
15	acenaphthylene		205-917-1	208-96-8	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
16	acenaphthene		201-469-6	83-32-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
17	fluorene		201-695-5	86-73-7	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene		201-581-5	85-01-8	0.15 mg/kg		0.13 mg/kg	0.000013 %	✓		
19	anthracene		204-371-1	120-12-7	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
20	fluoranthene		205-912-4	206-44-0	0.35 mg/kg		0.304 mg/kg	0.0000304 %	✓		
21	pyrene		204-927-3	129-00-0	0.27 mg/kg		0.235 mg/kg	0.0000235 %	✓		
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.24 mg/kg		0.209 mg/kg	0.0000209 %	✓		
23	chrysene	601-048-00-0	205-923-4	218-01-9	0.29 mg/kg		0.252 mg/kg	0.0000252 %	✓		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.45 mg/kg		0.391 mg/kg	0.0000391 %	✓		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.12 mg/kg		0.104 mg/kg	0.0000104 %	✓		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.3 mg/kg		0.261 mg/kg	0.0000261 %	✓		
27	indeno[123-cd]pyrene		205-893-2	193-39-5	0.2 mg/kg		0.174 mg/kg	0.0000174 %	✓		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.08 mg/kg		0.0696 mg/kg	0.00000696 %	✓		
29	benzo[ghi]perylene		205-883-8	191-24-2	0.24 mg/kg		0.209 mg/kg	0.0000209 %	✓		
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			16 mg/kg	1.895	26.359 mg/kg	0.00264 %	✓		
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	1.1 mg/kg	23.173	22.165 mg/kg	0.00222 %	✓		
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	1 mg/kg	1.855	1.613 mg/kg	0.000161 %	✓		
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9	22 mg/kg	1.462	27.96 mg/kg	0.0028 %	✓		
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	15 mg/kg	3.929	51.249 mg/kg	0.00512 %	✓		
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			93 mg/kg		80.87 mg/kg	0.00809 %	✓		
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
38		nickel { nickel diiodide }				19 mg/kg	5.324	87.967 mg/kg	0.0088 %	✓	
		028-029-00-4	236-666-6	13462-90-3							
39		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5							
40		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				190 mg/kg	4.398	726.614 mg/kg	0.0727 %	✓	
		030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
41		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
42		toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
43		ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
44		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
45		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
46		TPH (C6 to C40) petroleum group				<20 mg/kg		<20 mg/kg	<0.002 %		<LOD
				TPH							
Total:									0.106 %		

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: TP114

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

Sample details

Sample name:	LoW Code:
TP114	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
6%	
(dry weight correction)	

Hazard properties







None identified

Determinands



Moisture content: 6% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH		PH		8.6 pH		8.6 pH	8.6 pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
15	acenaphthylene	205-917-1	208-96-8		0.05 mg/kg		0.0472 mg/kg	0.00000472 %	✓		
16	acenaphthene	201-469-6	83-32-9		0.05 mg/kg		0.0472 mg/kg	0.00000472 %	✓		
17	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene	201-581-5	85-01-8		0.34 mg/kg		0.321 mg/kg	0.0000321 %	✓		
19	anthracene	204-371-1	120-12-7		0.11 mg/kg		0.104 mg/kg	0.0000104 %	✓		
20	fluoranthene	205-912-4	206-44-0		1.3 mg/kg		1.226 mg/kg	0.000123 %	✓		
21	pyrene	204-927-3	129-00-0		1.1 mg/kg		1.038 mg/kg	0.000104 %	✓		
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.1 mg/kg		1.038 mg/kg	0.000104 %	✓		
23	chrysene	601-048-00-0	205-923-4	218-01-9	1 mg/kg		0.943 mg/kg	0.0000943 %	✓		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	1.6 mg/kg		1.509 mg/kg	0.000151 %	✓		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.73 mg/kg		0.689 mg/kg	0.0000689 %	✓		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.3 mg/kg		1.226 mg/kg	0.000123 %	✓		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.77 mg/kg		0.726 mg/kg	0.0000726 %	✓		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.22 mg/kg		0.208 mg/kg	0.0000208 %	✓		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.74 mg/kg		0.698 mg/kg	0.0000698 %	✓		
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			6.1 mg/kg	1.895	10.902 mg/kg	0.00109 %	✓		
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	0.6 mg/kg	23.173	13.117 mg/kg	0.00131 %	✓		
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	0.4 mg/kg	1.855	0.7 mg/kg	0.00007 %	✓		
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		11 mg/kg	1.462	15.167 mg/kg	0.00152 %	✓		
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	15 mg/kg	3.929	55.6 mg/kg	0.00556 %	✓		
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			34 mg/kg		32.075 mg/kg	0.00321 %	✓		
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
38	 nickel { nickel diiodide }	028-029-00-4	236-666-6	13462-90-3	8.6 mg/kg	5.324	43.197 mg/kg	0.00432 %	✓	
39	 selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5	<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
40	 zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]	60 mg/kg	4.398	248.939 mg/kg	0.0249 %	✓	
41	benzene	601-020-00-8	200-753-7	71-43-2	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
42	toluene	601-021-00-3	203-625-9	108-88-3	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
43	 ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
44	 o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
45	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
46	 TPH (C6 to C40) petroleum group			TPH	<20 mg/kg		<20 mg/kg	<0.002 %		<LOD
Total:								0.0462 %		

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: TP114[2]

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

Sample details

Sample name:	LoW Code:
TP114[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
20%	
(dry weight correction)	

Hazard properties


None identified

Determinands

Moisture content: 20% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		7.8 pH		7.8 pH	7.8 pH		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	phenol				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
4	2,4,5-trichlorophenol				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	604-017-00-X	202-467-8	95-95-4							
5	2,4,6-trichlorophenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-018-00-5	201-795-9	88-06-2							
6	2,4-dichlorophenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-011-00-7	204-429-6	120-83-2							
7	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-062-00-5	411-220-5								
8	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]							
9	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD
	604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]							
10	2-nitrophenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
		201-857-5	88-75-5							
11	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-014-00-3	200-431-6	59-50-7							
12	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
13	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
14	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-917-1	208-96-8								
15	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
16	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
17	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-581-5	85-01-8								
18	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-371-1	120-12-7								
19	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-912-4	206-44-0								
20	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-927-3	129-00-0								
21	benz[a]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
22	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
23	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
24	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
25	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
26	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-893-2	193-39-5								
27	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
28	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-883-8	191-24-2								
29	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				15 mg/kg	1.895	23.682 mg/kg	0.00237 %	✓		
	033-005-00-1										
30	boron { boron tribromide }				1.8 mg/kg	23.173	34.759 mg/kg	0.00348 %	✓		
	005-003-00-0	233-657-9	10294-33-4								
31	cadmium { cadmium sulfate }				1.1 mg/kg	1.855	1.7 mg/kg	0.00017 %	✓		
	048-009-00-9	233-331-6	10124-36-4								
32	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
	024-017-00-8										
33	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				25 mg/kg	1.462	30.449 mg/kg	0.00304 %	✓		
		215-160-9	1308-38-9								
34	copper { copper sulphate pentahydrate }				14 mg/kg	3.929	45.839 mg/kg	0.00458 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
35	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	140 mg/kg		116.667 mg/kg	0.0117 %	✓		
	082-001-00-6										
36	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
37	nickel { nickel diiodide }				27 mg/kg	5.324	119.797 mg/kg	0.012 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
38	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
39		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				180 mg/kg	4.398	659.689 mg/kg	0.066 %	✓	
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]								
		231-793-3 [2]	7733-02-0 [2]								
Total:									0.105 %		

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: BH105

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

Sample details

Sample name:	LoW Code:
BH105	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
20%	
(dry weight correction)	

Hazard properties






None identified

Determinands



Moisture content: 20% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH		PH		7.7 pH		7.7 pH	7.7 pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
15	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene	201-581-5	85-01-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
19	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
20	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
21	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
23	chrysene	601-048-00-0	205-923-4	218-01-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
27	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			11 mg/kg	1.895	17.366 mg/kg	0.00174 %	✓		
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	0.7 mg/kg	23.173	13.518 mg/kg	0.00135 %	✓		
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	0.5 mg/kg	1.855	0.773 mg/kg	0.0000773 %	✓		
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		28 mg/kg	1.462	34.103 mg/kg	0.00341 %	✓		
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	13 mg/kg	3.929	42.565 mg/kg	0.00426 %	✓		
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			61 mg/kg		50.833 mg/kg	0.00508 %	✓		
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
38		nickel { nickel diiodide }				27 mg/kg	5.324	119.797 mg/kg	0.012 %	✓	
		028-029-00-4	236-666-6	13462-90-3							
39		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5							
40		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				120 mg/kg	4.398	439.793 mg/kg	0.044 %	✓	
		030-006-00-9	231-793-3 [1]	7446-19-7 [1]							
			231-793-3 [2]	7733-02-0 [2]							
41		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
42		toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
43		ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
44		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-022-00-9	202-422-2 [1]	95-47-6 [1]							
			203-396-5 [2]	106-42-3 [2]							
			203-576-3 [3]	108-38-3 [3]							
			215-535-7 [4]	1330-20-7 [4]							
45		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
46		TPH (C6 to C40) petroleum group				<20 mg/kg		<20 mg/kg	<0.002 %		<LOD
				TPH							
Total:									0.0752 %		

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: TP107

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

Sample details

Sample name:	LoW Code:
TP107	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
11%	
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 11% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH		PH		8 pH		8 pH	8pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
15	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene	201-581-5	85-01-8		0.18 mg/kg		0.162 mg/kg	0.0000162 %	✓		
19	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.045 mg/kg	0.0000045 %	✓		
20	fluoranthene	205-912-4	206-44-0		0.53 mg/kg		0.477 mg/kg	0.0000477 %	✓		
21	pyrene	204-927-3	129-00-0		0.46 mg/kg		0.414 mg/kg	0.0000414 %	✓		
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.39 mg/kg		0.351 mg/kg	0.0000351 %	✓		
23	chrysene	601-048-00-0	205-923-4	218-01-9	0.45 mg/kg		0.405 mg/kg	0.0000405 %	✓		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.62 mg/kg		0.559 mg/kg	0.0000559 %	✓		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.3 mg/kg		0.27 mg/kg	0.000027 %	✓		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.47 mg/kg		0.423 mg/kg	0.0000423 %	✓		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.34 mg/kg		0.306 mg/kg	0.0000306 %	✓		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.09 mg/kg		0.0811 mg/kg	0.00000811 %	✓		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.38 mg/kg		0.342 mg/kg	0.0000342 %	✓		
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			16 mg/kg	1.895	27.308 mg/kg	0.00273 %	✓		
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	0.3 mg/kg	23.173	6.263 mg/kg	0.000626 %	✓		
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	0.8 mg/kg	1.855	1.337 mg/kg	0.000134 %	✓		
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		18 mg/kg	1.462	23.701 mg/kg	0.00237 %	✓		
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	10 mg/kg	3.929	35.397 mg/kg	0.00354 %	✓		
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			68 mg/kg		61.261 mg/kg	0.00613 %	✓		
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
38	nickel { nickel diiodide }				19 mg/kg	5.324	91.137 mg/kg	0.00911 %		✓	
	028-029-00-4	236-666-6	13462-90-3								
39	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
40	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				160 mg/kg	4.398	633.935 mg/kg	0.0634 %		✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
41	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
42	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
43	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
44	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
45	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	603-181-00-X	216-653-1	1634-04-4								
46	TPH (C6 to C40) petroleum group				<20 mg/kg		<20 mg/kg	<0.002 %			<LOD
			TPH								
Total:									0.0916 %		

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: TP107[2]

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

Sample details

Sample name:	LoW Code:
TP107[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
21%	
(dry weight correction)	

Hazard properties


None identified

Determinands


Moisture content: 21% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH				7.8 pH		7.8 pH	7.8 pH		
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	phenol				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
4	2,4,5-trichlorophenol				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	604-017-00-X	202-467-8	95-95-4							
5	2,4,6-trichlorophenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-018-00-5	201-795-9	88-06-2							
6	2,4-dichlorophenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-011-00-7	204-429-6	120-83-2							
7	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-062-00-5	411-220-5								
8	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]							
9	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD
	604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]							
10	2-nitrophenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
		201-857-5	88-75-5							
11	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	604-014-00-3	200-431-6	59-50-7							
12	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
13	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
14	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-917-1	208-96-8								
15	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
16	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
17	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-581-5	85-01-8								
18	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-371-1	120-12-7								
19	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-912-4	206-44-0								
20	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-927-3	129-00-0								
21	benz[a]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
22	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
23	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
24	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
25	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
26	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-893-2	193-39-5								
27	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
28	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-883-8	191-24-2								
29	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				16 mg/kg	1.895	25.052 mg/kg	0.00251 %		✓	
	033-005-00-1										
30	boron { boron tribromide }				1.2 mg/kg	23.173	22.981 mg/kg	0.0023 %		✓	
	005-003-00-0	233-657-9	10294-33-4								
31	cadmium { cadmium sulfate }				1.7 mg/kg	1.855	2.606 mg/kg	0.000261 %		✓	
	048-009-00-9	233-331-6	10124-36-4								
32	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
	024-017-00-8										
33	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				38 mg/kg	1.462	45.9 mg/kg	0.00459 %		✓	
		215-160-9	1308-38-9								
34	copper { copper sulphate pentahydrate }				16 mg/kg	3.929	51.954 mg/kg	0.0052 %		✓	
	029-023-00-4	231-847-6	7758-99-8								
35	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	74 mg/kg		61.157 mg/kg	0.00612 %		✓	
	082-001-00-6										
36	mercury { mercury difulminate }				<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
37	nickel { nickel diiodide }				36 mg/kg	5.324	158.409 mg/kg	0.0158 %		✓	
	028-029-00-4	236-666-6	13462-90-3								
38	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
39		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				520 mg/kg	4.398	1890.018 mg/kg	0.189 %	✓	
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]								
		231-793-3 [2]	7733-02-0 [2]								
Total:									0.227 %		

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: TP108

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

Sample details

Sample name:	LoW Code:
TP108	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15%	
(dry weight correction)	

Hazard properties






None identified

Determinands

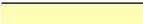



Moisture content: 15% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH				7.7 pH		7.7 pH	7.7 pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD


#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
15	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene	201-581-5	85-01-8		0.2 mg/kg		0.174 mg/kg	0.0000174 %	✓		
19	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.0435 mg/kg	0.00000435 %	✓		
20	fluoranthene	205-912-4	206-44-0		0.42 mg/kg		0.365 mg/kg	0.0000365 %	✓		
21	pyrene	204-927-3	129-00-0		0.32 mg/kg		0.278 mg/kg	0.0000278 %	✓		
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.32 mg/kg		0.278 mg/kg	0.0000278 %	✓		
23	chrysene	601-048-00-0	205-923-4	218-01-9	0.35 mg/kg		0.304 mg/kg	0.0000304 %	✓		
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.47 mg/kg		0.409 mg/kg	0.0000409 %	✓		
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.22 mg/kg		0.191 mg/kg	0.0000191 %	✓		
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.4 mg/kg		0.348 mg/kg	0.0000348 %	✓		
27	indeno[123-cd]pyrene	205-893-2	193-39-5		0.28 mg/kg		0.243 mg/kg	0.0000243 %	✓		
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.08 mg/kg		0.0696 mg/kg	0.00000696 %	✓		
29	benzo[ghi]perylene	205-883-8	191-24-2		0.3 mg/kg		0.261 mg/kg	0.0000261 %	✓		
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			14 mg/kg	1.895	23.064 mg/kg	0.00231 %	✓		
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	0.8 mg/kg	23.173	16.12 mg/kg	0.00161 %	✓		
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	1 mg/kg	1.855	1.613 mg/kg	0.000161 %	✓		
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		21 mg/kg	1.462	26.689 mg/kg	0.00267 %	✓		
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	12 mg/kg	3.929	40.999 mg/kg	0.0041 %	✓		
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			83 mg/kg		72.174 mg/kg	0.00722 %	✓		
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
38	 nickel { nickel diiodide }	028-029-00-4	236-666-6	13462-90-3	21 mg/kg	5.324	97.226 mg/kg	0.00972 %	✓	
39	 selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5	<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
40	 zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]	180 mg/kg	4.398	688.371 mg/kg	0.0688 %	✓	
41	benzene	601-020-00-8	200-753-7	71-43-2	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
42	toluene	601-021-00-3	203-625-9	108-88-3	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
43	 ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
44	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
45	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
46	 TPH (C6 to C40) petroleum group			TPH	<20 mg/kg		<20 mg/kg	<0.002 %		<LOD
Total:								0.1 %		

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: BH103

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

Sample details

Sample name:	LoW Code:
BH103	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
20%	
(dry weight correction)	

Hazard properties






None identified

Determinands


Moisture content: 20% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<		<	<		ND
2	pH		PH		7.7 pH		7.7 pH	7.7 pH		
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
4	phenol 604-001-00-2	203-632-7	108-95-2		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
5	2,4,5-trichlorophenol 604-017-00-X	202-467-8	95-95-4		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
6	2,4,6-trichlorophenol 604-018-00-5	201-795-9	88-06-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7	2,4-dichlorophenol 604-011-00-7	204-429-6	120-83-2		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
8	2,4-dimethyl-6-(1-methyl-pentadecyl)phenol 604-062-00-5	411-220-5			<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
9	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4] 604-008-00-0	202-433-2 [1] 203-402-6 [2] 203-582-6 [3] 246-691-4 [4]	95-57-8 [1] 106-48-9 [2] 108-43-0 [3] 25167-80-0 [4]		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10	m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4] 604-004-00-9	203-577-9 [1] 202-423-8 [2] 203-398-6 [3] 215-293-2 [4]	108-39-4 [1] 95-48-7 [2] 106-44-5 [3] 1319-77-3 [4]		<0.5 mg/kg		<0.5 mg/kg	<0.00005 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
11	2-nitrophenol	201-857-5	88-75-5		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
12	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol	604-014-00-3	200-431-6	59-50-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
13	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
14	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
15	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
16	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
17	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
18	phenanthrene	201-581-5	85-01-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
19	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
20	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
21	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	benz[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
23	chrysene	601-048-00-0	205-923-4	218-01-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
27	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
29	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
30	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }	033-005-00-1			13 mg/kg	1.895	20.524 mg/kg	0.00205 %	✓		
31	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4	1.2 mg/kg	23.173	23.173 mg/kg	0.00232 %	✓		
32	cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4	0.7 mg/kg	1.855	1.082 mg/kg	0.000108 %	✓		
33	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8			<1.8 mg/kg	2.27	<4.086 mg/kg	<0.000409 %			<LOD
34	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		28 mg/kg	1.462	34.103 mg/kg	0.00341 %	✓		
35	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8	15 mg/kg	3.929	49.113 mg/kg	0.00491 %	✓		
36	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			110 mg/kg		91.667 mg/kg	0.00917 %	✓		
37	mercury { mercury difulminate }	080-005-00-2	211-057-8	628-86-4	<0.3 mg/kg	1.419	<0.426 mg/kg	<0.0000426 %			<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
38		nickel { nickel diiodide }			24	mg/kg	5.324	106.486 mg/kg	0.0106 %	✓	
		028-029-00-4	236-666-6	13462-90-3							
39		selenium { nickel selenate }			<1	mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5							
40		zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }			190	mg/kg	4.398	696.338 mg/kg	0.0696 %	✓	
		030-006-00-9	231-793-3 [1]	7446-19-7 [1]							
			231-793-3 [2]	7733-02-0 [2]							
41		benzene			<0.005	mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
42		toluene			<0.005	mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
43		ethylbenzene			<0.005	mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
44		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]			<0.015	mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-022-00-9	202-422-2 [1]	95-47-6 [1]							
			203-396-5 [2]	106-42-3 [2]							
			203-576-3 [3]	108-38-3 [3]							
			215-535-7 [4]	1330-20-7 [4]							
45		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane			<0.005	mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
46		TPH (C6 to C40) petroleum group			<20	mg/kg		<20 mg/kg	<0.002 %		<LOD
				TPH							
Total:									0.106 %		

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 GB MCL determinands

■ pH (CAS Number: PH)

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

■ salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5
 Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
 Additional Hazard Statement(s): EUH032 \geq 0.2 %
 Reason for additional Hazards Statement(s):
 20 Nov 2021 - EUH032 \geq 0.2 % hazard statement sourced from: WM3, Table C12.2

■ 2-nitrophenol (EC Number: 201-857-5, CAS Number: 88-75-5)

Description/Comments: VOC; Data from C&L Inventory Database
 Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 02 Mar 2017
 Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT RE 2; H373 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ monohydric phenols (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)
 Data source: CLP combined data
 Data source date: 26 Mar 2019
 Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 \geq 3 % , Skin Irrit. 2; H315 1 £ conc. < 3 % , Eye Irrit. 2; H319 1 £ conc. < 3 % , Aquatic Chronic 2; H411

■ 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

▪ **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

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

GB MCL index number: 082-001-00-6

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

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

Reason for additional Hazards Statement(s):

20 Nov 2021 - 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

▪ **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

▪ **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

Worst case species

boron {boron tribromide}

Worst case species

cadmium {cadmium sulfate}

Worst case species

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species

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

Worst case species

copper {copper sulphate pentahydrate}

Worst case species

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

Cr(IV) not identified above laboratory limit of detection. Species unlikely to be to a chromate

mercury {mercury difulminate}

Worst case species

nickel {nickel diiodide}

Worst case species

selenium {nickel selenate}

Worst case species

zinc {zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]}

Cr(IV) not identified above laboratory limit of detection. Species unlikely to be to a chromate

Appendix C: Version

 HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2023.51.5529.10230 (20 Feb 2023)

HazWasteOnline Database: 2023.51.5529.10230 (20 Feb 2023)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

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 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

GB MCL List - version 1.1 of 09 June 2021

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