



Trowbridge Bioresources Centre

Site ID: 11799

SITE CONDITION REPORT – H5

July 2021

Revision	Date	Description	Author	Checked by	Reviewed by
01	July 2021	H5 SCR	E.Wilson	Rob Gordon	Rob Gordon

1.0 SITE DETAILS	
Name of the applicant	Wessex Water Services Limited
Activity address	Trowbridge Water Recycling Centre Off Bradford Road Trowbridge Wiltshire BA14 9BJ United Kingdom
National grid reference	Approximate Bioresources Centre: ST848587 (coordinates: 384760, 158790)

Document reference and dates for Site Condition Report at permit application and surrender	Reference: Site Condition Report H5 July 2021 Application Date: July 2021
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Document references for site plans (including location and boundaries)	<p>Stantec Industrial Emissions Directive Compliance Action Plan, Environmental Qualitative Risk Assessment, Trowbridge Bioresources Centre, Report Reference: EQRA 331101341, version 0.1, June 2021.</p> <p>Figure 2.1 Site Setting – Regional Figure 2.2 Site Setting – Local Figure 3.1 Sludge Treatment Process Flow Diagram Figure 3.2 Plan of Current Water Recycling Assets (& shows site surfacing) Figure 4.1 Site investigation borehole locations Figure 4.2 Surface Water Features</p>
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2.0 Condition of the land at permit issue	
<p>Environmental setting including:</p> <ul style="list-style-type: none"> • geology • hydrogeology • surface waters 	<p>The environmental setting of the WRC has been detailed in the Environmental Quantitative Risk Assessment (EQRA) completed for the site (Stantec, 2021).</p> <p>The Trowbridge site is located at the north-westerly extent of Trowbridge town and is approximately 12 km to the south-east of central Bath (NGR: 384760, 158790). The Bioresources Centre covers an area of approximately 1.28 ha which includes the main sludge assets at the WRC and the road to the south-eastern area where the skip storage is located.</p> <p>The Bioresources Centre is comprised of both the anaerobic digestion and associated activities (as operated by Wessex Water Services Limited (WWSL) and which are within the 'installation boundary') and the Combined Heat Plant (CHP) and Gas to Grid activities as operated by Wessex Water Enterprises Limited (WWEL) (and which are</p>

within the 'EPA/HB3602TR boundary') as shown on Figure 3.2.

Geological, hydrogeological and hydrological information detailed within the EQRA is based upon previous Site Investigation (SI) reports completed for various developments across the WRC.

Locations of the previous SI and available British Geological Survey (BGS) borehole logs are presented on Figure 4.1. Site Investigation Locations are as follows:

Structural soils (2004)

- Two boreholes (BH1 and BH2)
- Three trial pits (TP101 – TP103)

Located adjacent to the post digested tanks [E1 and E2].

CJ Associates (2008)

- Three boreholes (BH1, BH1R BH2)
- One trial pit (TP1)

Located beneath the APD3 [B6], sludge reception tank [K] and strained transfer tank [Q].

Geotechnics (2008)

- 16 boreholes (BH1 to BH16)

Located to the south of the Bioresources Centre and the majority along the eastern / south-eastern boundary of the Site.

BWB (2012)

- Two boreholes (BH1 and BH2)
- Six trial pits (TP1 to TP6)

Located to the south-west of Mesophilic Digester 1 [C1], east of the waste gas burner (CHP) [Y] and around the sludge reception tank [K] and pre-thickened tank [Z].

ESG (2016)

- Four boreholes (BH01 – BH04 including BH02A, BH04A and BH04B)

Located by the filter beds.

ESG (2017)

- One borehole (BH101)
- Three trial pits (HDP01 to HDP03)

Located in the liming plant area.

BWB (2020)

- Three boreholes (BH01 to BH03)
- Seven trial pits (HP01 to HP07)

Located to the east of the filter beds.

BGS Borehole Logs

- One borehole (ST85NW10)

Located within the WRC along the road between the sludge assets and cake skips.

Geology

Made Ground

Mapping indicates no Made Ground is present at the Site. However, Made Ground was recorded during site investigations. The Made Ground is described as sandy silty gravel and sandy slightly gravelly clay and is generally present at a thickness of between 0.65 m to 3 m across the Site (including in the main part of the Bioresources Centre in the north-west part of the Site). However, significantly thicker Made Ground (up to 7 m) was recorded along the east / south-east boundary of the Site adjacent to the valley containing the River Biss. This is where an earthworks / former refuse tip were identified on historical mapping and reflects how this area has been built up above the original ground levels.

Superficial Quaternary Deposits: Alluvium

The available mapping / site investigation data indicate that no superficial deposits are present at the Site, however alluvium follows the River Biss 30m to the east of the Site.

Kellaways Formation / Oxford Clay Formation

Bedrock at the Site is the Kellaways Formation / Oxford Clay Formation. This is described as sandy clay with occasional laminated mudstone layers at depth and is recorded at between 10 and 20 m thick beneath the Site. However, a 2 m thick sandstone unit within the Kellaways Formation was recorded by BWB (2020) at BH01 and BH02 at around 18.5 mbgl (c. 17.5 m AOD).

Cornbrash Formation / Forest Marble Formation

The Cornbrash Formation was recorded in the ESG (2017) boreholes to the east of the lagoons at depths of 17.65 mbgl (BH01) and 17.77 mbgl (BH02A) and is identified as weak thickly bedded grey fine to medium grained clayey limestone. Weathering and discontinuities are present within this unit.

Only one BGS borehole (ST85NW10) is available to a depth of 61 m located in the centre of the Site. This borehole recorded 30 m of blue/green/grey clay immediately beneath the ground (Kellaways Formation / Oxford Clay Formation). Beneath this lies 2 m of 'very hard stone and clay' which is potentially identified as the Cornbrash

Formation. Underlying this is 19 m of 'stone and clay with harder seams of clay' which is potentially identified as the Forest Marble Formation.

Hydrogeology

Aquifer Designations

The alluvium to the east of the Site is classified as a Secondary A aquifer. This is due to permeable layers they contain being capable of supporting water supplies at a local scale.

The Kellaways Formation / Oxford Clay Formation is classified as unproductive strata due to the low permeability of the layers that are considered to have negligible significance for water supply. However, the underlying Cornbrash Formation and Forest Marble Formation are classified as Secondary A Aquifers. This is due to permeable layers they contain being capable of supporting water supplies at a local scale.

Aquifer Testing

It is noted that the site investigation undertaken by BWB in 2012 (BWB, 2012) included a rising and falling head permeability test within BH03 where a piezometer was installed within the Made Ground unit. The rising head test calculated permeability values of 0.018 - 0.021 m/d and the falling head test values of 0.031 - 0.042 m/d, which indicative of low permeability materials.

Source Protection Zones

There are no Source Protection Zones within 500 m of the Site; the nearest is over 2 km to the north-east.

Licensed Groundwater Abstractions

The EQRA reports no licenced groundwater abstractions within 4 km of the Site. Further information is provided within the EQRA (Stantec, 2021).

Groundwater Observations

There are four boreholes that include dual installations (one shallow installation that monitors within the Made Ground; and one deep that monitors within the Kellaways / Oxford Clay). The data suggests that groundwater levels in these units tend to be very similar (several may indicate a small downwards hydraulic gradient from the Made Ground to the Kellaways / Oxford Clay).

There is one borehole that includes a dual installation with a shallower installation that monitors within the Kellaways / Oxford Clay and a deeper installation that monitors in the Cornbrash. The data suggests that there is downwards hydraulic gradient from the Kellaways / Oxford Clay to the Cornbrash.

Groundwater levels measured in the Kellaways / Oxford Clay in the main part of the Biosresources area to the west of the Site are typically around 38 to 42 m AOD.

Groundwater levels measured in the Made Ground and Kellaways / Oxford Clay in the north east of the Site are typically 34 to 36 m AOD.

Groundwater levels measured in the Made Ground and Kellaways / Oxford Clay along the eastern / south-eastern boundary are typically around 32 to 34 m AOD.

The groundwater strike and level data would appear to suggest that there is no Site wide shallow groundwater present within the Made Ground. It is considered likely that the groundwater levels that have been measured within the Made Ground and Kellaways / Oxford Clay reflect the general low permeability nature of these units. Isolated areas of groundwater may be present associated with more permeable areas of Made Ground.

Groundwater levels along the eastern / south-eastern boundary of the Site are several metres lower than in the main part of the Bioresources area to the west of the Site. This is where the presence of thicker Made Ground has been identified; the lower groundwater levels are to a degree assumed to reflect the lower elevation of the underlying Kellaways / Oxford Clay.

Further information on groundwater is included in the EQRA (Stantec, 2021).

Surface Waters (Hydrology)

Surface water in the area is expected to generally drain to the south-east from the higher ground where the Site is located towards the River Biss (i.e. following the local topography). The River Biss lies approximately 100 m east of the Site and flows northwards towards the River Avon where they meet approximately 900 m north of the Site. As outlined above, drains lie along the southern and eastern boundaries of

	<p>the Site. The southern boundary flows to the east towards the eastern drain / River Biss, however, during the site visit the confluence area by the Site's entry road to the south-east was too overgrown to confirm whether the southern drain converges with the eastern drain or River Biss. The eastern drain lies runs along the base of the valley (at the break in slope) parallel with the River Biss and flows towards the north-east where it discharges into the River Biss downstream of the Site.</p> <p>Four surface water lagoons lie immediately to the north of the Site. The most eastern two are surrounded by an embankment (approximately 1-2m high) and hence lie at a greater elevation than the sludge assets within the Bioresources Centre. These ponds are currently not in use. The western two lagoons lie immediately adjacent to the liming area (as shown on Figure 4.1) and are used for fishing/wildlife.</p>
<p>Pollution history including:</p> <ul style="list-style-type: none"> • pollution incidents that may have affected land • historical land-uses and associated contaminants • any visual/olfactory evidence of existing contamination • evidence of damage to pollution prevention measures 	<p>Pollution Incidents</p> <p>There are two historic pollution incidents recorded with the EA within 500 m of the Site. Both are associated with WW operations at the Site and relate to sewage materials impacting the River Biss to the south-east of the Site). WW and EA records for both incidents indicate sewage was discharged to the river following equipment failure in 2001 (which led to a minor impact on water) and after a lightning strike causing loss of power in 2003 (which led to a significant impact on water)..</p> <p>Records of pollution incidents are provided within the Groundsure Environmental Data Report included in the EQRA (Stantec, 2021) Appendix A.</p> <p>Historical land-uses & associated contaminants</p> <p>Historical mapping is provided in Appendix B and Appendix C of the EQRA (Stantec, 2021). Potentially contaminative activities / features are listed in the Groundsure Environmental Data Report provided in Appendix A of the EQRA.</p> <p>Sewage Works</p> <p>Sewage Works was constructed at the Site some point between 1901 and 1922 in what is currently the eastern part of the Site only. Tanks are listed as potentially contaminative land-use on site from 1922-1939.</p> <p>Following this, the land along the eastern edge of the Site (i.e. along the side of the valley containing the River Biss) was built up</p>

between 1924 and 1956-1960 as displayed by earthwork markings on the maps. This was extended further south along the south-east edge of the Site between 1956-1960 and 1985-1987. During this time the sewage works were extended to the west between 1968-1971 and 1974-1977 in the south-west corner of the Site and again between 1979 and 1985-1987 to cover the entire current Site area with the initial eastern area remaining as filter beds. Prior to this time the area appears to have been predominately agricultural.

Drainage Network

The drain that lies along the eastern boundary of the Site is identified in 1924 (and may have been constructed as part of the work that raised the land along the eastern edge of the Site at this time); there is an outfall (this is now the final effluent outfall) from the Site to this drain. This was first detailed on mapping from 1968 – 1971. The drain along the southern boundary of the Site is first identified in 1979; prior to this an area of vegetation was in this location.

The four lagoons that are currently located to the north of the Site were initially constructed between 1979 and 1985-87 as five ponds, however between 2010 and 2020 the three western ponds were altered into two ponds.

Waste Management Licences/Landfills

There are four historical landfill sites within 500 m of the Site and the closest is 185 m to the north-east of the Site. There are a further two refuse tips within 500m of the Site.

There are five licensed waste management facilities located within 500 m of the WRC. The three closest are located on site for the combustion of biogas, liquid treatment and sewage sludge treatment. These are operated by Wessex Water Enterprises Limited.

A refuse tip was located in the north-east corner of the Site from between 1936-1939 to 1974-1977, to the north of the filter beds. A further refuse tip was also present (to the north of where the current lagoons are) from between 1956-1960 to 1968-1971.

Potential Contaminants

Potential contaminants associated with the identified potential sources of contamination on site and in the surrounding area include: Metals, petroleum hydrocarbons - associated with fuel tank(s) and pumping stations; PAHs, polychlorinated biphenyls (PCBs) (associated with generators and electricity substations),

	<p>Metals, asbestos and ground gas (carbon dioxide, carbon monoxide) - from areas of infilling and sewage treatment.</p> <p>Further detail on the potential sources of contamination (PSC) and contaminants associated with current and historical use of the site and other potential sources of contamination (PSC) identified within 50m of the site (250m for infilled ground/ landfill) with an accompanying PSC Plan is included in the memorandum titled, <i>Potential Sources of Contamination Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report</i> (Stantec, 2021) presented as Appendix A of this document.</p> <p>Visual / Olfactory Evidence of Contamination</p> <p>No olfactory evidence of contamination was identified during the January 2021 site visit.</p> <p>As detailed within the EQRA, visual evidence of contamination included spillages from the return liquor pumping station and leaks from the return liquor balance tanks.</p> <p>Made Ground including ash was identified in BH02, HP05 and HP06 during the BWB 2020 ground investigation (GI) between 0 and 3.0m below ground level (bgl); however, this is located northeast of the current Bioresources Centre. Ash was not recorded in any other GI however macadam and clinker were noted in BH01 and BH02A/BH04 respectively in ESG 2016 boreholes which are located in the same area as BH02 mentioned above recording the ash.</p> <p>Evidence of Damage to Pollution Prevention Measures</p> <p>Within the EQRA, Table 3.1 Main Assets Associated with Sludge Treatment (collected during site visit) indicates that some failure has occurred at the BC. This included: (1) corrosion holes near the top of the Post Digested Tank [E1 and E2], Sludge Reception Tank [K], Post Thickened Tank [P] and Strained Transfer Tank [Q] limiting their use.</p>
<p>Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)</p>	<p>Out of the 7 previous GI reports existing for the Site, the following include geo-environmental chemical testing:</p> <ul style="list-style-type: none"> - Geotechnics (2008). - ESG (2017). - BWB (2020). - BWB (2012).

	<p>Detectable concentrations of metals, asbestos, Aliphatic and Aromatic fraction Total Petroleum Hydrocarbons (including some BTEX), PCBs and polycyclic aromatic hydrocarbons (PAH) were observed in these investigations.</p> <p>For detail on contamination encountered during previous GI at the site see the <i>Potential Sources of Contamination Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report (Stantec, 2021)</i> presented in Appendix A of this document.</p>
Baseline soil and groundwater reference data	<p>For detail of the soil and groundwater reference data at the Site see the <i>Potential Sources of Contamination Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report (Stantec, 2021)</i> presented in Appendix A of this document.</p> <p>As presented in Table 1.9 of the report in Appendix A there are potential contaminants (predominantly metals and PAHs and TPHs) associated with both the Bioresources Centre activities, at the Site and the wider WRC. There is sufficient data for soil and groundwater within the wider WRC to determine baseline data of the Site even though this is limited data for the Bioresources Centre.</p>
Supporting information	<ul style="list-style-type: none"> • Source information identifying environmental setting and pollution incidents • Historical Ordnance Survey plans • Site reconnaissance • Historical investigation / assessment / remediation / verification reports • Baseline soil and groundwater reference data

3.0 Permitted activities	
Permitted activities	WRC comprising Sludge Treatment Process outlined in the EQRA Section 3.1 Figure 3.1 Sludge Treatment Process Flow Diagram (Stantec, 2021).
Non-permitted activities undertaken	Not Applicable
Document references for: <ul style="list-style-type: none"> • plan showing activity layout; and • environmental risk assessment. 	<p>Stantec Industrial Emissions Directive Compliance Action Plan Environmental Qualitative Risk Assessment, Trowbridge Sludge Treatment Centre, Report Reference: EQRA 331101341, version 0.1, July 2021.</p> <p>Figure 2.1 Site Setting – Regional Figure 2.2 Site Setting – Local Figure 3.1 Sludge Treatment Process Flow Diagram</p>

	Figure 3.2 Plan of Current Water Recycling Centre Assets Table 3.1 Main assets associated with Sludge Treatment Section 6.0 EQRA.
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Note:

In Part B of the application form you must tell us about the activities that you will undertake at the site. You must also give us an environmental risk assessment. This risk assessment must be based on our guidance (*Environmental Risk Assessment - EPR H1*) or use an equivalent approach.

It is essential that you identify in your environmental risk assessment all the substances used and produced that could pollute the soil or groundwater if there were an accident, or if measures to protect land fail.

These include substances that would be classified as 'dangerous' under the Control of Major Accident Hazards (COMAH) regulations and also raw materials, fuels, intermediates, products, wastes and effluents.

If your submitted environmental risk assessment does not adequately address the risks to soil and groundwater we may need to request further information from you or even refuse your permit application.

4.0 Changes to the activity	
Have there been any changes to the activity boundary?	This application is for a new installation comprising existing activities.
Have there been any changes to the permitted activities?	If yes, provide a description of the changes to the permitted activities
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	If yes, list of them
Checklist of supporting information	<ul style="list-style-type: none"> • Plan showing any changes to the boundary (where relevant) • Description of the changes to the permitted activities (where relevant) • List of 'dangerous substances' used/produced by the permitted activities that were not identified in the Application Site Condition Report (where relevant)

5.0 Measures taken to protect land	
Use records that you collected during the life of the permit to summarise whether pollution prevention measures worked. If you can't, you need to collect land and/or groundwater data to assess whether the land has deteriorated.	
Checklist of supporting information	<ul style="list-style-type: none"> • Inspection records and summary of findings of inspections for all pollution prevention measures • Records of maintenance, repair and replacement of pollution prevention measures

6.0 Pollution incidents that may have had an impact on land, and their remediation	
Summarise any pollution incidents that may have damaged the land. Describe how you investigated and remedied each one. If you can't, you need to collect land and /or groundwater reference data to assess whether the land has deteriorated while you've been there.	
Checklist of supporting information	<ul style="list-style-type: none"> • Records of pollution incidents that may have impacted on land • Records of their investigation and remediation

7.0 Soil gas and water quality monitoring (where undertaken)

Provide details of any soil gas and/or water monitoring you did. Include a summary of the findings. Say whether it shows that the land deteriorated as a result of the permitted activities. If it did, outline how you investigated and remedied this.

Checklist
supporting
information

of

- Description of soil gas and/or water monitoring undertaken
- Monitoring results (including graphs)

8.0 Decommissioning and removal of pollution risk

Describe how the site was decommissioned. Demonstrate that all sources of pollution risk have been removed. Describe whether the decommissioning had any impact on the land. Outline how you investigated and remedied this.

Checklist of supporting information	<ul style="list-style-type: none">• Site closure plan• List of potential sources of pollution risk• Investigation and remediation reports (where relevant)
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9.0 Reference data and remediation (where relevant)

Say whether you had to collect land and/or groundwater data. Or say that you didn't need to because the information from sections 3, 4, 5 and 6 of the Surrender Site Condition Report shows that the land has not deteriorated.

If you did collect land and/or groundwater reference data, summarise what this entailed, and what your data found. Say whether the data shows that the condition of the land has deteriorated, or whether the land at the site is in a "satisfactory state". If it isn't, summarise what you did to remedy this. Confirm that the land is now in a "satisfactory state" at surrender.

Checklist of supporting information	<ul style="list-style-type: none">• Land and/or groundwater data collected at application (if collected)• Land and/or groundwater data collected at surrender (where needed)• Assessment of satisfactory state• Remediation and verification reports (where undertaken)
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10.0 Statement of site condition

Using the information from sections 3 to 7, give a statement about the condition of the land at the site. This should confirm that:

- the permitted activities have stopped
- decommissioning is complete, and the pollution risk has been removed
- the land is in a satisfactory condition.

Appendix A

Potential Sources of Contamination – Supporting Information

To: Wessex Water From: Stantec
File: 330201558 Wessex Water IED HRAs Date: July 5, 2021

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

BACKGROUND

Wessex Water Services is required to meet conditions under the Industrial Emissions Directive (IED). An Environmental Permit is required for the Bioresources Centre (the Site) located within Trowbridge Water Recycling Centre (WRC).

As part of the environmental permit application an Environmental Quantitative Risk Assessment (EQRA) (Stantec, 2021), has been undertaken for the Trowbridge Bioresources Centre. The EQRA provides a Compliance Action Plan (CAP) detailing the site specific actions required at the Trowbridge Bioresources Centre to ensure IED compliance. The EQRA will be used to identify the mitigation measures that are required to reduce the risk of pollution to ground or local water environment to comply with the IED. To support the EQRA process, a desk-top preliminary hydrogeological study for the Trowbridge Bioresources Centre has been undertaken and is presented within the EQRA.

In addition to the EQRA, an H5 Site Condition Report (SCR) (Stantec, 2021) has been completed for the Trowbridge Bioresources Centre. The purpose of the SCR is to describe and record the baseline conditions of the land and groundwater at the Site at the point of application/ start of operations.

To support the SCR, this memo documents a review of environmental data to identify potential sources of contamination at the Site and within the surroundings, resulting from historical and/ or current land uses/ activities.

This memo should be read in conjunction with the SCR and EQRA.

SITE SETTING

The Site is located at:

Trowbridge Bioresources Centre
Off Bradford Road
Trowbridge
BA14 9BJ
United Kingdom.

National Grid Reference: (approximate WRC centre): ST848587; Coordinates: 384760, 158790.

The Site is in a rural area but close to the suburbs of Trowbridge and Trowle Common. A solar farm lies adjacent to the western boundary and extends to the north beyond four lagoons which lie adjacent to the northern boundary of the Site. Drains lie adjacent to the eastern and southern boundary of the Site. To the east lies the River Biss at approximately 100 m away and flows in a northerly direction. A railway line lies to the east of the river at approximately 160 m east of the Site. The Kennet and Avon canal (Canal) lies 660 m north of the Site (at the closest point). The River Avon lies just north of the Canal at 720 m north of the Site.

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

The Site is on the southern edge of a fairly flat area of higher ground. This is defined by a south-west to north-east orientated valley to the south-east of the Site (that contains the River Biss) and an east to west orientated valley to the north of the Site which contains the Canal and River Avon. The high ground is at approximately 50 m AOD with the Site at 42 m AOD and the ground dropping steeply to the south-east down the side of the valley to approximately 30 m AOD at the River Biss.

Further information on site setting, including geology, hydrogeology and hydrology is provided in the EQRA.

HISTORICAL GROUND INVESTIGATION

Reports for 7 Site Investigations (SI) have been provided for the Trowbridge WRC.

- According to BWB (2012), Structural Soils drilled two boreholes (BH1 and BH2) and excavated three trial pits (TP101 – TP103) adjacent to the post digested tanks [E1 and E2] in 2004. However, borehole / trial pit logs are not available.
- According to BWB (2012), CJ Associates drilled three boreholes (BH1, BHR1 and BH2) and excavated one trial pit (TP1) beneath the APD3 [B6], sludge reception tank [K] and strained transfer tank [Q] in 2008. However, borehole / trial pit logs are not available for BH1R or TP1.
- Geotechnics Ltd (2008) drilled 16 boreholes (BH1 to BH16) across the Site in 2008 with four located to the south of the Bioresources Centre and the majority along the eastern / south-eastern boundary of the Site.
- BWB (2012) drilled two boreholes (BH1 and BH2) and excavated six trial pits (TP1 to TP6) to the south-west of Mesophilic Digester 1 [C1], east of the waster gas burner (CHP) [Y] and around the sludge reception tank [K] and pre-thickened tank [Z] in 2012.
- ESG (2017) drilled four boreholes (BH01 – BH04 including BH02A, BH04A and BH04B) by the filter beds in 2016.
- According to Sweco (2019), ESG also drilled one borehole (BH101) and excavated three trial pits (HDP01 to HDP03) in the hardstanding area to the north of the site in 2017.
- BWB (2020) drilled three boreholes (BH01 to BH03) and seven trial pits (HP01 to HP07) to the east of the filter beds in 2020.

Figure 4.1 extracted from the EQRA shows the locations of the exploratory holes completed as part of the SIs, in addition to British Geological Survey (BGS) boreholes available (BGS, 2021).

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

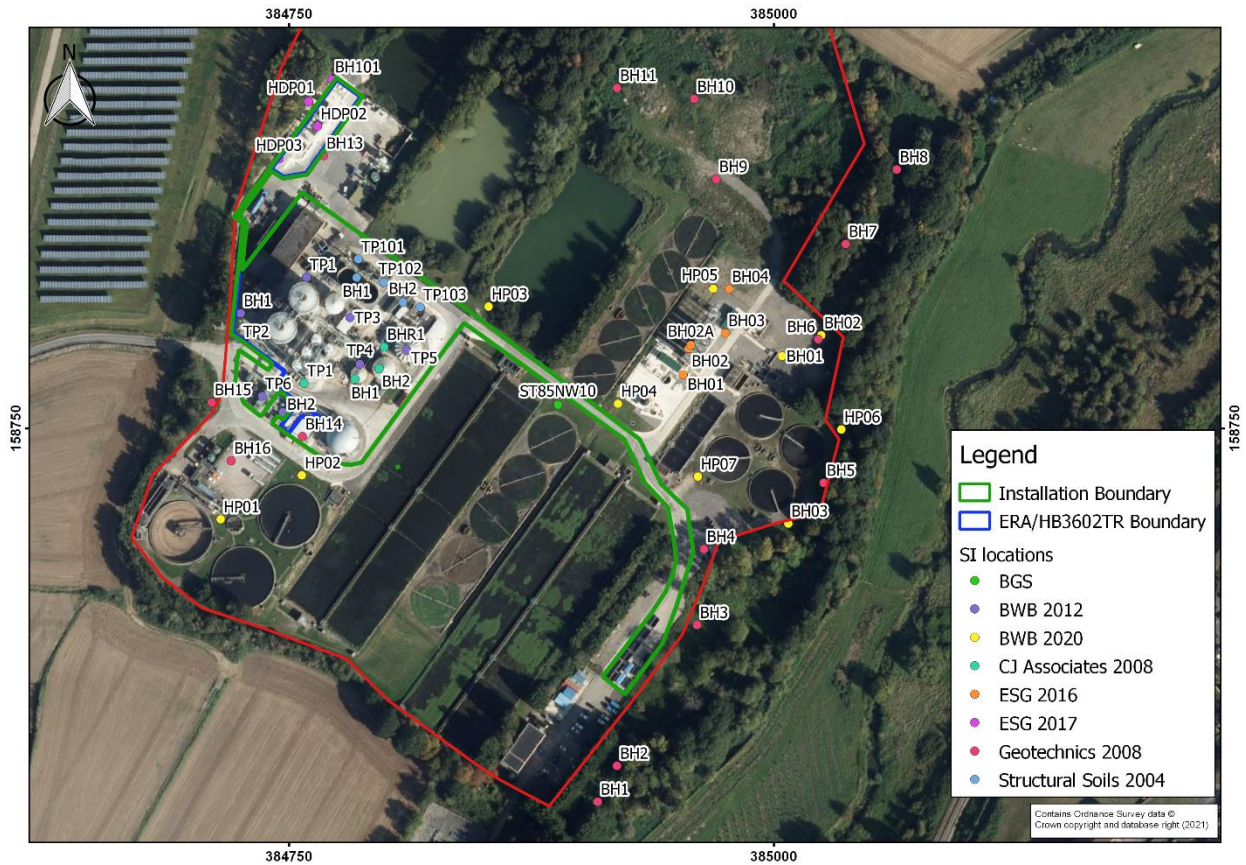


Figure 4.1 Previous Ground Investigations Exploratory Hole Location Plan (current Bioresources Centre boundary)

Strata Encountered

A review of the strata encountered as reported on the exploratory hole logs is detailed within the EQRA Section 4, but is also summarised as follows:

Made Ground

Mapping indicates no Made Ground is present at the Site. However, Made Ground was recorded during site investigations. The Made Ground is described as sandy silty gravel and sandy slightly gravelly clay and is generally present at a thickness of between 0.65 m to 3 m across the Site (including in the main part of the Bioresources Centre in the north-west part of the Site). However, significantly thicker Made Ground (up to 7 m) was recorded along the east / south-east boundary of the Site adjacent to the valley containing the River

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Biss. This is where the earthworks / former refuse tip were identified on the historical mapping and reflects how this has been built up above the original ground levels.

No visual/olfactory evidence of contamination was noted in the exploratory hole records.

Superficial Quaternary Deposits: Alluvium

The available mapping indicates that no superficial deposits are present at the Site, however a 125 m wide strip of alluvium follows the River Biss 30m to the east of the Site.

Bedrock

Mapping shows that bedrock at the Site is the Kellaways Formation and Oxford Clay Formation (undifferentiated). The two formations are identified as 'undifferentiated' by the BGS as they are comprised of similar geology (i.e. predominately mudstone) and so available descriptions are not always sufficient to distinguish between the two or not enough information is available to tell them apart.

The Kellaways Formation comprises mudstone which is locally sandy. According to BGS (2000) the Kellaways Formation is up to 27m and is typically around 20m in the Wessex Basin. BGS (2000) shows the Oxford Clay Formation overlying the Kellaways Formation. The Kellaways Formation is underlain by a thin layer (3 – 6 m) of Cornbrash Formation which is comprised of limestone. The Forest Marble Formation further underlies this unit which is predominantly mudstone. These two units mainly outcrop to the north-west of the Site (c. 600 m), however an isolated outcrop to the south-east of the Site (c. 400 m) is also present.

The Kellaways Formation / Oxford Clay Formation is described as sandy clay with occasional laminated mudstone layers at depth and is recorded at between 10 and 20 m thick beneath the Site. However, a 2 m thick sandstone unit within the Kellaways Formation was recorded by BWB (2020) at BH01 and BH02 at around 18.5 mbgl (c. 17.5 m AOD).

The Cornbrash Formation was recorded in the ESG (2017) boreholes to the east of the lagoons at depths of 17.65 mbgl (BH01) and 17.77 mbgl (BH02A) and is identified as weak thickly bedded grey fine to medium grained clayey limestone. Weathering and discontinuities are present within this unit.

Further information on the geology encountered during these GI at the Bioresources Centre and wider WRC is provided in the EQRA.

Geo-Environmental Analysis

Out of the 7 SI reports existing for the Site, the following include geo-environmental chemical testing:

- Geotechnics (2008)
- BWB Consulting (2012)
- ESG Ltd (2017)
- BWB Consulting (2020)

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Table A1 presented in Appendix A summarises the geo-environmental soil samples available for review.

Soil Analysis

Laboratory analysis results from Geotechnics (2008) reported that BTEX (benzene, toluene, ethylbenzene and xylene) were only identified in BH2 and BH8. A range of Polyaromatic hydrocarbons (PAHs) were identified in all boreholes with the greatest concentration of PAH 16 Total recorded at BH4 (85,000 µg/kg) and the smallest at BH13 (27 µg/kg). Other than the BTEX detected in BH2 and BH8 no other volatile organic compounds were detected. No asbestos was detected.

Detected maximum and minimum concentrations identified during the 2008 SI are summarised in Table 1.1.

Table 1.1 Summary of Detected Contaminant Concentrations, Geotechnics 2008

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Total Sulphate	510 mg/kg	BH4 at 1.0m	17000 mg/kg	BH13 at 1.0m
Boron Water Soluble	<3.5 mg/kg	BH2 at 1.0m, BH4 at 1.0m, BH8 at 1.0m, BH10 at 0.5m, BH13 at 1.0m and BH16 at 1.0m	14 mg/kg	BH6 at 4.0m
Arsenic	9 mg/kg	BH8 at 1.0m	54 mg/kg	BH2 at 1.0m
Barium	59 mg/kg	BH16 at 1.0m	1500 mg/kg	BH2 at 1.0m
Beryllium	<0.4 mg/kg	BH13 at 1.0m	5.8 mg/kg	BH2 at 1.0m
Cadmium	<0.3 mg/kg	BH10 at 0.5m, BH13 at 1.0m and BH16 at 1.0m	3.3 mg/kg	BH2 at 1.0m
Chromium	21 mg/kg	BH13 at 1.0m	150 mg/kg	BH5 at 3.5m
Copper	<0.6 mg/kg	BH16 at 1.0m	290 mg/kg	BH6 at 4.0m
Lead	9 mg/kg	BH16 at 1.0m	590 mg/kg	BH6 at 4.0m
Mercury	<0.6 mg/kg	BH4 at 1.0m, BH10 at 0.5m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	1.7 mg/kg	BH5 at 3.5m
Nickel	<0.9 mg/kg	BH13 at 1.0m	71 mg/kg	BH2 at 1.0m
Vanadium	25 mg/kg	BH13 at 1.0m	51 mg/kg	BH2 at 1.0m
Zinc	22 mg/kg	BH13 at 1.0m	1300 mg/kg	BH2 at 1.0m
Nitrate (soluble) as NO ₃	<1 mg/kg	BH13 at 1.0m	440 mg/kg	BH5 at 3.5m
Easily Liberated Sulphide	<15 mg/kg	BH2 at 1.0m, BH4 at 1.0m, BH5 at 3.5m, BH6 at 4.0m, BH8 at 1.0m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	27 mg/kg	BH10 at 0.5m
Elemental Sulphur	<70 mg/kg	BH2 at 1.0m, BH6 at 4.0m, BH8 at 1.0m, BH10 at 0.5m, BH11 at	350 mg/kg	BH5 at 3.5m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
		8.0m, BH13 at 1.0m and BH16 at 1.0m		
pH Value	6.61 pH	BH13 at 1.0m	8.26 pH	BH10 at 0.5m
EPH (DRO) (C10-C40)	38 mg/kg	BH13 at 1.0m	3300 mg/kg	BH5 at 3.5m
GRO (C4-C10)	17 µg/kg	BH4 at 1.0m, BH5 at 3.5m, BH6 at 4.0m, BH10 at 0.5m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	84 µg/kg	BH2 at 1.0m
Sum of BTEX	<10 µg/kg	BH4 at 1.0m, BH5 at 3.5m, BH6 at 4.0m, BH10 at 0.5m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	84 µg/kg (including benzene, toluene and m and p-xylene)	BH2 at 1.0m
PAH 16 Total	27 µg/kg	BH13 at 1.0m	85,000 µg/kg	BH4 at 1.0m
VOC Toluene	<5 µg/kg	BH4 at 1.0m, BH5 at 3.5m, BH6 at 4.0m, BH8 at 1.0m, BH10 at 0.5m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	9 µg/kg	BH2 at 1.0m

Analytical results from the recovered trial pit soil samples by BWB (2012) were found below the Limit of Detection (LoD) for PCBs and PAHs at TP2 (0.4m depth), TP3 (1.2m depth) and TP5 (1.1m depth). However, TPH>C6-C40 was detected at TP3 (0.9m depth). Chloride and sulphate were both detected at TP2, TP4 and TP5 at depths of 1.9m, 0.6m and 1.2m respectively. MTBE and BTEX at TP2, TP3 and TP5 were all below the LoD. At TP5, Total PAHs was below the LoD, however TP3 recorded a concentration of 204 µg/kg due to detection of 8 PAHs (pyrene recorded maximum of 32.2 µg/kg). Asbestos was not identified at TP3 or TP5. WAC testing has been carried out at TP2, TP3 and TP5.

The maximum and minimum concentrations detected are summarised in Table 1.2.

Table 1.2 Summary of Detected Contaminant Concentrations, BWB 2012

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Asbestos	None Detected	TP3 at 0.9m, TP5 at 0.4m	None Detected	TP3 at 0.9m, TP5 at 0.4m
pH	4.84	TP2 at 1.9m	8.22	TP5 at 1.1m
Mineral oil >C10-C40	32.7 mg/kg	TP2 at 0.4m	52 mg/kg	TP3 at 1.2m
Organic Carbon, Total	0.357 %	TP5 at 1.1m	0.568 %	TP3 at 1.2m
TPH >C6-C40	<10 mg/kg	TP5 at 0.4m	164 mg/kg	TP3 at 0.9m
Sulphate, Total	1120 mg/kg	TP2 at 1.9m	1200 mg/kg	TP4 at 0.6m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Water Soluble Sulphate as SO4 2:1 Extract	0.0423 g/l	TP2 at 1.9m	0.625 g/l	TP4 at 0.6m
Chloride (soluble)	6.46 mg/kg	TP2 at 1.9m	21.9 mg/kg	TP4 at 0.6m
Naphthalene	<9 µg/kg	TP5 at 0.4m	12.5 µg/kg	TP3 at 0.9m
Phenanthrene	<15 µg/kg	TP5 at 0.4m	25.2 µg/kg	TP3 at 0.9m
Fluoranthene	<17 µg/kg	TP5 at 0.4m	38 µg/kg	TP3 at 0.9m
Pyrene	<15 µg/kg	TP5 at 0.4m	32.2 µg/kg	TP3 at 0.9m
Benz(a)anthracene	<14 µg/kg	TP5 at 0.4m	27.7 µg/kg	TP3 at 0.9m
Chrysene	<10 µg/kg	TP5 at 0.4m	19 µg/kg	TP3 at 0.9m
Benzo(b)fluoranthene	<15 µg/kg	TP5 at 0.4m	29.1 µg/kg	TP3 at 0.9m
Benzo(a)pyrene	<15 µg/kg	TP5 at 0.4m	20.8 µg/kg	TP3 at 0.9m
PAH, Total Detected USEPA 16	<118 µg/kg	TP5 at 0.4m	204 µg/kg	TP3 at 0.9m

Laboratory analysis results from BWB 2020 boreholes reported that asbestos was detected at BH02 at 1.0m depth, BH03 at 3.5m depth and HP07 at 1.02m and 0.4m depth. This was chrysotile at <0.001% at all locations. A range of speciated PAHs were detected in 12 out of 20 samples with the greatest concentrations recorded at BH03 at a depth of 3.5m (Total PAH at 115 mg/kg). This included a measurement of 20mg/kg of fluoranthene. No BTEX or MTBE were detected in any soil samples. Total Petroleum Hydrocarbons (TPH) for Aliphatic (EC5 - EC35) were present above the laboratory LoD (<10 mg/kg) at BH02 (1.0m depth), BH03 (3.5m depth), BH01 (0.7m depth), HP06 (0.6m depth) and HP07 (0.2m and 0.4m depth). The same locations, except for BH01, recorded concentrations above the LoD for Aromatic TPHs (EC5 – EC35) also, with the addition of HP01 (0.1m depth), HP04 (0.1m depth), HP05 (0.2m and 0.5m depth) and HP06 (0.1m depth). Most heavy metals were detected in all samples, except for chromium, mercury and selenium which were predominantly below the LoD or at very low concentrations.

The maximum and minimum concentrations detected are summarised in Table 1.3.

Table 1.3 Summary of Detected Contaminant Concentrations, BWB 2020

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Asbestos	Not Detected	BH02 at 4.0m, BH03 at 7.5m, BH01 at 0.7m and 3.0m, HP01 – HP06 at all depths	<0.001% (Chrysotile)	BH02 at 1.0m, BH03 at 3.5m, HP07 at 0.2m and 0.4m
pH	7.4	HP05 at 0.5m	9.6	BH02 at 1.0m
Total Organic Carbon	0.4%	HP04 at 0.5m	3.8%	BH01 at 0.7m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Speciated Total EPA-16 PAHs	<0.8 mg/kg	BH01 at 3.0m, BH02 at 4.0m, HP01, HP03, HP04 at 0.5m, HP05 at 0.5m	115 mg/kg	BH03 at 3.5m
TPH-CWG - Aliphatic (EC5 - EC35)	<10 mg/kg	BH02 at 4.0m and BH03 at 7.5m, BH01 at 3.0m, HP01 – HP05, HP06 at 0.1m	700 mg/kg	HP06 at 0.6m
TPH-CWG - Aromatic (EC5 - EC35)	<10 mg/kg	BH02 at 4.0m and BH03 at 7.5m, BH01, HP01, HP03, HP04 at 0.5m and HP05 at 0.5m	430 mg/kg	HP06 at 0.6m
Antimony (aqua regia extractable)	<1.0 mg/kg	BH03 at 7.5m, HP01 at 0.1m and 0.6m, HP03 at 0.5m, HP04 at 0.1m,	27 mg/kg	BH03 at 3.5m
Arsenic (aqua regia extractable)	9 mg/kg	HP03 at 0.5m	64 mg/kg	BH01 at 0.7m
Barium (aqua regia extractable)	36 mg/kg	HP03 at 0.5m	940 mg/kg	BH03 at 3.5m
Cadmium (aqua regia extractable)	<0.2 mg/kg	BH02 at 4.0m, BH03 at 7.5m, BH01 at 3.0m, HP01 at 0.6m, HP03 at 0.5m, HP04 at 0.5m, HP05 at 0.5m	4.3 mg/kg	BH01 at 0.7m
Chromium (aqua regia extractable)	19 mg/kg	HP01 at 0.3m	200 mg/kg	BH02 at 1.0m
Copper (aqua regia extractable)	13 mg/kg	HP01 at 0.3m and 0.6m	1100 mg/kg	BH01 at 0.7m
Lead (aqua regia extractable)	17 mg/kg	HP04 at 0.5m	910 mg/kg	BH01 at 0.7m
Mercury (aqua regia extractable)	<0.3 mg/kg	BH02 at 4.0m, BH03 at 7.5m, HP01 at 0.1m and 0.6m, HP03, HP04, HP05 at 0.5m, HP06 at 0.1m, HP07 at 0.2m	5 mg/kg	BH01 at 0.7m
Molybdenum (aqua regia extractable)	0.55 mg/kg	HP03 at 0.5m	9.7 mg/kg	BH01 at 0.7m
Nickel (aqua regia extractable)	10 mg/kg	HP01 at 0.3m	87 mg/kg	BH02 at 1.0m
Vanadium (aqua regia extractable)	22 mg/kg	HP06 at 0.1m	87 mg/kg	BH02 at 1.0m
Zinc (aqua regia extractable)	57 mg/kg	HP01 at 0.6m	1900 mg/kg	BH03 at 3.5m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Laboratory analysis results from ESG 2017 boreholes reported that asbestos was detected at BH02A at 1.2m depth and BH03 at 1.0m depth. PCBs were detected at BH03 and BH04B with PCB52 detected at BH04B and PCB153, PCB138 and PCB180 detected at BH03. WAC testing has been carried out at BH02A, BH03 and BH04B. A range of speciated PAHs were detected in four of the samples at BH02A at 1.2m depth, BH03 at 0.1m and 1.0m depth and BH04B at 1.2m depth. The greatest concentrations were recorded at BH03 at a depth of 1.0m. All monoaromatics and oxygenates (i.e., BTEX and MTBE) were recorded below their respective LoD's. Most heavy metals were detected in all samples, except for chromium III, chromium VI, phenol, GRO (C6-C10) and cyanide (complex and total) which were below their LoD.

The maximum and minimum concentrations detected are summarised in Table 1.4.

Table 1.4 Summary of Detected Contaminant Concentrations, ESG 2017

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Asbestos	Not Detected	BH03 at 0.1m and BH04B at 1.2m	Amosite and Chrysotile	BH02A at 1.2m and BH03 at 1.0m
PCB52	<5.8 and <6.4 µg/kg	BH02A at 1.2m and BH03 at 1.0m	190 µg/kg	BH04B at 1.2m
PCB153	<5.7 and <6.4 µg/kg	BH02A at 1.2m and BH04B at 1.2m	9.4 µg/kg	BH03 at 1.0m
PCB138	<5.7 and <6.4 µg/kg	BH02A at 1.2m and BH04B at 1.2m	10.6 µg/kg	BH03 at 1.0m
PCB180	<5.7 and <6.4 µg/kg	BH02A at 1.2m and BH04B at 1.2m	8.4 µg/kg	BH03 at 1.0m
Naphthalene	< 0.09 mg/kg	BH04B at 1.2m and BH03 at 0.1m	0.14 mg/kg	BH03 at 1.0m
Acenaphthylene	< 0.09 mg/kg	BH04B at 1.2m	0.88 mg/kg	BH03 at 1.0m
Acenaphthene	< 0.09 mg/kg	BH04B at 1.2m and BH03 at 0.1m	0.21 mg/kg	BH03 at 1.0m
Fluorene	< 0.09 mg/kg	BH04B at 1.2m and BH03 at 0.1m	0.22 mg/kg	BH03 at 1.0m
Phenanthrene	0.10 mg/kg	BH04B at 1.2m	3.08 mg/kg	BH03 at 1.0m
Anthracene	< 0.09 mg/kg	BH04B at 1.2m	1.36 mg/kg	BH03 at 1.0m
Fluoranthene	0.28 mg/kg	BH04B at 1.2m	11.70 mg/kg	BH03 at 1.0m
Pyrene	0.25 mg/kg	BH04B at 1.2m	9.75 mg/kg	BH03 at 1.0m
Benzo[a]anthracene	0.22 mg/kg	BH04B at 1.2m	8.14 mg/kg	BH03 at 1.0m
Chrysene	0.17 mg/kg	BH04B at 1.2m	5.82 mg/kg	BH03 at 1.0m
Benzo[b]fluoranthene	0.26 mg/kg	BH04B at 1.2m	10.42 mg/kg	BH03 at 1.0m
Benzo[k]fluoranthene	0.10 mg/kg	BH04B at 1.2m	3.60 mg/kg	BH03 at 1.0m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Benzo[a]pyrene	0.20 mg/kg	BH04B at 1.2m	8.22 mg/kg	BH03 at 1.0m
Indeno[1,2,3-cd]pyrene	0.20 mg/kg	BH04B at 1.2m	9.03 mg/kg	BH03 at 1.0m
Dibenzo[a,h]anthracene	< 0.09 mg/kg	BH04B at 1.2m	2.02 mg/kg	BH03 at 1.0m
Benzo[g,h,i]perylene	0.16 mg/kg	BH04B at 1.2m	6.82 mg/kg	BH03 at 1.0m
Coronene	< 0.09 mg/kg	BH04B at 1.2m	1.81 mg/kg	BH03 at 1.0m
Total (USEPA16) PAHs	< 2.49 mg/kg	BH04B at 1.2m	81.35 mg/kg	BH03 at 1.0m
SO4-- (H2O sol) mg/l	39 mg/l	BH03 at 2.0m	332 mg/kg	BH03 at 3.8m
Total Sulphur.	0.031 %	BH01 at 2.1m	1.01 mg/kg	BH03 at 3.8m
SO4-- (acid sol)	312 mg/kg	BH03 at 2.0m	2070 mg/kg	BH03 at 3.8m
Boron (H2O Soluble)	1.2 mg/kg	BH04B at 1.2m	8.1 mg/kg	BH04B at 3.4m
Arsenic (MS)	5.9 mg/kg	BH01 at 2.1m	20.4 mg/kg	BH03 at 0.1m
Cadmium (MS)	<0.2 mg/kg	BH01 at 2.1m and BH03 at 2.0m	1.62 mg/kg	BH03 at 1.0m
Chromium (MS)	28 mg/kg	BH01 at 2.1m	63.8 mg/kg	BH04B at 1.2m
Copper (MS)	12.3 mg/kg	BH01 at 2.1m	673.4 mg/kg	BH04B at 3.4m
Lead (MS)	8.7 mg/kg	BH01 at 2.1m	286.6 mg/kg	BH03 at 1.0m
Mercury (MS)	<0.5 mg/kg	BH01 at 2.1m and BH03 at 2.0m	0.6 mg/kg	BH03 at 1.0m
Nickel (MS)	18.5 mg/kg	BH03 at 2.0m	38.4 mg/kg	BH03 at 0.1m
Selenium (MS)	<0.5 mg/kg	BH01 at 2.1m, BH03 at 2.0m and BH04B at 1.2m	0.9 mg/kg	BH02A at 11.2m and BH03 at 0.1m
Zinc (MS)	78.9 mg/kg	BH01 at 2.1m	404.3 mg/kg	BH03 at 0.1m
pH units (AR)	7.3	BH01 at 2.1m	10.2	BH04B at 1.2m
Cyanide (Free) (AR)	<0.6 mg/kg	BH01 at 2.1m, BH02A at 11.2m, BH03 at 1.0m and BH04B at 1.2m and 3.4m	0.7 mg/kg	BH03 at 2.0m
Tot.Moisture @ 105C	13 %	BH04B at 1.2m	23.2%	BH03 at 2.0m
TPH Band (>C10-C16)	<11 mg/kg	BH04B at 1.2m	15 mg/kg	BH03 at 1.0m
TPH Band (>C10-C40)	81 mg/kg	BH02A at 11.2m	973 mg/kg	BH03 at 1.0m
TPH Band (>C16-C21)	<13 mg/kg	BH02A at 11.2m, BH03 at 2.0m and BH04B at 3.4m	97 mg/kg	BH03 at 1.0m
TPH Band (>C21-C35)	<12 mg/kg	BH01 at 2.1m	766 mg/kg	BH03 at 1.0m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
TPH by GCFID (AR)	13 mg/kg	BH01 at 2.1m	975 mg/kg	BH03 at 1.0m
Acid Neut. Capacity	4.45 Mol/kg	BH02A at 11.2m	9.13 Mol/kg	BH04B at 1.2m
Chloride:(2:1)	5 mg/l	BH03 at 2.0m	29 mg/l	BH01 at 2.1m
L.O.I. % @ 450C	1.6%	BH04B at 1.2m	6.8%	BH03 at 1.0m
Total Organic Carbon	0.27 %M/M	BH01 at 2.1m	6.02 %M/M	BH03 at 0.1m

No data was provided by Wessex Water on the composition of the sludge and cake at the Bioresources Centre so no comparison can be undertaken between the concentrations recorded during the site investigations to provide a baseline.

Leachability Samples

Leachability analysis was undertaken on samples taken by BWB (2020) at BH01, BH02, HP01 and HP03 – HP07 in November 2011. The results showed that all petroleum hydrocarbons, speciated and Total PAHs and monoaromatics and oxygenates (i.e., BTEX and MTBE) were recorded below their respective LoDs. Cyanide (total and free) was not detected in any sample. Total phenols were only detected at its LoD in HP06 at 0.6m and HP07 at 0.4m. Most heavy metals were detected excluding hexavalent chromium, mercury and selenium which were below their LoD in all samples. A range of concentrations are reported for the metals and general inorganics as displayed in Table 1.5. pH was recorded as pH 7.6 – 8.1.

Table 1.5 Summary of Detected Contaminant Concentrations in Leachate, BWB 2020

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
pH	7.6	HP07 at 0.4m	8.1	BH01 at 0.7m
Sulphate as SO ₄	2.6 mg/l	HP03 at 0.1m	426 mg/l	HP07 at 0.4m
Ammoniacal Nitrogen as N	<15 µg/l	HP01 at 0.6m	3100 µg/l	BH01 at 3.0m
Total Phenols (monohydric)	<10 µg/l	All depths at BH01, BH02, HP01, HP03 – HP05 and HP06 at 0.1m	19 µg/l	HP06 at 0.6m
Arsenic (dissolved)	<1.0 µg/l	HP03 at 0.1m, BH02 at 4.0m, HP04 at 0.5m HP05 at 0.1m and 0.5m, and HP07 at 0.4m	9.7 µg/l	HP06 at 0.6m
Boron (dissolved)	20 µg/l	HP06 at 0.1m	710 µg/l	BH01 at 3.0m
Cadmium (dissolved)	<0.08 µg/l	All depths at BH01, BH02, HP01, HP03 – HP06	0.09 µg/l	HP07 at 0.4m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Chromium (III)	<1.0 µg/l	BH01 at 3.0m, BH02 at 4.0m and HP04 at 0.5m	5.1 µg/l	BH01 at 0.7m
Chromium (dissolved)	<0.4 µg/l	BH01 at 3.0m	5.1 µg/l	BH01 at 0.7m
Copper (dissolved)	6.8 µg/l	HP04 at 0.5m	17 µg/l	HP05 at 0.1m and HP06 at 0.1m
Lead (dissolved)	<1.0 µg/l	HP01 at 0.6m	9.7 µg/l	HP06 at 0.6m
Nickel (dissolved)	0.8 µg/l	HP06 at 0.1m	4.0 µg/l	BH02 at 4.0m
Zinc (dissolved)	8.4 µg/l	BH01 at 3.0m	70 µg/l	HP07 at 0.4m

Leachability analysis was undertaken on samples taken by ESG (2017) at BH03 and BH04B and recorded few determinands greater than their LoDs. BTEX, MTBE, cadmium, mercury, selenium, ammoniacal nitrogen as N, cyanide (free and total), phenol, TPH Band >C10-C16 and GRO >C6->C10 were all recorded below their LoD. However, multiple PAHs and metals were detected as shown in Table 1.6 with the majority of maximum concentrations recorded at BH03.

Table 1.6 Summary of Detected Contaminant Concentrations in Leachate, ESG 2017

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
pH units	7.5	BH03 at 0.1m	7.8	BH04B at 1.2m
Total Sulphur as SO4 (Dissolved)	6.1 mg/l	BH03 at 0.1m	8.8 mg/l	BH04B at 1.2m
Nickel as Ni (Dissolved)	<0.001 mg/l	BH04B at 1.2m	0.002 mg/l	BH03 at 0.1m
Chromium as Cr (Dissolved)	<0.001 mg/l	BH03 at 0.1m	0.002 mg/l	BH04B at 1.2m
Copper as Cu (Dissolved)	0.004 mg/l	BH04B at 1.2m	0.024 mg/l	BH03 at 0.1m
Lead as Pb (Dissolved)	0.002 mg/l	BH04B at 1.2m	0.006 mg/l	BH03 at 0.1m
Zinc as Zn (Dissolved)	0.016 mg/l	BH04B at 1.2m	0.05 mg/l	BH03 at 0.1m
Arsenic as As (Dissolved)	0.004 mg/l	BH03 at 0.1m and BH04B at 1.2m	0.004 mg/l	BH03 at 0.1m and BH04B at 1.2m
Boron as B (Dissolved)	0.03 mg/l	BH04B at 1.2m	0.04 mg/l	BH03 at 0.1m
Ammoniacal Nitrogen as NH4	<0.01 mg/l	BH03 at 0.1m	0.01 mg/l	BH04B at 1.2m
TPH Band >C16-C21	<0.01 mg/l	BH04B at 1.2m	0.01 mg/l	BH03 at 0.1m
TPH Band (>C21-C35)	0.02 mg/l	BH04B at 1.2m	0.03 mg/l	BH03 at 0.1m
TPH GC	0.03 mg/l	BH04B at 1.2m	0.06 mg/l	BH03 at 0.1m
Naphthalene	0.096 µg/l	BH04B at 1.2m	0.236 µg/l	BH03 at 0.1m
Acenaphthylene	<0.010 µg/l	BH04B at 1.2m	0.026 µg/l	BH03 at 0.1m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Acenaphthene	0.021 µg/l	BH04B at 1.2m	0.765 µg/l	BH03 at 0.1m
Fluorene	0.015 µg/l	BH04B at 1.2m	0.368 µg/l	BH03 at 0.1m
Phenanthrene	0.070 µg/l	BH04B at 1.2m	0.738 µg/l	BH03 at 0.1m
Anthracene	0.014 µg/l	BH04B at 1.2m	0.161 µg/l	BH03 at 0.1m
Fluoranthene	0.052 µg/l	BH04B at 1.2m	0.228 µg/l	BH03 at 0.1m
Pyrene	0.043 µg/l	BH04B at 1.2m	0.161 µg/l	BH03 at 0.1m
Benzo[a]anthracene	0.030 µg/l	BH04B at 1.2m	0.050 µg/l	BH03 at 0.1m
Chrysene	0.018 µg/l	BH04B at 1.2m	0.046 µg/l	BH03 at 0.1m
Benzo[b]fluoranthene	0.022 µg/l	BH04B at 1.2m	0.043 µg/l	BH03 at 0.1m
Benzo[k]fluoranthene	<0.010 µg/l	BH04B at 1.2m	0.019 µg/l	BH03 at 0.1m
Benzo[a]pyrene	0.013 µg/l	BH04B at 1.2m	0.032 µg/l	BH03 at 0.1m
Indeno[1,2,3-cd]pyrene	<0.010 µg/l	BH04B at 1.2m	0.026 µg/l	BH03 at 0.1m
Dibenzo[a,h]anthracene	<0.010 µg/l	BH04B at 1.2m	<0.010 µg/l	BH03 at 0.1m
Benzo[g,h,i]perylene	<0.010 µg/l	BH04B at 1.2m	0.024 µg/l	BH03 at 0.1m
Total (USEPA16) PAHs	<0.444 µg/l	BH04B at 1.2m	<2.933 µg/l	BH03 at 0.1m

Groundwater Samples

Groundwater samples were taken by BWB (2020) at BH02 (deep) and BH03 (shallow and deep) in November 2011. The results showed that phenols and volatile free fatty acids were below the LoD in all three samples. BTEX and MTBE were below the LoD at BH03 (S) which was the only sample analysed for these. PAHs were only detected at BH03 (S) with a Total PAH concentration of 318 µg/l (with all 16 PAHs being detected). Petroleum hydrocarbons were only analysed for at BH03 (S) and recorded detections of both aliphatic (C5 – C35) and aromatic (C5 – C35) at concentrations of 390 µg/l and 1400 µg/l. All metals were detected in all three locations except for hexavalent chromium, beryllium, cadmium and mercury (excluding BH02 (D) for mercury). A range of concentrations are reported for major anions and cations as displayed in Table 1.7. pH was recorded as pH 7.3 – 7.7.

Table 1.7 Summary of Detected Contaminant Concentrations, BWB 2020

Contaminant	Minimum	Exploratory Hole Location	Maximum	Exploratory Hole Location
pH	7.3	BH03 (S)	7.7	BH02 (D)
Total EPA-16 PAHs	<0.16 µg/l	BH02 (D) and BH03 (D)	318 µg/l	BH03 (S)
TPH-CWG - Aliphatic (C5 - C35)	390 µg/l	BH03 (S)	390 µg/l	BH03 (S)

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location	Maximum	Exploratory Hole Location
TPH-CWG - Aromatic (C5 - C35)	1400 µg/l	BH03 (S)	1400 µg/l	BH03 (S)
Thiocyanate as SCN	240 µg/l	BH02 (D)	330 µg/l	BH03 (D)
Sulphate as SO4	104 mg/l	BH03 (S)	803 mg/l	BH02 (D)
Sulphide	<5.0 µg/l	BH02 (D) and BH03 (D)	120 µg/l	BH03 (S)
Chloride	22 mg/l	BH03 (S)	840 mg/l	BH02 (D)
Ammoniacal Nitrogen as N	190 µg/l	BH03 (D)	4800 µg/l	BH03 (S)
Total Nitrogen (Kjeldahl)	6.6 mg/l	BH03 (S)	6.6 mg/l	BH03 (S)
Total Organic Carbon (TOC)	11.3 mg/l	BH02 (D)	33.7 mg/l	BH03 (S)
Nitrate as N	0.05 mg/l	BH02 (D)	0.09 mg/l	BH03 (S)
Nitrate as NO3	0.41 mg/l	BH03 (S)	0.41 mg/l	BH03 (S)
Chemical Oxygen Demand (Total)	120 mg/l	BH02 (D)	1900 mg/l	BH03 (S)
BOD (Biochemical Oxygen Demand) (Total) - PL	7.1 mg/l	BH03 (S)	56 mg/l	BH02 (D)
Boron (dissolved)	420 µg/l	BH03 (S)	3900 µg/l	BH02 (D)
Calcium (dissolved)	78 mg/l	BH02 (D)	130 mg/l	BH03 (D)
Iron (dissolved)	0.038 mg/l	BH03 (S)	0.17 mg/l	BH02 (D)
Magnesium (dissolved)	7.3 mg/l	BH03 (S)	21 mg/l	BH02 (D)
Potassium (dissolved)	12 mg/l	BH03 (S)	23 mg/l	BH02 (D)
Sodium (dissolved)	100 mg/l	BH03 (S)	920 mg/l	BH02 (D)
Chromium (total)	6.8 µg/l	BH03 (S)	8.4 µg/l	BH03 (D)
Lead (total)	7 µg/l	BH03 (S)	43 µg/l	BH02 (D)
Mercury (total)	<0.05 µg/l	BH03 (S)	0.15 µg/l	BH02 (D)
Nickel (total)	27 µg/l	BH02 (D)	80 µg/l	BH03 (S)
Selenium (total)	4 µg/l	BH03 (S)	8.7 µg/l	BH02 (D)
Zinc (total)	220 µg/l	BH02 (D)	6800 µg/l	BH03 (S)
Antimony (dissolved)	1.3 µg/l	BH02 (D)	4 µg/l	BH03 (S)
Arsenic (dissolved)	2.98 µg/l	BH03 (S)	5.56 µg/l	BH02 (D)
Barium (dissolved)	37 µg/l	BH02 (D)	68 µg/l	BH03 (S)
Manganese (dissolved)	120 µg/l	BH02 (D)	1800 µg/l	BH03 (S)
Vanadium (dissolved)	1.2 µg/l	BH03 (D)	5.5 µg/l	BH02 (D)
Copper (total)	11 µg/l	BH03 (S)	63 µg/l	BH02 (D)

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Groundwater was sampled by ESG (2017) at four boreholes on 6 February 2017. PAHs were only detected at BH04B where pyrene was recorded at 0.012 µg/l, all others were below the LoD. Phenol, sulphide and cyanide were not detected in any samples. TPH Bands (>C21 – C35) was detected at BH01, BH02A and BH04B at 0.04 mg/l and TPH GC was detected in all four samples with a maximum concentration of 0.06 mg/l at BH02A and BH04B. Major cations and anions and metals were detected in most samples with the maximum and minimums displayed in Table 1.8.

Table 1.8 Summary of Detected Contaminant Concentrations, ESG 2017

Contaminant	Minimum	Exploratory Hole Location	Maximum	Exploratory Hole Location
pH units	7.4 pH	BH04B	7.8 pH	BH02A
Conductivity uS/cm @ 25C	4000 µS/cm	BH03 and BH04B	5200 µS/cm	BH01
Chloride as Cl	490 mg/l	BH04B	1070 mg/l	BH01
Total Sulphur as SO ₄ (Total)	625 mg/l	BH02A	1310 mg/l	BH03 and BH04B
Total Sulphur as SO ₄ (Dissolved)	694 mg/l	BH02A	1490 mg/l	BH04B
Magnesium as Mg (Dissolved)	14 mg/l	BH02A	72 mg/l	BH04B
Nickel as Ni (Dissolved)	0.004 mg/l	BH01 and BH02A	0.008 mg/l	BH04B
Chromium as Cr (Total)	0.002 mg/l	BH01 and BH02A	0.037 mg/l	BH03
Cadmium as Cd (Dissolved)	<0.0001 mg/l	BH04B	0.0004 mg/l	BH01
Copper as Cu (Dissolved)	0.002 mg/l	BH02A and BH04B	0.003 mg/l	BH01 and BH03
Lead as Pb (Dissolved)	<0.001 mg/l	BH01, BH03 and BH04B	0.002 mg/l	BH02A
Zinc as Zn (Dissolved)	0.009 mg/l	BH04B	0.105 mg/l	BH01 and BH03
Arsenic as As (Dissolved)	0.001 mg/l	BH04B	0.005 mg/l	BH02A
Boron as B (Dissolved)	2.54 mg/l	BH02A	4.0 mg/l	BH03
Mercury as Hg (Dissolved)	<0.0001 mg/l	BH03 and BH04B	0.0001 mg/l	BH01 and BH02A
Selenium as Se (Dissolved)	0.001 mg/l	BH04B	0.099 mg/l	BH02A
Ammoniacal Nitrogen as N	0.16 mg/l	BH04B	1.0 mg/l	BH02A
Nitrate as NO ₃ (Kone Calc)	<0.9 mg/l	BH04B	47.4 mg/l	BH02A
Nitrate as N	<0.2 mg/l	BH04B	10.7 mg/l	BH02A
TPH Band (>C21-C35)	<0.01 mg/l	BH03	0.04 mg/l	BH01, BH02A and BH04B
TPH GC	0.02 mg/l	BH03	0.06 mg/l	BH02A and BH04B

A prior groundwater sample was taken at BH01 on 8 December 2016. The following was recorded:

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

- Selenium (0.006 mg/l), ammoniacal nitrogen as NH₄ (0.03 mg/l), ammoniacal nitrogen N (0.02 mg/l), nitrate as NO₃ (50.5 mg/l) and nitrate as N (11.4 mg/l) were all detected.
- Phenol was detected at a concentration of 0.0029 mg/l.
- Only two PAHs were detected which were acenaphthene (0.012 µg/l) and benzo[a]anthracene (0.011 µg/l)
- TPH: >C16 – C21 and >C21 – C35 were detected at concentrations of 0.01 mg/l and 0.013 mg/l respectively.

It should be noted that a great deal of emphasis may be placed on the limited chemical data that is available and the reported data should not be assumed to represent groundwater quality at the Site. The chemical data is for samples collected by third parties; sample collection and storage procedures are not known and could affect the validity of the results. Furthermore, chemical concentrations vary spatially and with time.

The laboratory analysis reports are appended to the individual SI Reports, presented as Appendix B to E of this memo (Stantec, 2021).

POTENTIAL SOURCES OF CONTAMINATION (PSCs)

PSCs identified on site and within 50m of the Trowbridge Bioresources Centre (250m for potentially infilled ground) are summarised in Table 1.9 and illustrated in Figure 1. This has been completed by reviewing the site history presented in the EQRA and using information, including historical mapping included in the Environmental Data Report (Groundsure, 2021) and online sources (Data.gov.uk, 2021).

Table 1.9 Potential Sources of Contamination (PSCs)

PSC Plan ID	PSC on site or within 50m radius, 250m radius for potentially infilled land	Distance to site	Status / Year	Potential Contaminants
1	Trowbridge Bioresources Centre. Infrastructure includes digesters, APDs, strain presses and boiler including fuel oil storage tank. Potential for infilling of former tanks and infrastructure bases during development of bioresources centre (see EQRA Figure 3.3 For Current Bioresources Centre Assets).	On-Site	Present	Metals, petroleum hydrocarbons, VOCs including BTEX, MTBE - associated with fuel tank(s) and pumping stations
1a	Wider Trowbridge WRC Sewage works and unspecified tanks (PSC 1b) (c.1922) in the east. WRC expands slightly to the southwest in c.1968-1971 and 1974-1977 and again between 1979 and 1985-1987 to cover the entire Site area. Potential for infilling of former tanks and infrastructure bases over various phases of redevelopment. Made Ground including ash was identified in BH02, HP05 and HP06 during the BWB 2020 GI between 0 and 3 mbgl; however, this is located northeast of the current Bioresources Centre. Ash was not recorded in any other GI however macadam and clinker were noted in BH01 and BH02A/BH04 respectively in ESG 2016 boreholes which are located in the same area as BH02 mentioned above recording the ash (see Figure 4.1 for locations).	Adjacent	1901 - 1922 to present	Phenols, PAHs, pathogens, polychlorinated biphenyls (PCBs) (associated with generators and electricity substations), Asbestos and ground gas (carbon dioxide, carbon monoxide, methane, hydrogen sulphide) - from areas of infilling and sewage treatment, Volatile organic vapours – from storage tanks
1b	Unspecified Tanks	On-site	1974 to 1985	Metals, petroleum hydrocarbons, VOCs, including BTEX, MTBE - associated with fuel tank(s) and pumping stations Phenols, PAHs, pathogens, PCBs, ground gas (carbon dioxide, carbon monoxide, methane, hydrogen sulphide) – associated with sludge beds
	Sewage Works		1922 – 1939, 1973 - 1974 to 1985 - 1987	
1c	Filter Tanks	On site. 77m south.	1939	
1d	Electricity Substation	On-site	Present	Petroleum Hydrocarbons (heavy fractions) and PCBs
2	Refuse Heap	138m northeast	1956	BTEX, PAHs, Volatile Organic Compound - Toluene.
Landfills within 250m; pollution incidents within 50m (Groundsure, 2020) (Data.gov.uk, 2021)				

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Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

2	BGS Recorded Historical Landfill approximately 185m northeast of Site at Bradford Road, Trowbridge. No other information is supplied.
2	Environment Agency Recorded Historical Landfill approximately 135m northeast of Site at Bradford Road received industrial and commercial waste and was operated by Trowbridge Urban District Council. No dates of issue or surrender are supplied.
2	Local Authority Recorded 2 Historical Landfills approximately 119m north and 196m east of Site and from historic mapping. No other information is supplied.
N/A	Pollution incidents – none recorded within 50m
British Geological Survey (BGS) Online Records (artificial ground within 250m)	
N/A	None recorded in published mapping.
Environmental Permitting / Exemptions (50m radius) (Groundsure, 2020)	
N/A	Environmental Permits held at the Site for Biological Treatment (issued 1993), Combustion of Biogas (issued 2014) and Sewage Sludge Treatment (issued 2011) for 250,000 tonnes.
N/A	One storage of waste exemption (S1 & S2) is held for the storage of waste in secure containers at Trowbridge WRC.

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.



Figure 1 Potential Sources of Contamination (PSC) Plan

RECOMMENDATIONS FOR BASELINE DATA

A number of potential sources of contamination (PSCs) have been identified on Site. As presented in Table 1.9, there are potential contaminants (predominantly metals, PAHs and TPHs) associated with both the Bioresources Centre activities at the Site and the wider WRC. There is sufficient data for soil and groundwater within the wider STW to determine baseline data of the Site even though this is limited data for the Bioresources Centre.

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QUALITY ASSURANCE

Version 1 Author: Elizabeth Wilson Checker: Rob Gordon Reviewer:	
---------------------------------------------------------------------------	--

Attachment

Appendix A – Data Tables

Table A1 Historical GI Geo-Environmental Analysis

Exploratory Hole ID	Sample Depth	Strata	Suites of Analysis					
			Metals	Asbestos	BTEX, GRO, DRO	PAHs	VOCs	
Geotechnics 2008								
BH2	1.0 m	MG	X	X	X	X	X	
BH4	1.0 m	MG	X	X	X	X	X	
BH5	3.5 m	KF/OC	X	X	X	X	X	
BH6	4.0 m	MG	X	X	X	X	X	
BH8	1.0 m	MG	X	X	X	X	X	
BH10	0.5 m	MG	X	X	X	X	X	
BH11	8.0 m	KF/OC	X	X	X	X	X	
BH13	1.0 m	KF/OC	X	X	X	X	X	
BH16	1.0 m	KF/OC	X	X	X	X	X	
BWB 2012								
Exploratory Hole ID	Sample Depth	Strata	LOI, Mineral Oil, TOC, PCBs, Total PAHs	pH	Sulphate, chloride	TPHs, PAHs, asbestos	BTEX	WAC
TP2	0.4 m	MG	X	X			X	X
	1.9 m	KF/OC		X	X			
TP3	0.9 m	MG				X		
	1.2 m	MG	X	X			X	X
TP4	0.6 m	MG		X	X			
	2.5 m	MG						
TP5	0.4 m	MG				X		
	1.1 m	MG	X				X	X
TP6	1.20 m	KF/OC		X	X			
ESG 2017								
Exploratory Hole ID	Sample Depth	Strata	pH	Sulphate, Sulphur	Metals, Cyanides, Sulphate, GRO, Phenol, TPHs, BTEX, MTBE, PAHs	Asbestos	TOC, PCBs	WAC
BH01	2.1 m	KF/OC	X	X	X			

BH02A	1.2 m	MG	X	X	X	X	X	X
BH03	0.1 m	Topsoil	X		X	X		
BH03	1.0 m	MG	X		X	X	X	X
BH03	2.0 m	MG – KF/OC boundary	X	X	X			
BH03	3.8 m	KF/OC	X	X				
BH04B	1.2 m	MG	X		X	X	X	X
BH04B	3.4 m	KF/OC	X		X			
BWB 2020								
Exploratory Hole ID	Sample Depth	Strata	Metals, TOC Cyanide	Asbestos	PAHs	BTEX, TPHs		
BH02	1.0 m	MG	X	X	X	X		
BH02	2.0 m	MG	X	X	X	X		
BH03	3.5 m	MG	X	X	X	X		
BH03	7.5 m	MG – KF/OC boundary	X	X	X	X		
BH01	0.7 m	MG	X	X	X	X		
BH01	3.0 m	KF/OC	X	X	X	X		
HP01	0.1 m	MG	X	X	X	X		
HP01	0.3 m	MG	X	X	X	X		
HP01	0.6 m	KF/OC	X	X	X	X		
HP03	0.1 m	MG	X	X	X	X		
HP03	0.5 m	KF/OC	X	X	X	X		
HP04	0.1 m	MG	X	X	X	X		
HP04	0.5 m	MG	X	X	X	X		
HP05	0.2 m	MG	X	X	X	X		
HP05	0.5 m	MG	X	X	X	X		
HP06	0.1 m	MG	X	X	X	X		
HP06	0.6 m	MG	X	X	X	X		
HP07	0.2 m	MG	X	X	X	X		
HP07	0.4 m	MG	X	X	X	X		

TPH CWG - Total Petroleum Hydrocarbons Criteria Working Group; PAHs - polycyclic aromatic hydrocarbons, TOC - Total Organic Carbon, BTEX - Benzene Toluene Ethylbenzene and Xylene.

KF = Kellaways Formation, OC = Oxford Clay Formation.

Table A2 Historical Groundwater Quality Analysis

ESG 2017								
Exploratory Hole ID	Sample Depth	Strata	Metals,	Phenol	PAHs	TPHs	Nitrate, Ammoniacal	Conductivity, pH

			Cyanide, Sulphide				nitrogen, sulphur	
BH01	-	-	x	x	x	x	x	x
BH02A	-	-	x	x	x	x	x	x
BH03	-	-	x	x	x	x	x	x
BH04B	-	-	x	x	x	x	x	x
BWB 2020								
Exploratory Hole ID	Sample Depth	Strata	General Inorganics	Metals	PAHs	Phenols	Volatile free fatty acids	Petroleum hydrocarbons, monoaromatics % oxygenates
BH02 (D)	-	-	x	x	x	x	x	
BH03 (D)	-	-	x	x	x	x	x	
BH03 (S)	-	-	x	x	x	x	x	x

Table A3 Historical Leachability Quality Analysis

BWB 2020								
Exploratory Hole ID	Sample Depth	Strata	General Inorganics	Metals	PAHs	Phenols	Volatile free fatty acids	Petroleum hydrocarbons, monoaromatics % oxygenates
BH01	0.7	MG	x	x	x	x	x	x
BH01	3.0	KF/OC	x	x	x	x	x	x
HP01	0.6	KF/OC	x	x	x	x	x	x
HP03	0.1	MG	x	x	x	x	x	x
HP04	0.5	MG	x	x	x	x	x	x
HP05	0.1	MG	x	x	x	x	x	x
HP05	0.5	MG	x	x	x	x	x	x
HP06	0.1	MG	x	x	x	x	x	x
HP06	0.6	MG	x	x	x	x	x	x
HP07	0.4	MG	x	x	x	x	x	x

Attachment

Appendix B – Geotechnics, 2008

Attachment

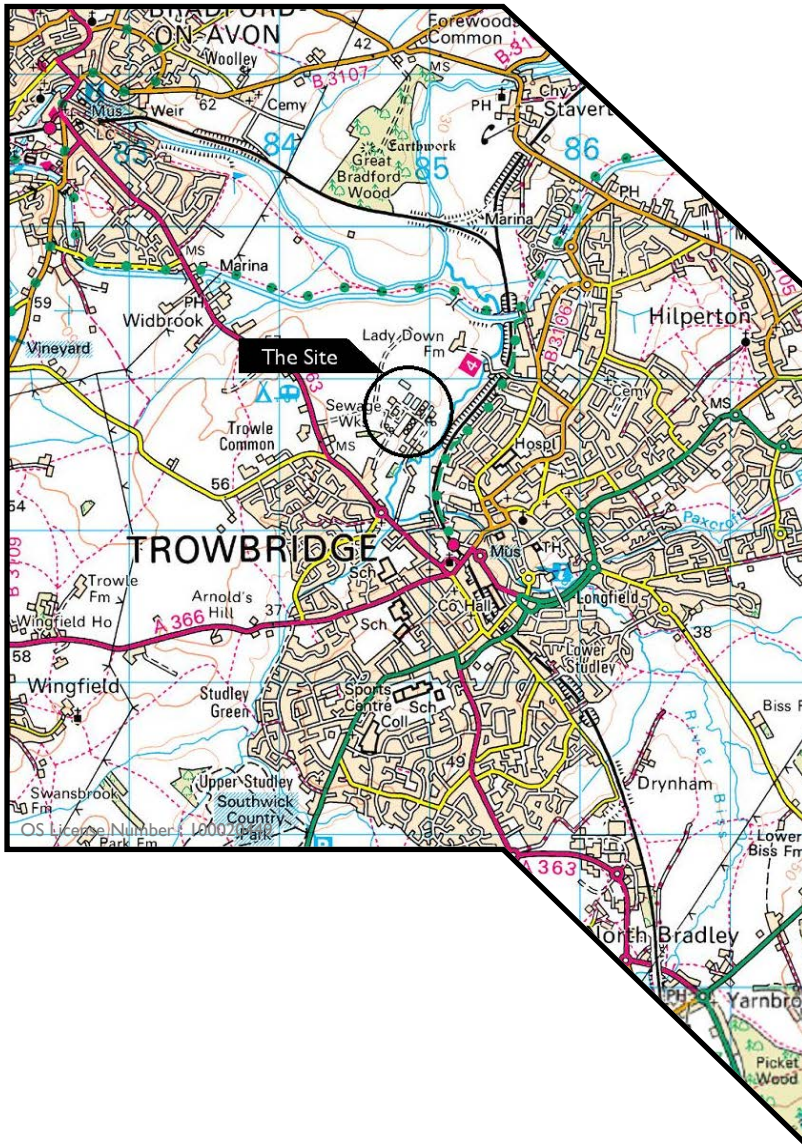
Appendix C – ESG Ltd, 2017

Attachment

Appendix D – BWB Consulting, 2012

Attachment

Appendix E – BWB Consulting, 2020



Contaminated Land
Improvement Review

Trowbridge STW

Factual Report

for
Wessex Water Services Limited

Project Number : PE080558

June 2008

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Contaminated Land Improvement Review

Factual Report

TROWBRIDGE STW

for
Wessex Water Services Limited

Project No:

PE080558

June 2008

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APPENDICES

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APPENDIX 2	Site Location Plan
APPENDIX 3	Borehole Records
APPENDIX 4	Exploratory Hole Location Plan
APPENDIX 5	Monitoring Results
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APPENDIX 7	Investigation Techniques and General Notes

1.0 INTRODUCTION

A geoenvironmental investigation was undertaken by Geotechnics Ltd at the site of an operational Sewage Treatment Works (STW) in Trowbridge, Wiltshire. The investigation was carried out to the instructions of the Client, Wessex Water Services Ltd. This report describes the work undertaken and presents the data obtained.

2.0 OBJECT AND SCOPE OF THE INVESTIGATION

The object of the investigation was to obtain information on the ground and groundwater conditions relating to potential contamination, and migration of contaminants, across the site within the limitations posed by exploratory hole numbers, locations, depths, methods adopted and the scope of approved in situ and laboratory testing. The Client's Brief for the project and Geotechnics Limited's response is included in Appendix 1. The investigation comprised Rotary Boreholes, in situ and laboratory testing and reporting. A geoenvironmental interpretation and evaluation of the data obtained was not commissioned.

3.0 PRESENTATION

A description of the site and a summary of the procedures followed during the investigation process are presented in Sections 4 to 6. The factual data so obtained are presented in Appendices 2 to 6 of this report.

In addition, data in electronic PDF format is presented separately on disk.

Attention is drawn to the General Notes and Investigation Procedures presented in Appendix 7 to aid an understanding of the procedures followed and the context in which the report should be read.

4.0 THE SITE

4.1 Location

The site is located approximately 1 km north west of Trowbridge town centre, Wiltshire. It lies approximately 500m east of the A363 between Trowbridge and Bradford-on-avon, Wiltshire. The approximate Ordnance Survey National Grid Reference for the centre of the site is ST 848 587 and an extract from the relevant 1:50,000 Scale O.S. Map (Sheet No. 173) is included as Appendix 2.

4.2 Description

The site is approximately rectangular in shape covering an area of around 250m by 400m. The site generally slopes gently down toward the south east, with local undulations.

The site comprises many STW structures and lagoons and an historic landfill to the north east and south east edges of the site. The site is surrounded by a chain link perimeter fence, with many hedges, trees and drainage ditches.

Agricultural pasture land surrounds the site on all sides, with the River Biss and associated flood plain approximately 50m to the south east. Access to the site is via a track from the west leading from the A363.

Some areas are inaccessible by heavy plant due to soft ground or the presence of structures.

5.0 PROCEDURE

5.1 Commissioning

The work was awarded following submission of a proposal for ground investigation of the site in accordance with the Client's requirements (see Appendix 1).

5.2 General

The procedures followed in this site investigation are based on *BS 5930 (1999) - Code of Practice for Site Investigations*. The borehole records are included in Appendix 3 and their approximate positions are shown on the Exploratory Hole Location Plan in Appendix 4.

The Exploratory Hole locations were selected by Geotechnics Ltd and the client to provide general coverage of the site perimeter to identify whether there is subsurface contamination present and to determine whether its source is on or off site. Levels shown on the Exploratory Hole Records were estimated from the Survey Drawing provided by the Client and the depths quoted are in metres below ground level.

A walkover visual search of the site for a Victorian culvert was carried out within the site boundary. However, no evidence of the culvert was found during the visit.

5.3 Rotary Boreholes

Fifteen (15 No.) 140mm diameter boreholes (numbered BH1 to BHR11, and BH13 to BH16) were sunk utilising open hole rotary with ODEX casing techniques to a depth of 8.00m below ground level. The work was carried out between the 19th March and 25th March. An inspection pit was excavated at each borehole location using hand tools to a depth not exceeding 1.20m below ground level to check for the presence of underground services.

The drilling equipment on this particular contract utilised compressed air as the flushing medium. Some strata descriptions in the open hole sections of the borehole records are the Drilling Foreman's estimate based on sediment and chipping returns in the flushing medium. The rate of penetration is also used as an indicator of the type of material being drilled, particularly where there is loss of flush returns. Definitive classification in terms of geology or degree of disturbance is not usually possible from these sources.

In some boreholes the ground was particularly soft and the material was pushed aside by the air flush rather than collected and flushed to the ground surface. As a result some boreholes had little return material to sample, and the description is based on drillers' observations.

Groundwater observations are included on the borehole records where appropriate.

On completion standpipes were installed in boreholes BH2, BH4, BH5, BH6, BH8, BH9, BH10 and BH13 to BH16 (See section 5.4). The boreholes BH1, BH3, BH7, and BH11 were backfilled with bentonite on completion.

Borehole BH12 was cancelled due to inaccessibility as a result of localised flooding.

Borehole records are presented in Appendix 3.

5.4 Instrumentation and Monitoring

Long term monitoring of the gas and groundwater levels was made possible by the installation of standpipes as follows:

Exploratory Hole	Standpipe Slotted pipe & Filter Zone (m)
BH2	1.00 to 8.00
BH4	1.00 to 8.00
BH5	1.00 to 8.00
BH6	1.00 to 8.00
BH8	1.00 to 8.00
BH9	1.00 to 8.00
BH10	1.00 to 8.00
BH13	1.00 to 8.00
BH14	1.00 to 8.00
BH15	1.00 to 8.00
BH16	1.00 to 8.00

Monitoring of the gas and groundwater levels at the site commenced on April 3rd 2008 and comprised 5 further visits on the 10th, 16th, and 23rd April, and the 1st and 9th May 2008.

At each position a record of the groundwater level in each instrument was taken

In addition to the groundwater levels the following parameters were measured and recorded in each standpipe using a GA2000 and Gas Data LSMxi Gas Analysers:

- Concentrations (% Vol) of CH₄, O₂, CO₂, along with (% LEL) CH₄.
- Flow Rate
- Differential Pressure
- Barometric Pressure

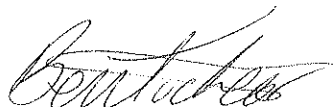
The results of the monitoring are presented in Appendix 5.

6.0 LABORATORY TESTING

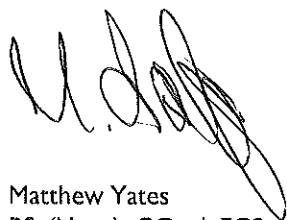
6.1 Contamination

Selected samples of soil and groundwater were tested at the laboratories of ALcontrol Geochem for a number of determinands in order to check on potential site contamination. The determinands were specified by the Client.

The results are presented in Appendix 6.



Ben Tucker
BSc (Hons)
Graduate Engineer



Matthew Yates
BSc(Hons), CGeol, FGS
Principal Engineer

APPENDIX I

The Brief

1. EXECUTIVE SUMMARY

Wessex Water conducted a Preliminary Environmental Site Assessment (ESA) at Trowbridge Sewage Treatment Works (STW) located at off Bradford Road, Trowbridge (Site Id.13318). The Preliminary Environmental Site Assessment (ESA) was completed as part of an internal environmental due diligence audit of selected WW facilities.

Purpose

To evaluate the environmental condition of the site under Part IIA of the Environmental Protection Act (1990) and determine the potential for risk to the environment or human health associated with the continued use of the site as a STW facility.

Identified Sources of Site Contamination

Onsite sources of potential contamination were identified to include the following:

- Fuel storage facilities – there is one diesel above ground fuel tank and one tank used to store waste oil.
- The old landfill site;
- Areas used for old sludge beds;
- Substations on site;
- Waste/flytipping on the site;
- Site operations associated with STW facility.

No potential off-site sources of contamination were identified.

Preliminary Risk Assessment

With respect to the findings of the Preliminary ESA, the following areas of potential environmental or human health risk are discussed.

- Landfill site – the material within the landfill site is largely unknown. There is a risk of leachate generated from the decomposition of the material entering the groundwater and possibly the surface water. There is also the potential for the generation and migration of landfill gases.

- Fuel tanks - there are 2 above ground storage tanks on site. One is used to collect waste oil and the other is for the storage of diesel for use on site. There is a potential risk of localised soil contamination and the diesel mixing with surface water run off.
- STW Facility – the presence of likely contaminants in soils underlying the STW are considered to pose a minimal risk to human health, given the low sensitivity of land use and reduced potential for human exposure due to restricted site access to trained personnel.

Conclusion & Recommendations

In summary, the findings of the Preliminary ESA indicate that the site is considered as suitable for the continued land use as a STW facility. If however the surrounding land were to be redeveloped for a more sensitive use then more detailed investigation should be undertaken to confirm whether any further remediation would be required.

To ensure that human health risks and environmental impacts associated with future site operations are minimised, the following recommendations are made:

- All waste on site should be removed in the appropriate manner.
- Filter bed media should be analysed prior to disposal to ensure that it is not contaminated. Disposal on site may then be an option.
- The diesel tank has a double skin but should be bunded. This should also include the dispensing pump. This will reduce spillages to the area and localised contamination. Checks should be made to ensure compliance with The Control of Pollution (Oil Storage) (England) Regulations 2001.
- The landfill site should be sampled both for landfill gases and leachate to establish whether they are still being generated from the decomposition of materials.

Your Ref :
Our Ref : MY/QE070004
Date : 01 February 2008

Wessex Water
Claverton Down Road
Claverton Down
Bath
BA2 7WW

FAO: Paul Slade
Email: Paul.slade@wessexwater.co.uk

Dear Sirs

Geotechnical Investigation Quotes: Contaminated Land Improvement Review

Further to your email dated 23rd January 2008 and following a meeting with yourself, we have pleasure in enclosing our revised quotes for carrying out the works as discussed. The works have been based on the following:

- Bowerhill: Provide a crew to obtain shallow soil samples from around the perimeter of the pond and water samples taken within the pond for metals testing. Letter report allowed for.
- Wells STW: Cable percussion boreholes to be located around the hillock towards the middle of the site. Window samples within the sludge dumping area towards the south-west part of the site. This area may be accessible using a man-handleable wheeled rig. Alternative equipment (jack-hammer window sampling kit) would be mobilised as an alternative should ground conditions require. Parts of this area of the site have not been visited and additional plant may be required to gain access.
- Trowbridge: Based on providing a tractor mounted rotary drilling rig to carry out open-hole (with ODEX casing to keep boreholes open to allow standpipe installation) drilling. Engineer supervision includes for walkover search of Victorian culvert.
- Westbury: Three days worth of window sampling, some boreholes to be installed with standpipes.
- Paulton: Provide a crew to obtain soil samples from the south-eastern end of the site. Letter report allowed for.
- Yeovil: Cable percussion boreholes to be located across the site to investigate potential contamination from off-site and on-site sources. Geoenvironmental input from our environmental department has been allowed for.
- Glastonbury: Hand pitting around suspected hydrocarbon leak 0 based on excavating through grass areas. Cable percussion and window sample boreholes through the site, some with standpipe installations.

All installations would be dual purpose gas and water monitoring standpipes. Geotechnics Ltd would need to be informed of the exact requirements from Wessex Water regarding proposed exploratory hole locations and borehole requirements.

We assume that access is available for the various rigs, together with unlimited headroom. Most sites should be readily accessible for the rigs we have quoted for. However, some areas of some sites may be boggy, in particular the Yeovil site. We have allowed for using floatation tyres on the cable percussion rig, however it is possible that an excavator/tractor may need to assist in moving around the site.

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Scottish Office
The Geotechnical Centre
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Duckburn Business Park
Dunblane, FK15 0EW
Scotland
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F: 01786 823345

At Wells, we understand that vegetation clearance and access would be made available for drilling between the small river and the sludge landfill.

As detailed on the enclosed Conditions of Offer, the Employer, or his appointed representative, will be responsible for notifying Geotechnics Ltd of the location of any services, utilities or buried structures present on the site. No work can be started on site until such information is made available. In the absence of such information we would be pleased to undertake enquiries with the statutory undertakers or, in the case of private sites, organise an on-site services search by a specialist company. The costs for undertaking these services can be provided if required. It should be recognised that the information from a specialist company can be provided in CAD format to become a permanent record for inclusion in the site H&S File for the project.

We ask you to note that it is company policy to excavate service inspection pits to 1.2m at all borehole locations unless instructed in writing by the Client/Engineer not to do so. Any such written instruction would relieve Geotechnics Ltd of any liability for damage to underground apparatus.

Mobilisation to site can currently take place within around two weeks following receipt of a written instruction to proceed. Some of the activities such as providing a pitting crew can be mobilised more quickly, usually within 1 week.

We hope you find our offer of interest, however, should you have any queries or require further information, please do not hesitate to contact us.

Yours faithfully

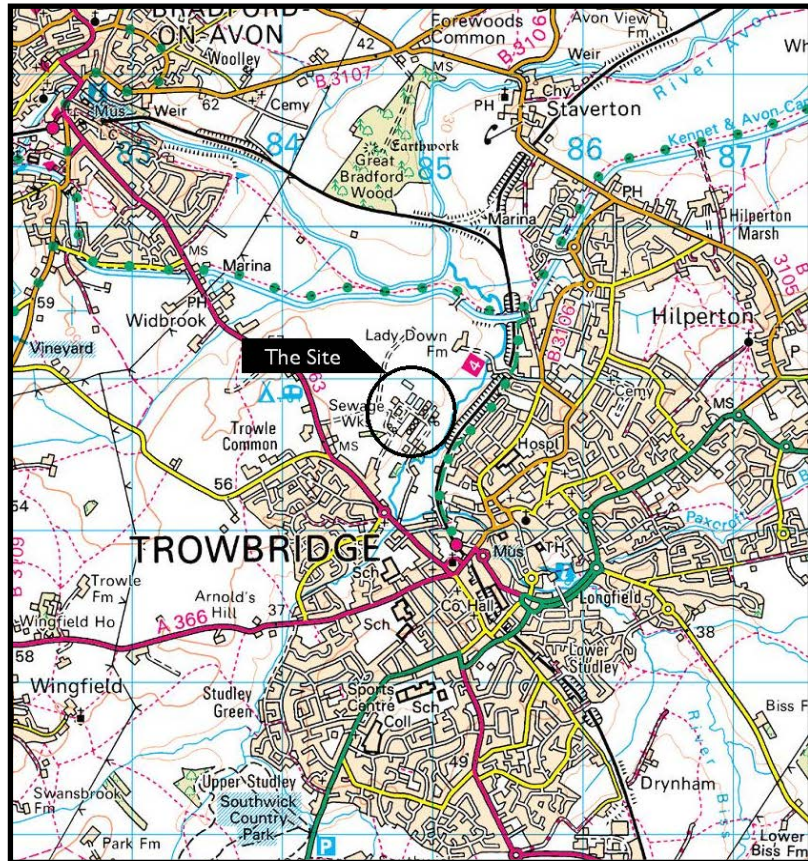


Matthew Yates
for GEOTECHNICS LIMITED – South West Office
email: myates@geotechnics.co.uk
Enc

APPENDIX 2

Site Location Plan

SITE LOCATION PLAN



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Contaminated Land Improvement Review
Trowbridge STW
for
Wessex Water Services Limited



APPENDIX 3




Borehole Records









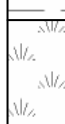
Samples	
B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
P	Piston sample (PF - failed piston sample)
TW	Thin walled push in sample
U -	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
V	Vial sample
W	Water sample

Insitu Testing / Properties	
S	Standard Penetration Test (SPT)
C	SPT with cone
VN	Strength from Insitu Vane
HV	Strength from Hand Vane
PP	Strength from Pocket Penetrometer
(All other strengths from undrained triaxial testing)	
w%	Water content
N	SPT Result
-/-	Blows/penetration (mm) after 150mm seating.
-*/-	Total blows/penetration (mm)
()	Extrapolated value













Rotary Core	
RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (mm)	Maximum
NI	Minimum
NR	Non-intact core
(where core recovery is unknown it is assumed to be at the base of the run)	

Groundwater	
Water Strike	▽
Depth Water Rose To	▼

Instrumentation	
Seal	
Filter	
Seal	

Strata		
Made Ground	Type 1	
	Type 2	
Topsoil		
Cobbles and Boulders		
Gravel		
Sand		
Silt		
Clay		
Peat		

Note: Composite soil types shown by combined symbols

Chalk		
Limestone		
Sandstone		
Coal		
Mudstone		
Siltstone		
Metamorphic Rock	Fine Grained	
	Medium Grained	
	Coarse Grained	
Igneous Rock	Fine Grained	
	Medium Grained	
	Coarse Grained	

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH1
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 34.45 m AOD


Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Black and dark brown very clayey gravelly sand of ash. Gravel is angular to subrounded fine to coarse of pottery, glass, brick and clinker. [MADE GROUND]		G.L.		34.45
1.00	E					Black soil and black clay ** [MADE GROUND]	1.20		
3.00	3.00						3.90		30.55
							4.90		29.55
							8.00		26.45
					End of Drillhole				

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			25/03/08	08:00						None encountered during boring.
3.00	0.14	ODEX Rotary	AB-OVO	8.00	3.00	DRY	25/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation. Inspection pit hand excavated to 1.20m depth to check for presence of buried services. Borehole backfilled with arisings and bentonite on completion.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description

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 Figure 1 of 1
 02/07/2008



BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

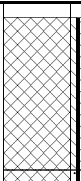
WESSEX WATER SERVICES LIMITED

Borehole
Project No

BH2
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 35.30 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Black and dark brown clayey very gravelly sand of ash. Gravel is angular to subrounded fine to coarse of clinker, brick, charcoal and glass with rare rootlets. [MADE GROUND]		G.L.		35.30
1.00	E					Brown to yellow clay ** [MADE GROUND]	1.00		34.30
							3.40		31.90
					Dark soil fill glass and plastic ** [MADE GROUND]				
4.50	4.50						5.20		30.10
					Grey CLAY with limestone bands **				
							8.00		27.30
					End of Drillhole				

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			25/03/08	08:00						None encountered during boring.
4.50	0.14	ODEX Rotary	AB-OVO	8.00	4.50	Dry	25/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH3
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 35.50 m AOD


Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type	Length	ROD	Description General	Description Detail	Depth	Legend	Level m AOD
		TCR/SCR%	Max/Min	%					
0.50	E				Black soil and fill ** [MADE GROUND]		G.L.		35.50
1.00	E				Black and dark brown clayey very gravelly sand of ash. Gravel is angular to subrounded fine to coarse of brick, clinker, glass and pottery with rare rootlets. [MADE GROUND]		1.20		34.30
2.00	D								
3.00	3.00				Grey and yellow CLAY with limestone bands **		5.40		30.10
4.00	D								
5.40	D				End of Drillhole		8.00		27.50

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			20/03/08	08:00						None encountered during boring.
3.00	0.14	ODEX Rotary	AB-OVO	8.00	3.00		20/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 Borehole backfilled with arisings and bentonite on completion.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description

Figure 1 of 1
02/07/2008



BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH4
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 36.40 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Black and dark brown clayey very gravelly sand of ash. Gravel is angular to subrounded fine to coarse of brick, clinker, glass and concrete with occasional up to cobble sized pockets of sandy clay. [MADE GROUND]		G.L.		36.40
1.00	E			Dark soil and fill ** [MADE GROUND]			1.00		35.40
				Yellow and brown clay fill ** [MADE GROUND]			2.40		34.00
				Black fill and glass ** [MADE GROUND]			2.90		33.50
3.00	3.00				Grey CLAY with limestone bands **		3.40		33.00
					End of Drillhole		8.00		28.40

Drilling				Progress					Ground water					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			20/03/08	08:00	6.00	3.00				
3.00	0.14	ODEX Rotary	AB-OVO	8.00	3.00		20/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

All dimensions are in metres.

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH5
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 35.75 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Soft dark brown and black slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick, clinker, ash and glass with rare rootlets. [MADE GROUND]		G.L.		35.75
1.00	D						0.40		35.35
1.50	D				Firm orange brown and dark grey slightly sandy slightly gravelly clay. Gravel is subangular fine and medium of chalk, brick and glass with occasional gravel sized pockets of ash. [MADE GROUND]		1.40		34.35
2.50	D								
3.00	3.00				Soft brown and grey slightly sandy slightly gravelly clay. Gravel is subangular to subrounded fine to coarse of clinker, brick and glass. Many gravel sized pockets of ash. [MADE GROUND]		3.30		32.45
3.50	D								
					Grey CLAY and yellow limestone bands **				
					End of Drillhole		8.00		27.75

Drilling				Progress					Ground water					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			20/03/08	08:00						None encountered during drilling.
3.00	0.14	ODEX Rotary	AB-OVO	8.00	3.00		20/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure 1 of 1
02/07/2008

geotechnics

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole
Project No

BH6
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 36.30 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Soft dark brown and black slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick, glass and clinker with many pockets of ash with occasional rootlets. [MADE GROUND]	Between 1.00-1.10m: firm orange brown	G.L.		36.30
1.00	E						1.10		35.20
2.00	D				Black fill ** [MADE GROUND]				
3.00	D								
4.00	D				Dark brown clay ** [MADE GROUND]		3.60		32.70
4.50	4.50								
5.50	D				Black to dark brown very clayey very gravelly sand of ash. Gravel is angular to subrounded fine to coarse of brick, glass, clinker and charcoal with occasional pockets of grey slightly sandy clay with rare rootlets. [MADE GROUND]		5.10		31.20
							5.50		30.80
					Grey CLAY **				
					Grey CLAY and limestone **				
							6.20		30.10
							8.00		28.30
					End of Drillhole				

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit		G.I.			20/03/08	08:00	3.00					
4.50	0.14	ODEX Rotary	AB-OVO	8.00	4.50		20/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH7
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 38.30 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Firm orange brown slightly sandy slightly gravelly clay. Gravel is subangular fine of brick and glass with occasional rootlets [MADE GROUND]	Below 1.00m: with pockets of black ash and rare cobbles of meta lithorelicts.	G.L.		38.30
1.00	E						1.30		37.00
2.00	D				Black clay and fill ** [MADE GROUND]		2.10		36.20
4.00	D				Black and brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick, clinker and ash. [MADE GROUND]				
5.50	D				Grey and yellow CLAY **		5.30		33.00
6.00	6.00								
					End of Drillhole		8.00		30.30

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			19/03/08	08:00						Damp at around 4.00m depth.
6.00	0.14	ODEX Rotary	AB-OVO	8.00	6.00		19/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 Borehole backfilled with arisings and bentonite on completion.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description

Figure 1 of 1
02/07/2008



BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

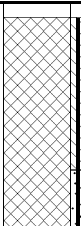
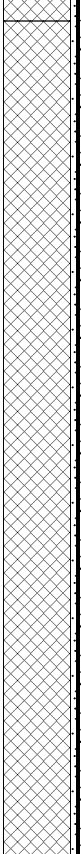
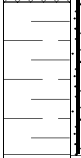
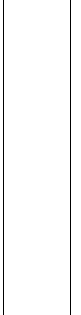
WESSEX WATER SERVICES LIMITED

Borehole Project No

BH8
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 38.70 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50				
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD		
0.50	E				Firm orange brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of glass and brick with occasional rootlets. [MADE GROUND]	Below 1.00m: with many pockets of brown clayey sand of ash.	G.L.		38.70		
1.00	E										
1.50	D				Black clayey very gravelly sand of ash. Gravel is angular to subrounded fine and medium of glass, brick and clinker with rare roots and rootlets. [MADE GROUND]		1.50		37.20		
3.00	D										
5.00	D										
6.00	6.00				Grey and yellow CLAY **						
7.00	D										31.70
					End of Drillhole		8.00		30.70		

Drilling				Progress				Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			19/03/08	08:00						None encountered during boring.
6.00	0.14	ODEX Rotary	AB-OVO	8.00	6.00		19/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

All dimensions are in metres.



BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH9
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 40.35 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50			
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD	
0.50	E				Firm to stiff orange brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to medium of brick, flint and meta - lithorelicts with occasional pockets of black ash and rare rootlets. [MADE GROUND]		G.L.		40.35	
1.00	E									
1.50	D				Soft black and dark brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick, glass and ash with rare rootlets. [MADE GROUND]		1.40		38.95	
2.00	D									
3.00	D									
4.00	D									
5.00	D									
6.00	6.00									
6.00	D									
							6.70		33.65	
					Brown and grey CLAY **					
							8.00		32.35	
					End of Drillhole					

Drilling				Progress				Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			19/03/08	08:00	3.00					
6.00	0.14	ODEX Rotary	AB-OVO	8.00	6.00		19/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

All dimensions are in metres.

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH10
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 41.30 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Firm to stiff orange brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick and meta - lithorelicts with rare rootlets. [MADE GROUND]		G.L.		41.30
1.00	D						1.40		39.90
2.00	D				Soft brown and black slightly sandy gravelly clay. Gravel is angular to subrounded fine to coarse of brick, glass, ash and clinker. [MADE GROUND]				
4.00	D								
6.00	6.00								
6.00	D						6.70		34.60
					Grey and yellow CLAY **				
					End of Drillhole		8.00		33.30

Drilling				Progress				Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			19/03/08	08:00						Damp at around 3.00m depth.
6.00	0.14	ODEX Rotary	AB-OVO	8.00	6.00		19/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

All dimensions are in metres.

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH11
PE080558

Client WESSEX WATER SERVICES LIMITED


Ground Level 42.95 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Dark soil ** [MADE GROUND]		G.L. 0.20		42.95 42.75
1.00	E				Firm to stiff orange brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse brick, flint and clinker with rare rootlets. [MADE GROUND]		1.00		41.95
1.30	D								
4.00	D				Black and brown very clayey very gravelly sand of ash. Gravel is subangular to subrounded fine to coarse of clinker, brick, glass and fragments of decomposing organic material. [MADE GROUND]				
6.00	6.00								
8.00	D				Grey and yellow CLAY **		6.30		36.65
					End of Drillhole		8.00		34.95

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			19/03/08	08:00						Damp at around 4.00m depth.
6.00	0.14	ODEX Rotary	AB-OVO	8.00	6.00		19/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 Borehole backfilled with arisings and bentonite on completion.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description

Figure 1 of 1
02/07/2008



BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole
Project No

BH13
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 42.50 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Concrete ** [MADE GROUND]		G.L. 0.15 0.25		42.50 42.35 42.25
1.00	E				Hardcore ** [MADE GROUND]				
1.50					Stiff orange brown and grey indistinctly structured slightly sandy CLAY.				
3.00	D				Soft grey slightly sandy CLAY.		3.10		39.40
7.00	D				Grey CLAY limestone bands **	Below 5.60m: with rare subangular fine to coarse gravel of limestone.	5.60		36.90
					End of Drillhole		8.00		34.50

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			25/03/08	08:00	5.90	1.50				
1.50	0.14	ODEX Rotary	AB-OVO	8.00	1.50		25/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure 1 of 1
02/07/2008



BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole Project No

BH14
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 42.20 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Soil ** [TOPSOIL]		G.L.		42.20
1.00	E				Firm to stiff orange mottled blue - grey slightly sandy CLAY with rare rootlet traces.		0.20		42.00
1.50	1.50				Grey CLAY with yellow bands **		1.90		40.30
					Grey CLAY with limestone bands **		3.40		38.80
					End of Drillhole		8.00		34.20

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			25/03/08	08:00						None encountered during boring.
1.50	0.14	ODEX Rotary	AB-OVO	8.00	1.50		25/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole
Project No

BH15
PE080558

Client WESSEX WATER SERVICES LIMITED

Ground Level 43.20 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Firm to stiff orange mottled blue - grey slightly sandy CLAY with rare rootlet traces.		G.L.		43.20
1.00	E								
1.50	1.50				Grey CLAY with limestone bands **		3.30		39.90
					End of Drillhole		8.00		35.20

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			20/03/08	08:00						None encountered during boring.
1.50	0.14	ODEX Rotary	AB-OVO	8.00	1.50		20/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of; 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW
- TROWBRIDGE STW

Engineer

WESSEX WATER SERVICES LIMITED

Borehole
Project No

BH16
PE080558

Client WESSEX WATER SERVICES LIMITED

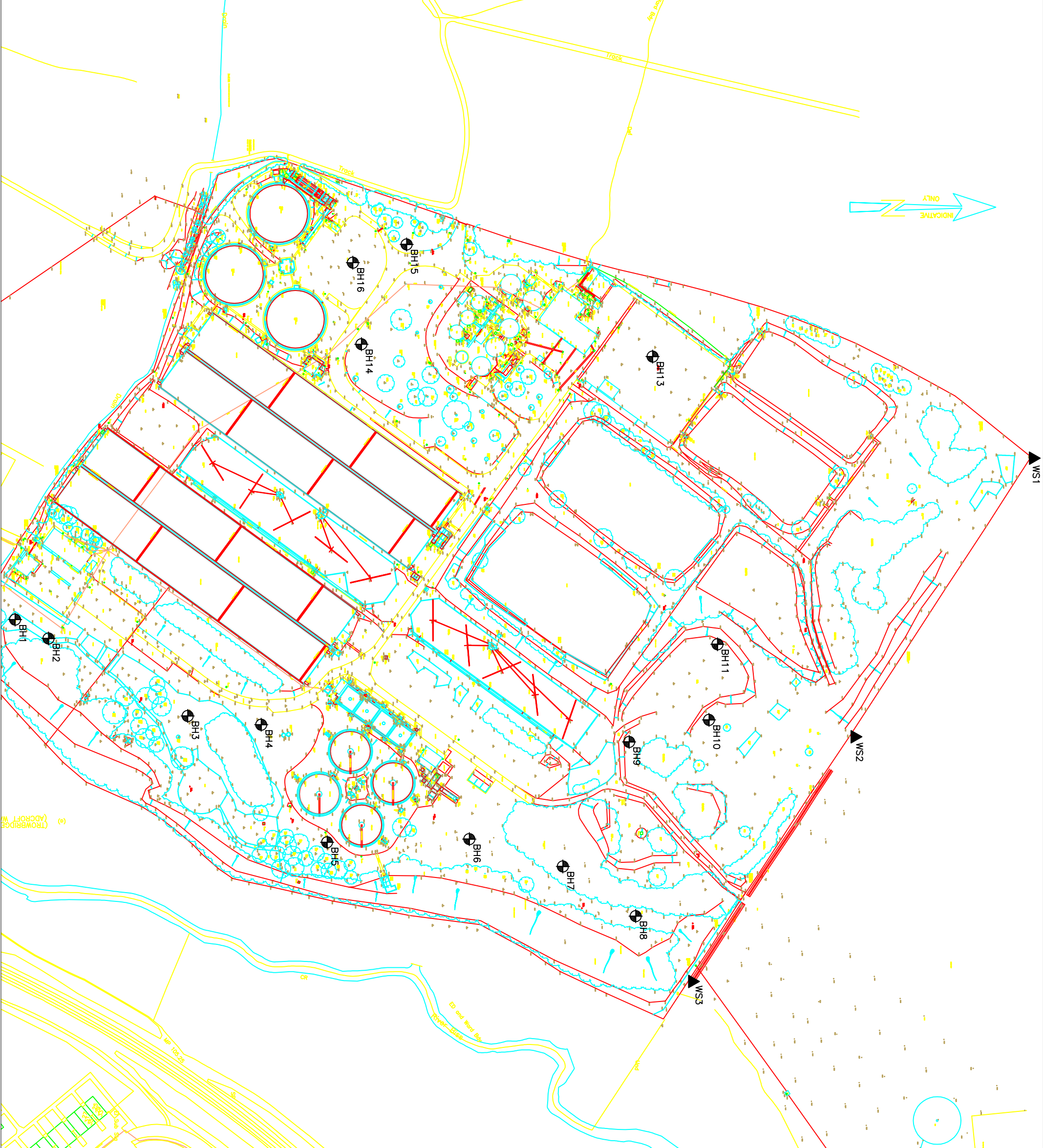
Ground Level 42.20 m AOD

Drilling		Properties/Sampling			Strata		Scale 1:50		
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	ROD %	Description General	Description Detail	Depth	Legend	Level m AOD
0.50	E				Hardcore gravel ** [MADE GROUND]		G.L.		42.20
1.00	E				Firm to stiff orange mottled blue grey slightly sandy CLAY with rare rootlet traces.		0.30		41.90
1.50	1.50				Grey and yellow CLAY **		1.40		40.80
					Grey CLAY with limestone bands **		2.90		39.30
					End of Drillhole		8.00		34.20

Drilling				Progress				Ground water						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.I.			25/03/08	08:00						None encountered during boring.
1.50	0.14	ODEX Rotary	AB-OVO	8.00	1.50		25/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks
 Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres.
 Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
 Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
 E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
 ** = Drillers' description
 A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

APPENDIX 4
Exploratory Hole Location Plan



KEY:



Borehole Location



Water Sample Location



The Geotechnical Centre,
 8 Orchard Court,
 Heron Road, Sowton,
 EXETER
 Devon, EX2 7LL
 Phone: (01392) 412446
 Fax: (01392) 362159
 Email: mail@exeter.geotechnics.co.uk
 www.geotechnics.co.uk

Client:
 Wessex Water Services Limited

Project:
 Contaminated Land Improvement Review
 Trowbridge STW

Drawing Title:
 Exploratory Hole Location Plan
 Taken from a drawing supplied by the client

Not To Scale
Date:
 June 2008

Project No:
 PE080558
File Name:
 PE080558_EXP

APPENDIX 5

Monitoring Results

FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH2

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	25 March 2008		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		2.93	7.90	0	0	2.3	19.1	78.5	
10-Apr-2008			7.58	0	0	1.9	19.2	78.9	
16-Apr-2008		2.53	7.52	0	0	1.9	19.2	78.9	
23-Apr-2008		2.52	7.48	0	0	3.5	17.5	79.00	
1-May-2008			7.50	0	0	4.0	17.1	78.9	
9-May-2008			7.35	0	0	0.0	20.5	79.5	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH2

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	25 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1028	-	+0.01	
10-Apr-2008		994	+000.25	-0.0	
16-Apr-2008		1014	+000.07	-0.0	
23-Apr-2008		1013	+0.00	-0.00	
1-May-2008		1001	-000.10	+0.0	
9-May-2008		1007	+000.11	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH4

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	20 March 2008		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		3.15	7.80	0	0	1.3	19.5	79.0	Tap left open.
10-Apr-2008			7.70	0	0	7.6	12.8	79.6	
16-Apr-2008		2.84	7.46	0	0	0.9	19.8	79.3	
23-Apr-2008		2.88	7.49	0	0	8.4	12.4	79.2	
1-May-2008			7.43	0	0	8.6	11.3	80.1	
9-May-2008			7.41	0	0	0.3	20.2	79.5	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH4

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	20 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1028			
10-Apr-2008		993	+000.21		
16-Apr-2008		1015	+000.32	-0.0	
23-Apr-2008		1013	-000.12	-0.0	
1-May-2008		1001	-000.04	+0.0	
9-May-2008		1006	+000.21	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558
Borehole BH5
Sheet No. 1 (1 of 2)

Client WESSEX WATER SERVICES LIMITED

Installation Details

Installation Type Standpipe Diameter 50mm
Depth to Base 8.00m Cover Type Upright lockable protective cover
Filter Zone 1.00 - 8.00m Ground Level
Date Installed 20 March 2008

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008			7.90	0	0	0.8	19.8	79.3	
10-Apr-2008			7.60	0	0	4.1	14.3	81.6	
16-Apr-2008		2.90	7.63	0	0	4.1	14.1	81.8	
23-Apr-2008		2.95	7.59	0	0	4.0	14.6	81.4	
1-May-2008			7.50	0	0	0.9	19.0	80.1	
9-May-2008			7.52	0	0	0.0	20.5	79.5	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH5

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	20 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1028		+0.1	
10-Apr-2008		993	+000.17	-0.0	
16-Apr-2008		1015	+000.27	+0.0	
23-Apr-2008		1013	+000.01	-0.0	
1-May-2008		1001	+000.03	+0.0	
9-May-2008		1007	+000.22	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH6

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	20 March 2008		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		3.55	7.90	0	0	3.7	19.0	77.1	
10-Apr-2008			7.48	0	0	9.6	7.3	83.1	
16-Apr-2008		3.31	7.36	0	0	0	20.5	79.5	
23-Apr-2008		3.31	7.29	0	0	13.5	0.7	85.8	
1-May-2008			7.23	0	0	7.7	10.1	82.2	
9-May-2008			7.04	0	0	0.0	20.5	79.5	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH6

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	20 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1028		-0.01	
10-Apr-2008		993	+000.10	-0.0	
16-Apr-2008		1015	+000.10	-0.0	
23-Apr-2008		1013	-000.07	-0.0	
1-May-2008		1001	-000.02	+0.0	
9-May-2008		1007	+000.13	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH8

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (1 of 2)

Installation Details									
Installation Type		standpipe			Diameter		50mm		
Depth to Base		8.00m			Cover Type		Upright lockable protective cover		
Filter Zone		1.00 - 8.00m			Ground Level				
Date Installed		19 March 2008							
Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		7.15	7.99	0	0	1.4	20.4	78.1	
10-Apr-2008			7.64	0	0	5.9	11.3	82.8	
16-Apr-2008		6.81	7.65	0	0	0.4	19.6	80	
23-Apr-2008		6.80	7.65	0	0	0.7	19.7	79.6	
1-May-2008			7.65	0	0	0.7	20.1	79.2	
9-May-2008			7.62	0	0	1.5	19.6	78.9	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH8

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	19 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1028		-0.1	
10-Apr-2008		994	+000.12	-0.0	
16-Apr-2008		1015	+000.07	+0.0	
23-Apr-2008		1012	+000.05	-0.0	
1-May-2008		1001	+000.00	+0.0	
9-May-2008		1007	+000.10	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH9

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	19 March 2008		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		4.03	7.80	0	0	0.4	21.0	78.5	
10-Apr-2008			7.45	0.1	0.2	3.3	11.1	85.6	
16-Apr-2008			7.47	0.2	3.0	5.4	3.0	91.6	
23-Apr-2008		3.85	7.38	0	0	0.3	19.8	79.9	
1-May-2008			7.37	0	0	0.1	20.3	79.6	
9-May-2008			7.38	0	0	0.0	20.5	79.50	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH9

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	19 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		-0.01	
10-Apr-2008		993	+000.20	-0.0	
16-Apr-2008		993	+000.20	-0.0	
23-Apr-2008		1011	-000.04	-0.0	
1-May-2008		1001	+000.06	+0.0	
9-May-2008		1006	+000.19	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH10

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	19 March 2008		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		5.57			9.7	1.8	18.2	19.4	
10-Apr-2008			7.56	10.7	>99.9	6.9	0.8	92.3	
16-Apr-2008		5.20	7.45	10.0	5.4	4.4	7.1	88.5	
23-Apr-2008		5.18	7.41	0.1	1.0	0.8	19.9	79.3	
1-May-2008			7.27	0.3	6.0	0.2	20	79.8	
9-May-2008			7.29	2.6	52	1.6	17.2	81.2	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH10

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	19 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		+0.0	
10-Apr-2008		993	+000.14	-0.0	
16-Apr-2008		1016	+000.14	-0.0	
23-Apr-2008		1011	+000.05	-0.0	
1-May-2008		1000	+000.08	+0.0	
9-May-2008		1007	+000.00	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558
Borehole BH13
Sheet No. 1 (1 of 2)

Client WESSEX WATER SERVICES LIMITED

Installation Details

Installation Type Standpipe Diameter 50mm
Depth to Base 8.00m Cover Type Flush lockable protective cover
Filter Zone 1.00 - 8.00m Ground Level
Date Installed 25 March 2008

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		1.05		0	0	2.6	14.0	83.3	
10-Apr-2008			7.66	0.3	5.0	5.0	6.6	88.4	
16-Apr-2008		0.50	7.19						Bung not sealed.
23-Apr-2008		0.46	7.13						Flooded.
1-May-2008			7.06	0	0	0.0	20.4	79.6	
9-May-2008			7.02	0	0	0.0	20.5	79.5	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH13

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	25 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		-2.81	
10-Apr-2008		993	+002.17	-0.0	
16-Apr-2008		1018	+000.03	-0.0	
23-Apr-2008					
1-May-2008		1001	-000.32	+0.0	
9-May-2008		1007	+000.04	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH14

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	25 March 2008		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		6.03		0	0	1.8	18.2	19.4	
10-Apr-2008			7.50	0	0	3.2	16.5	80.3	
16-Apr-2008		4.24	7.50	0	0	0.5	19.4	80.1	
23-Apr-2008		3.54	7.55	0	0	0.0	20.4	79.6	
1-May-2008			7.54	0	0	0.2	20.1	79.7	
9-May-2008			7.51	0	0	0.0	20.5	79.5	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH14

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	25 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		+0.01	
10-Apr-2008		993	+000.09	-0.0	
16-Apr-2008		1017	+000.06	+0.0	
23-Apr-2008		1012	-000.06	-0.0	
1-May-2008		1000	+000.00	+0.0	
9-May-2008		1006	+000.04	+0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH15

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	20 March 2008		

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		4.81		0	0	1.7	13.6	84.6	
10-Apr-2008			7.61	0	0	2.2	14.4	83.4	
16-Apr-2008		2.48	7.63	0	0	0.4	19.3	80.3	
23-Apr-2008		2.09	7.62	0	0	2.4	17.4	80.2	
1-May-2008			7.61	0	0	0.1	20.3	79.6	
9-May-2008			7.62	0	0	0.0	20.5	79.5	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558
Borehole BH15
Sheet No. 1 (2 of 2)

Client WESSEX WATER SERVICES LIMITED

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Upright lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	20 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		-0.0	
10-Apr-2008		993	-000.15	-0.0	
16-Apr-2008		1017	-000.00	-0.0	
23-Apr-2008		1011	-000.06	-0.0	
1-May-2008		1000	+000.09	+0.0	
9-May-2008		1006	+000.02	-0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558
Borehole BH16
Sheet No. 1 (1 of 2)

Client WESSEX WATER SERVICES LIMITED

Installation Details

Installation Type Standpipe Diameter 50mm
Depth to Base 8.00m Cover Type Flush lockable protective cover
Filter Zone 1.00 - 8.00m Ground Level
Date Installed 25 March 2008

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		4.49		0.8	14.8	4.2	15.9	78.9	
10-Apr-2008			7.58	0.2	3.0	6	13.5	80.5	
16-Apr-2008		Flooded							Flooded over cover.
23-Apr-2008		1.39	7.53	0	0.0	0.0	20.3	79.7	
1-May-2008			7.53	0.1	3.0	0.4	20.2	79.4	
9-May-2008			7.54	0	0.0	0.0	20.4	79.6	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project CONTAMINATED LAND IMPROVEMENT REVIEW -
TROWBRIDGE STW

Project No PE080558

Borehole BH16

Client WESSEX WATER SERVICES LIMITED

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.00 - 8.00m	Ground Level	
Date Installed	25 March 2008		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		+0.0	
10-Apr-2008		993	+000.17	-0.0	
16-Apr-2008					
23-Apr-2008		1011	-000.05	-0.0	
1-May-2008		1000	+000.03	+0.0	
9-May-2008		1007	+000.04	-0.0	

Remarks



APPENDIX 6
Laboratory Test Results - Contamination



Geotechnics Ltd
The Geotechnical Centre
8 Orchard Court
Heron Road
Sowton Industrial State
Exeter, Devon
EX2 7LL

ATTN: Cathy Smith

CERTIFICATE OF ANALYSIS

Date: 15 May, 2008
Our Reference: 08/08299/02/01
Your Reference: PEO80558
Location: TROWBRIDGE STW

A total of 24 samples was received for analysis on Friday, 02 May 2008 and completed on Wednesday, 14 May 2008. Accredited laboratory tests are defined in the log sheet, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation. We are pleased to enclose our final report, it was a pleasure to be of service to you, and we look forward to our continuing association.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials- whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Signed

Diane Whittlestone
Tech. Support Manager

David O'Hare
Project Manager

Caroline Suttie
Project Coordinator
Team Leader

Valid if signed by any of the above signatories.

Compiled By

.....
Briony Johnson



ALcontrol Laboratories TEST SCHEDULE

JOB NUMBER : 08/8299/02
CLIENT : Geotechnics Ltd
CONTACT : Cathy Smith
DATE OF RECEIPT : 02/05/08
LOCATION : TROWBRIDGE STW

BATCH NUMBER : 1
CLIENT REF/CODE : PEO80558
ORDER NUMBER : OE4778
TURNAROUND : 6 days

Numeric values indicate additional scheduling

* indicates test subcontracted

Sample Number	Sample Identity	P / V	Depth	Sample Type	UKAS Accredited ?	Metals ICP. 9 (S)	Boron Water Soluble (S)	Beryllium (S)	Barium (S)	Vanadium (S)	Sulphur Elemental (S)	Cyanide Total (S)	Cyanide Free (S)	Nitrate as NO3 Kone (S)	Sulphate Total (S)	Sulphide Easily Liberated (S)	Asbestos Screen (ID)	pH (S)	Acetone (S)	EPH (DRO) (S)	GRO BTEX MTBE GC (S)	PAH Spec MS (S)	VOC MS (S)		
1	BH2	1KGTub	1.00	SOLID	✓													X							
2	BH2	JAR 250g	1.00	SOLID		X	X	X	X	X	X				X					X	X	X	X		
3	BH2	Vial	1.00	SOLID																				X	
4	BH4	1KGTub	1.00	SOLID								X	X	X			X	X							
5	BH4	JAR 250g	1.00	SOLID		X	X	X	X	X	X				X					X	X	X	X		
6	BH4	Vial	1.00	SOLID																				X	
7	BH5	1KGTub	3.50	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	BH5	Vial	3.50	SOLID																				X	
9	BH6	1KGTub	4.00	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10	BH6	Vial	4.00	SOLID																				X	
11	BH8	1KGTub	1.00	SOLID								X	X	X			X	X							
12	BH8	JAR 250g	1.00	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
13	BH8	Vial	1.00	SOLID																				X	
14	BH10	1KGTub	0.50	SOLID								X	X	X			X	X							
15	BH10	JAR 250g	0.50	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16	BH10	Vial	0.50	SOLID																				X	
17	BH11	1KGTub	8.00	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
18	BH11	Vial	8.00	SOLID																				X	
19	BH13	1KGTub	1.00	SOLID								X	X	X			X	X							
20	BH13	JAR 250g	1.00	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
21	BH13	Vial	1.00	SOLID																				X	
22	BH16	1KGTub	1.00	SOLID								X	X	X			X	X							

ALcontrol Laboratories TEST SCHEDULE

JOB NUMBER : 08/8299/02
CLIENT : Geotechnics Ltd
CONTACT : Cathy Smith
DATE OF RECEIPT : 02/05/08
LOCATION : TROWBRIDGE STW

BATCH NUMBER : 1
CLIENT REF/CODE : PEO80558
ORDER NUMBER : OE4778
TURNAROUND : 6 days

Numeric values indicate additional scheduling

* indicates test subcontracted

Sample Number	Sample Identity	UKAS Accredited ?	Metals ICP. 9 (S)	Boron Water Soluble (S)	Beryllium (S)	Barium (S)	Vanadium (S)	Sulphur Elemental (S)	Cyanide Total (S)	Cyanide Free (S)	Nitrate as NO3 Kone (S)	Sulphate Total (S)	Sulphide Easily Liberated (S)	Asbestos Screen (ID)	pH (S)	Acetone (S)	EPH (DRO) (S)	GRO BTEX MTBE GC (S)	PAH Spec MS (S)	VOC MS (S)
23	BH16	JAR 250g	X	X	X	X	X	X			X	X			X	X	X	X	X	X
24	BH16	Vial	X	X	X	X	X	X												X
Total Number of Tests			9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

ALcontrol Laboratories

Extractable Petroleum Hydrocarbons (EPH) By GC-FID

Carbon Range C10-C40

Job Number : 08/08299/02/01

Client : Geotechnics Ltd

Client Ref : PEO80558

Matrix [Units] : SOLID [mg/kg]

All results expressed on a dry weight basis.

Sample No	Sample Identity	Depth	EPH	Interpretation
2	BH2	1.0	680	PAHs/Bitumen/Tar/Humic acids
5	BH4	1.0	570	PAHs/Bitumen/Tar
7	BH5	3.5	3300	biodegraded diesel/bitumen/tar/pahs/carboxylic acids
9	BH6	4.0	820	biodegraded diesel/bitumen/tar/humics
12	BH8	1.0	390	Bitumen/Tar/humic acids
15	BH10	0.5	100	Bitumen/Tar/humic acids
17	BH11	8.0	1100	PAHs/Bitumen/Tar/Humic acids
20	BH13	1.0	38	biodegraded diesel
23	BH16	1.0	53	humic acids

Extractable Petroleum Hydrocarbons (formally Diesel Range Organics) :- Any compound extractable in n-hexane within the carbon range C10-C40, includes Aliphatic (Min Oil), Aromatic (PAHs) and naturally occurring compounds.

ALcontrol Laboratories Analytical Services

Sample Descriptions

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref : PEO80558

Grain sizes	
<0.063mm	Very Fine
0.1mm - 0.063mm	Fine
0.1mm - 2mm	Medium
2mm - 10mm	Coarse
>10mm	Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
BH2	1.0	Brown	0.1mm - 2mm	Loam (topsoil) with some Stones	1
BH4	1.0	Brown	0.1mm - 0.063mm	Silty Clay Loam with some Stones	1
BH5	3.5	Brown	0.1mm - 0.063mm	Silty Clay Loam with some Stones	1
BH6	4.0	Brown	0.1mm - 2mm	Loam (topsoil) with some Glass & Stones	1
BH8	1.0	Brown	0.1mm - 2mm	Sandy Silt Loam with some Stones	1
BH10	0.5	Beige	0.1mm - 0.063mm	Silty Clay with some Stones	1
BH11	8.0	Brown	0.1mm - 0.063mm	Silty Clay Loam with some Glass & Stones	1
BH13	1.0	Beige	<0.063mm	Clay	1
BH16	1.0	Beige	<0.063mm	Clay	1

* These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

¹ Sample Description supplied by client

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Preliminary

ALcontrol Laboratories Analytical Services

Table Of Results

ISO 17025 accredited
M MCERTS accredited
* Subcontracted test
» Shown on prev. report

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Matrix: SOLID
Location: TROWBRIDGE STW
Client Contact: Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	1-3	4-6	7-8	9-10	11-13	14-16	17-18	19-21	22-24		
Total Sulphate	2200	510	5500	14000	2400	610	2400	17000	580	TM129 [#] _M	<100 mg/kg
Boron Water Soluble	<3.5	<3.5	9.8	14	<3.5	<3.5	5.8	<3.5	<3.5	TM129 [#] _M	<3.5 mg/kg
Arsenic	54	18	30	47	9	10	13	13	9	TM129 [#] _M	<3.0 mg/kg
Barium	1500	460	530	450	150	120	240	110	59	TM129 [#] _M	<6.0 mg/kg
Beryllium	5.8	0.8	1.9	4.2	0.7	0.8	0.8	<0.4	0.5	TM129	<0.4 mg/kg
Cadmium	3.3	0.8	2.1	2.5	0.8	<0.3	1.0	<0.3	<0.3	TM129	<0.3 mg/kg
Chromium	62	73	150	58	33	32	33	21	28	TM129 [#] _M	<4.5 mg/kg
Copper	200	73	240	290	63	19	120	7	<6	TM129 [#] _M	<6 mg/kg
Lead	310	190	310	590	96	58	130	21	9	TM129 [#] _M	<2 mg/kg
Mercury	1.1	<0.6	1.7	0.9	0.9	<0.6	<0.6	<0.6	<0.6	TM129 [#] _M	<0.6 mg/kg
Nickel	71	23	49	56	21	16	30	<0.9	4.0	TM129 [#] _M	<0.9 mg/kg
Selenium	<3	<3	<3	<3	<3	<3	<3	<3	<3	TM129 [#] _M	<3 mg/kg
Vanadium	51	37	42	40	25	32	32	25	40	TM129 [#] _M	<1.5 mg/kg
Zinc	1300	400	890	940	200	110	300	22	43	TM129 [#] _M	<2.5 mg/kg
Nitrate (soluble) as NO3	230	30	440	52	60	2	81	<1	34	TM102 [#]	<1 mg/kg
Easily Liberated Sulphide	<15	<15	<15	<15	<15	27	<15	<15	<15	TM180 [#]	<15 mg/kg
Total Cyanide	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM153 [#] _M	<1 mg/kg
Free Cyanide	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM153	<1 mg/kg
Asbestos Presence Screen	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	TM001	NONE
Elemental Sulphur	<70	250	350	<70	<70	<70	<140	<70	<70	TM136 [#]	<70 mg/kg
pH Value	7.68	7.83	7.31	7.55	7.77	8.26	7.46	6.61	8.02	TM133 [#] _M	<1.00 pH Units
EPH (DRO) (C10-C40)	680	570	3300	820	390	100	1100	38	53	TM061 [#] _M	<35 mg/kg
EPH (DRO) (C10-C40) % Surrogate Recovery	96	95	98	96	98	98	96	100	100	TM061 [#] _M	%
GRO (C4-C10)	84	<10	<10	<10	17	<10	<10	<10	<10	TM089	<10 ug/kg
GRO (C10-C12)	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM089	<10 ug/kg
Benzene	14	<10	<10	<10	<10	<10	<10	<10	<10	TM089 [#] _M	<10 ug/kg
Toluene	41	<10	<10	<10	17	<10	<10	<10	<10	TM089 [#] _M	<10 ug/kg
Ethyl benzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM089 [#] _M	<10 ug/kg
m & p Xylene	29	<10	<10	<10	<10	<10	<10	<10	<10	TM089 [#] _M	<10 ug/kg
o Xylene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM089 [#] _M	<10 ug/kg
Sum m&p and o Xylene	29	<10	<10	<10	<10	<10	<10	<10	<10	TM089	<10 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

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ALcontrol Laboratories Analytical Services

Table Of Results

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 * Subcontracted test
 » Shown on prev. report

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Matrix: SOLID
Location: TROWBRIDGE STW
Client Contact: Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units		
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0				
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID				
Sampled Date													
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08				
Batch	1	1	1	1	1	1	1	1	1				
Sample Number(s)	1-3	4-6	7-8	9-10	11-13	14-16	17-18	19-21	22-24				
Sum of BTEX	84	<10	<10	<10	17	<10	<10	<10	<10			TM089	<10 ug/kg
MTBE	<10	<10	<10	<10	<10	<10	<10	<10	<10			TM089 [#]	<10 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

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 Preliminary

ALcontrol Laboratories Analytical Services

Table Of Results

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 * Subcontracted test
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Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Matrix: SOLID
Location: TROWBRIDGE STW
Client Contact: Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	1-3	4-6	7-8	9-10	11-13	14-16	17-18	19-21	22-24		
PAH by GCMS											
Naphthalene	270	200	260	420	23	22	150	<10	<10	TM074 [#] _M	<10 ug/kg
Acenaphthylene	390	830	510	170	38	22	170	<5	<5	TM074 [#] _M	<5 ug/kg
Acenaphthene	23	69	140	26	<14	<14	170	<14	<14	TM074 [#] _M	<14 ug/kg
Fluorene	64	420	210	65	14	<12	360	<12	<12	TM074 [#] _M	<12 ug/kg
Phenanthrene	1300	7000	1700	790	140	92	4300	<21	56	TM074 [#] _M	<21 ug/kg
Anthracene	610	2700	710	240	78	58	1800	<9	17	TM074 [#] _M	<9 ug/kg
Fluoranthene	3700	17000	4100	1000	470	320	11000	<25	120	TM074 [#] _M	<25 ug/kg
Pyrene	3100	13000	3500	820	420	280	7300	<22	76	TM074 [#] _M	<22 ug/kg
Benz(a)anthracene	2500	7700	2400	730	290	200	6200	17	91	TM074 [#] _M	<12 ug/kg
Chrysene	2500	6000	2200	680	290	240	6300	10	92	TM074 [#] _M	<10 ug/kg
Benzo(b)fluoranthene	4400	10000	4200	1000	550	440	10000	<16	97	TM074 [#] _M	<16 ug/kg
Benzo(k)fluoranthene	2100	3500	1400	430	180	180	3300	<25	58	TM074 [#] _M	<25 ug/kg
Benzo(a)pyrene	2600	6600	2800	600	350	250	6000	<12	75	TM074 [#] _M	<12 ug/kg
Indeno(123cd)pyrene	1900	4000	2100	470	250	160	4000	<11	42	TM074 [#] _M	<11 ug/kg
Dibenzo(ah)anthracene	500	1200	500	180	70	51	1300	<8	11	TM074 [#] _M	<8 ug/kg
Benzo(ghi)perylene	2000	4600	2500	620	290	200	4500	<10	60	TM074 [#] _M	<10 ug/kg
PAH 16 Total	28000	85000	29000	8300	3500	2500	67000	27	790	TM074 [#] _M	<25 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

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ALcontrol Laboratories Analytical Services

Table Of Results

ISO 17025 accredited
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* Subcontracted test
» Shown on prev. report

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Matrix: SOLID
Location: TROWBRIDGE STW
Client Contact: Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	1-3	4-6	7-8	9-10	11-13	14-16	17-18	19-21	22-24		
Volatile Organic Compounds											
Dichlorodifluoromethane	<4	<4	<4	<4	<4	<4	<4	<4	<4	TM116 [#]	<4 ug/kg
Chloromethane	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116 [#]	<7 ug/kg
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#] _M	<10 ug/kg
Bromomethane	<13	<13	<13	<13	<13	<13	<13	<13	<13	TM116	<13 ug/kg
Chloroethane	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116 [#]	<14 ug/kg
Trichlorofluoromethane	<6	<6	<6	<6	<6	<6	<6	<6	<6	TM116 [#] _M	<6 ug/kg
trans-1-2-Dichloroethene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116 [#]	<11 ug/kg
Dichloromethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#]	<10 ug/kg
Carbon Disulphide	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116 [#] _M	<7 ug/kg
1,1-Dichloroethene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#] _M	<10 ug/kg
1,1-Dichloroethane	<8	<8	<8	<8	<8	<8	<8	<8	<8	TM116 [#] _M	<8 ug/kg
Methyl Tertiary Butyl Ether	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116	<11 ug/kg
cis-1-2-Dichloroethene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116 [#] _M	<5 ug/kg
Bromochloromethane	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116 [#]	<14 ug/kg
Chloroform	<8	<8	<8	<8	<8	<8	<8	<8	<8	TM116 [#] _M	<8 ug/kg
2,2-Dichloropropane	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116	<12 ug/kg
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116 [#]	<5 ug/kg
1,1,1-Trichloroethane	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116 [#] _M	<7 ug/kg
1,1-Dichloropropene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116 [#] _M	<11 ug/kg
Benzene	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116 [#] _M	<9 ug/kg
Carbontetrachloride	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116 [#] _M	<14 ug/kg
Dibromomethane	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116 [#]	<9 ug/kg
1,2-Dichloropropane	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116 [#] _M	<12 ug/kg
Bromodichloromethane	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116 [#] _M	<7 ug/kg
Trichloroethene	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116 [#] _M	<9 ug/kg
cis-1-3-Dichloropropene	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116 [#] _M	<14 ug/kg
trans-1-3-Dichloropropene	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116 [#] _M	<14 ug/kg
1,1,2-Trichloroethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#]	<10 ug/kg
Toluene	9	<5	<5	<5	<5	<5	<5	<5	<5	TM116 [#] _M	<5 ug/kg
1,3-Dichloropropane	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116 [#]	<7 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

Validated
Preliminary

ALcontrol Laboratories Analytical Services

Table Of Results

ISO 17025 accredited
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* Subcontracted test
» Shown on prev. report

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Matrix: SOLID
Location: TROWBRIDGE STW
Client Contact: Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	1-3	4-6	7-8	9-10	11-13	14-16	17-18	19-21	22-24		
Volatile Organic Compounds (cont)											
Dibromochloromethane	<13	<13	<13	<13	<13	<13	<13	<13	<13	TM116 [#]	<13 ug/kg
1,2-Dibromoethane	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116 [#]	<12 ug/kg
Tetrachloroethene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116 [#]	<5 ug/kg
1,1,1,2-Tetrachloroethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 ^{#M}	<10 ug/kg
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116 ^{#M}	<5 ug/kg
Ethylbenzene	<4	<4	<4	<4	<4	<4	<4	<4	<4	TM116 [#]	<4 ug/kg
p/m-Xylene	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116 [#]	<14 ug/kg
Bromoform	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#]	<10 ug/kg
Styrene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#]	<10 ug/kg
1,1,2,2-Tetrachloroethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#]	<10 ug/kg
o-Xylene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#]	<10 ug/kg
1,2,3-Trichloropropane	<17	<17	<17	<17	<17	<17	<17	<17	<17	TM116 [#]	<17 ug/kg
Isopropylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116 [#]	<5 ug/kg
Bromobenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 ^{#M}	<10 ug/kg
2-Chlorotoluene	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116 [#]	<9 ug/kg
Propylbenzene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116 [#]	<11 ug/kg
4-Chlorotoluene	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116 [#]	<12 ug/kg
1,2,4-Trimethylbenzene	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116 [#]	<9 ug/kg
4-Isopropyltoluene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116 [#]	<11 ug/kg
1,3,5-Trimethylbenzene	<8	<8	<8	<8	<8	<8	<8	<8	<8	TM116 [#]	<8 ug/kg
1,2-Dichlorobenzene	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116 ^{#M}	<12 ug/kg
1,4-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116 ^{#M}	<5 ug/kg
sec-Butylbenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#]	<10 ug/kg
tert-Butylbenzene	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116 [#]	<12 ug/kg
1,3-Dichlorobenzene	<6	<6	<6	<6	<6	<6	<6	<6	<6	TM116 [#]	<6 ug/kg
n-Butylbenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116 [#]	<10 ug/kg
1,2-Dibromo-3-chloropropane	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116 [#]	<14 ug/kg
1,2,4-Trichlorobenzene	<6	<6	<6	<6	<6	<6	<6	<6	<6	TM116 [#]	<6 ug/kg
Naphthalene	<13	<13	<13	<13	<13	<13	<13	<13	<13	TM116 [#]	<13 ug/kg
1,2,3-Trichlorobenzene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116 [#]	<11 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

ALcontrol Laboratories Analytical Services

Table Of Results - Appendix

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP	No Determination Possible	*	Subcontracted test
NFD	No Fibres Detected	>	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
PFD	Possible Fibres Detected	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

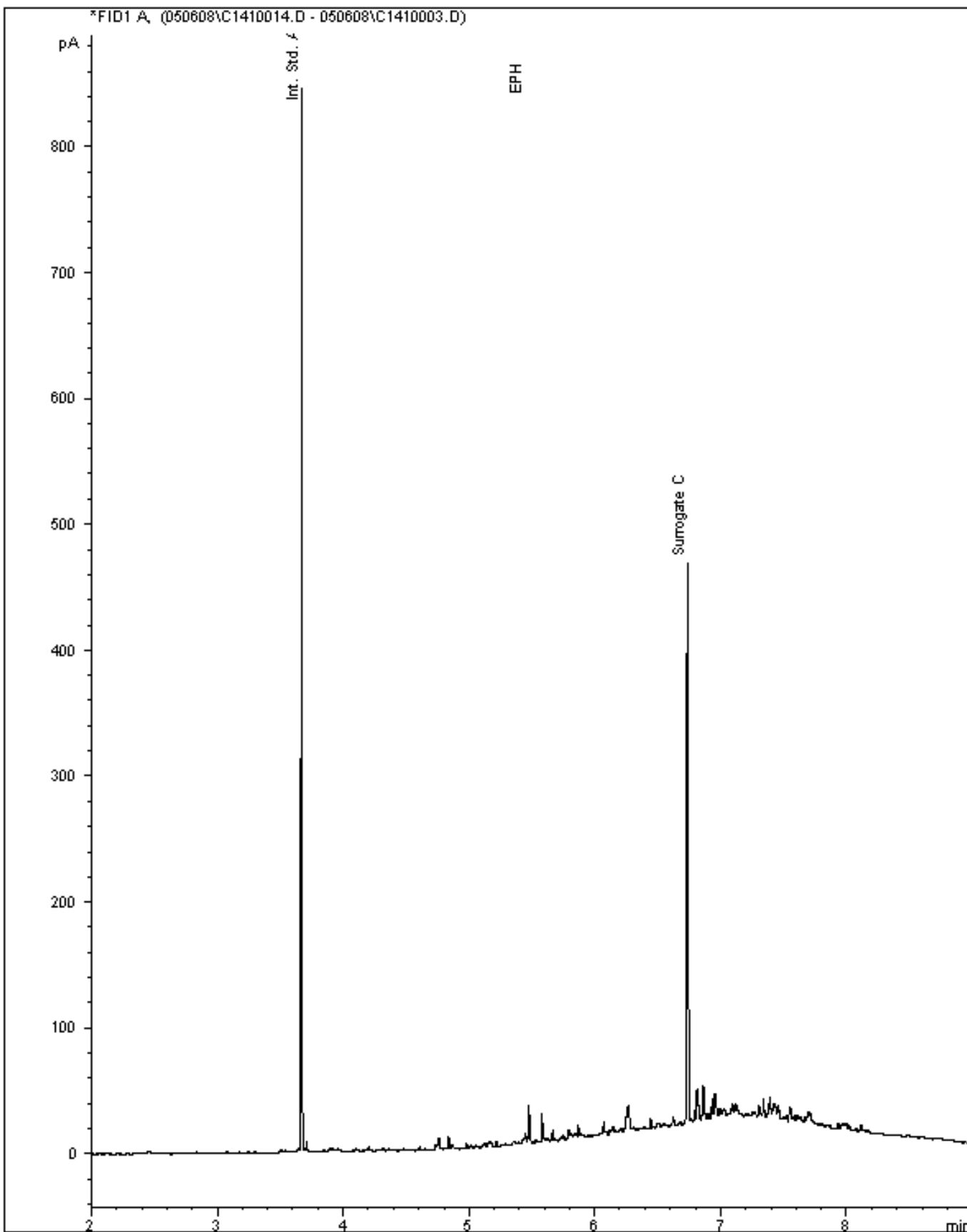
Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
PENDING		method details are pending			WET	
TM001	In - house Method	Screening of Soils for Fibres			WET	
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)	✓	✓	DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.	✓		DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.	✓	✓	DRY	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)			WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓		WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓	✓	WET	
TM102	Method 4500H, AWWA/APHA, 20th Ed., 1999	Determination of Total Oxidised Nitrogen using the Kone Analyser	✓		DRY	
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS			WET	
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS	✓		WET	
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS	✓	✓	WET	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

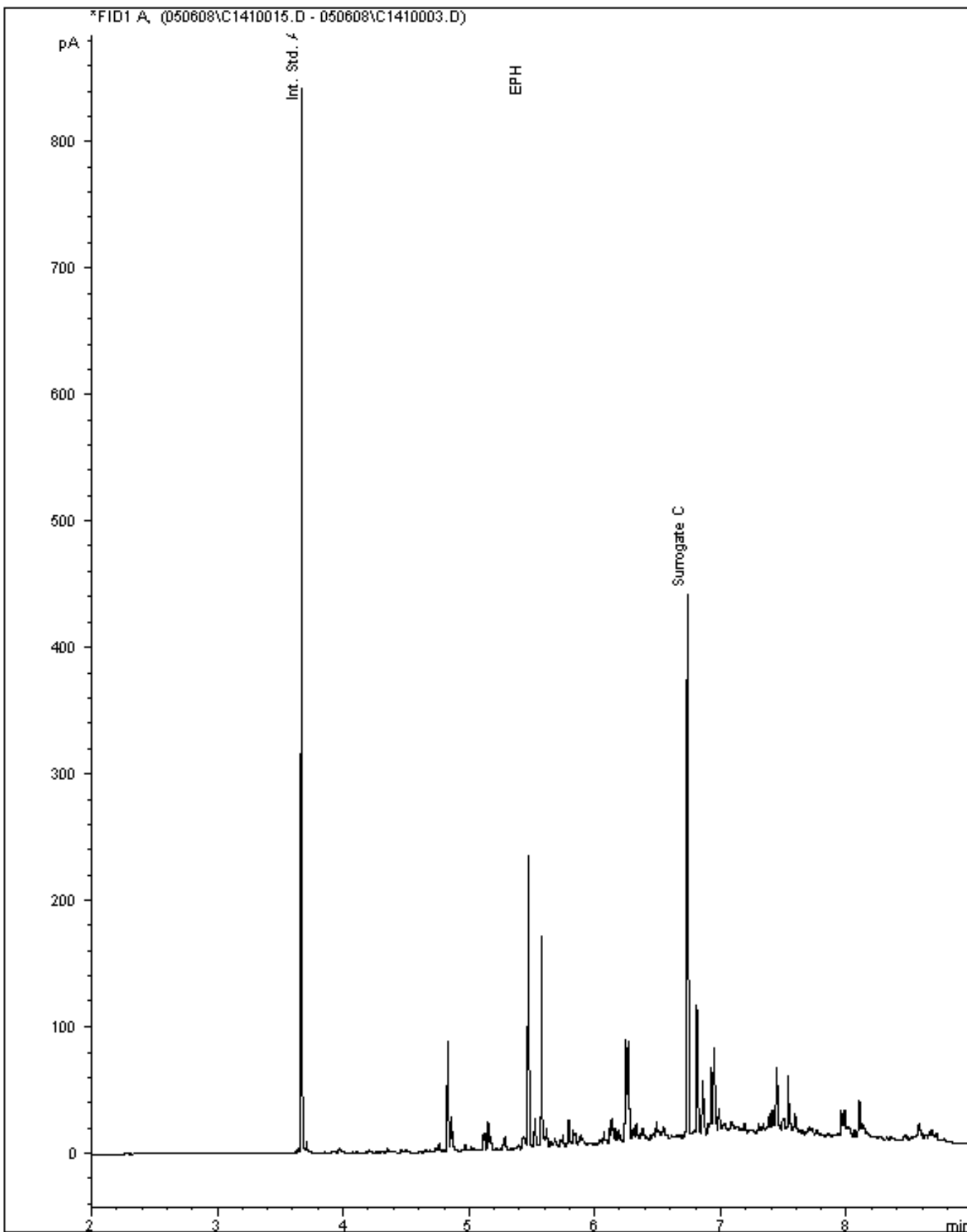
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity : 200808299-2/S
Date Acquired : 06/05/08 21:28:56 PM
Units : mg/kg
Sample Multiplier : 1.005
Dilution :



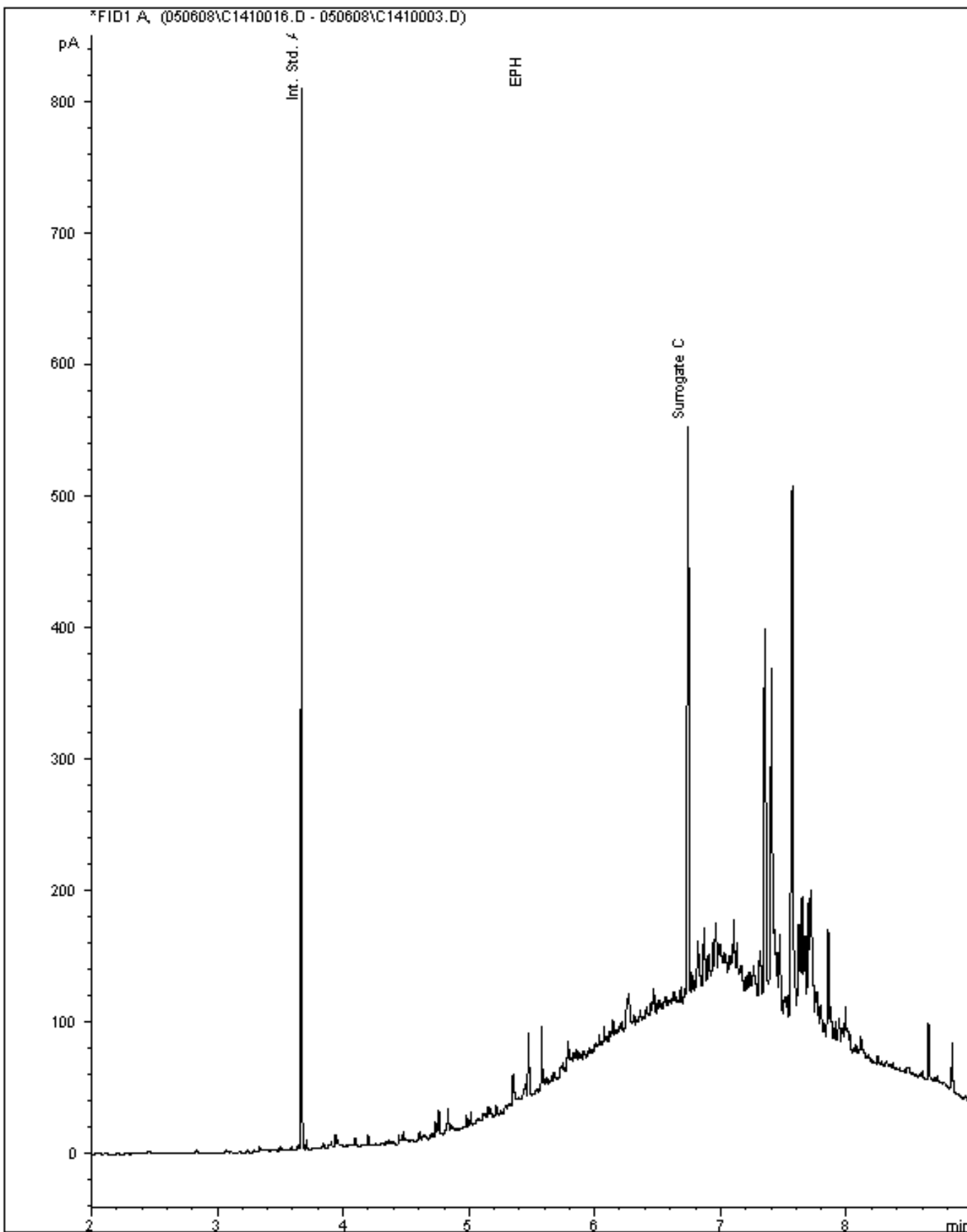
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity : 200808299-5/S
Date Acquired : 06/05/08 21:50:36 PM
Units : mg/kg
Sample Multiplier : 1.000
Dilution :



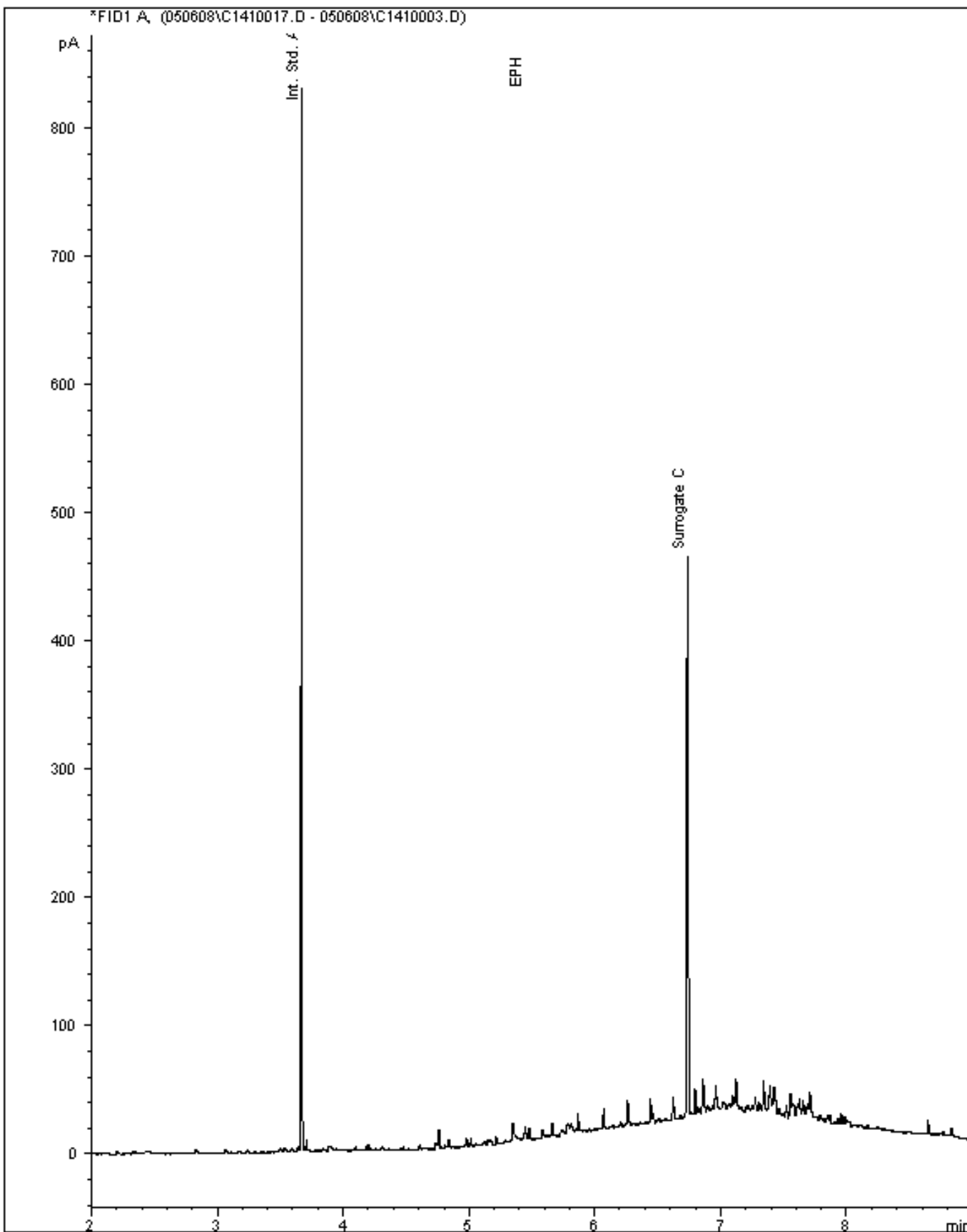
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity : 200808299-7/S
Date Acquired : 06/05/08 22:12:16 PM
Units : mg/kg
Sample Multiplier : 1.004
Dilution :



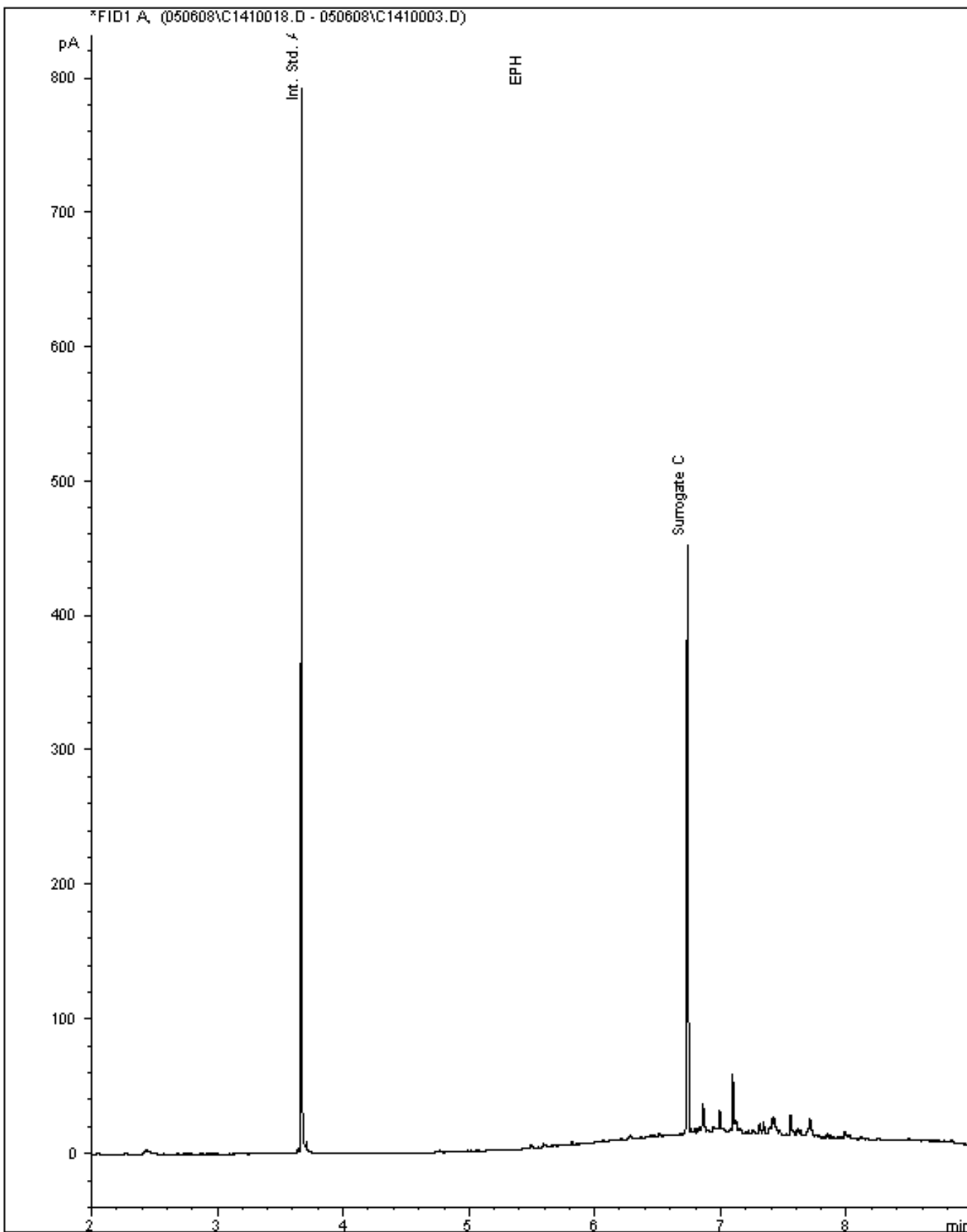
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity : 200808299-9/S
Date Acquired : 06/05/08 22:33:37 PM
Units : mg/kg
Sample Multiplier : 1.001
Dilution :



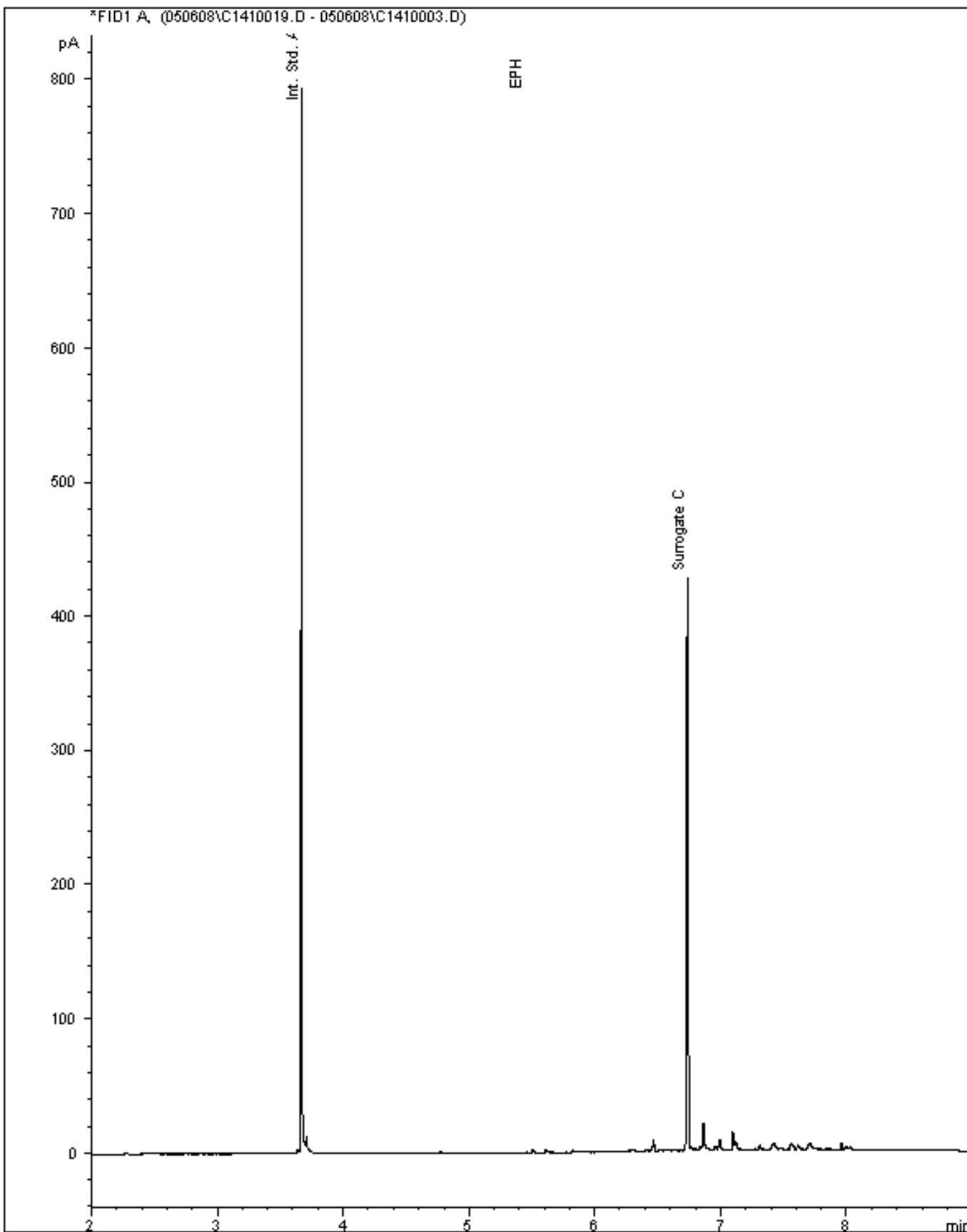
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity : 200808299-12/S
Date Acquired : 06/05/08 22:54:58 PM
Units : mg/kg
Sample Multiplier : 0.998
Dilution :



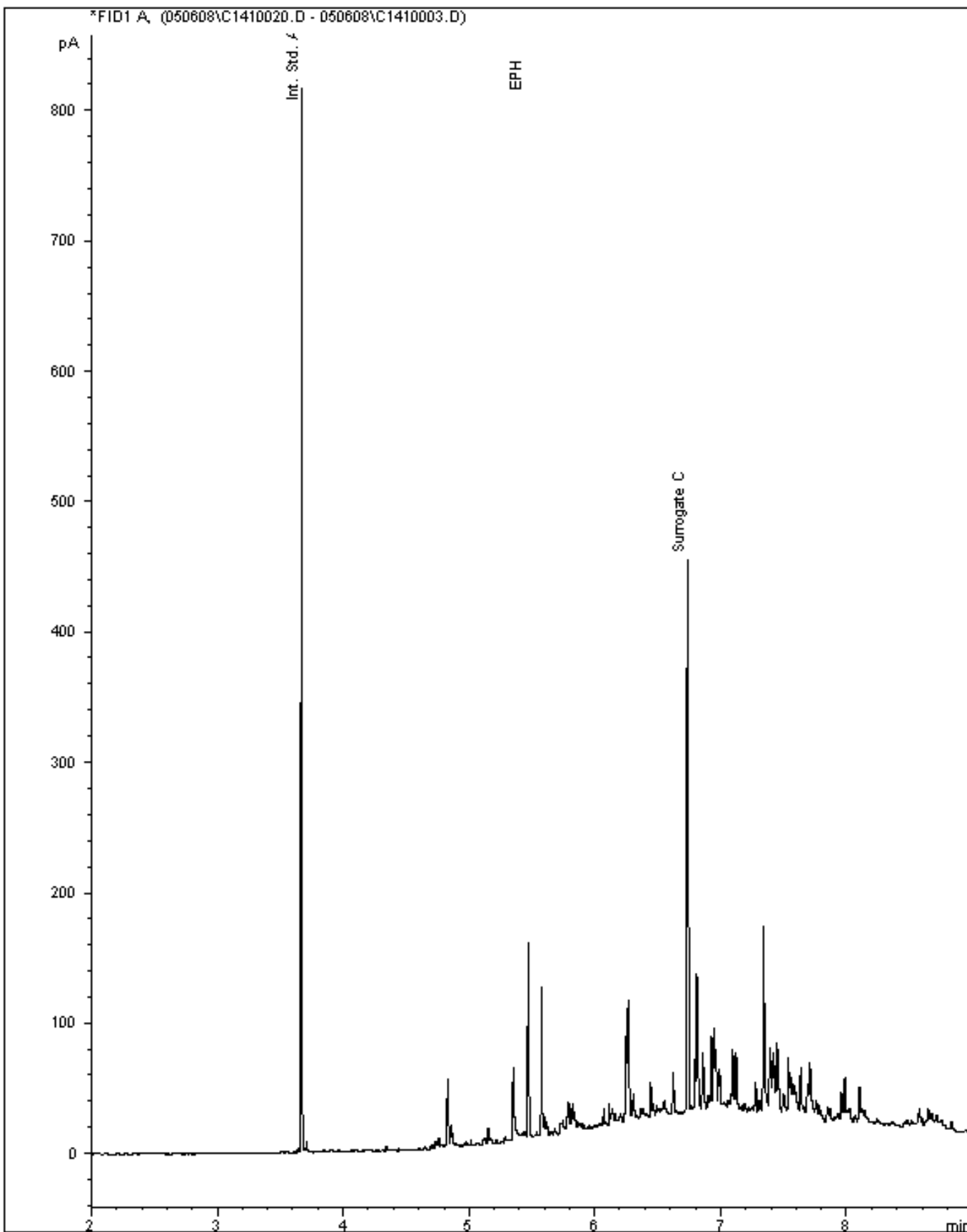
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

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Units : mg/kg
Sample Multiplier : 0.997
Dilution :



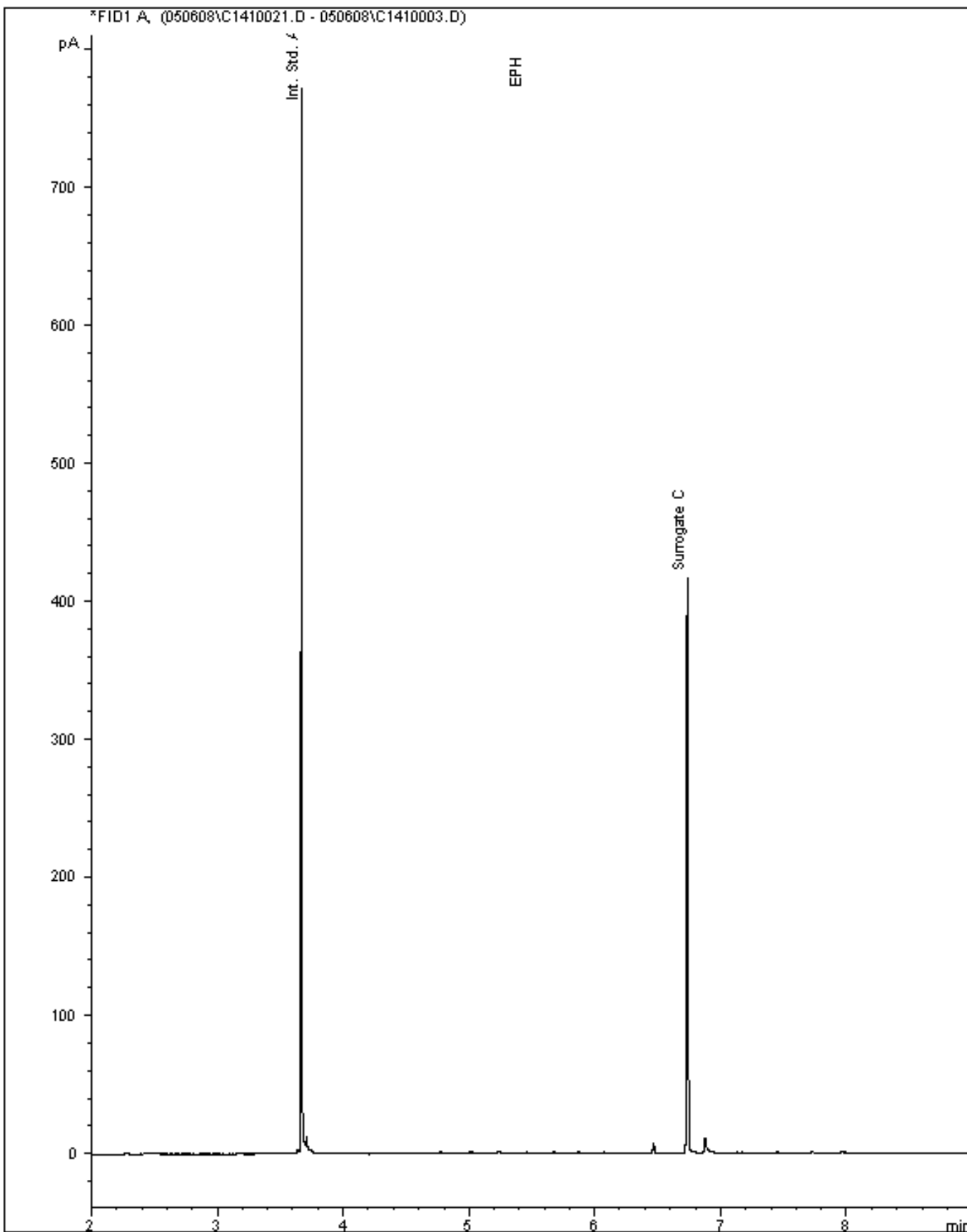
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity : 200808299-17/S
Date Acquired : 06/05/08 23:37:42 PM
Units : mg/kg
Sample Multiplier : 0.995
Dilution :



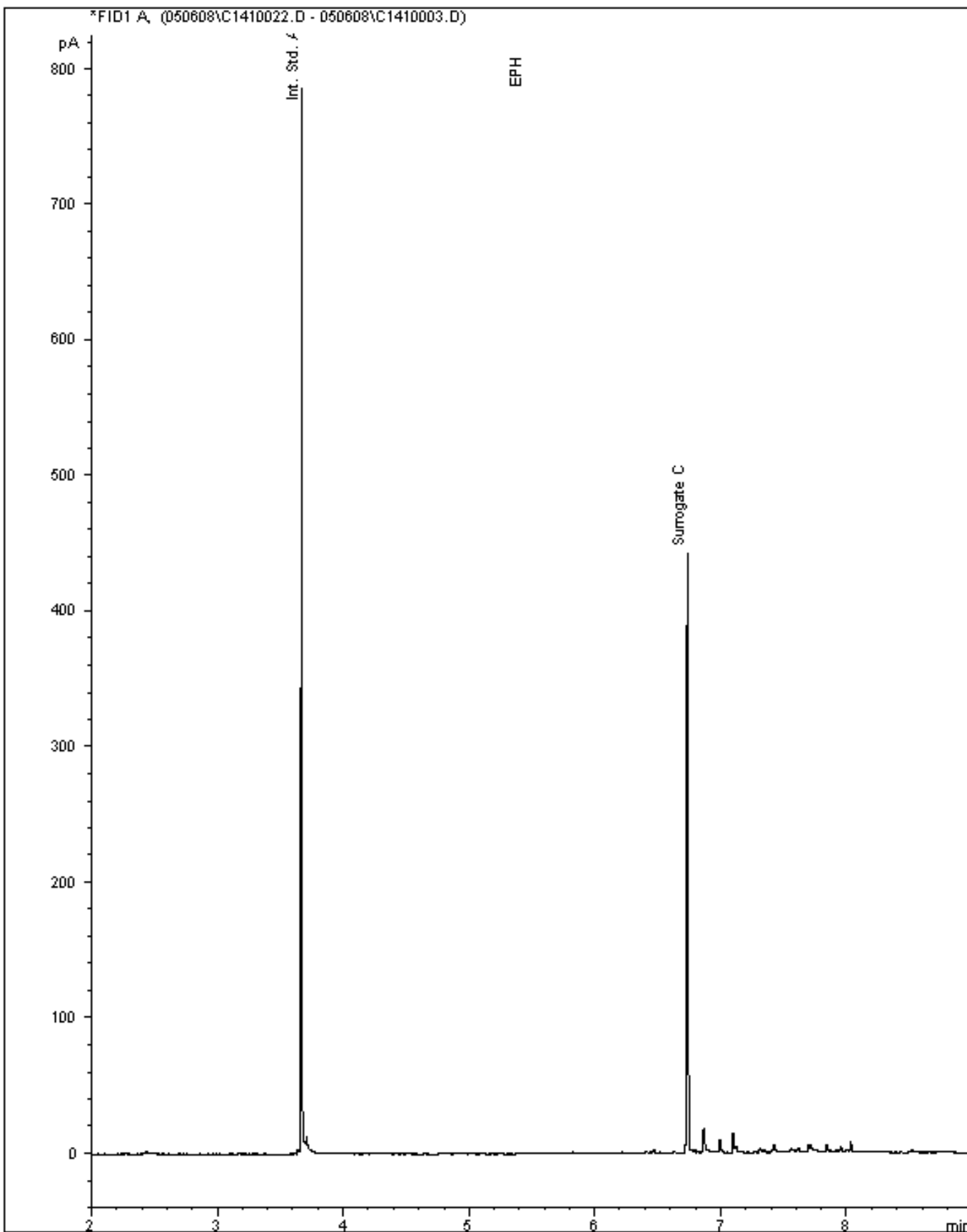
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity : 200808299-20/S
Date Acquired : 06/05/08 23:58:49 PM
Units : mg/kg
Sample Multiplier : 1.004
Dilution :



Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

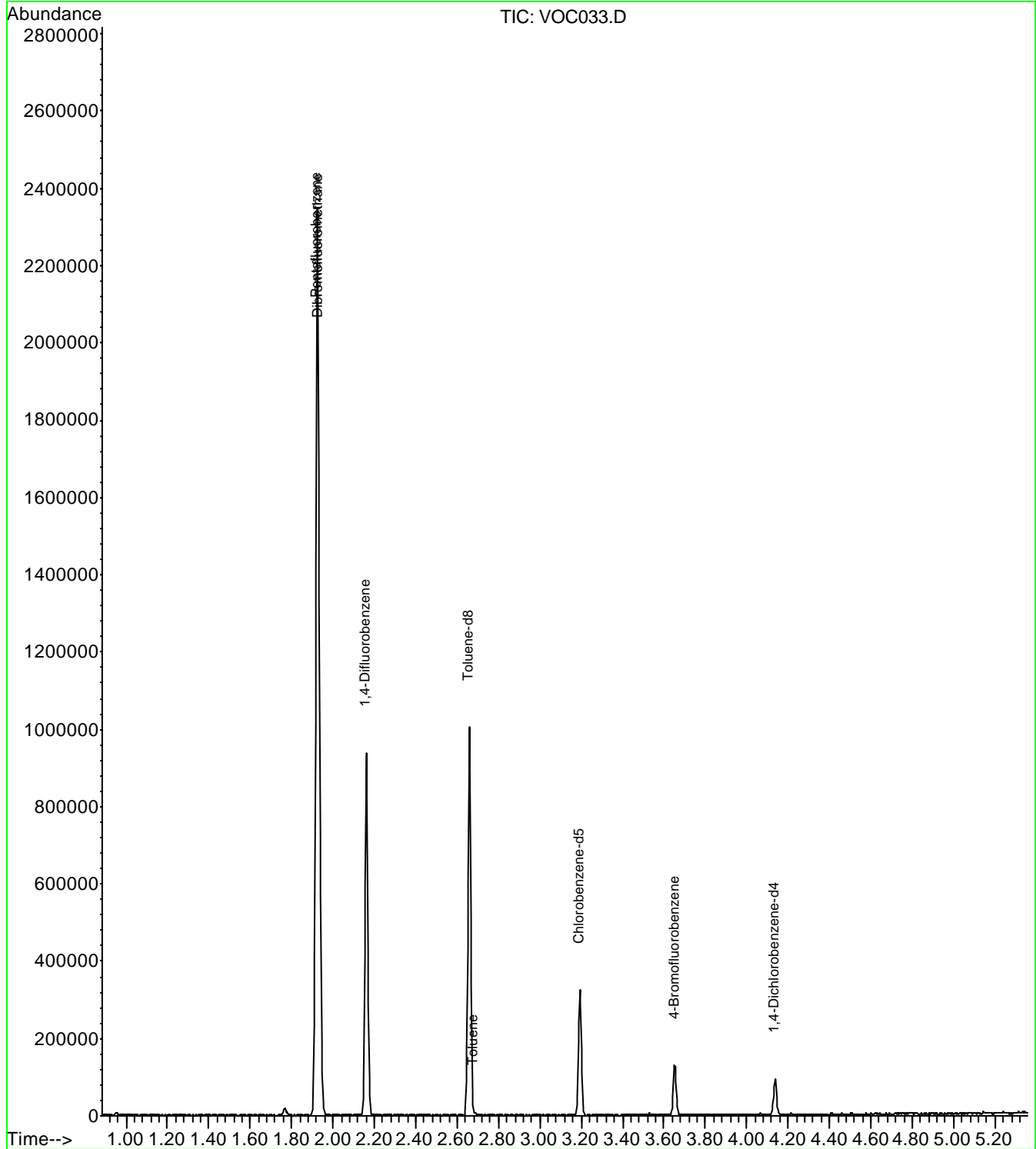
Sample Identity : 200808299-23/S
Date Acquired : 07/05/08 00:20:15 PM
Units : mg/kg
Sample Multiplier : 1.001
Dilution :



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC033.D
Acq On : 10 May 2008 15:18
Operator : Alcontrol Labs
Sample : 200808299-003
Misc : /soil
ALS Vial : 33 Sample Multiplier: 2

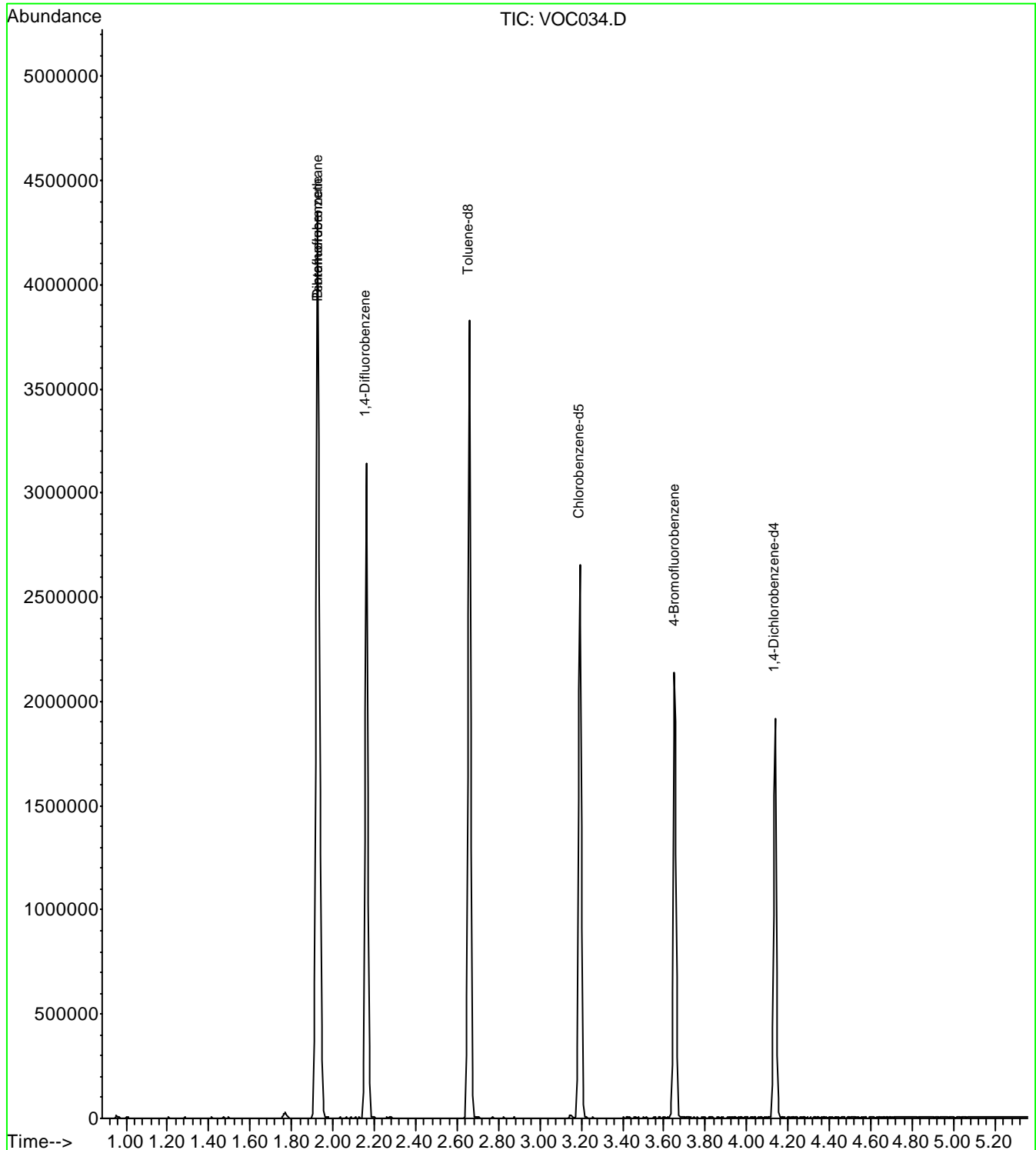
Quant Time: May 12 11:29:28 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC034.D
Acq On : 10 May 2008 15:29
Operator : Alcontrol Labs
Sample : 200808299-006
Misc : /soil
ALS Vial : 34 Sample Multiplier: 2

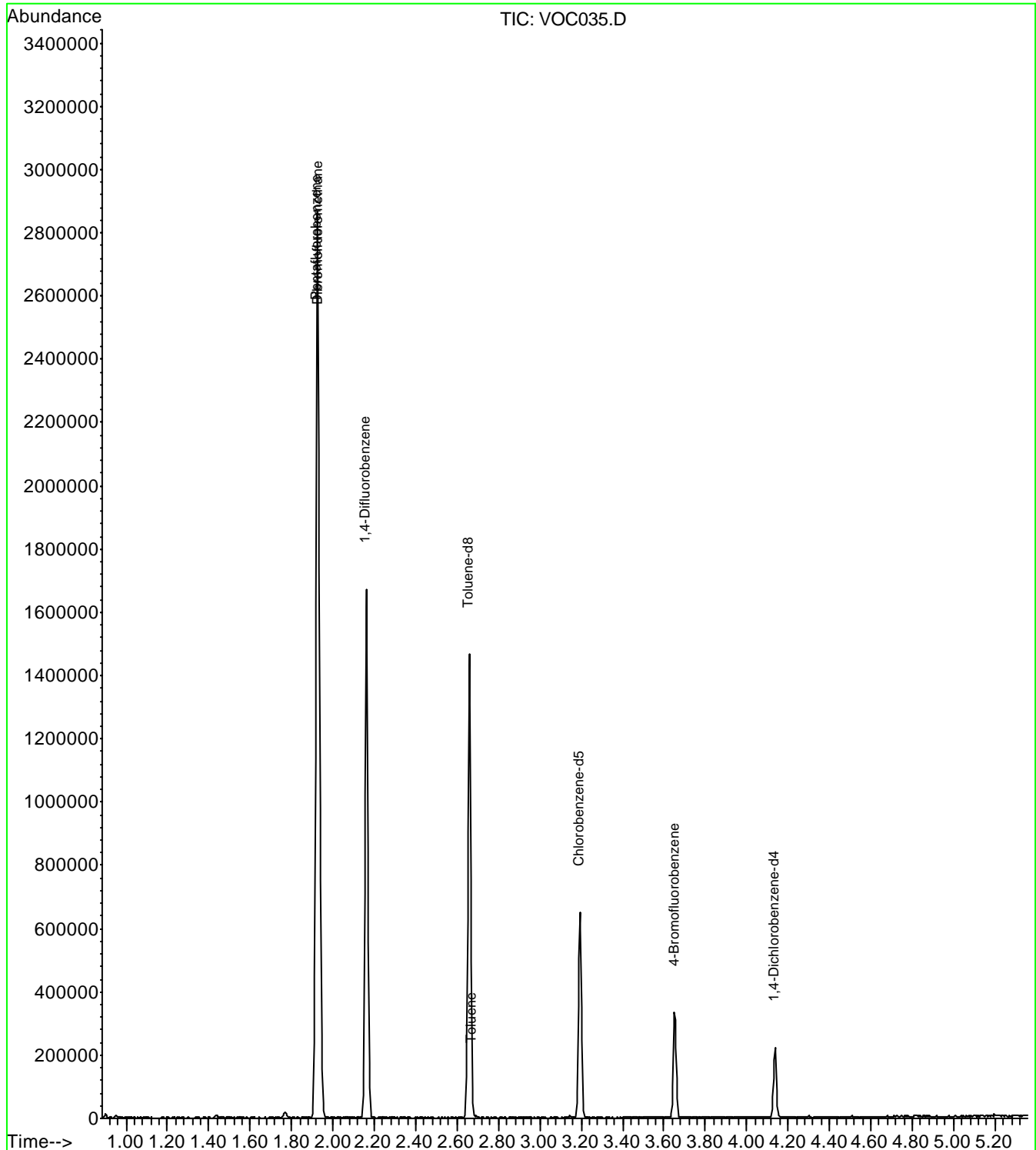
Quant Time: May 12 11:29:30 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC035.D
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Operator : Alcontrol Labs
Sample : 200808299-008
Misc : /soil
ALS Vial : 35 Sample Multiplier: 2

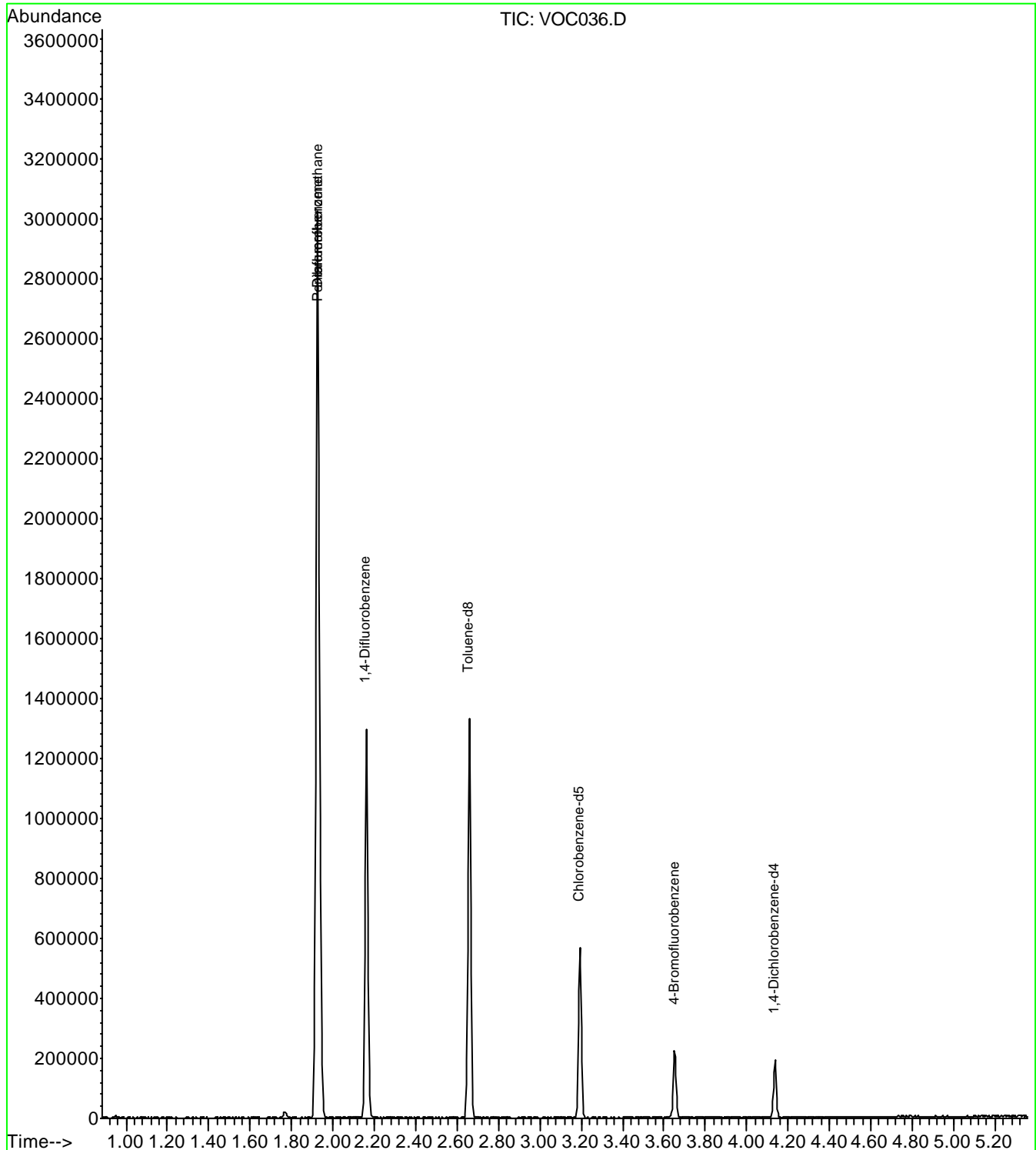
Quant Time: May 12 11:45:25 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC036.D
Acq On : 10 May 2008 15:50
Operator : Alcontrol Labs
Sample : 200808299-010
Misc : /soil
ALS Vial : 36 Sample Multiplier: 2

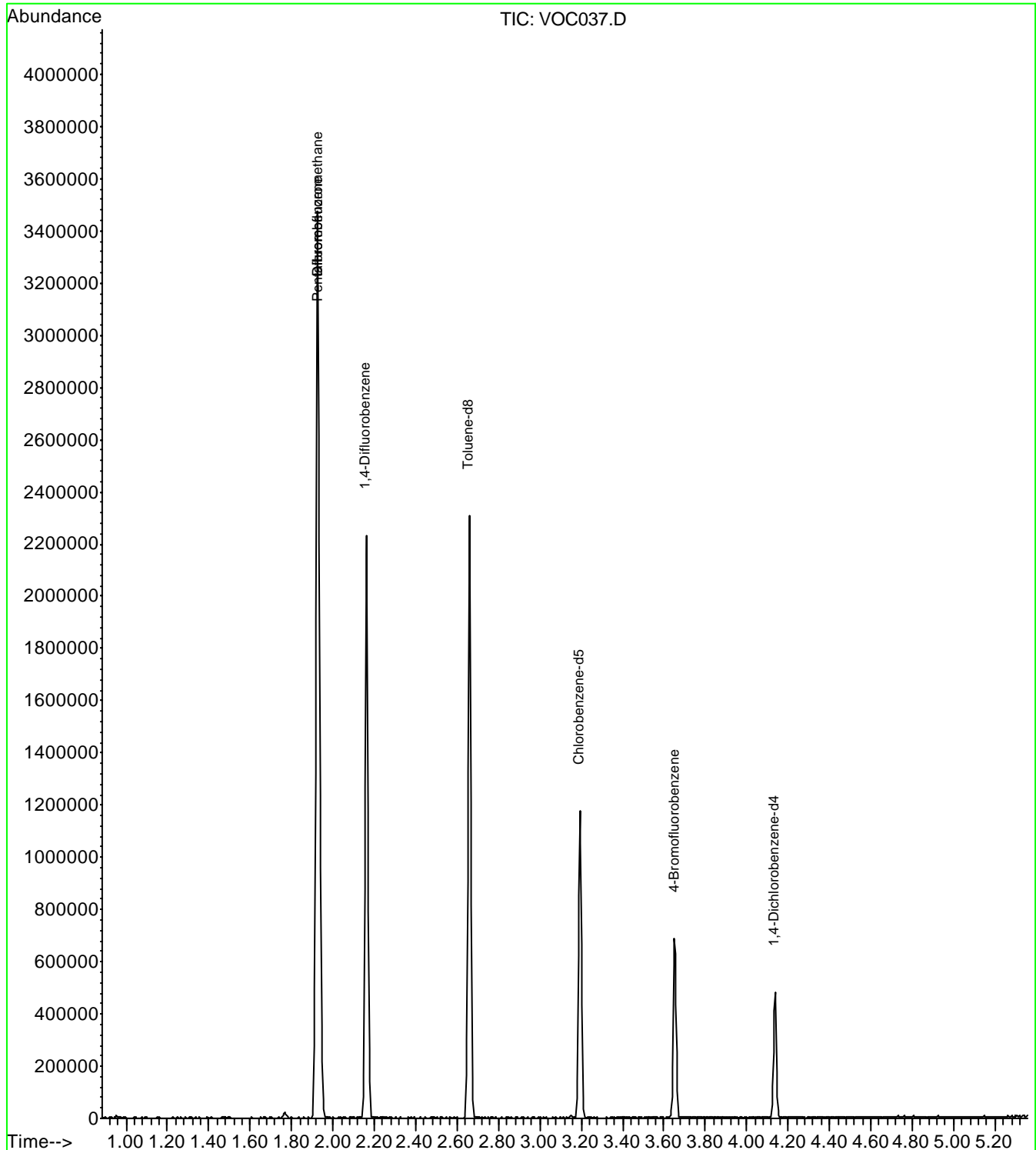
Quant Time: May 12 11:29:34 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC037.D
Acq On : 10 May 2008 16:01
Operator : Alcontrol Labs
Sample : 200808299-013
Misc : /soil
ALS Vial : 37 Sample Multiplier: 2

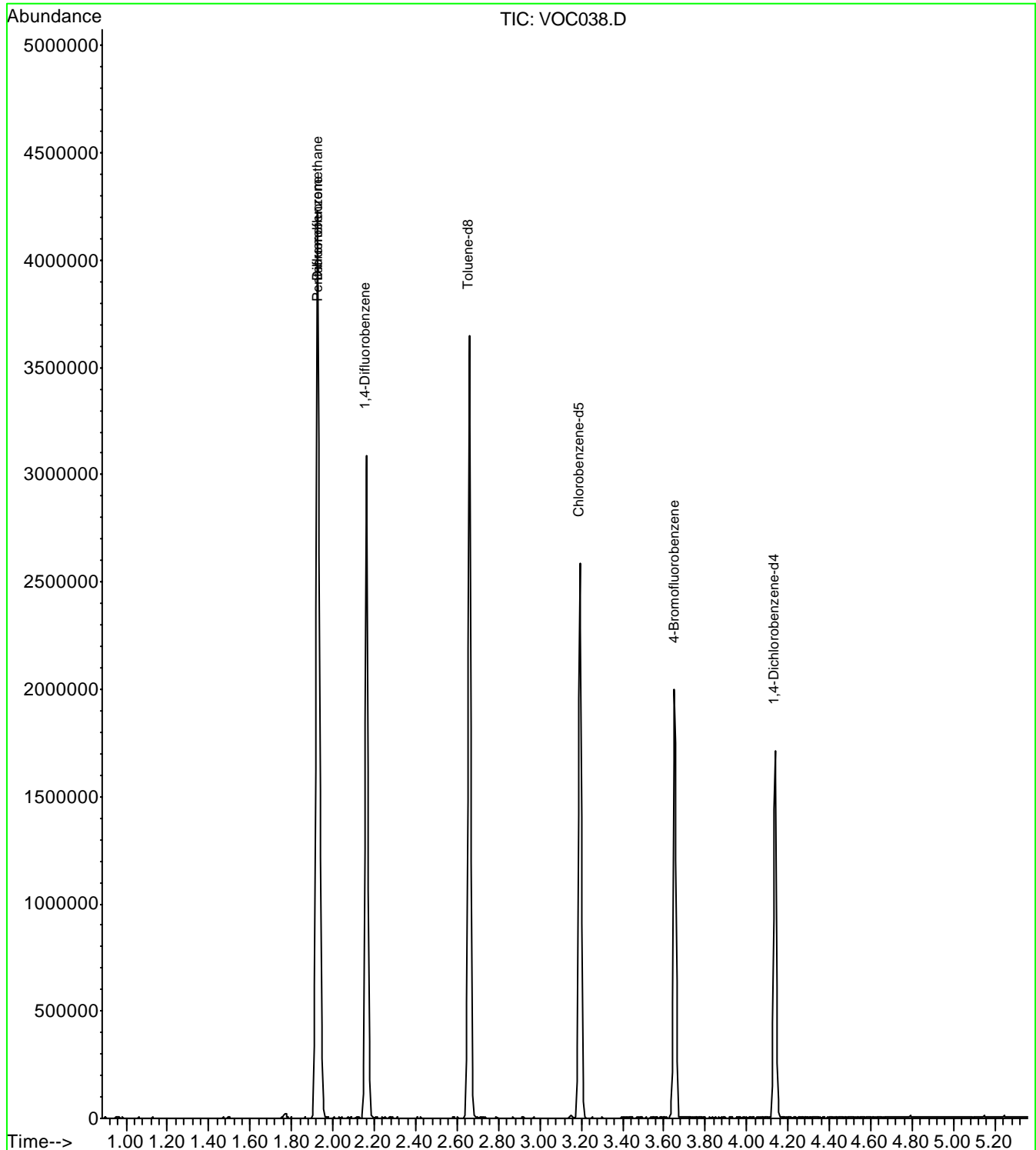
Quant Time: May 12 11:29:36 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

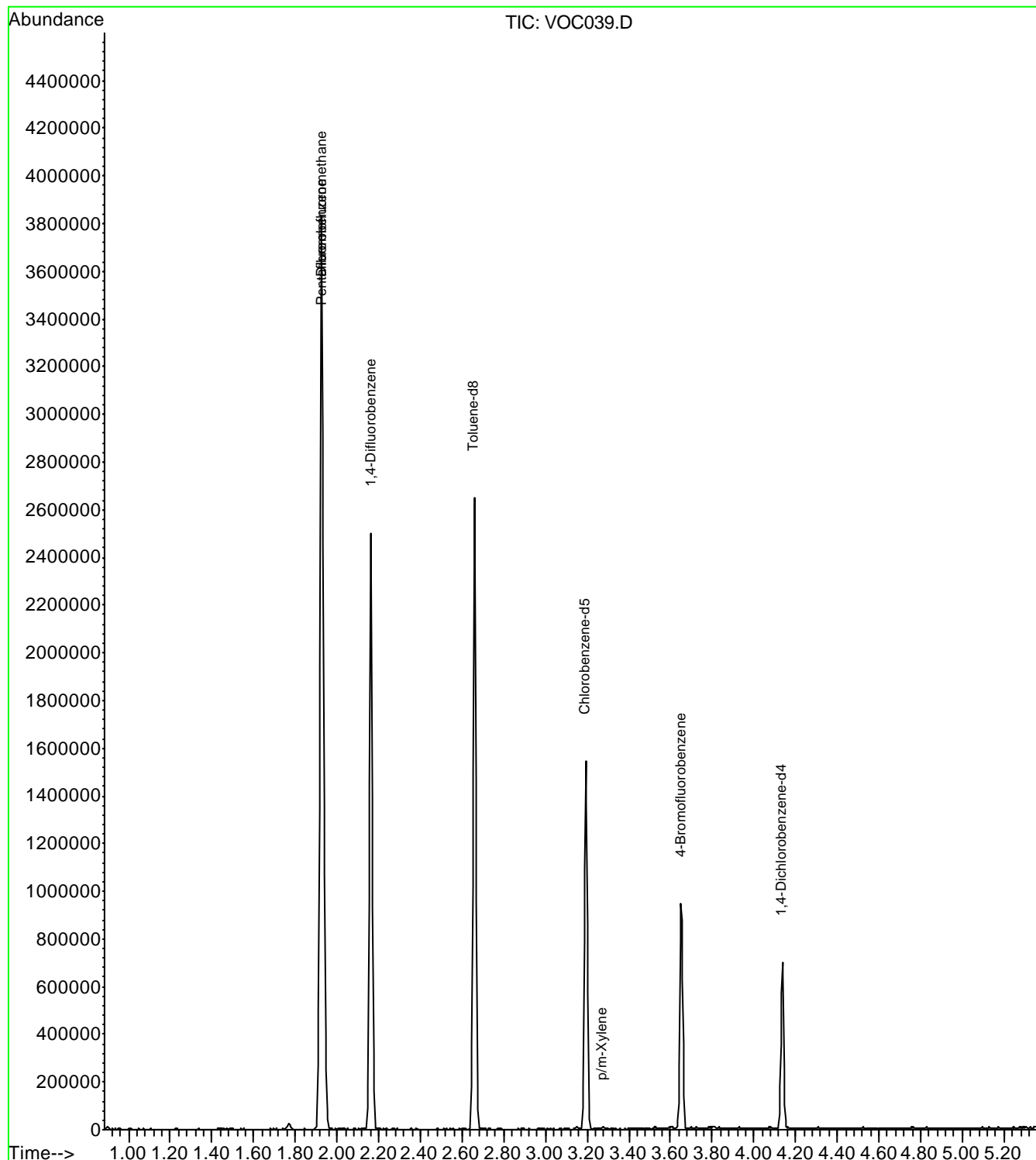
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Data File : VOC038.D
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Operator : Alcontrol Labs
Sample : 200808299-016
Misc : /soil
ALS Vial : 38 Sample Multiplier: 2

Quant Time: May 12 11:29:38 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC039.D
Acq On : 10 May 2008 16:23
Operator : Alcontrol Labs
Sample : 200808299-018
Misc : /soil
ALS Vial : 39 Sample Multiplier: 2

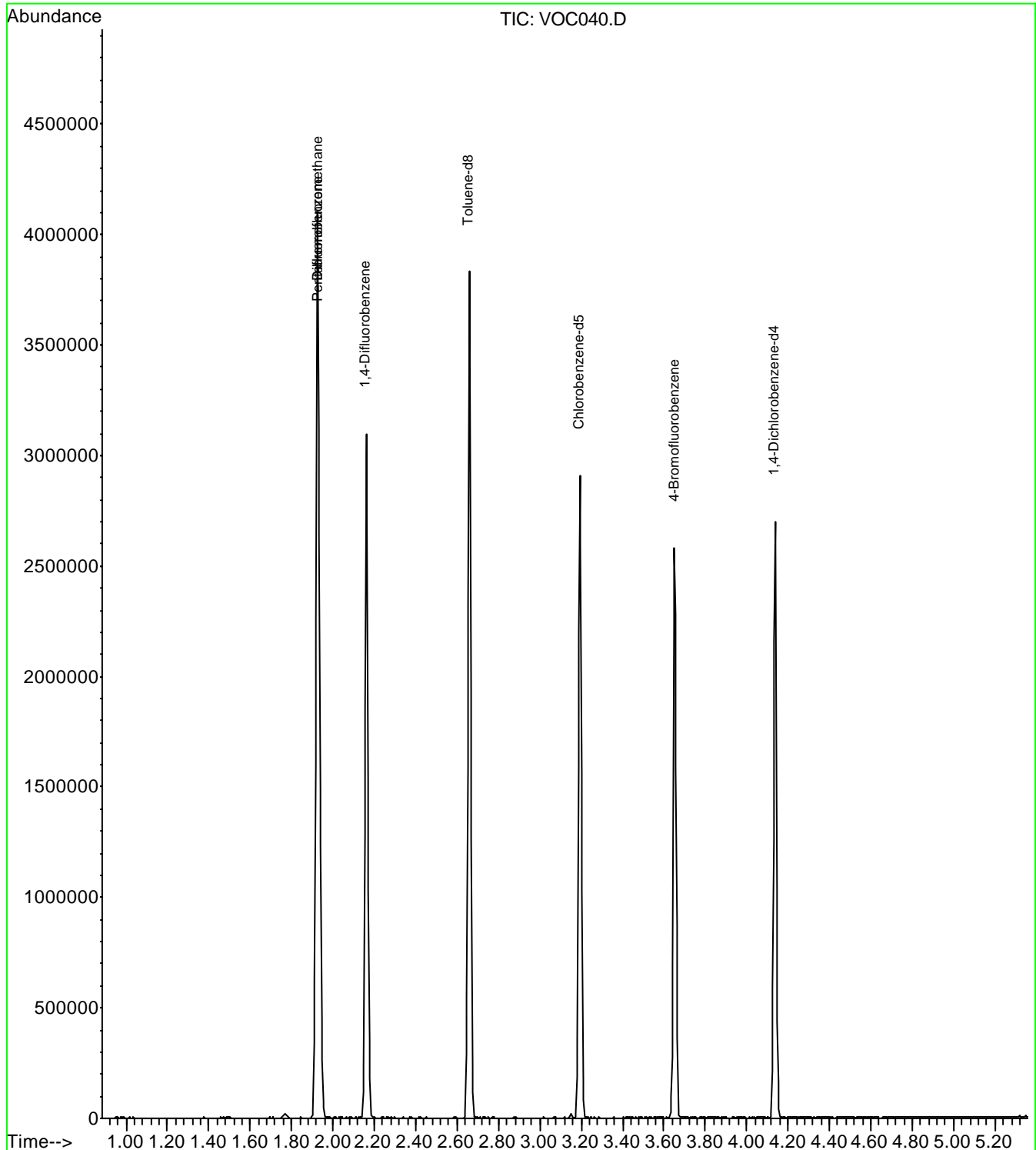
Quant Time: May 12 11:46:20 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC040.D
Acq On : 10 May 2008 16:34
Operator : Alcontrol Labs
Sample : 200808299-021
Misc : /soil
ALS Vial : 40 Sample Multiplier: 2

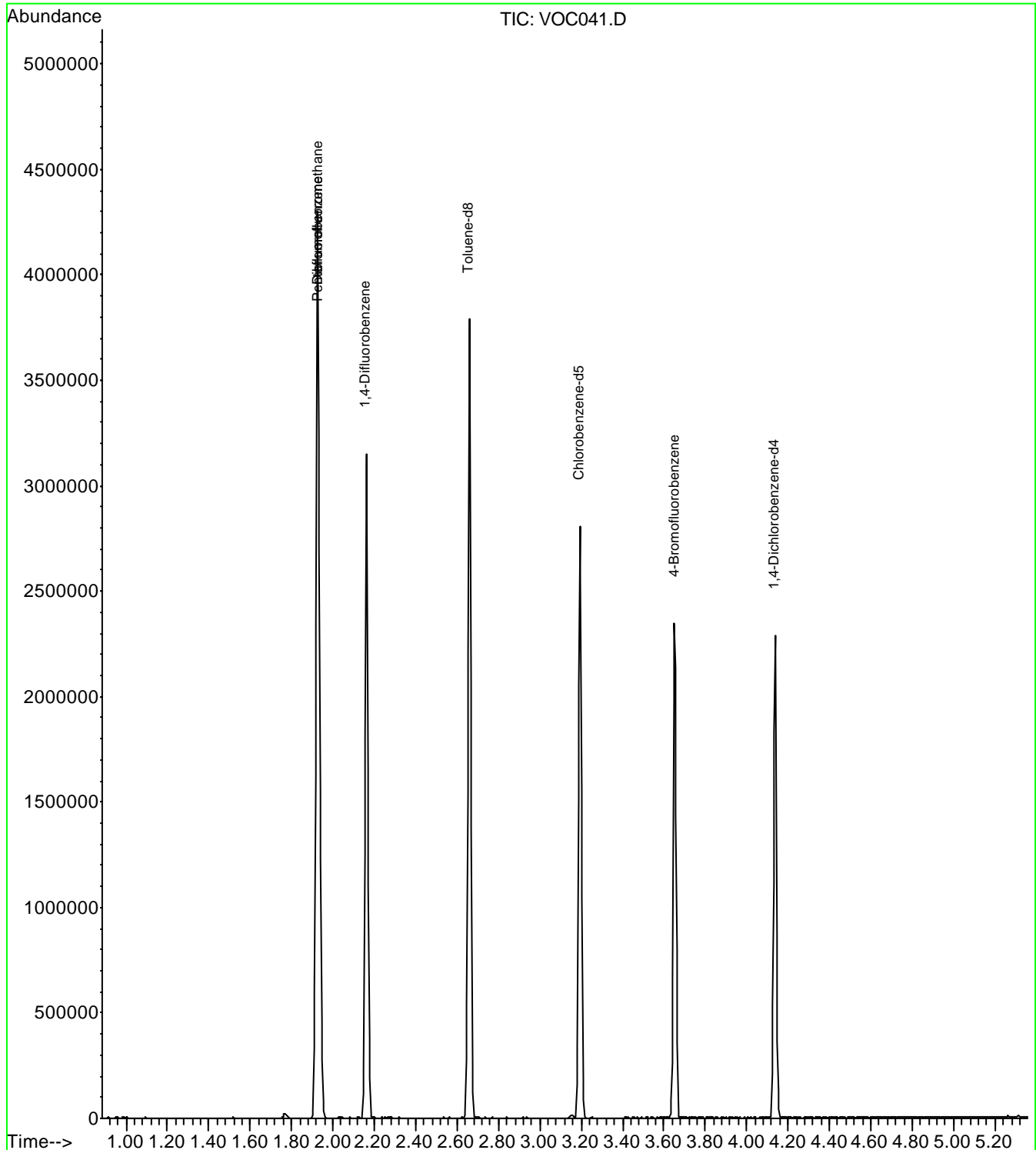
Quant Time: May 12 11:29:42 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC041.D
Acq On : 10 May 2008 16:45
Operator : Alcontrol Labs
Sample : 200808299-024
Misc : /soil
ALS Vial : 41 Sample Multiplier: 2

Quant Time: May 12 11:46:55 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



APPENDIX

APPENDIX

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH₄ by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.
2. Samples will be run in duplicate upon request, but an additional charge may be incurred.
3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Geochem reserve the right to charge for samples received and stored but not analysed.
4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
6. When requested, an asbestos screen is done in-house on soils and if no fibres are found will be reported as NFD – no fibres detected. If asbestos is detected, then identification is carried out by ALcontrol Shutler. If a sample is suspected of containing asbestos, then further preparation and analysis will be suspended on that sample until the asbestos result is known. If asbestos is present, then no further analysis will be undertaken.
7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample – similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.
8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.
9. NDP – No determination possible due to insufficient/unsuitable sample.
10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals – total metals must be requested separately.
11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.
12. **Surrogate recoveries** – Currently the only analysis, which is surrogate corrected, is PAHs on soils. For EPH on soils the result is not surrogate corrected, but a percentage recovery is quoted.
13. **Product analyses** – Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.
14. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).
15. Total of 8 speciated phenols by HPLC includes Resorcinol, Catechol, Phenol, Napthol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).
16. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
17. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.
18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.
22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials – whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

.Last Updated March 2008

APPENDIX 7

Investigation Techniques and General Notes

INVESTIGATION TECHNIQUES

INTRODUCTION

The following brief review of Ground Investigation techniques, generally used as part of most Site Investigations in the UK, summarises their methodology, advantages and limitations. Detailed descriptions of the techniques are available and can be provided on request. This review should be read in conjunction with the accompanying General Notes.

TRIAL PITS

The trial pit is amongst the most simple yet effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a backacting excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the trial pits will not have been provided with temporary side support during their construction. Under such circumstances ground conditions to some 1.20 metres can be closely inspected, subject to stability assessment, but below this depth, entrance into the pit is not permitted in the absence of shoring and hence observations will have been made from ground surface and samples taken from the excavator bucket.

Trends in strata type, level and thickness can be determined, shear surfaces identified and the behaviour of plant, excavation sides and excavated materials can be related to the construction process. They are particularly valuable in land slip investigations. Some types of *insitu* test can be undertaken in such pits and large disturbed or block samples obtained.

CABLE PERCUSSION BORING

The light Cable Percussion technique of soft ground boring, typically at a diameter of 150mm, is a well established simple and flexible method of boring vertical holes and generally allows data to be obtained in respect of strata conditions other than rock. A tubular cutter (for cohesive soils) or shell with a flap valve (for granular soils) is repeatedly lifted and dropped using a winch and rope operating from an "A" frame. Soil which enters these tools is regularly removed and either sampled for subsequent examination or test, or laid to one side for backfilling. Steel casing will have been used to prevent collapse of the borehole sides where necessary. A degree of disturbance of soil and mixing of layers is inevitable and the presence of very thin layers of different soils within a particular stratum may not be identified. Changes in strata type can only be detected on recognition of a change in soil samples at surface, after the interface has been passed. For the foregoing reasons, depth measurements should not be considered to be more accurate than 0.10 metre.

In cohesive soils cylindrical samples are retrieved by driving or pushing in 100mm nominal diameter tubes. In soft soils, piston sampling or vane testing may be undertaken. In granular soils and often in cohesive materials, *insitu* Standard Penetration Tests (SPT's) are performed. The SPT records the number of standard blows required to drive a 50mm diameter open or cone ended probe for 300mm after an initial 150mm penetration. A modified method of recording is used in more dense strata. Small disturbed samples are obtained throughout.

The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.

ROTARY DRILLING

Rotary Drilling to produce cores by rotating an annular diamond-impregnated tube or barrel into the ground is the technique most appropriate to the forming of site investigation boreholes through rock or other hard strata. It has the advantage of being able to be used vertically or at an angle. Core diameters of less than 100mm are most common for site investigation purposes. Core is normally retrieved in plastic lining tubes. A flushing fluid such as air, water or foam is used to cool the bit and carry cuttings to the surface.

Examination of cores allows detailed rock description and generally enables angled discontinuity surfaces to be observed. However, vertical holes do not necessarily reveal the presence of vertical or near-vertical fissures or joint discontinuities. The core type and/or techniques used. Where open hole rotary drilling is employed, descriptions of strata result from examination at surface of small particles ejected from the borehole in the flushing medium. In consequence, no indication of fissuring, bedding, consistency or degree of weathering can be obtained. Small scale plant can be used for auger drilling to limited depths where access is constrained.

Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.

WINDOW SAMPLING

This technique involves the driving of an open-ended tube into the ground and retrieval of the soil which enters the tube. The term "window sample" arose from the original device which had a "window" or slot cut into the side of the tube through which samples were taken. This has now been superseded by the use of a thin-walled plastic liner within a sampler which has a solid wall. Diameters range from 36 to 86mm. Such samples can be used for qualitative logging, selection of samples for classification and chemical analysis and for obtaining a rudimentary assessment of strength.

Driving devices can be hand-held or machine mounted and the drive tubes are typically in 1m lengths. The hole formed is not cased, however, and hence the success of this technique is limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 8m can be achieved in suitable circumstances but depths of 4m to 6m are more common.

EXPLORATORY HOLE RECORDS

The data obtained by these techniques are generally presented on Trial Pit, Borehole, Drillhole or Window Sample Records. The descriptions of strata result from information gathered from a number of sources which may include published geological data, preliminary field observations and descriptions, *insitu* test results, laboratory test results and specimen descriptions. A key to the symbols and abbreviations used accompanies the records. The descriptions on the exploratory hole records accommodate but may not necessarily be identical to those on any preliminary records or the laboratory summaries.

The records show ground conditions at the exploratory hole locations. The degree to which they can be used to represent conditions between or beyond such holes, however, is a matter for geological interpretation rather than factual reporting and the associated uncertainties must be recognised.

DYNAMIC PROBING

This technique typically measures the number of blows of a standard weight falling over a standard height to advance a cone-ended rod over sequential standard distances (typically 100mm). Some devices measure the penetration of the probe per standard blow. It is essentially a profiling tool and is best used in conjunction with other investigation techniques where site-specific correlation can be used to delineate the distribution of soft or loose soils or the upper horizon of a dense or strong layer such as rock.

Both machine-driven and hand-driven equipment is available, the selection depending upon access restrictions and the depth of penetration required. It is particularly useful where access for larger equipment is not available, disturbance is to be minimised or where there are cost constraints. No samples are recovered and some techniques leave a sacrificial cone head in the ground. As with other lightweight techniques, progress is limited in strong or dense soils. The results are presented both numerically and graphically. Depths of up to 10m are commonly achieved in suitable circumstances.

The hand-driven DCP probing device has been calibrated by the TRL to provide a profile of CBR values over a range of depths of up to 1.50m.

INSTRUMENTATION

The most common form of instrument used in site investigation is either the standpipe or else the standpipe piezometer which can be installed in investigation holes. They are used to facilitate monitoring of groundwater levels and water sampling over a period of time following site work. Normally a standpipe would be formed using rigid plastic tubing which has been perforated or slotted over much of its length whilst a standpipe piezometer would have a filter tip which would be placed at a selected level and the hole sealed above and sometimes below to isolate the zone of interest. Groundwater levels are determined using an electronic "dipmeter" to measure the depth to the water surface from ground level. Piezometers can also be used to measure permeability. They are simple and inexpensive instruments for long term monitoring but response times can limit their use in tidal areas and access to the ground surface at each instrument is necessary. Remote reading requires more sophisticated hydraulic, electronic or pneumatic equipment.

Settlement can be monitored using surface or buried target plates whilst lateral movement over a range of depths is monitored using slip indicator or inclinometer equipment.

GENERAL NOTES

1. *The report is prepared for the exclusive use of the Client named in the document and copyright subsists with Geotechnics Limited. Prior written permission must be obtained to reproduce all or part of the report. It is prepared on the understanding that its contents are only disclosed to parties directly involved in the current investigation, preparation and development of the site.*
2. *Further copies may be obtained with the Client's written permission, from Geotechnics Limited with whom the master copy of the document will be retained.*
3. *The report and/or opinion is prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to Geotechnics Limited at that time. Re-consideration will be necessary should those details change. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Geotechnics Limited.*
4. *The assessment of the significance of the factual data, where called for, is provided to assist the Client and his Engineer and/or Advisers in the preparation of their designs.*
5. *The report is based on the ground conditions encountered in the exploratory holes together with the results of field and laboratory testing in the context of the proposed development. The data from any commissioned desk study and site reconnaissance are also drawn upon. There may be special conditions appertaining to the site, however, which are not revealed by the investigation and which may not be taken into account in the report.*
6. *Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical and any geoenvironmental data would be required to provide discussion and evaluations appropriate to these methods.*
7. *The accuracy of results reported depends upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristics of the strata as a whole (see accompanying notes on Investigation Techniques). Where such measurements are critical, the technique of investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the Company where necessary.*
8. *The samples selected for laboratory test are prepared and tested in accordance with the relevant Clauses of BS 1377 Parts 1 to 8, where appropriate, in Geotechnics Limited's UKAS accredited Laboratory, where possible. A list of tests is given.*
9. *Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.*
10. *Any unavoidable variations from specified procedures are identified in the report.*
11. *Specimens are cut vertically, where this is relevant and can be identified, unless otherwise stated.*
12. *All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.*
13. *Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.*
14. *Classification of materials as Made Ground is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for fill materials that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.*
15. *The classification of materials as Topsoil is generally based on visual description and should not be interpreted to mean that the material so described complies with the criteria for Topsoil used in BS 3882 (1994). Specific testing would be necessary where such definition is a requirement.*
16. *Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.*
17. *Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.*
18. *Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. The foundations should be designed in accordance with the good practice embodied in BS 8004:1986 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.*
19. *Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.*
20. *The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.*



TROWBRIDGE STW, WILTSHIRE

FACTUAL REPORT ON GROUND INVESTIGATION

Report No H6100-16







February 2017

Carried out for:
Wessex Water Services Limited
Claverton Down Road
Claverton Down
Bath

Engineer:
SWECO
Hanover House
Queen Charlotte Street
Bristol

Report No H6100-16

February 2017

Issue No Date	Status	Prepared by	Checked by	Approved by
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		NAME and QUALIFICATIONS	NAME and QUALIFICATIONS	NAME and QUALIFICATIONS
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Whilst every effort has been made to ensure the accuracy of the data supplied and any analysis interpretation derived from it, the possibility exists of variations in the ground and groundwater conditions around and between the exploratory positions. No liability can be accepted for any such variations in these conditions. Furthermore, any recommendations are specific to the development as detailed in this Report and no liability will be accepted should they be used for the design of alternative schemes without prior consultant with ESGL.

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APPENDIX C INSTRUMENTATION AND MONITORING

APPENDIX D IN-SITU TESTING

APPENDIX E GEOTECHNICAL LABORATORY TEST RESULTS

APPENDIX F GEOENVIRONMENTAL LABORATORY TEST RESULTS

1 INTRODUCTION

In August 2016 ESG was commissioned by SWECO, on behalf of Wessex Water Services Limited (WW) to carry out a ground investigation at Trowbridge Sewage Treatment Works (STW), Wiltshire. The investigation was required to obtain geotechnical and geoenvironmental information for a proposed upgrade to existing infrastructure.

The scope of the investigation was specified by SWECO and comprised dynamically sampled with rotary follow on cored boreholes, in situ testing and laboratory testing. The investigation was performed in accordance with the contract specification, and the general requirements of BS 5930 (2015), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant related standards identified below. The fieldwork took place between 30 September and 19 October 2016.

This report presents the factual records of the fieldwork and laboratory testing.

2 SITE SETTING

2.1 Location and Description

Trowbridge STW is located approximately 1.00 km northwest, at National Grid reference ST 848587, see Site Location Plan in Appendix A.

The site comprises a currently operational sewage treatment works. The site is approximately rectangular and measures approximately 320 m by 340 m. The site is dominated by a series of filter beds and lagoons around which lie several buildings and access roads associated with the sewage treatment works.

The site is bound to the north, south and west by open agricultural land. The River Biss lies approximately 70 m east of the site, beyond which lie residential dwellings.

2.2 Published Geology

The published geological map for the area, BGS Sheet 381 (1994) and the BGS Geology of Britain Viewer (2016) show the site located on Kellaway Mudstone Formation of Jurassic age. This is indicated to comprise mudstone and occasional sandstone.

3 FIELDWORK

The fieldwork was carried out in general accordance with BS 5930 (2015), BS EN 1997-2 (2007) and BS EN ISO 22475-1 (2006).

The exploratory hole locations were selected by SWECO. The locations were set out from local features. The co-ordinates and reduced levels were surveyed by JV Survey Limited to National Grid and Ordnance Datum. The exploratory hole locations are shown on the Site Plan in Appendix A.

3.1 Exploratory Holes

The exploratory holes are listed in the following table.

TABLE 1: SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	MAXIMUM DEPTH (m)	REMARKS
Dynamically Sampled with Rotary Follow on Coring	7	25.72	BH01 to BH04 (including BH02A, BH04A ad BH04B)

Exploratory hole location BH02 was terminated at 1.73 m depth due to an obstruction. The borehole was relocated 2.00 m north east and renamed BH02A.

Exploratory hole BH04 was terminated at 1.84 m depth due to an obstruction. The borehole was relocated 2.00 m north east and renamed BH04A.

Exploratory hole BH04A was terminated at 1.84 m depth due to an obstruction. The borehole was relocated 2.00 m south east and renamed BH04B.

The exploratory hole logs are presented in Appendix B. These provide information including the equipment and methods used, samples taken, tests carried out, water observations and descriptions of the strata encountered. Explanation of the terms and abbreviations used on the logs is given in the Key to Exploratory Hole Records in Appendix B, together with other explanatory information. The logging of soil and rock materials is in accordance with BS EN ISO 14688-1+A1 (2013) for soils and BS EN ISO 14689-1 (2003) for rocks, as amplified by BS 5930 (2015). On completion of the fieldwork geotechnical samples were transported to the Bridgend office of ESG for temporary retention, with those required for testing being transferred to the ESG

laboratories. Geoenvironmental samples were transported from site directly to the laboratory at ESG.

3.2 Groundwater Monitoring

Instrumentation installed in the exploratory holes for groundwater monitoring are shown on the logs and summarised in Appendix C. Records of monitoring carried out by ESG during and after the fieldwork period are presented in Appendix C.

3.3 In Situ Testing

In situ testing was carried out in accordance with the relevant standards as tabulated below. The testing is summarised in the following table and the results are presented in Appendix D unless noted otherwise.

Calibration certificates where appropriate are included with the results in the appendix.

TABLE 2: SUMMARY OF IN SITU TESTING

TYPE	QUANTITY	REMARKS
Standard Penetration Test	54	BS EN ISO 22476-3 (2011). Results presented on logs in Enclosure A
California Bearing Ratio Tests	3	BS 1377 (1990)

4 LABORATORY TESTING

4.1 Geotechnical Testing

Geotechnical laboratory testing was scheduled by SWECO and was carried out in accordance with BS 1377 (1990), BS EN ISO 17892 (2014) Part 1 and ISRM (2007) unless otherwise stated. The testing is summarised below and the results are presented in Appendix E.

- Φ Water Content Determination
- Φ Atterberg Limit Determination
- Φ Particle Size Distribution Analysis

-
- Φ pH, Acid and Water Soluble Sulphate and Total Sulphur Content of Soils. Test methods are BS 1377 or others recognised in BRE Special Digest 1 (2005); they are indicated on the results report sheets in Appendix E.
 - Φ Unconsolidated Undrained Triaxial Compression Testing
 - Φ One Dimensional Oedometer Consolidation Testing
 - Φ Index Properties of Rock
 - Φ Point Load Index Test
 - Φ Shear Strength by Hand Vane

4.2 Geoenvironmental Testing

Geoenvironmental laboratory testing was scheduled by SWECO on the soil and water samples recovered during the fieldwork. The testing was carried out by the laboratory at Burton on Trent. The results are presented in Appendix F.

REFERENCES

BGS England and Wales Sheet 381 : 1994 : Frome. 1:50000 geological map (solid and drift). British Geological Survey.

BGS Geology of Britain Viewer : 2016. www.bgs.ac.uk. British Geological Survey.

BRE Special Digest 1 : 2005 : Concrete in aggressive ground. Building Research Establishment.

BS 1377 : 1990 : Methods of test for soils for civil engineering purposes. British Standards Institution.

BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution.

BS EN 1997-2 : 2007 : Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.

BS EN ISO 14688-1:2002+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description. British Standards Institution.

BS EN ISO 14688-2:2004+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification. British Standards Institution.

BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description. British Standards Institution.

BS EN ISO 17892-1, Geotechnical investigation and testing – Laboratory Testing of soil – Determination of water content.

BS EN ISO 22475-1 : 2006 : Geotechnical investigation and testing – Sampling methods and groundwater measurements - Part 1 Technical principles for execution. British Standards Institution.

BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing - Part 3 Standard penetration test. British Standards Institution.

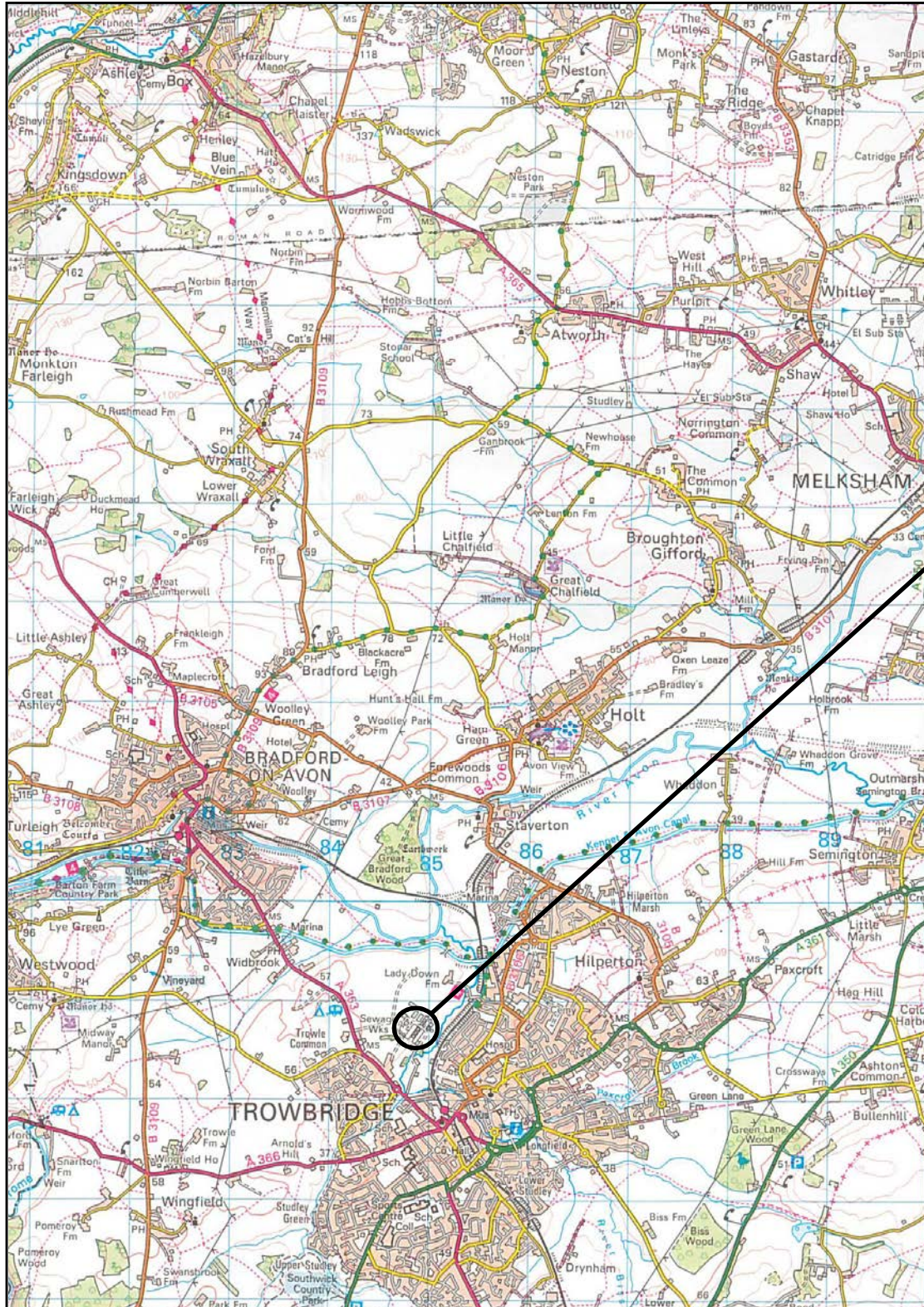
ISRM : 2007 : The Complete ISRM Suggested Methods for Rock Characterisation, Testing and Monitoring (1974-2006). Commission on Testing Methods, International Society for Rock Mechanics (Editors Ulusay R & Hudson JA).

APPENDIX A
FIGURES AND DRAWINGS

Site Location Plan
Site Plan

A1
A2

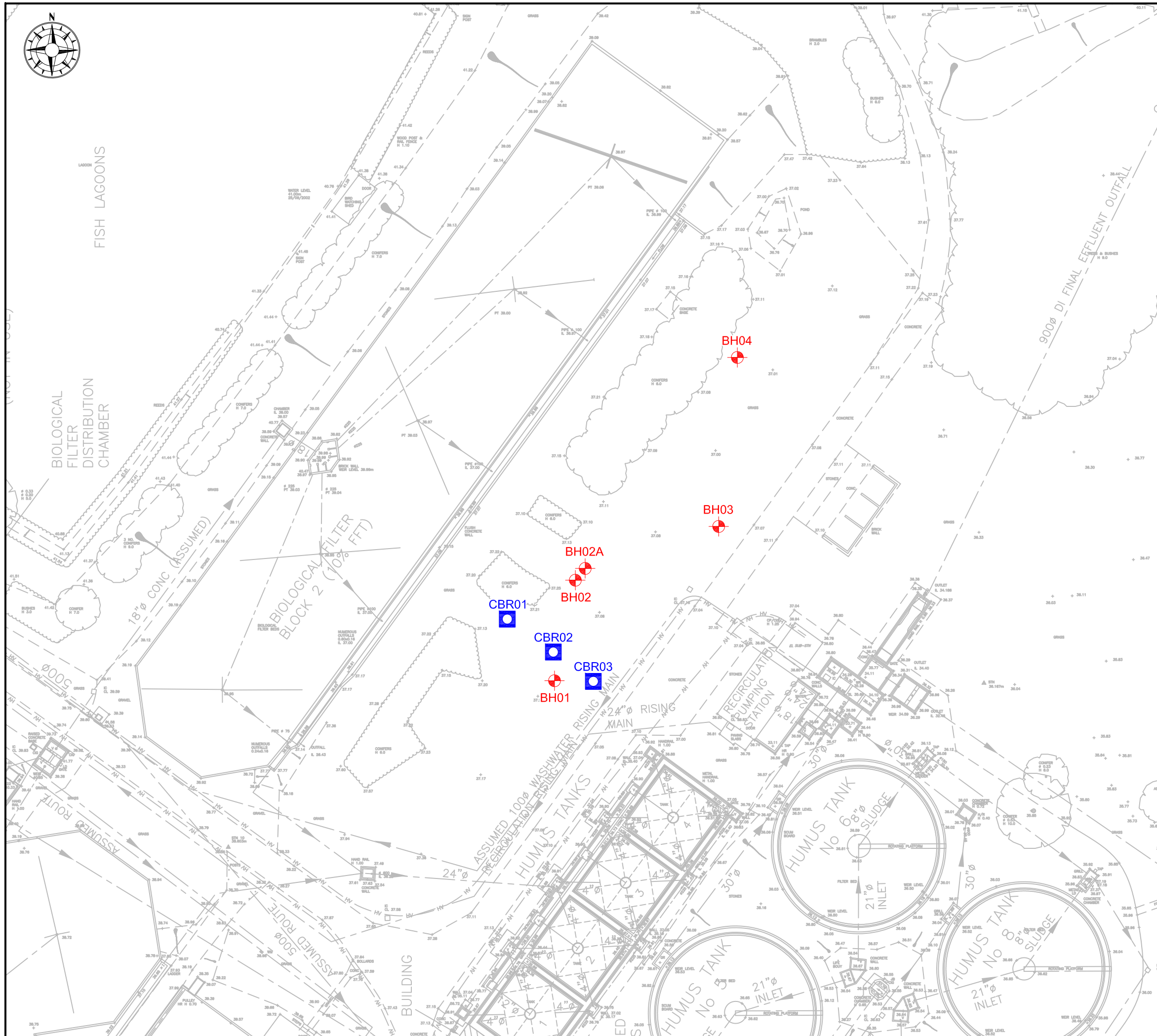
Site Location Plan



**THE
SITE**

Reproduced from the 2002 Ordnance Survey 1:50 000 scale Landranger map No 172 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, Environmental Services Group Limited. All rights reserved. Licence Number 100006060

<p>Notes: Scale 1:50 000</p>	<p>Project Trowbridge STW, Wiltshire Project No. H6100-16 Carried out for Wessex Water Services Limited</p>	<p>Figure A1</p>
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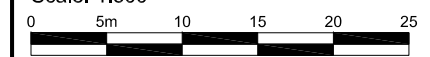
GENERAL NOTES

1. Reproduced from Wessex Water Services Limited's Drawing No. D9702/0001 Rev No. B.
2. Hole Locations to National Grid Co-ordinate Reference System.

LEGEND TO SYMBOLS

- Borehole Location
- CBR Location

Scale: 1:500



x	x	x	x	x	x
Rev	Drawn	Date	Approv.	Date	Modification Details

AMENDMENTS

Title
SITE PLAN

Project
TROWBRIDGE STW, WILTSHIRE

Client
WESSEX WATER SERVICES LIMITED



Date	Drawn By	Approv. By
07/12/2016	BS	AP

Sheet Size	Scale	Project No
A3	1:500	H6100-16

Drawing No	Rev
A2	0

APPENDIX B
EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
SPT Hammer Energy Ratio Report	SPT Hammer Reference JD5
Dynamic Probing Rig Energy Ratio Report	DP Rig Reference
Borehole Logs	BH01 to BH04 (inc. BH02A, BH04A and BH04B)

Key to Exploratory Hole Records



SAMPLES

Undisturbed

U	Driven tube sample	} nominally 100 mm diameter and full recovery unless otherwise stated
UT	Driven thin wall tube sample	
TW	Pushed thin wall tube sample	
P	Pushed piston sample	
L	Liner sample (from Windowless or similar sampler), full recovery unless otherwise stated	
CBR	CBR mould sample	
BLK	Block sample	
CS	Core sample (from rotary core) taken for laboratory testing	
AMAL	Amalgamated sample	

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample

	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments

Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that attempt was made to take a tube sample, however, there was no recovery.

Monitoring samples taken after completion of hole construction are not shown on the exploratory hole logs.

TESTS

SPT S or SPT C	Standard Penetration Test, open shoe (S) or solid cone (C)
----------------	------------------------------------------------------------

The Standard Penetration Test is defined in BS EN ISO 22476-3:2005+A1:2011. The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 the total blow count beyond the seating drive is given (without the N = prefix).

IV	<i>in situ</i> Vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Permeability tests (KFH = falling head, KRH = rising head; KPI = packer inflow); results provided in Field Records column (one value per stage for packer tests)

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930:2015

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented. The term non-intact (NI) is used where the core is fragmented.

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER

▼	Groundwater strike
▽	Groundwater level after standing period

Notes:
See report text for full references of standards

Project Trowbridge STW, Wiltshire
Project No. H6100-16
Carried out for Wessex Water Services Limited

Key
Sheet 1 of 2

INSTALLATION

Standpipe/ piezometer

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

SP
SPIE
PPIE
EPIE



The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:
Standpipe
Standpipe piezometer
Pneumatic piezometer
Electronic piezometer

Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

ICE
ICM
SLIP



The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:
Biaxial inclinometer
Inclinometer tubing for use with probe
Slip indicator

Settlement Points or Pressure Cells

The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

ESET
ETM
EPCE
PPCE

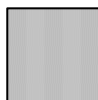


The type of instrument installed is indicated by a code in the Legend column:
Electronic settlement cell/gauge
Magnetic extensometer settlement point
Electronic embedment pressure cell
Electronic push in pressure cell

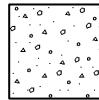
INSTALLATION LEGENDS

A legend describing the installation is shown in the rightmost column. Legends used to describe the backfill materials as indicated below.

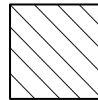
Arisings



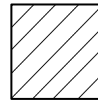
Concrete



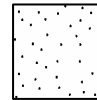
Grout



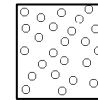
Bentonite



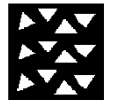
Sand



Gravel



Macadam



NOTES

- 1 Soils and rocks are described in accordance with BS EN ISO 14688-1:2002+A1:2013 and 14689-1:2003 respectively as amplified by BS 5930:2015.
- 2 For fine soils, consistency determined during description is reported for those strata where undisturbed samples are available. Where the logger considers that the sample may not be representative of the condition in situ, for whatever reason, the reported consistency is given in brackets. The reliability of the sample is indicated by Probably or Possibly as appropriate. Hence (Probably firm) indicates the logger is reasonably confident of the assessment, but (Possibly firm) means less certainty. Where the samples available are too disturbed to allow a reasonable assessment of the in situ condition, no consistency is given.
- 3 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs, however, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.
- 4 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.
- 5 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures
- 6 Water level observations of discernible entries during the advancing of the exploratory hole are given at the foot of the log and in the Legend column. The term "none observed" is used where no discrete entries are identified although this does not necessarily indicate that the hole has not been advanced below groundwater level. Under certain conditions groundwater cannot be observed, for instance, drilling with water flush or overwater, or boring at a rate much faster than water can make its way into the borehole. In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.
- 7 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

Notes:
See report text for full references of standards

Project Trowbridge STW, Wiltshire
Project No. H6100-16
Carried out for Wessex Water Services Limited

Key

Sheet 2 of 2

SPT Calibration Report



Hammer Energy Measurement Report

Type of Hammer: SPT HAMMER
 Client: JACKSON DRILLING
 Test No: EQU1392
 Test Depth (m): 7.80
 Date of Test: 23 December 2015
 Valid until: 22 December 2016
 Hammer ID: JD5

Mass of the hammer: $m = 63.5\text{kg}$
 Falling height: $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter: $d_r = 0.052\text{m}$
 Length of the instrumented rod: 0.558m
 Area: $A = 11.61\text{cm}^2$
 Modulus: $E_a = 206843\text{MPa}$

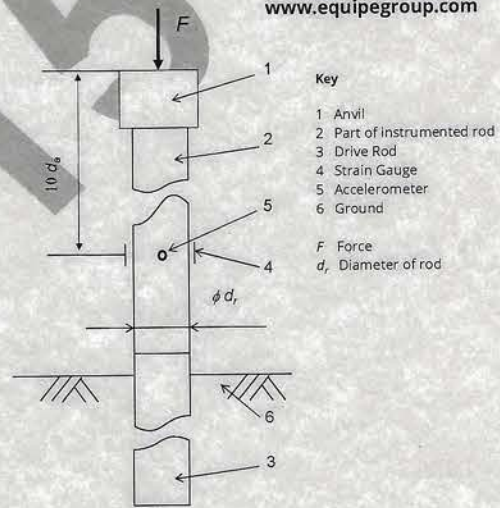
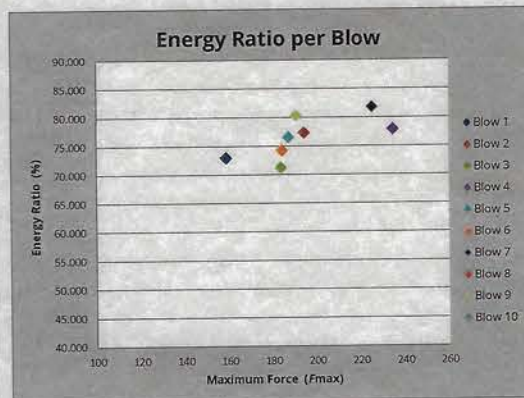
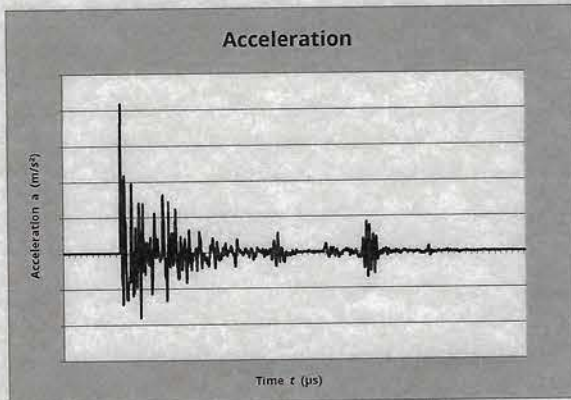
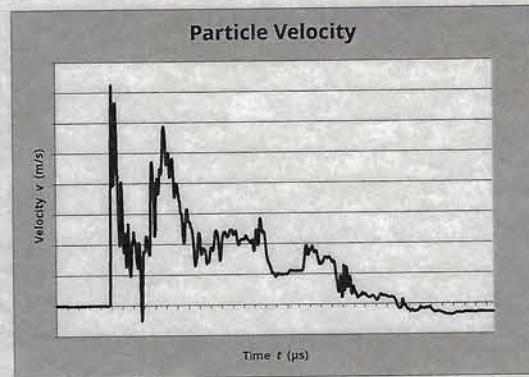
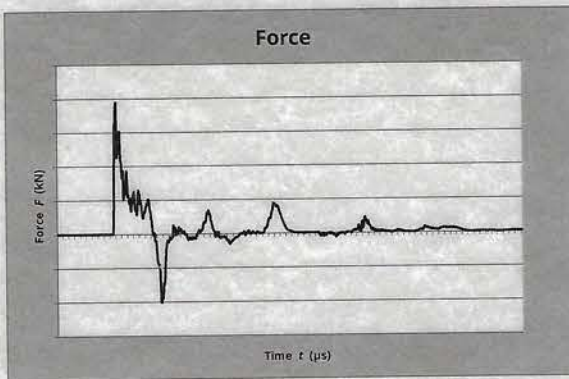


Fig. B.1 and B.2 BS EN ISO 22476-3 : 2005 + A1 : 2011



Observations:

1.

$E_{\text{meas}} = 0.363\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

$$\text{Energy Ratio } (E_r) = \frac{E_{\text{meas}}}{E_{\text{theor}}} = 76.79\%$$

Equipe SPT Analyzer Operators:

MH

Prepared by:

Checked by:

Date

06/01/2016

Borehole Log



Drilled	LM/PM	Start	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	37.15 mOD
Logged	ND	30/09/2016	Comacchio 205 Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.	(m)	(m)	(mm)	(m)	Coordinates (m)	E 384953.00
Checked	AP	End		1.50	3.00	101	4.50	National Grid	N 158777.00
Approved	LL	04/10/2016		3.00	4.50	87			
				4.50	5.70	87			
				5.70	7.20	87			
				7.20	22.15	120			

Samples and Tests				Strata Description				Depth, Level	Legend	Backfill	
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail	(Thickness)			
0.10 - 0.20	ES 2			30/09/16	0800	Brown gravelly silty fine to medium SAND. Gravel is subangular to subrounded fine to coarse of chert, chalk and brick. (MADE GROUND) Very stiff light brown to brown sandy gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of chalk, brick and chert. (MADE GROUND) Greyish brown sandy clayey angular to subangular fine to coarse GRAVEL of limestone and macadam. (MADE GROUND) Grey slightly silty sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.25)			
0.10 - 0.20	D 1							0.25	+36.90		
0.30 - 0.40	ES 4							(0.20)			
0.30 - 0.40	D 3							0.45	+36.70		
0.50 - 0.60	ES 6							(0.55)			
0.50 - 0.70	B 5							1.00	+36.15		
1.00 - 1.20	ES 8		N=20 (2,5/5,5,5,5)					(1.00)			
1.00 - 1.20	B 7										
1.20 - 1.65	SPTS D 9							2.00	+35.15		
1.20 - 1.65	D 9							(0.85)			
1.50 - 3.00	L 16		100% rec		Dry			(1.00)			
2.00 - 2.10	D 10					Soft to firm yellowish brown mottled grey slightly sandy silty CLAY. Sand is fine to medium. (KELLWAY'S FORMATION)		2.00	+35.15		
2.10 - 2.30	ES 11							(0.85)			
3.00 - 3.45	SPTS L 17		N=16 (2,2/3,5,5,3)	3.00	Dry	Stiff yellowish brown mottled grey and orange slightly sandy silty CLAY. Sand is fine to medium. (KELLWAY'S FORMATION)		2.85	+34.30		
3.00 - 4.50	D 12			100% rec	4.50		Dry		(1.65)		
3.00 - 3.45	D 12								4.50	+32.65	
4.50 - 4.95	SPTS L 18		N=16 (1,1/2,3,5,6)	4.50	Dry	Very stiff dark grey locally thinly laminated CLAY. Occasional shell fragments. (KELLWAY'S FORMATION)		4.50	+32.65		
4.50 - 5.70	D 13			100% rec	4.50		Dry				
4.50 - 4.95	D 13										
5.70 - 6.15	SPTS L 19		N=23 (1,2/4,4,7,8)	4.50	Dry						
5.70 - 7.20	D 14			100% rec	4.50		Dry		(2.70)		
5.70 - 6.15	D 14										
7.20 - 7.65			N=50 (5,7/8,13,20,9)	4.50	Dry	NO RECOVERY.		7.20	+29.95		
7.20 - 7.65	NA	NA		C 20					(0.45)		
7.20 - 7.65	NA	NA		D 15							
7.20 - 7.65	NA	NA							7.65	+29.50	
7.65 - 9.15				C 21							
7.65 - 9.15	100 NA NA	NA NA NA				Very stiff dark grey locally thinly laminated CLAY. Occasional shell fragments. (KELLWAY'S FORMATION)	8.03-8.05 Silty sandy with shell fragments	(1.50)			
9.15 - 10.65			C 22	30/09/16	1800 Dry	Soft dark grey CLAY. (KELLWAY'S FORMATION)	9.15-9.20 AZCL	9.15	+28.00		
9.15 - 10.65					03/10/16		0800 Dry		(0.70)		
9.15 - 10.65	100 NA NA	NA NA NA				Very stiff dark grey thinly laminated slightly		9.85	+27.30		

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used		

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH01
Scale 1:50	Project No.	H6100-16		
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Borehole Log



Drilled	LM/PM	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	37.15 mOD
Logged	ND	30/09/2016	Comacchio 205 Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.	1.50	3.00	101	4.50	Coordinates (m)	E 384953.00
Checked	AP	End		3.00	4.50	101		National Grid	N 158777.00
Approved	LL	04/10/2016		4.50	5.70	87			
				5.70	7.20	87			
				7.20	22.15	120			

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail			
10.65 - 12.15		NA NA NA	C 23			gravelly CLAY. Gravel is subangular fine to coarse of mudstone lithorelics. (KELLWAY'S FORMATION)		(1.00)		
10.65 - 12.15	100 NA NA					Very stiff dark grey thickly laminated slightly gravelly CLAY with occasional shell fragments. Gravel is subangular fine to coarse of mudstone lithorelics. Occasional partings of fine to medium sand between laminae. (KELLWAY'S FORMATION)	10.80-10.81 Some subangular pieces of coarse gravel of calcareous mudstone.	10.85	+26.30	
12.15 - 13.65			C 24				11.79-11.80 Band of shell fragments			
12.15 - 13.65	100 NA NA									
13.65 - 15.15		NA NA NA	C 25					(5.80)		
13.65 - 15.15	100 NA NA									
15.15 - 16.65			C 26							
15.15 - 16.65	100 NA NA									
16.65 - 18.15		NA NA NA	C 27			Very stiff dark grey thinly laminated CLAY. (KELLWAY'S FORMATION)		16.65	+20.50	
16.65 - 18.15	100 73 73	650 650 650				Weak dark grey lightly calcareous very shelly thickly laminated MUDSTONE. (KELLWAY'S FORMATION)		(0.35)		
16.65 - 18.15								17.00	+20.15	
18.15 - 19.65		NI 230 450	C 28			Medium strong light grey calcareous fossiliferous fine grained LIMESTONE. (CORNBURASH FORMATION). Weathering: Trace sand infill on discontinuity surfaces. Discontinuities: Medium spaced horizontal undulating rough.		(0.65)		
18.15 - 19.65	100 62 55						17.65	+19.50		
18.15 - 19.65								(1.40)		
19.65 - 21.15			C 29			Strong grey slightly calcareous very fossiliferous fine grained LIMESTONE. (CORNBURASH FORMATION). Weathering: Some clay infill up to 7 mm thick on discontinuity surfaces. Discontinuities: closely to medium spaced horizontal undulating rough.	18.45-18.70 Subvertical fracture stepped rough with trace sand infill. Some voids in fracture (up to 2 mm diameter). 18.70-19.05 NI 19.10-19.15 Band of clayey gravel of limestone	19.05	+18.10	
Hole continues on next sheet										

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	
1	15.00									

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH01
Scale 1:50	Project No.	H6100-16		
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Borehole Log



Drilled	LM/PM	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	37.15 mOD
Logged	ND	30/09/2016	Comacchio 205 Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.	1.50	3.00	101	4.50	Coordinates (m)	E 384953.00
Checked	AP	End		4.50	5.70	87		National Grid	N 158777.00
Approved	LL	04/10/2016		5.70	7.20	87			
				7.20	22.15	120			

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail			
19.65 - 21.15	100 89 72	NI 180 300						(1.95)		
21.15 - 22.65		NA NA NA	C 30			Stiff grey to dark green thickly laminated CLAY. Frequent pockets of black organic material (up to 3 mm diameter). Rare voids (up to 3 mm diameter). (CORNBRAH FORMATION)		21.00 (0.15) +16.15		
21.15 - 22.65	100 NA NA	NI 70 140				Stiff to very stiff green thickly laminated CLAY. (CORNBRAH FORMATION)		21.65 (0.30) +15.50		
22.65 - 24.15		NA NA NA	C 31	03/10/16 4.50	1800 Dry	Weak green mottled dark green MUDSTONE. Occasional veins of dark brown organic material (up to 1 mm thick). Rare pockets of black organic material (up to 2 mm diameter). (CORNBRAH FORMATION). Discontinuities: closely spaced horizontal to dipping 5 degrees planar smooth with trace clay infill.		21.95 (0.70) +15.20		
22.65 - 24.15	100 97 80	NI 120 260		04/10/16 4.50	0800 Dry	Medium strong to strong calcareous greenish grey interlaminated LIMESTONE AND MUDSTONE. (CORNBRAH FORMATIONS). Weathering: Up to 1 mm clay infill on discontinuity surfaces. Discontinuities: Closely to medium spaced horizontal to dipping 5 degrees planar smooth.		22.65 (1.40) +14.50		
24.15 - 25.15			C 32			Weak calcareous interlaminated LIMESTONE and MUDSTONE. (CORNBRAH FORMATION). Weathering: Trace clay infill on discontinuity surfaces. Discontinuities: closely spaced horizontal to dipping 5 degrees planar smooth.	24.00-24.05 Very stiff greenish grey clay	24.05 (1.10) +13.10		
24.15 - 25.15	100 100 56	NI 70 140		04/10/16 4.50	1800 15.37		24.41-24.50 Extremely weak mudstone			
						END OF EXPLORATORY HOLE		25.15 +12.00		

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH01
Scale 1:50	Project No.	H6100-16		
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Borehole Log



Drilled ML	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	37.16 mOD
Logged NJD	10/10/2016	Commachio Geo 205	1.20	1.65	92		Coordinates (m)	E 384956.00
Checked AP	End	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.65 m. SPT from 1.65 m to 1.73 m.	1.65	1.73	45		National Grid	N 158791.00
Approved LL	10/10/2016	Terminated at 1.73 m depth due to obstruction. Relocated 2 m NE to BH02A.						

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail			
0.10 - 0.20	ES 2			07/10/16	0800	Brown gravelly silty fine to coarse SAND. Gravel is angular to rounded fine to medium of chert, clinker and brick. (MADE GROUND)		(0.20)		
0.10 - 0.20	D 1							+36.96		
0.40 - 0.50	ES 4					Dark brown sandy silty angular to subangular fine to coarse GRAVEL of limestone, clinker and brick. Occasional pockets of clay. (MADE GROUND)		(0.50)		
0.40 - 0.60	B 3							+36.46		
0.70 - 0.80	ES 6					Stiff becoming firm from 1.20 m depth grey slightly gravelly CLAY with orangish brown silty fine sand and dark brown sandy silt partings. Gravel is angular to rounded fine to medium of chalk and chert. (MADE GROUND)		(0.90)		
0.70 - 0.80	D 5			07/10/16	1800 Dry					
1.20 - 1.65	B 7			10/10/16	0800 Dry					
				10/10/16	1800 Dry					
1.65 - 1.73	SPTC		50 (25 for 75mm/50 for 5mm)			Medium strong light grey CONCRETE. (MADE GROUND)		1.60 (0.05)	+35.56	
						Hole progressed by SPT.		1.73 (0.08)	+35.51	
						END OF EXPLORATORY HOLE			+35.43	

Groundwater Entries				Depth Related Remarks				Chiselling Details			
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used		
					1.20 - 1.73	SPT Hammer ID: JD3 Er%: 70.62					

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH02
Scale 1:50	Project No.	H6100-16		
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Borehole Log



Drilled ML	Start 10/10/2016	Equipment, Methods and Remarks Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	Depth from (m) 0.00	to (m) 11.90	Diameter (mm) 102	Casing Depth (m) 3.00	Ground Level 37.09 mOD
Logged NJD	End		11.90	25.40	92		Coordinates (m) E 384957.00
Checked AP	11/10/2016						National Grid N 158792.00
Approved LL							

Samples and Tests				Strata Description			Depth, Level (Thickness)	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail		
1.20 - 1.50	ES 1		100% rec	10/10/16	0800	<p>Brown very gravelly silty fine to coarse SAND. Gravel is angular to rounded fine to medium of chert, clinker and brick. (MADE GROUND)</p> <p>Dark brown sandy silty angular to subangular fine to coarse GRAVEL of limestone, clinker and brick. Occasional pockets of clay. Sand is fine to coarse. (MADE GROUND)</p> <p>Stiff grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular to rounded fine to coarse of various lithologies. (MADE GROUND)</p> <p>Medium strong light greyish brown CONCRETE. Recovered as sandy angular to subangular fine to coarse gravel. (MADE GROUND)</p> <p>Stiff light brown mottled grey slightly sandy CLAY with orange silty fine sand partings. Sand is fine to medium. (Reworked KELLAWAYS FORMATION)</p> <p>Stiff brownish grey slightly sandy CLAY with orangish brown fine sand and yellow silt partings. (Reworked KELLAWAYS FORMATION)</p> <p>Very stiff grey CLAY with silty fine sand dustings. Occasional gypsum crystals and rare shell fragments. (KELLAWAYS FORMATION)</p> <p>Stiff grey sandy silty CLAY with silty fine sand dustings. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)</p> <p>Very stiff grey CLAY. (KELLAWAYS FORMATION)</p> <p>Stiff grey sandy silty CLAY with silty fine sand dustings. Sand is fine to medium. Occasional shell fragments. (KELLAWAYS FORMATION)</p> <p>Very stiff grey CLAY. (KELLAWAYS FORMATION)</p> <p>Very stiff grey sandy silty CLAY. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)</p> <p>Very stiff grey CLAY. (KELLAWAYS FORMATION)</p>	1.20-1.65 Firm and light brown. 1.45 Angular cobble of clinker.	0.20 (+36.89)	
1.20 - 1.65	L 14								
1.50 - 1.60	D 2								
1.65 - 2.02	SPTC		N=20 (25 for 75mm/13,3,2,2)						
1.65 - 3.00	L 15		100% rec						
1.65 - 1.75	D 3								
1.75 - 2.00	ES 4								
2.00 - 2.10	D 5								
3.00 - 3.45	SPTS		N=17 (2,2/3,4,5,5)	10/10/16	1800			2.80-3.40 Shell fragments.	1.65 (+35.44)
3.00 - 4.50	L 16		100% rec					3.00-3.40 Gypsum crystals.	1.75 (+35.34)
3.00 - 3.45	D 6			3.00	Dry				
3.40 - 3.60	ES 7			11/10/16	0800				
4.50 - 4.95	SPTS		N=23 (2,3/4,5,7,7)	3.00	Dry		4.70-6.40 Orangish brown silty fine sand partings.	2.40 (+34.69)	
4.50 - 6.00	L 17		100% rec	3.00	Dry				
4.50 - 4.95	D 8								
6.00 - 6.45	SPTS		N=38 (5,7/7,10,10,11)	3.00	Dry		6.28 Ammonite fragments.	3.40 (+33.69)	
6.00 - 7.50	L 18		100% rec	3.00	Dry				
6.00 - 6.45	D 9								
7.50 - 7.95	SPTS		N=37 (5,6/8,9,9,11)	3.00	Dry				
7.50 - 9.00	L 19		100% rec	3.00	Dry				
7.50 - 7.95	D 10								
9.00 - 9.45	SPTS		N=36 (5,6/8,8,9,11)	3.00	Dry		9.54 Fossil fragments.	6.40 (+30.69)	
9.00 - 10.50	L 20		100% rec	3.00	Dry			6.50 (+30.59)	
9.00 - 9.45	D 11								

Groundwater Entries				Depth Related Remarks			Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
					0.00 - 23.99	SPT Hammer ID: JD3 Er%: 70.62			
Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project Trowbridge STW, Wiltshire			Borehole BH02A		
Scale 1:50				Project No. H6100-16			Sheet 1 of 3		
(c) ESG www.esg.co.uk 04/01/2017 14:12:00				Carried out for Wessex Water Services Limited					

Borehole Log



Drilled ML	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	37.09 mOD
Logged NJD	10/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	0.00	11.90	102	3.00	Coordinates (m)	E 384957.00
Checked AP	End		11.90	25.40	92		National Grid	N 158792.00
Approved LL	11/10/2016							

Samples and Tests				Strata Description							
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill	
10.50 - 10.95	SPTS L 21 D 12		N=34 (3,4/5,8,10,11) 100% rec	3.00	Dry	Stiff grey sandy silty CLAY. Occasional shell fragments. (KELLAWAYS FORMATION)		10.30 +26.79			
10.50 - 11.90				3.00	Dry	Very stiff grey CLAY. (KELLAWAYS FORMATION)		10.50 +26.59			
10.50 - 10.95											(0.40)
											10.90 +26.19
						Stiff grey silty sandy CLAY. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)		(0.50)			
						Very stiff grey CLAY with silty fine sand dustings. (KELLAWAYS FORMATION)		11.40 +25.69			
								(0.50)			
11.90 - 12.31	100 100 100		50 (10,14/13,14,15,8 for 35mm) C 22 D 13	11/10/16	1800	Extremely weak medium to thickly bedded grey MUDSTONE with silty fine sand partings and dustings. Occasional shell fragments. (KELLAWAYS FORMATION) Discontinuities: Horizontal medium to widely spaced undulating smooth clean.	12.38 Drilling induced fracture 12.45-12.65 Core recovered in following run. 12.93 Drilling induced fracture. 13.17 Drilling induced fracture. 13.40-13.51 AZCL	3.00	Dry	11.90 +25.19	
11.90 - 12.65				12/10/16	0800			3.00	Dry		
11.90 - 12.65											
12.65 - 13.40	100 99 99		C 23								
12.65 - 13.40											
13.40 - 13.85	93 92 92		SPTC N=49 (4,7/10,12,13,14) C 24	3.00	Dry						
13.40 - 14.90											
14.90 - 15.33	380 540 1420		SPTC 50 (5,9/11,12,15,12 for 55mm) C 25	3.00	Dry						
14.90 - 16.40											
14.90 - 16.40	98 97 93										
14.90 - 16.40											
16.40 - 16.77	93 91 91		SPTC 50 (6,11/12,17,21 for 70mm) C 26	3.00	Dry						
16.40 - 17.90											
16.40 - 17.90	100 95 92										
16.40 - 17.90											
17.90 - 18.14	1160 1160 1160		SPTC 50 (20,5/35,15 for 20mm) C 27	3.00	Dry	Extremely to very weak medium bedded dark grey silty sandy MUDSTONE with calcareous laminae. Frequent shell fragments increasing with depth. (KELLAWAYS FORMATION)		17.15 +19.94			
17.90 - 19.40											
17.90 - 19.40	100 95 92					Weak thickly bedded grey fine to medium grained clayey LIMESTONE with occasional very weak dark grey silty sandy mudstone partings. (CORNBASH FORMATION)		17.77 +19.32			
17.90 - 19.40											
19.40 - 19.50	NI 180 410		SPTC 50 (25 for 75mm/50 for 25mm) C 28	3.00	Dry	Medium strong medium bedded light grey fine grained LIMESTONE. (CORNBASH FORMATION) Discontinuities: Horizontal undulating rough clean.		18.40 +18.69			
19.40 - 20.90											
19.40 - 20.90						Very weak thickly bedded grey fine to coarse grained clayey LIMESTONE with very closely spaced laminae and partings of extremely weak dark grey mudstone. (CORNBASH FORMATION) Discontinuities: Very closely to medium spaced horizontal undulating rough clean.		18.93 +18.16			
								(0.53)			
								18.93 +18.16			
								(1.25)			
								19.13 Trace firm grey clay infill. 19.30 Drilling induced fracture. 19.36-19.40 Non-intact 19.40-19.41 AZCL			
								19.99-20.18 Largely non-intact. Trace firm grey clay infill.			

Groundwater Entries				Depth Related Remarks				Chiselling Details			
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used		

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH02A
Scale 1:50	Project No.	H6100-16		
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Borehole Log



Drilled ML	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	37.09 mOD
Logged NJD	10/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	0.00	11.90	102	3.00	Coordinates (m)	E 384957.00
Checked AP	End		11.90	25.40	92		National Grid	N 158792.00
Approved LL	11/10/2016							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail			
19.40 - 20.90	99 86 86			12/10/16 3.00	1800 Dry	Weak thickly bedded grey fine to medium grained clayey LIMESTONE with occasional very weak dark grey silty sandy mudstone partings. (CORNBRAH FORMATION)	20.32 Drilling induced fracture.	20.18 +16.91 (0.72)		
20.90 - 21.00 20.90 - 22.40			SPTC 50 (25 for 75mm/50 for 20mm) C 29	13/10/16 3.00	0800 Dry	Extremely to very weak medium to thickly bedded light grey calcareous MUDSTONE. (CORNBRAH FORMATION) Discontinuities: Medium to widely spaced horizontal undulating smooth clean.	20.90-20.91 AZCL. 20.91-21.32 Extremely closely spaced black carbonaceous partings and fragments.	20.90 +16.19		
20.90 - 22.40	99 99 99	330 750 1560					21.48 Drilling induced fracture. 21.82 Drilling induced fracture.	(1.61)		
22.40 - 22.49 22.40 - 23.90			SPTC 50 (25 for 75mm/50 for 15mm) C 30	3.00	Dry		22.15 Drilling induced fracture. 22.40-22.41 AZCL.	22.51 +14.58		
22.40 - 23.90	99 99 99					Very weak thinly interlaminated to very thinly interbedded light grey calcareous mudstone and weak clayey LIMESTONE. (CORNBRAH FORMATION) Discontinuities: Very closely to widely spaced horizontal planar smooth clean.				
23.90 - 23.98 23.90 - 25.40			SPTC 50 (25 for 75mm/50 for 10mm) C 31	3.00	Dry		23.66 Drilling induced fracture.	(2.89)		
23.90 - 25.40	97 87 77	30 170 600					24.90-24.94 AZCL. 25.01 Drilling induced fracture.			
				13/10/16 3.00	1800 Dry	END OF EXPLORATORY HOLE		25.40 +11.69		

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH02A
Scale 1:50	Project No.	H6100-16		
(c) ESG www.esg.co.uk 04/01/2017 14:12:00	Carried out for	Wessex Water Services Limited		Sheet 3 of 3

Borehole Log



Drilled	DH	Start	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	(m)	(m)	(mm)	(m)	Coordinates (m)	E 384975.00
Checked	AP	End		1.20	10.40	92	4.50	National Grid	N 158798.00
Approved	LL	07/10/2016		10.40	25.40	121			

Samples and Tests				Strata Description				Depth, Level	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail	(Thickness)		
0.10 - 0.20	ES 2			05/10/16	0800	Very stiff dark brown gravelly silty CLAY. Gravel is angular to rounded fine to medium of chert. (TOPSOIL)		(0.20)	+36.83	
0.10 - 0.20	D 1									
0.30 - 0.40	ES 4					Very stiff light brown becoming brownish grey from 0.60 m gravelly CLAY with low cobble content. Gravel is angular to rounded fine to coarse of chalk, chert and brick. Cobbles are angular of limestone and concrete. (MADE GROUND)		(0.80)		
0.30 - 0.40	D 3									
0.50 - 0.70	B 5									
1.00 - 1.10	ES 7		100% rec			Stiff greyish brown to brown clayey slightly gravelly SILT with low cobble content. Gravel is angular to rounded fine to coarse of limestone and brick. Cobbles are angular of concrete. (MADE GROUND)		1.00	+36.03	
1.00 - 1.10	D 6				Dry					
1.20 - 2.25	L 17									
1.20 - 2.00	B 8									
2.00 - 2.10	ES 9					Firm becoming stiff from 2.80 m light brown mottled orange and grey sandy CLAY with orange clayey sand partings. Sand is fine to medium. (ALLUVIUM)	2.40-2.80 Very sandy.	2.00	+35.03	
2.25 - 2.70	SPTS		N=8 (1,1/2,1,2,3)	0.00	Dry					
2.25 - 3.75	L 18		100% rec		Dry		2.80-3.05 Slightly sandy.			
2.25 - 2.70	D 10							(1.50)		
3.75 - 4.20	SPTS		N=14 (1,3/3,4,4,3)	0.00	Dry	Stiff brownish grey slightly sandy CLAY with orange clayey sandy silt partings. Sand is fine to medium. (Weathered KELLAWAYS FORMATION)		3.50	+33.53	
3.75 - 4.20	L 19		100% rec		Dry			(0.30)		
3.75 - 4.20	D 12					Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		3.80	+33.23	
3.80 - 3.90	ES 11									
5.30 - 5.75	SPTS		N=16 (3,3/3,4,4,5)	0.00	Dry			(2.40)		
5.30 - 6.80	L 20		100% rec		Dry					
5.30 - 5.75	D 13									
6.80 - 7.25	SPTS		N=21 (2,3/4,5,6,6)	0.00	Dry	Very stiff grey slightly sandy silty CLAY with occasional calcareous accretions. (KELLAWAYS FORMATION)		6.20	+30.83	
6.80 - 8.30	L 21		100% rec		Dry			(0.55)		
6.80 - 7.25	D 14					Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		6.75	+30.28	
8.30 - 8.75	SPTS		N=32 (2,4/6,8,8,10)	0.00	Dry	Very stiff grey slightly sandy silty CLAY with occasional shell fragments. (KELLAWAYS FORMATION)		7.10	+29.93	
8.30 - 9.80	L 22		100% rec		Dry			(0.60)		
8.30 - 8.75	D 15					Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		7.70	+29.33	
9.80 - 10.25	SPTS		N=27 (5,5/4,6,8,9)	0.00	Dry	Very stiff grey silty sandy CLAY with moderate shell and fossil fragments. (KELLAWAYS FORMATION)		8.30	+28.73	
9.80 - 10.25	D 16					Very stiff CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		8.70	+28.33	
								(1.55)		

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	
1	6.18									
2	6.22									

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH03
Scale 1:50	Project No.	H6100-16		
(c) ESG www.esg.co.uk 04/01/2017 14:12:03	Carried out for	Wessex Water Services Limited		Sheet 1 of 3

Borehole Log



Drilled	DH	Start	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	(m)	(m)	(mm)	(m)	Coordinates (m)	E 384975.00
Checked	AP	End		10.40	10.40	92	4.50	National Grid	N 158798.00
Approved	LL	07/10/2016		10.40	25.40	121			

Samples and Tests				Strata Description				Depth, Level	Legend	Backfill
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Main	Detail	(Thickness)		
10.40 - 11.15				05/10/16	1800 Dry	NO RECOVERY.	10.40-10.45 AZCL.	10.25 (0.15)		
10.40 - 11.15	93 0 0		C 23	06/10/16	0800 6.18	Very stiff grey slightly sandy silty CLAY. Sand is fine to medium. Occasional shell fragments (up to 10mm). (KELLAWAYS FORMATION)	10.87 Drilling induced fracture.	+26.78 +26.63 (0.77)		
11.15 - 11.90								11.17	+25.86	
11.15 - 11.90	100 0 0		C 24			Stiff to very stiff grey thinly laminated CLAY. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)	11.58 Drilling induced fracture.	(0.83)		
11.90 - 12.28				4.50	Wet		11.65-11.87 Moderate shell fragments.	12.00	+25.03	
11.90 - 13.40			SPTC 50 (10,12/14,14,19,3 for 5mm) C 25			Soft to firm grey CLAY. Occasional shell fragments (up to 5mm). (KELLAWAYS FORMATION)	11.89-11.90 CRF. 11.90-12.55 Reduced strength due to CPT.	(0.54)		
11.90 - 13.40	100 0 0	NA NA NA				Very stiff grey slightly sandy silty CLAY. Sand is fine to medium. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)	12.15-12.90 Moderate shell fragments.	12.54	+24.49	
13.40 - 13.75				4.50	Wet		13.27 Drilling induced fractures.	13.45	+23.58	
13.40 - 14.90			SPTC 50 (5,6/17,20,13 for 50mm) C 26			Soft to firm grey CLAY. (KELLAWAYS FORMATION)	13.34 Drilling induced fractures. 13.40-13.49 AZCL.	(0.40)		
13.40 - 14.90	94 0 0					Stiff to very stiff grey thinly laminated CLAY. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)		13.85	+23.18	
14.90 - 15.23				4.50	Wet		14.51 35 degree fracture. 14.73 Drilling induced fracture.			
14.90 - 16.40			SPTC 50 (13,12/15,19,16 for 30mm) C 27					(2.93)		
14.90 - 16.40	100 0 0	NI 130 350					15.40 Accidental cut. 15.44 Calcareous clasts. 15.51-15.62 Non-intact and reduced strength.			
16.40 - 16.77				06/10/16	1800 4.50		16.32 Drilling induced fracture.	16.78	+20.25	
16.40 - 17.90			SPTC 50 (9,11/12,15,23 for 75mm) C 28	07/10/16	0000 4.50	Extremely weak grey sandy MUDSTONE. Occasional shell fragments (up to 10mm). (KELLAWAYS FORMATION)	16.40-16.42 AZCL. 16.42-16.47 Non-intact and reduced strength due to CPT.	(0.97)		
16.40 - 17.90	99 80 80	NA NA NA					16.97 Drilling induced fracture. 17.10 Drilling induced fracture. 17.25 Drilling induced fracture.			
17.90 - 18.25				4.50	Wet		17.90-17.94 AZCL.	17.75	+19.28	
17.90 - 19.40			SPTC 50 (10,12/17,17,16 for 50mm) C 29			Medium strong thinly laminated grey and light grey fine to medium grained LIMESTONE. (CORNBURASH FORMATION) Discontinuities: Medium spaced horizontal undulating rough clean.	17.94-18.03 Non-intact with trace of firm grey clay infill.	(1.15)		
17.90 - 19.40	97 90 84							18.90	+18.13	
19.40 - 19.73				4.50	Wet		19.18 Drilling induced fracture.	(2.10)		
19.40 - 20.90	100 190 390		SPTC 50 (17,8/20,19,11 for 25mm) C 30			Weak thinly bedded grey fine to medium grained clayey LIMESTONE with very closely spaced laminae and partings of extremely weak grey silty sandy mudstone. Occasional shell fragments (up to 10mm). (CORNBURASH FORMATION) Discontinuities: Closely to medium spaced horizontal undulating stepped rough.	19.23-19.34 <5 mm firm grey clay infill. 19.29 Drilling induced fracture. 19.40-19.43 CRF. 19.51 Drilling induced fracture.			
Hole continues on next sheet										

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	
					11.90 - 24.07	SPT hammer ID: JD3 Er%: 70.62				

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH03
Scale 1:50	Project No.	H6100-16		
(c) ESG www.esg.co.uk 04/01/2017 14:12:03	Carried out for	Wessex Water Services Limited		Sheet 2 of 3

Borehole Log



Drilled	DH	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	1.20	10.40	92	4.50	Coordinates (m)	E 384975.00
Checked	AP	End		10.40	25.40	121		National Grid	N 158798.00
Approved	LL	07/10/2016							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill	
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail				
19.40 - 20.90	100 0 0						20.12 Drilling induced fracture. 20.16-20.41 Extremely closely spaced dark brown to black carbonaceous partings. 20.40 Drilling induced fracture 20.50-21.12 Occasional closely spaced laminae and partings. 20.90-20.94 AZCL. 20.94 Possible <5 mm firm grey clay infill. 21.24 Drilling induced fracture. 21.55 Drilling induced fracture. 21.73 Drilling induced fracture. 21.81 Drilling induced fracture. 21.97 Drilling induced fracture. 22.19 Drilling induced fracture. 22.30 Drilling induced fracture. 22.48-22.50 Extremely closely spaced dark brown to black carbonaceous partings. 22.70 Drilling induced fracture. 22.81 Drilling induced fracture. 23.06-23.12 Non-intact and sandy. 23.48 Drilling induced fracture. 23.64 Drilling induced fracture. 23.90-23.96 AZCL. 24.39-24.42 Mainly non-intact and sandy. 25.02-25.12 Mainly non-intact and sandy. 25.26-25.29 Mainly non-intact and sandy.	21.00	+16.03		
20.90 - 21.06 20.90 - 22.40			SPTC 50 (25 for 75mm/30,20 for 15mm) C 31	4.50	Wet	Extremely weak to very weak locally thinly laminated greenish grey calcareous MUDSTONE. (CORNBRAH FORMATION) Discontinuities: Very closely to closely spaced horizontal planar smooth.		(1.65)			
20.90 - 22.40	97 97 97	50 150 200									
22.40 - 22.58 22.40 - 23.90			SPTC 50 (25 for 75mm/27,23 for 30mm) C 32	4.50	Wet	Thinly interlaminated to thinly interbedded very weak light grey calcareous MUDSTONE and weak grey clayey LIMESTONE. (CORNBRAH FORMATION) Discontinuities: Very closely to closely spaced horizontal planar smooth.		22.65	+14.38		
22.40 - 23.90	100 91 80										
23.90 - 24.07 23.90 - 25.40			SPTC 50 (25 for 75mm/35,15 for 20mm) C 33	4.50	Wet			(2.75)			
23.90 - 25.40	96 89 13	30 80 140									
				07/10/16	1800	END OF EXPLORATORY HOLE		25.40	+11.63		

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH03
Scale 1:50	Project No.	H6100-16		
(c) ESG www.esg.co.uk 04/01/2017 14:12:03	Carried out for	Wessex Water Services Limited		Sheet 3 of 3

Borehole Log



Drilled ML	Start	Equipment, Methods and Remarks Commachio Geo 205 Hand excavated trial pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.75 m. SPT from 1.75 m to 1.84 m. Terminated at 1.84 m depth due to obstruction. Relocated 2 m NE to BH04A.	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	36.99 mOD
Logged NJD	14/10/2016		1.20	1.75	92		Coordinates (m)	E 384977.00
Checked AP	End		1.75	1.84	45		National Grid	N 158820.00
Approved LL	14/10/2016							

Samples and Tests				Strata Description				Depth, Level (Thickness)	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail			
0.10 - 0.20	ES 2			14/10/16	0800	Dark brown sandy silty angular to subrounded fine to coarse GRAVEL of limestone, clinker and chert. Sand is fine to coarse. (MADE GROUND) Very stiff light brown mottled grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular coarse of tile. (MADE GROUND) Brownish grey sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.30)		
0.10 - 0.20	D 1							0.30	+36.69	
0.40 - 0.50	ES 4							(0.60)		
0.40 - 0.50	D 3							0.90	+36.09	
0.70 - 0.90	B 5							(0.85)		
0.90 - 1.20	B 6									
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 10mm)	14/10/16	1800 Dry	Hole progressed by SPT. END OF EXPLORATORY HOLE		1.75 (0.09)	+35.24	
								1.84	+35.15	

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	
					1.20 - 1.84	SPT Hammer ID: JD3 Er%: 70.62				

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH04
Scale 1:50	Project No.	H6100-16		Sheet 1 of 1
(c) ESG www.esg.co.uk 04/01/2017 14:12:05	Carried out for	Wessex Water Services Limited		

Borehole Log



Drilled ML	Start	Equipment, Methods and Remarks Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.75 m. SPT from 1.75 to 1.84. Terminated at 1.84 m due to obstruction. Relocated 2 m SE to BH04B.	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level
Logged NJD	14/10/2016		1.20	1.75	92		Coordinates (m)
Checked AP	End		1.75	1.84	45		National Grid
Approved LL	14/10/2016						

Samples and Tests

Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
1.20 - 1.65	SPTC		N=26 (6,7/8,7,6,5)	14/10/16	0800	Dark brown sandy silty angular to subrounded fine to coarse GRAVEL of limestone, clinker and chert. Sand is fine to coarse. (MADE GROUND) Very stiff light brown mottled grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular coarse of tile. (MADE GROUND)		0.20 (0.70) 0.90		
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 10mm)	14/10/16	1800 Dry	Brownish grey sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.85) 1.75 1.84 (0.09)		
						Hole progressed by SPT. END OF EXPLORATORY HOLE				

Groundwater Entries				Depth Related Remarks			Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used
					1.20 - 1.84	SPT Hammer ID: JD3 Er%: 70.62			

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH04A
Scale 1:50	Project No.	H6100-16		Sheet 1 of 1
(c) ESG www.esg.co.uk 04/01/2017 14:12:06	Carried out for	Wessex Water Services Limited		

Borehole Log



Drilled	TP ML	Start	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level
Logged	JH	14/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	(m)	(m)	(mm)	(m)	Coordinates (m)
Checked	AP	End		1.20	8.70	102	3.00	National Grid
Approved	LL	19/10/2016		8.70	25.30	92		
				25.30	25.72	45		

Samples and Tests				Strata Description				Depth, Level	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail	(Thickness)		
1.20	L 1			14/10/16	0800	Dark brown gravelly slightly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick, limestone, mudstone and concrete. Occasional rootlets. (MADE GROUND)				
1.20 - 1.75	ES 20		55% rec	14/10/16	1800			(2.00)		
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 20mm)	0.00	Dry					
2.00 - 2.50			L 2 60% rec	0.00	Dry	Dark brown and grey clayey angular to subangular fine to coarse GRAVEL of mixed lithologies including limestone, basalt and macadam. (MADE GROUND)		2.00		
2.00 - 3.00	100		ES 21	0.00	Dry			(0.70)		
2.50 - 3.00	0		L 3 60% rec	0.00	Dry	Firm grey mottled orange fissured slightly sandy CLAY. Sand is fine. Occasional pockets of fine sand. (Weathered KELLAWAYS FORMATION)		2.70		
3.00 - 3.45			SPTS N=13 (2,2/2,3,4,4)	3.00	Dry			(0.90)		
3.00 - 4.50			L 4 100% rec	3.00	Dry					
3.40			D 23							
3.00 - 4.50	99		ES 22					3.60		
	0							(1.15)		
4.50 - 4.95			SPTS N=16 (2,2/3,4,4,5)	3.00	Dry			4.75		
4.50 - 6.00			L 5 100% rec	3.00	Dry	Soft to firm dark grey slightly sandy CLAY. Sand is fine to medium. (Weathered KELLAWAYS FORMATION)				
4.50			D 24							
4.50 - 6.00	99							4.75		
	0									
6.00 - 6.45		NA	SPTS N=24 (2,3/3,6,7,8)	3.00	Dry			(2.10)		
6.00 - 7.30		NA	L 6 100% rec	3.00	Dry					
6.00		NA	D 25							
6.00 - 7.30	98							6.85		
	0							(0.65)		
7.30 - 7.71			SPTS 50 (5,10/16,15,12,7 for 35mm)	3.00	Dry			7.50		
7.30 - 8.70			L 7 100% rec	3.00	Dry	Soft dark grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine of chert and quartzite. (Weathered KELLAWAYS FORMATION)		(0.50)		
7.30			D 26							
7.30 - 8.80	93							8.00		
	0							(0.80)		
8.80 - 9.22			SPTS 50 (9,10/11,13,15,11 for 40mm)	17/10/16	1800			8.80		
8.80 - 9.55			C 8	3.00	Dry	Soft becoming stiff with depth dark grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine of mixed lithologies including quartzite and chert. (Weathered KELLAWAYS FORMATION)		(0.55)		
8.80 - 9.55	95		D 27	3.00	Dry					
9.55 - 10.30								9.35		
9.55 - 10.30	100		C 9							
	100									
	100									

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	
					0.00 - 1.20	No samples required				
					1.20 - 25.72	SPT Hammer ID: JD3 Er%: 70.62				

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH04B
Scale 1:50	Project No.	H6100-16		
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Borehole Log



Drilled	TP ML	Start	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level
Logged	JH	14/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	(m)	(m)	(mm)	(m)	Coordinates (m)
Checked	AP	End		1.20	8.70	102	3.00	National Grid
Approved	LL	19/10/2016		8.70	25.30	92		
				25.30	25.72	45		

Samples and Tests				Strata Description				Depth, Level	Legend	Backfill
Depth	TCR SCR RCD	If	Records/Samples	Date Casing	Time Water	Main	Detail	(Thickness)		
10.30 - 10.72 10.30 - 11.80		100 200 400	SPTC 50 (5,7,12,12,15,11 for 40mm) C 10	3.00	Dry			(1.71)		
10.30 - 11.80	97 97 97					Very weak thinly interlaminated dark grey silty MUDSTONE. (KELLAWAYS FORMATION) Discontinuities: Widely spaced horizontal planar smooth partings along laminae.		11.06		
11.80 - 12.22 11.80 - 13.30		200 250 320	SPTC 50 (6,9,13,12,13,12 for 40mm) C 11	3.00	Dry		11.80-12.05 Weathered soft grey CLAY.	(1.04)		
11.80 - 13.30	96 96 94	NA NA NA				Firm laminated dark grey CLAY. (KELLAWAYS FORMATION)		12.10		
13.30 - 13.64 13.30 - 14.80			SPTC 51 (12,13,17,19,15 for 35mm) C 12	3.00	Dry		12.60-15.60 Rare brown nodules (up to 10mm). Possibly iron.	(0.50)		
13.30 - 14.80	99 99 90	100 150 350				Very weak thinly laminated dark grey silty MUDSTONE. (KELLAWAYS FORMATION) Discontinuities: Very closely to closely spaced horizontal planar occasionally stepped partings along laminae.		12.60		
14.80 - 15.14 14.80 - 16.30			SPTC 50 (11,9,16,14,20 for 45mm) C 13	3.00	Dry					
14.80 - 16.30	99 94 76					Very weak thinly laminated dark grey slightly silty MUDSTONE with rare laminae of fine sandstone. (KELLAWAYS FORMATION) Discontinuities: Medium spaced and locally closely spaced horizontal planar stepped smooth along laminae partings.		15.60		
16.30 - 16.63 16.30 - 17.80		40 120 150	SPTC 50 (12,10,18,16,16 for 30mm) C 14	3.00	Dry			(1.10)		
16.30 - 17.80	98 98 93	70 180 280				Weak thinly laminated dark grey silty MUDSTONE. Occasional thin shell-rich beds. Shell content increases with depth. (KELLAWAYS FORMATION) Discontinuities: Medium spaced horizontal rough stepped partings.		16.70		
17.80 - 17.90 17.80 - 19.30		150 260 260	SPTC 50 (25 for 75mm/50 for 20mm) C 15	3.00	Dry		17.49-18.00 Sharp upper contact. Rare bioturbation below upper contact.	17.49		
17.80 - 19.30	96 90 84	100 NI 500	NI NI 100			Strong light grey slightly silty medium grained ooidal and shelly Limestone. (CORNBASH FORMATION) Discontinuity: Horizontal undulating rough.	18.00-18.30 Occasional disseminations of pyrite.	(0.51)		
19.30 - 19.40 19.30 - 20.80		60 72 590	SPTC 50 (25 for 75mm/50 for 25mm) C 16	3.00	Dry		18.30-18.94 Rare subvertical to vertical veins of calcite.	18.00		
						Weak to medium strong lenticular cross-bedded light grey mottled dark grey silty bioclastic medium grained Limestone with beds of poorly consolidated MUDSTONE. Shell content increases with depth. (CORNBASH FORMATION) Discontinuities: Very closely to closely spaced	18.30	(0.64)		
							19.05-19.10 Non-intact.	18.94		
						Hole continues on next sheet		(2.09)		

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH04B
Scale 1:50	Project No.	H6100-16		
(c) ESG www.esg.co.uk 04/01/2017 14:12:07	Carried out for	Wessex Water Services Limited		Sheet 2 of 3

Borehole Log



Drilled	TP ML	Start	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level
Logged	JH	14/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	(m)	(m)	(mm)	(m)	Coordinates (m)
Checked	AP	End		1.20	8.70	102	3.00	National Grid
Approved	LL	19/10/2016		8.70	25.30	92		
				25.30	25.72	45		

Samples and Tests				Strata Description				Depth, Level	Legend	Backfill
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Main	Detail	(Thickness)		
19.30 - 20.80	100 100 92					subhorizontal undulating smooth partings along beds.	20.40-21.03 Becomes medium strong with no mudstone beds.			
20.80 - 22.30			C 17				21.03-22.85 Rare laminae of carbonaceous MUDSTONE.	21.03		
20.80 - 22.30	93 93 83					Weak poorly bedded dark green mottled light brown occasionally calcareous MUDSTONE. (FOREST MARBLE FORMATION) Discontinuities: Horizontal closely spaced undulating smooth occasionally rough partings along bedding.		(1.82)		
22.30 - 22.72			SPTC 50 (5,7/12,12,15,11 for 40mm) C 18	18/10/16 3.00	1800 Dry					
22.30 - 23.80				19/10/16 3.00	0800 Dry					
22.30 - 23.80	96 77 75		70 150 304			Weak thinly to thickly laminated dark green and white MUDSTONE with occasional thin laminae of fine grained bioclastic LIMESTONE. (FOREST MARBLE FORMATION) Discontinuities: Closely spaced horizontal planar smooth partings along laminae.		22.85		
23.80 - 25.30			C 19			Weak to medium strong thickly interlaminated olive green and white MUDSTONE and LIMESTONE. (FOREST MARBLE FORMATION) Discontinuities: Medium spaced horizontal planar rough partings along laminations. One joint vertical stepped rough.		(0.61)		
23.80 - 25.30	66 55 48		40 170 290					23.46		
25.30 - 25.72			SPTC 50 (6,9/13,12,13,12 for 50mm)	3.00	Dry	Hole progressed by SPT.		(1.84)		
				19/10/16 3.00	1800 Dry			25.30		
						END OF EXPLORATORY HOLE		(0.42)		
								25.72		

Groundwater Entries				Depth Related Remarks				Chiselling Details		
No.	Depth	Strike	Remarks	Depth Sealed	Depths (m)	Remarks	Depths (m)	Duration (mins)	Tools used	

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Trowbridge STW, Wiltshire	Borehole	BH04B
Scale 1:50	Project No.	H6100-16		
(c) ESG www.esg.co.uk 04/01/2017 14:12:07	Carried out for	Wessex Water Services Limited		Sheet 3 of 3

APPENDIX C
INSTRUMENTATION AND MONITORING

Installation Details	Table C1
Groundwater Monitoring	Table C2
Gas Monitoring	Table C3
Water Sampling Records	BH01, BH02A, BH03, BH04B

Installation Details



Instrument Reference	Instrument Type (See Notes)	Installation Date, dd/mm/yyyy	Pipe Diameter, mm	Instrument Base, mbgl	Response Zone Range, mbgl	Pipe Top Details	Headworks	Remarks
BH01 (1)	SPIE	04/10/2016	19	3.00	1.00 to 3.00	Gas tap	Flush	
BH01 (2)	SP	04/10/2016	50	24.00	12.00 to 24.00	Gas tap	Flush	
BH02A (1)	SP	11/10/2016	50	20.50	18.00 to 20.50	Gas tap	Flush	
BH02A (2)	SP	11/10/2016	19	2.50	1.80 to 2.50	Gas tap	Flush	
BH03 (1)	SP	17/10/2016	50	16.00	10.00 to 16.00	Gas tap	Flush	
BH03 (2)	SP	07/10/2016	19	1.50	0.50 to 1.50	Gas tap	Flush	
BH04B (1)	SP	19/10/2016	50	16.50	3.00 to 16.50	Gas tap	Flush	
BH04B (2)	SP	19/10/2016	19	2.20	0.50 to 2.20	Gas tap	Flush	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well



Project Trowbridge STW, Wiltshire
 Project No. H6100-16
 Carried out for Wessex Water Services Limited

Table

C1

Groundwater Monitoring



Instrument Reference	Instrument Type	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Depth to groundwater, mbgl	Comments
BH01 (1)	SPIE	3.00	17/11/2016 09:00:00	1.95	
BH01 (1)	SPIE	3.00	22/11/2016 13:10:00	0.47	
BH01 (1)	SPIE	3.00	30/11/2016 10:00:00	2.08	
BH01 (1)	SPIE	3.00	08/12/2016 09:10:00	1.87	
BH01 (1)	SPIE	3.00	12/01/2017 09:00:00	1.86	
BH01 (1)	SPIE	3.00	23/01/2017 12:10:00	2.00	
BH01 (1)	SPIE	3.00	06/02/2017 11:40:00	1.90	
BH01 (2)	SP	24.00	17/11/2016 10:00:00	2.25	
BH01 (2)	SP	24.00	22/11/2016 13:00:00	0.80	
BH01 (2)	SP	24.00	30/11/2016 10:30:00	2.10	
BH01 (2)	SP	24.00	08/12/2016 09:00:00	1.76	
BH01 (2)	SP	24.00	12/01/2017 09:10:00	2.05	
BH01 (2)	SP	24.00	23/01/2017 12:00:00	2.00	
BH01 (2)	SP	24.00	06/02/2017 11:30:00	2.00	
BH02A (1)	SP	20.50	12/01/2017 09:25:00	2.17	
BH02A (1)	SP	20.50	23/01/2017 12:20:00	1.90	
BH02A (1)	SP	20.50	06/02/2017 12:15:00	2.10	
BH02A (2)	SP	2.50	12/01/2017 09:35:00	1.57	
BH02A (2)	SP	2.50	23/01/2017 12:25:00	1.40	
BH02A (2)	SP	2.50	06/02/2017 12:20:00	1.60	
BH03 (1)	SP	16.00	12/01/2017 09:50:00	1.83	
BH03 (1)	SP	16.00	23/01/2017 12:35:00	1.70	
BH03 (1)	SP	16.00	06/02/2017 12:45:00	1.80	
BH03 (2)	SP	1.50	12/01/2017 10:00:00	1.70	
BH03 (2)	SP	1.50	23/01/2017 12:40:00	1.80	
BH03 (2)	SP	1.50	06/02/2017 12:40:00	1.70	
BH04B (1)	SP	16.50	12/01/2017 10:15:00	1.72	
BH04B (1)	SP	16.50	23/01/2017 12:50:00	1.70	
BH04B (1)	SP	16.50	06/02/2017 13:00:00	1.70	
BH04B (2)	SP	2.20	12/01/2017 10:25:00	1.70	
BH04B (2)	SP	2.20	23/01/2017 12:55:00	1.80	
BH04B (2)	SP	2.20	06/02/2017 13:00:00	1.70	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well



Project Trowbridge STW, Wiltshire
 Project No. H6100-16
 Carried out for Wessex Water Services Limited

C2

Gas Monitoring



Instrument Reference	Date Time dd/mm/yyyy hh:mm:ss	Reading Depth, mBGL	Air Temperature, oC	Barometric Pressure, mbar	Instrument Base, magl	Gas Differential Pressure, Pa	Gas Flow Rate, l/hr	Gas Concentrations						
								Carbon Dioxide, %vol	Carbon Monoxide, ppm	Hydrogen Sulphide, ppm	Methane, %LEL	Methane, %vol	Oxygen, %vol	Total VOCs, ppm
BH01 (1)	17/11/2016 09:00:00	0.00	9.0	992	3.00	0.0	0.0	6.5		0.0	0.0	0.0	8.5	
BH01 (1)	22/11/2016 13:10:00	0.00	7.0	996	3.00	0.0	0.0	0.0		0.0	0.0	0.0	20.5	
BH01 (1)	30/11/2016 10:00:00	0.00	0.0	1032	3.00	0.1	0.0	6.6		0.0	1.1	0.1	10.8	
BH01 (1)	08/12/2016 09:10:00	0.00	10.0	1011	3.00	0.6	0.2	0.0		0.0	0.0	0.0	20.5	
BH01 (1)	12/01/2017 09:00:00	0.00	5.0	992	3.00	0.0	0.0	0.0		0.0	0.0	0.0	20.4	
BH01 (1)	23/01/2017 12:10:00	0.00	3.0	1022	3.00	0.1	0.0	3.6		0.0	0.0	0.0	17.1	
BH01 (1)	06/02/2017 11:40:00	0.00	3.0	1013	3.00	-0.2	0.1	4.1		0.0	0.0	0.0	15.9	
BH01 (2)	17/11/2016 10:00:00	0.00	9.0	992	24.00	0.0	0.2	0.4		0.0	0.0	0.0	19.2	
BH01 (2)	22/11/2016 13:00:00	0.00	7.0	996	24.00	-0.2	0.0	1.2		0.0	0.0	0.0	18.6	
BH01 (2)	30/11/2016 10:30:00	0.00	0.0	1031	24.00	-2.6	-1.0	0.7		0.0	0.0	0.0	18.9	
BH01 (2)	08/12/2016 09:00:00	0.00	10.0	1014	24.00	-0.9	-0.3	0.0		0.0	0.0	0.0	20.5	
BH01 (2)	12/01/2017 09:10:00	0.00	5.0	993	24.00	0.0	0.3	0.1		0.0	0.0	0.0	20.2	
BH01 (2)	23/01/2017 12:00:00	0.00	3.0	1023	24.00	0.0	-0.2	0.1		0.0	0.0	0.0	19.3	
BH01 (2)	06/02/2017 11:30:00	0.00	3.0	1012	24.00	-2.3	-1.4	0.6		0.0	0.0	0.0	19.5	
BH02A (1)	12/01/2017 09:25:00	0.00	5.0	993	20.50	0.0	0.1	0.2		0.0	0.0	0.0	18.0	
BH02A (1)	23/01/2017 12:20:00	0.00	3.0	1023	20.50	0.0	0.0	0.8		0.0	0.0	0.0	19.1	
BH02A (1)	06/02/2017 12:15:00	0.00	3.0	1013	20.50	-0.1	0.2	0.3		0.0	0.0	0.0	16.9	
BH02A (2)	12/01/2017 09:35:00	0.00	5.0	993	2.50	0.0	0.0	0.0		0.0	0.0	0.0	20.1	
BH02A (2)	23/01/2017 12:25:00	0.00	3.0	1021	2.50	0.0	0.1	0.4		0.0	0.0	0.0	19.8	
BH02A (2)	06/02/2017 12:20:00	0.00	3.0	1013	2.50	-0.2	0.0	0.4		0.0	0.0	0.0	19.1	
BH03 (1)	12/01/2017 09:50:00	0.00	5.0	991	16.00	0.0	0.0	0.0		0.0	0.0	0.0	20.3	
BH03 (1)	23/01/2017 12:35:00	0.00	3.0	1023	16.00	0.2	0.0	0.1		0.0	0.0	0.0	20.2	
BH03 (1)	06/02/2017 12:45:00	0.00	3.0	1012	16.00	-0.1	-0.4	0.3		0.0	0.0	0.0	19.2	
BH03 (2)	12/01/2017 10:00:00	0.00	5.0	991	1.50	0.0	0.1	1.2		0.0	0.0	0.0	18.3	
BH03 (2)	23/01/2017 12:40:00	0.00	3.0	1020	1.50	0.1	-0.1	0.0		0.0	0.0	0.0	20.3	
BH03 (2)	06/02/2017 12:40:00	0.00	3.0	1012	1.50	0.0	0.1	0.6		0.0	0.0	0.0	16.3	
BH04B (1)	12/01/2017 10:15:00	0.00	5.0	992	16.50	0.0	0.1	0.0		0.0	0.0	0.0	20.3	
BH04B (1)	23/01/2017 12:50:00	0.00	3.0	1022	16.50	0.1	0.0	0.1		0.0	0.0	0.0	20.2	
BH04B (1)	06/02/2017 13:00:00	0.00	3.0	1013	16.50	-0.1	0.0	2.1		0.0	0.0	0.0	18.4	
BH04B (2)	12/01/2017 10:25:00	0.00	5.0	992	2.20	0.0	0.1	2.7		0.0	0.0	0.0	18.4	
BH04B (2)	23/01/2017 12:55:00	0.00	3.0	1023	2.20	0.2	0.0	0.2		0.0	0.0	0.0	20.3	

Notes: ND - not detected

Project Trowbridge STW, Wiltshire
Project No. H6100-16
Carried out for Wessex Water Services Limited

Figure
C3

Project No
Project
Client
Borehole No **Site Area**
Date

Purging Data

Initial Water Level, mBGL (a)	<input type="text" value="2"/>	Guideline Water Volumes	
Base of Installation, m BGL (b)	<input type="text" value="24"/>	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	<input type="text" value="22"/>	17	0.23
Diameter of Installation, mm (d)	<input type="text" value="50"/>	50	2.0
Base of Borehole, m (e)	<input type="text" value="25.15"/>	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) ($\pi d^2 c/4$)x10⁻³ **Readings taken during purging**
Number of Well Volumes (g) **Water Level, mBGL**
Purging Device **Temperature, degC**
Flow Rate, l/min (h) **pH**
Time to purge, min (gf/h) **Dissolved O2, mg/l**
Volume Purged, litres **Conductivity, uS/m**
Redox Potential, mV

Sampling Data

Sample Collection Depth, mBGL **Oil**
Sample No (use ddmmyy) EWM **Appearance and Colour**
Time Collected (hh:mm:ss) **Odour**
Time since purge (minutes) **Sediment**
Containers: Number **Type**

Remarks

Weather
Notes and Comments

Name

Signature

Project No
Project
Client
Borehole No **Site Area**
Date

Purging Data

Initial Water Level, mBGL (a)	<input type="text" value="2.1"/>	Guideline Water Volumes	
Base of Installation, m BGL (b)	<input type="text" value="20.5"/>	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	<input type="text" value="18.4"/>	17	0.23
Diameter of Installation, mm (d)	<input type="text" value="50"/>	50	2.0
Base of Borehole, m (e)	<input type="text" value="25.4"/>	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) ($\pi d^2 c/4$)x10⁻³ **Readings taken during purging**
Number of Well Volumes (g) **Water Level, mBGL**
Purging Device **Temperature, degC**
Flow Rate, l/min (h) **pH**
Time to purge, min (gf/h) **Dissolved O2, mg/l**
Volume Purged, litres **Conductivity, uS/m**
Redox Potential, mV

Sampling Data

Sample Collection Depth, mBGL **Oil**
Sample No (use ddmmyy) EWM **Appearance and Colour**
Time Collected (hh:mm:ss) **Odour**
Time since purge (minutes) **Sediment**
Containers: Number **Type**

Remarks

Weather
Notes and Comments

Name

Signature

Project No
Project
Client
Borehole No **Site Area**
Date

Purging Data

Initial Water Level, mBGL (a)	<input type="text" value="1.8"/>	Guideline Water Volumes	
Base of Installation, m BGL (b)	<input type="text" value="16"/>	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	<input type="text" value="14.2"/>	17	0.23
Diameter of Installation, mm (d)	<input type="text" value="50"/>	50	2.0
Base of Borehole, m (e)	<input type="text" value="25.4"/>	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) ($\pi d^2 c/4$)x10⁻³ **Readings taken during purging**
Number of Well Volumes (g) **Water Level, mBGL**
Purging Device **Temperature, degC**
Flow Rate, l/min (h) **pH**
Time to purge, min (gf/h) **Dissolved O2, mg/l**
Volume Purged, litres **Conductivity, uS/m**
Redox Potential, mV

Sampling Data

Sample Collection Depth, mBGL **Oil**
Sample No (use ddmmyy) EWM **Appearance and Colour**
Time Collected (hh:mm:ss) **Odour**
Time since purge (minutes) **Sediment**
Containers: Number **Type**

Remarks

Weather
Notes and Comments

Name

Signature

Project No
Project
Client
Borehole No **Site Area**
Date

Purging Data

Initial Water Level, mBGL (a)	<input type="text" value="1.7"/>	Guideline Water Volumes	
Base of Installation, m BGL (b)	<input type="text" value="16.5"/>	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	<input type="text" value="14.8"/>	17	0.23
Diameter of Installation, mm (d)	<input type="text" value="50"/>	50	2.0
Base of Borehole, m (e)	<input type="text" value="25.72"/>	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) ($\pi d^2 c/4$)x10⁻³ **Readings taken during purging**
Number of Well Volumes (g) **Water Level, mBGL**
Purging Device **Temperature, degC**
Flow Rate, l/min (h) **pH**
Time to purge, min (gf/h) **Dissolved O2, mg/l**
Volume Purged, litres **Conductivity, uS/m**
Redox Potential, mV

Sampling Data

Sample Collection Depth, mBGL **Oil**
Sample No (use ddmmyy) EWM **Appearance and Colour**
Time Collected (hh:mm:ss) **Odour**
Time since purge (minutes) **Sediment**
Containers: Number **Type**

Remarks

Weather
Notes and Comments

Name

Signature

**APPENDIX D
IN-SITU TESTING**

California Bearing Ratio Tests

CB01 to CB03

Dynamic Cone Penetrometer Test

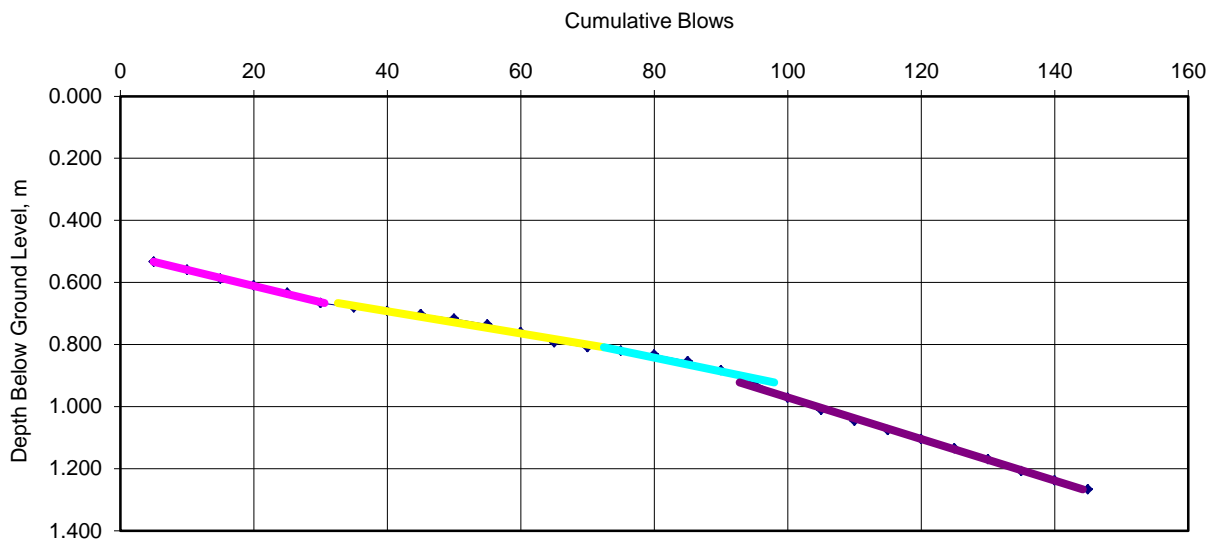


Date of Test: 03/10/2016 Test Depth: 0.500 mBGL

Method: TRL PROBE

Remarks:

Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows
0.533	5	1.208	135						
0.559	10	1.238	140						
0.588	15	1.267	145						
0.610	20								
0.633	25								
0.666	30								
0.681	35								
0.692	40								
0.703	45								
0.717	50								
0.736	55								
0.760	60								
0.793	65								
0.809	70								
0.820	75								
0.833	80								
0.854	85								
0.883	90								
0.922	95								
0.972	100								
1.011	105								
1.046	110								
1.076	115								
1.105	120								
1.135	125								
1.170	130								



CBR Values

Top, mBGL	Base, mBGL	CBR, % ¹
0.53	0.67	52
0.67	0.81	78
0.81	0.92	62
0.92	1.27	40

Notes:

Calculated using DMRB Vol 7, Section 3, Part 2, HD29/08 (2008)

Project

Trowbridge STW, Wiltshire

Project No.

H6100-16

Carried out for

Wessex Water Services Limited

Hole

CBR01

Dynamic Cone Penetrometer Test

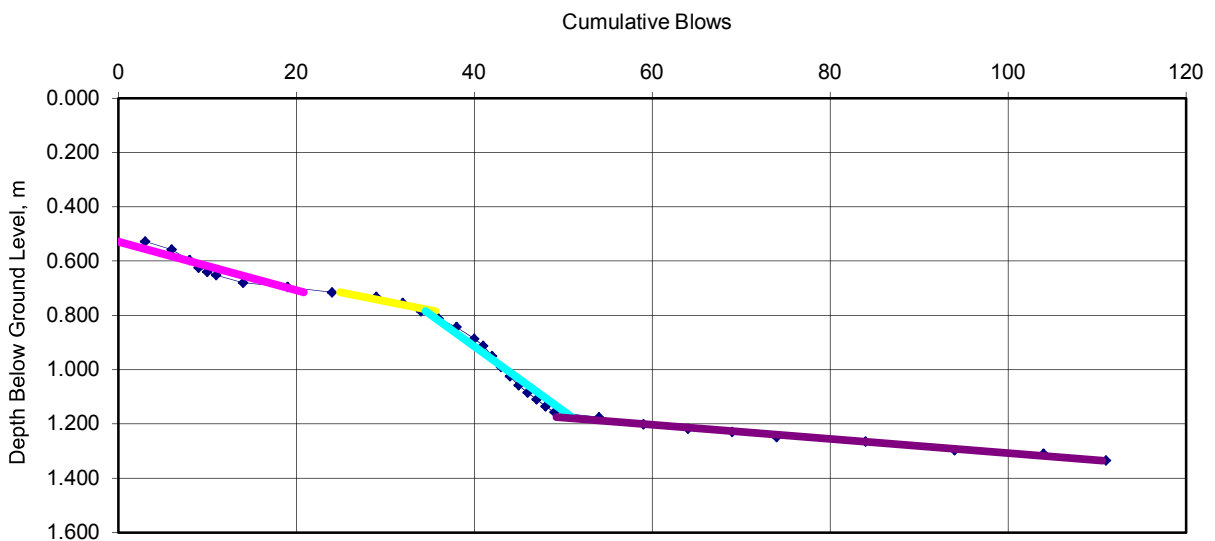


Date of Test: 19/10/2016 Test Depth: 0.500 mBGL

Method: TRL PROBE

Remarks:

Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows
0.528	3	1.218	64						
0.558	6	1.230	69						
0.596	8	1.248	74						
0.625	9	1.265	84						
0.640	10	1.297	94						
0.652	11	1.310	104						
0.680	14	1.335	111						
0.696	19								
0.715	24								
0.732	29								
0.754	32								
0.785	34								
0.812	36								
0.843	38								
0.886	40								
0.912	41								
0.950	42								
0.990	43								
1.025	44								
1.058	45								
1.085	46								
1.109	47								
1.135	48								
1.157	49								
1.175	54								
1.201	59								



CBR Values

Top, mBGL	Base, mBGL	CBR, % ¹
0.53	0.72	29
0.72	0.79	41
0.79	1.18	10
1.18	1.34	100

Notes:

Calculated using DMRB Vol 7, Section 3, Part 2, HD29/08 (2008)

Project

Trowbridge STW, Wiltshire

Project No.

H6100-16

Carried out for

Wessex Water Services Limited

Hole

CBR02

Dynamic Cone Penetrometer Test

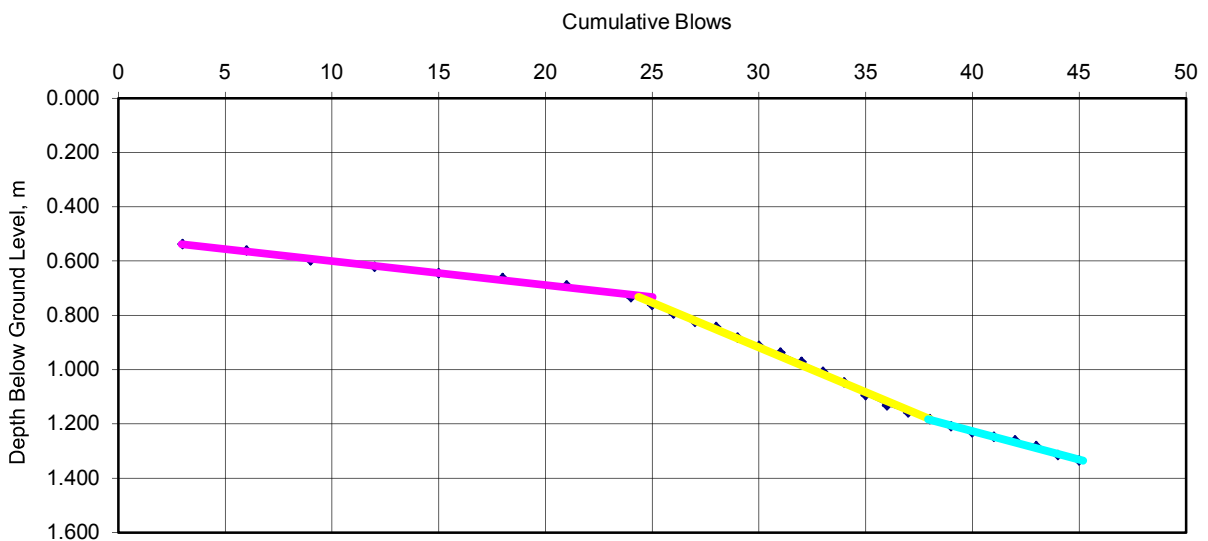


Date of Test: 19/10/2016 Test Depth: 0.500 mBGL

Method: TRL PROBE

Remarks:

Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows
0.538	3	1.282	43						
0.561	6	1.314	44						
0.598	9	1.335	45						
0.621	12								
0.645	15								
0.663	18								
0.690	21								
0.733	24								
0.762	25								
0.793	26								
0.824	27								
0.843	28								
0.882	29								
0.912	30								
0.937	31								
0.972	32								
1.008	33								
1.047	34								
1.094	35								
1.132	36								
1.158	37								
1.183	38								
1.208	39								
1.231	40								
1.247	41								
1.260	42								



CBR Values

Top, mBGL	Base, mBGL	CBR, % ¹
0.54	0.73	30
0.73	1.18	7.5
1.18	1.34	12

Notes:

Calculated using DMRB Vol 7, Section 3, Part 2, HD29/08 (2008)

Project

Trowbridge STW, Wiltshire

Project No.

H6100-16

Carried out for

Wessex Water Services Limited

Hole

CBR03

APPENDIX E

GEOTECHNICAL LABORATORY TEST RESULTS

Index Properties – Summary of Results	INDX 1
Particle Size Distribution Analyses	PSD 1
Unconsolidated Undrained Triaxial Compression Tests – Summary of Results	UUSUM 1
One Dimensional Consolidation Test	OED 1
Point Load Index Tests	PLT 1
Shear Strength by Hand Vane	HV 1
BRE SD1 Tests	EFS/168818 and EFS/188933

INDEX PROPERTIES - SUMMARY OF RESULTS



Hole No.	Sample			Soil Description	ρ	pd	W	< 425 μ m sieve	WL	WP	IP	ρ_s	Remarks	
	No.	Depth (m)												type
		from	to											
					Mg/m ³	%	%	%	%		Mg/m ³			
BH01	10	2.00		D			5.4							
BH01	12	3.00		D			14	43	39 b	19	20			
BH01	14	5.70		D			21	99	54 a	22	32			
BH01	21	7.65		C			22	100	57 a	23	34			
BH01	22	9.15		C			39							
BH01	23	10.65		C			20	99	50 a	22	28			
BH01	24	12.15		C			19	99	47 a	21	26			
BH01	25	13.65		C			20	100	51 a	23	28			
BH01	26	15.15		C			25	100	57 a	29	28			
BH01	28	18.15		C			5							
BH01	31	22.65		C			5.3							
BH02A	15	1.65		L			19							
BH02A	16	3.00		L			23							
BH02A	8	4.50		D			27	99	51 a	21	30			
BH02A	10	7.50		D			15	90	38 a	15	23			
BH02A	12	10.50		D			22	100	52 a	23	29			
BH03	10	2.25		D			24	99	37 a	19	18			
BH03	15	8.30		D			18	94	44 a	19	25			
BH03	24	11.15		C			25	99	42 a	19	23			
BH03	25	11.90		C			12	99	41 a	21	20			
BH03	27	14.90		C			30	100	56 a	27	29			
BH04B	23	3.00		D			24	96	53 a	22	31			
BH04B	24	4.50		D			24	100	56 a	22	34			
BH04B	25	6.00		D			19	100	48 a	25	23			

General notes: All above tests carried out to BS1377 : 1990 unless annotated otherwise. See individual test reports for further details.

Key : ρ bulk density, linear WL Liquid limit WP Plastic limit <425 μ m preparation ρ_s particle density
 pd dry density a 4 point cone test NP non - plastic n from natural soil -g = gas jar
w moisture content b 1 point cone test IP Plasticity Index s sieved specimen -p = small pyknometer

* test carried out to BS EN ISO 17892-1 2014

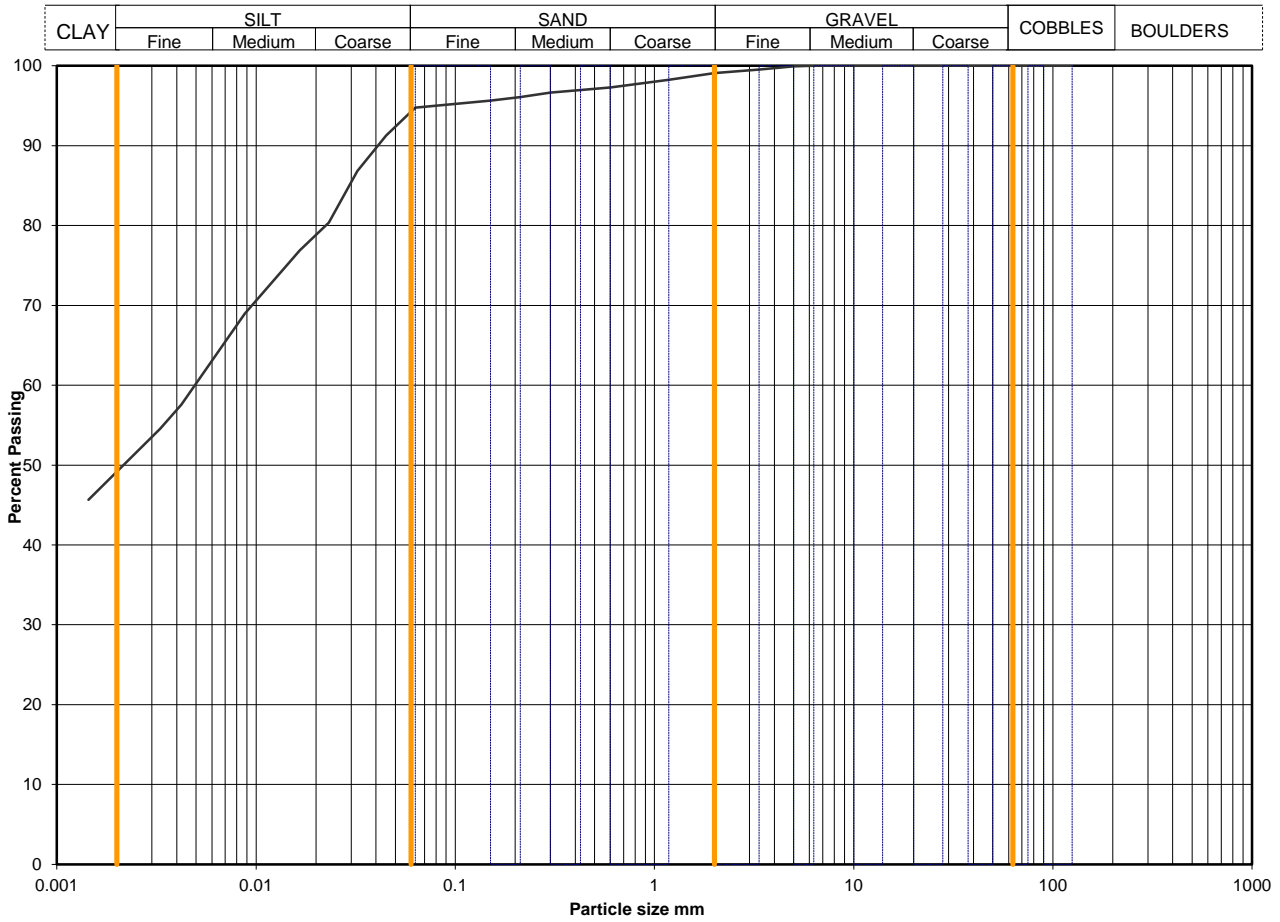
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

QA Ref SLR 1 Rev 2.91 Sep 16	Project No H6100-16	Project Name Trowbridge GI	Printed:01/12/2016 11:41	Table INDX
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Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH01
	H6100-1620161006031710	Sample Depth (m BGL)	3
		Sample Type and No	L17
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	95
90	100	0.0449	91
75	100	0.0322	87
63	100	0.0232	80
50	100	0.0166	77
37.5	100	0.0088	69
28	100	0.0042	58
20	100	0.0033	55
14	100	0.0014	46
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	99		
1.18	98		
0.600	97		
0.425	97	2.65	assumed
0.300	97		
0.212	96		
0.150	96		
0.063	95		

Dry mass of sample, kg	
3.0	

Soil description	Grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions	Cobbles / boulders Gravel Sand Silt Clay	Whole	*<60mm
		0	0
		1	1
		4	4
		49	49

*<60mm values to aid description only

Uniformity Coefficient	D60 / D10	Not applicable
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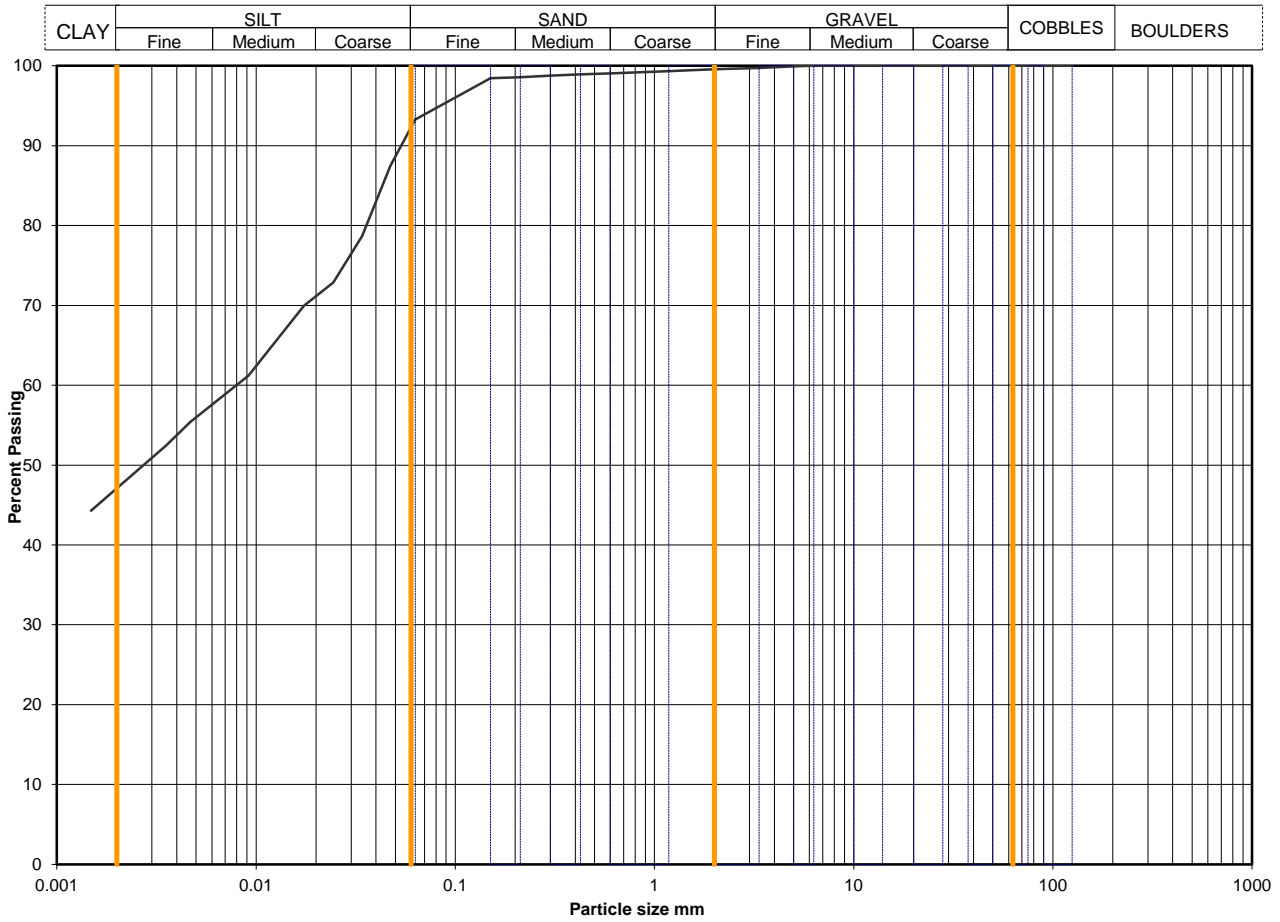
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH01
	H6100-1620161006032755	Sample Depth (m BGL)	12.15
		Sample Type and No	C24
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	93
90	100	0.0472	87
75	100	0.0341	79
63	100	0.0244	73
50	100	0.0174	70
37.5	100	0.0092	61
28	100	0.0047	55
20	100	0.0035	52
14	100	0.0015	44
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	99		
0.600	99		
0.425	99	2.65	assumed
0.300	99		
0.212	99		
0.150	98		
0.063	93		
			Dry mass of sample, kg
			1.2

Soil description	Very stiff brownish grey slightly sandy CLAY with occasional shell fragments.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions	Cobbles / boulders Gravel Sand Silt Clay	Whole	*<60mm
		0	0
		0	0
		6	6
		46	46
*<60mm values to aid description only		47	47

Uniformity Coefficient	D60 / D10	Not applicable
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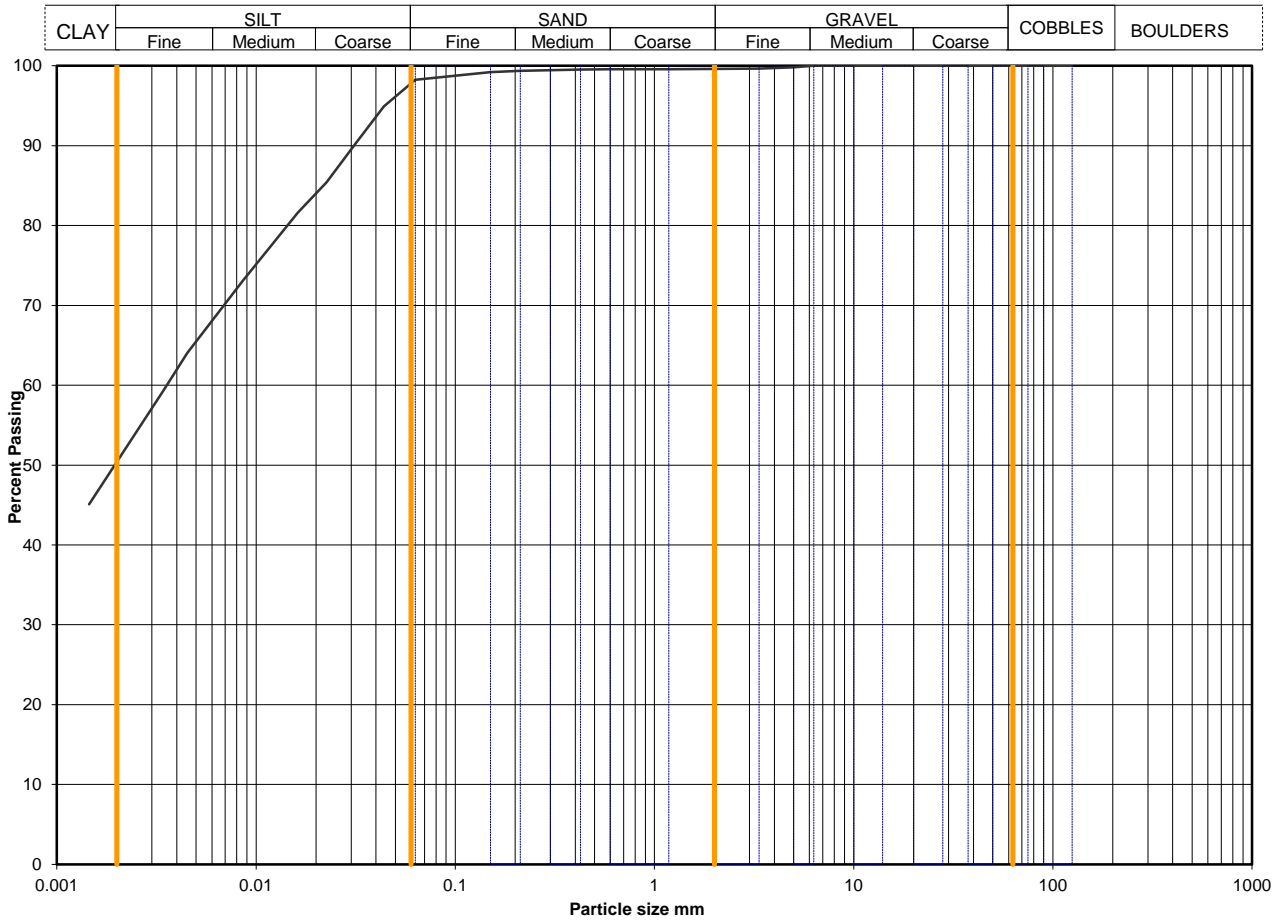
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH01
	H6100-1620161006032825	Sample Depth (m BGL)	15.15
		Sample Type and No	C26
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0438	95
75	100	0.0314	90
63	100	0.0226	85
50	100	0.0162	82
37.5	100	0.0086	73
28	100	0.0045	64
20	100	0.0034	59
14	100	0.0015	45
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100	2.65	assumed
0.300	99		
0.212	99		
0.150	99		
0.063	98		
		Dry mass of sample, kg	
		1.0	

Soil description	Grey fissured slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions	Cobbles / boulders Gravel Sand Silt Clay	Whole	*<60mm
		0	0
		0	0
		1	1
		48	48
*<60mm values to aid description only		50	50

Uniformity Coefficient	D60 / D10	Not applicable
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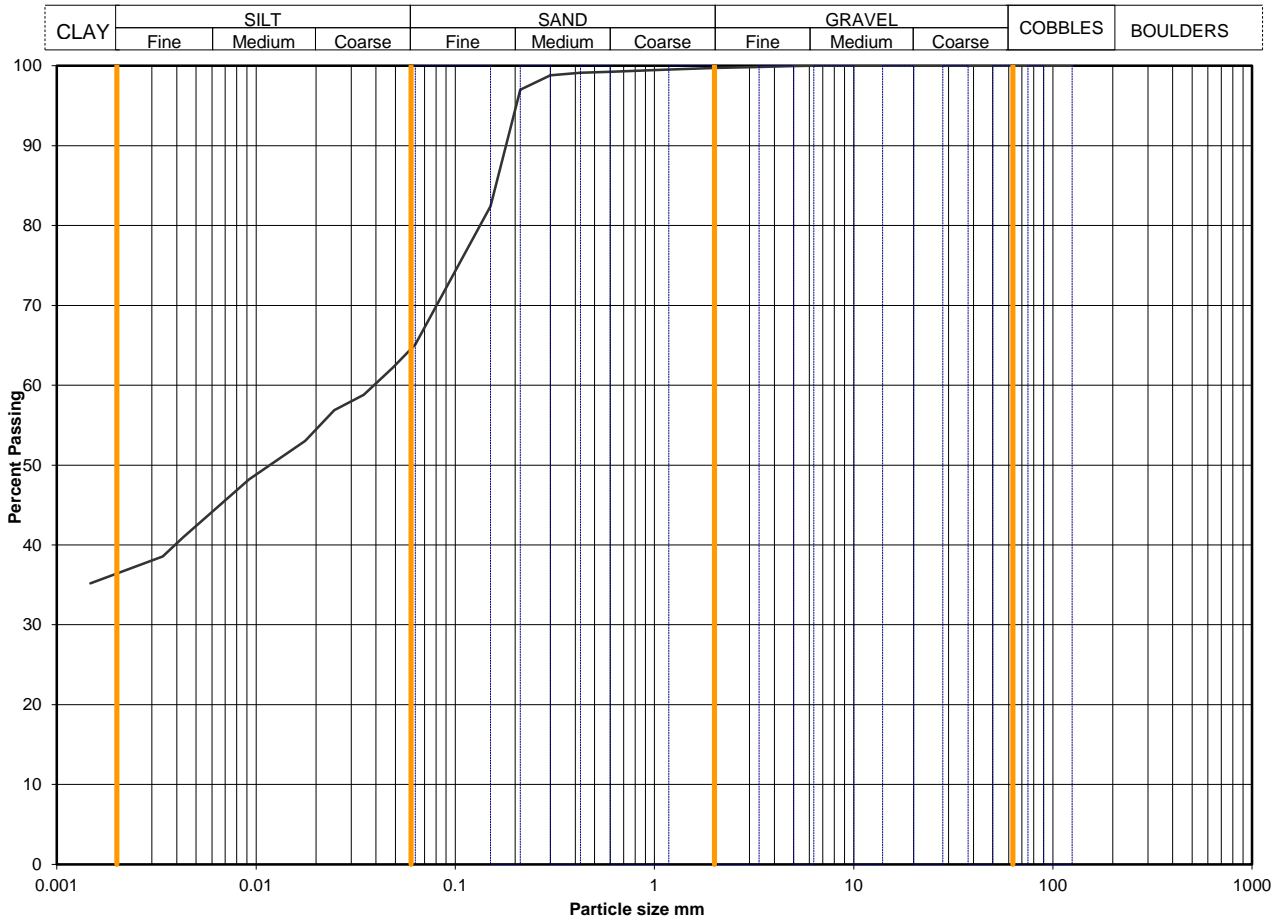
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH02A
	H6100-1620161019093115	Sample Depth (m BGL)	1.65
		Sample Type and No	L15
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	65
90	100	0.0486	62
75	100	0.0347	59
63	100	0.0247	57
50	100	0.0176	53
37.5	100	0.0092	48
28	100	0.0043	41
20	100	0.0034	39
14	100	0.0015	35
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	99		
0.425	99	2.65	assumed
0.300	99		
0.212	97		
0.150	82		
0.063	65		

Dry mass of sample, kg	1.4
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Soil description	Yellowish brown and light grey slightly sandy silty CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions	Cobbles / boulders Gravel Sand Silt Clay	Whole	*<60mm
		0	0
		0	0
		35	35
		29	29
*<60mm values to aid description only		36	36

Uniformity Coefficient	D60 / D10	Not applicable
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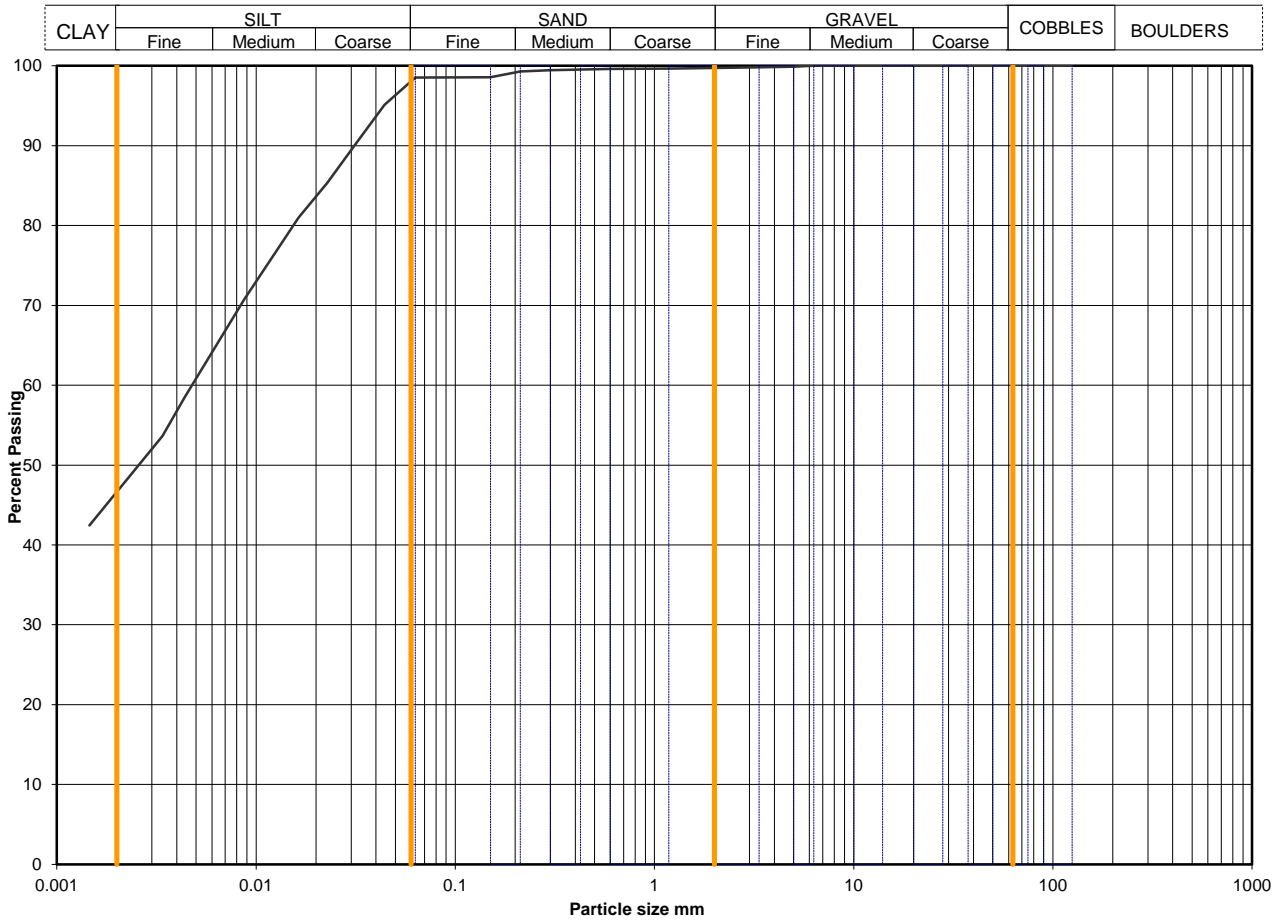
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH02A
	H6100-1620161019093310	Sample Depth (m BGL)	6
		Sample Type and No	L18
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0441	95
75	100	0.0317	90
63	100	0.0228	85
50	100	0.0163	81
37.5	100	0.0087	71
28	100	0.0044	59
20	100	0.0034	54
14	100	0.0015	42
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100	2.65	assumed
0.300	99		
0.212	99		
0.150	99		
0.063	99		
			Dry mass of sample, kg
			1.8

Soil description	Grey slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only	Cobbles / boulders	Whole	*<60mm
	Gravel	0	0
	Sand	1	1
	Silt	52	52
	Clay	47	47

Uniformity Coefficient	D60 / D10	Not applicable
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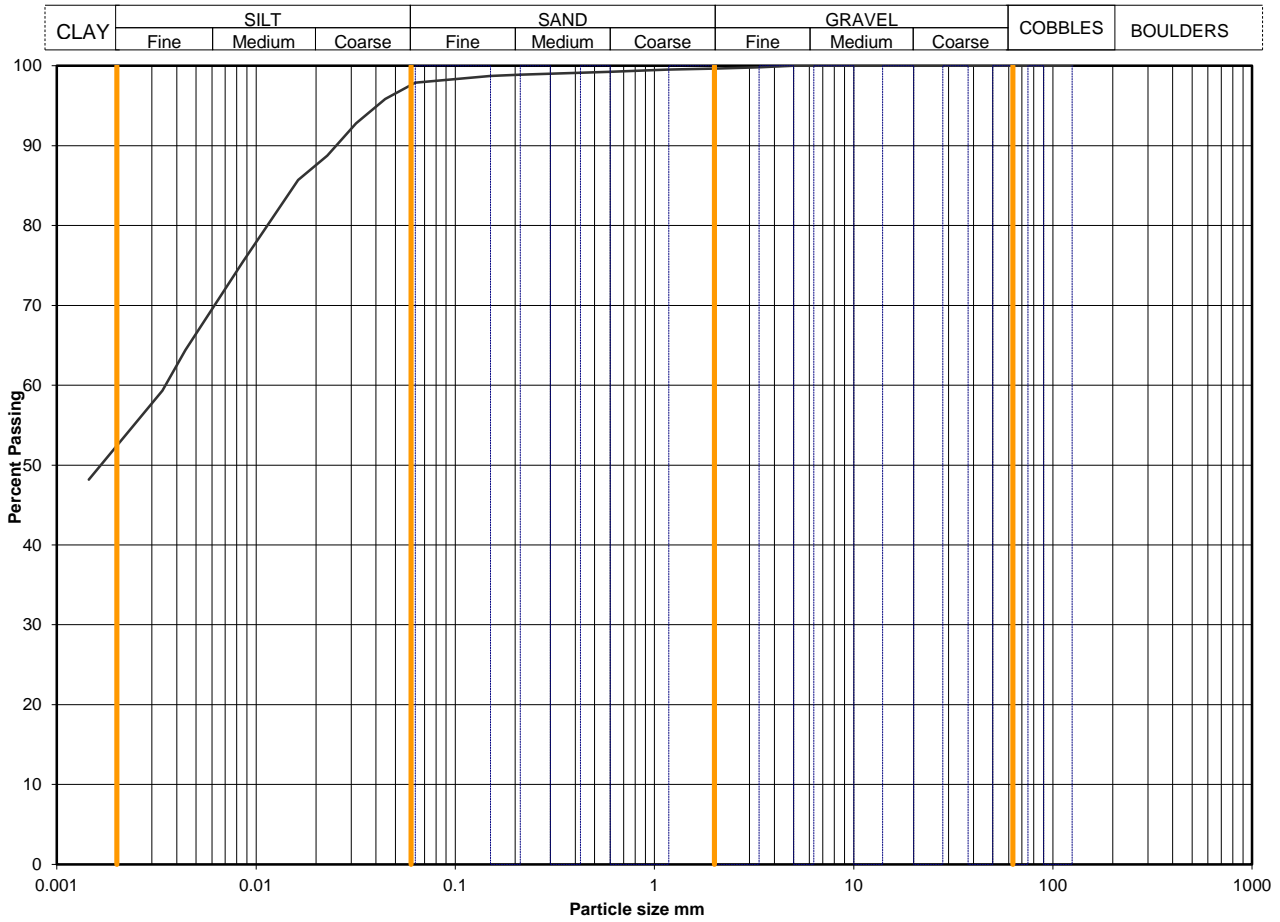
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH02A
	H6100-1620161019093518	Sample Depth (m BGL)	10.5
		Sample Type and No	L21
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0445	96
75	100	0.0318	93
63	100	0.0228	89
50	100	0.0162	86
37.5	100	0.0086	76
28	100	0.0044	64
20	100	0.0034	59
14	100	0.0014	48
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	99		
0.425	99	2.65	assumed
0.300	99		
0.212	99		
0.150	99		
0.063	98		
		Dry mass of sample, kg	
		1.5	

Soil description	Firm brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only	Cobbles / boulders	Whole	*<60mm
	Gravel	0	0
	Sand	2	2
	Silt	45	45
	Clay	52	52

Uniformity Coefficient	D60 / D10	Not applicable
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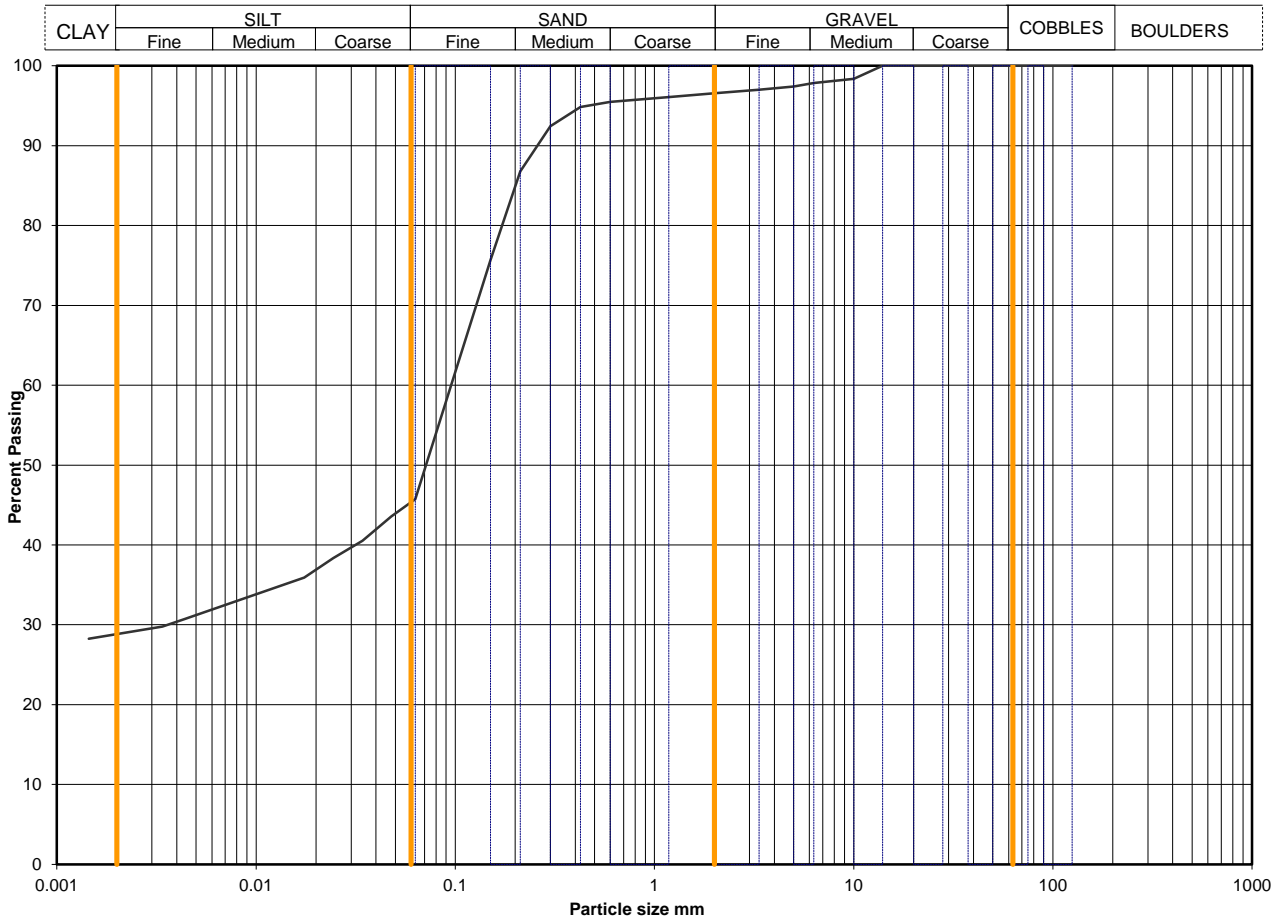
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH03
	H6100-1620161013112222	Sample Depth (m BGL)	2.25
		Sample Type and No	L18
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	46
90	100	0.0478	44
75	100	0.0342	41
63	100	0.0244	38
50	100	0.0175	36
37.5	100	0.0091	33
28	100	0.0044	31
20	100	0.0034	30
14	100	0.0014	28
10	98		
6.3	98		
5.0	97		
3.35	97		
2.00	97		
1.18	96		
0.600	95		
0.425	95	2.65	assumed
0.300	92		
0.212	87		
0.150	76		
0.063	46		
			Dry mass of sample, kg
			3.0

Soil description	Brown mottled grey slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only	Cobbles / boulders	Whole	*<60mm
	Gravel	0	0
	Sand	3	3
	Silt	51	51
	Clay	17	17
		29	29

Uniformity Coefficient	D60 / D10	Not applicable
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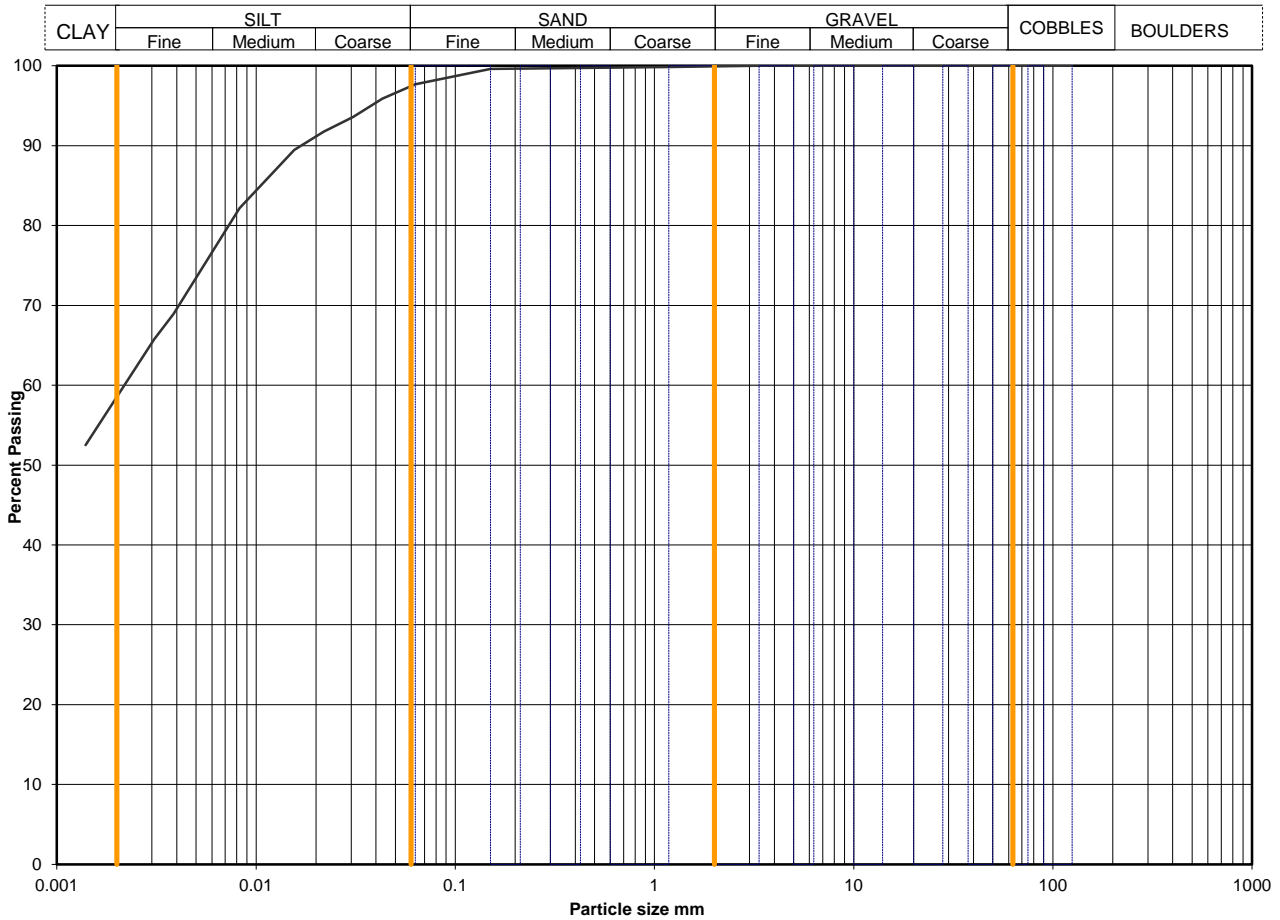
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH03
	H6100-1620161013112245	Sample Depth (m BGL)	3.75
		Sample Type and No	L19
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0430	96
75	100	0.0307	94
63	100	0.0218	92
50	100	0.0156	89
37.5	100	0.0082	82
28	100	0.0039	69
20	100	0.0031	66
14	100	0.0014	52
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100	2.65	assumed
0.300	100		
0.212	100		
0.150	100		
0.063	98		
			Dry mass of sample, kg
			2.3

Soil description	Grey slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only	Cobbles / boulders	Whole	*<60mm
	Gravel	0	0
	Sand	2	2
	Silt	39	39
	Clay	59	59

Uniformity Coefficient	D60 / D10	Not applicable
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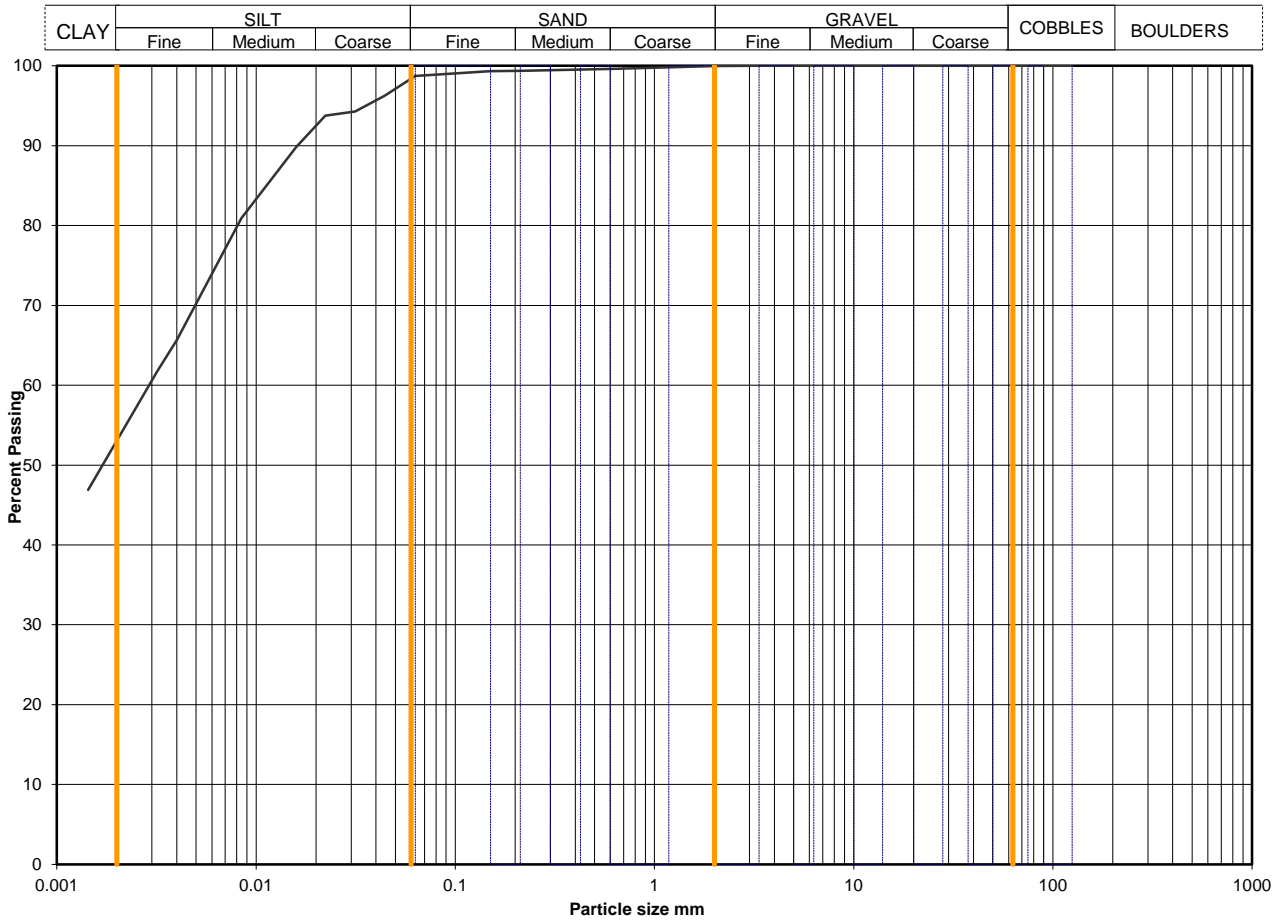
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH04B
	H6100-1620161021103646	Sample Depth (m BGL)	3
		Sample Type and No	L4
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0441	96
75	100	0.0314	94
63	100	0.0222	94
50	100	0.0159	90
37.5	100	0.0085	81
28	100	0.0040	66
20	100	0.0032	62
14	100	0.0014	47
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100	2.65	assumed
0.300	99		
0.212	99		
0.150	99		
0.063	99		
			Dry mass of sample, kg
			2.4

Soil description	Brownish grey slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only	Cobbles / boulders	Whole	*<60mm
	Gravel	0	0
	Sand	1	1
	Silt	46	46
	Clay	53	53

Uniformity Coefficient	D60 / D10	Not applicable
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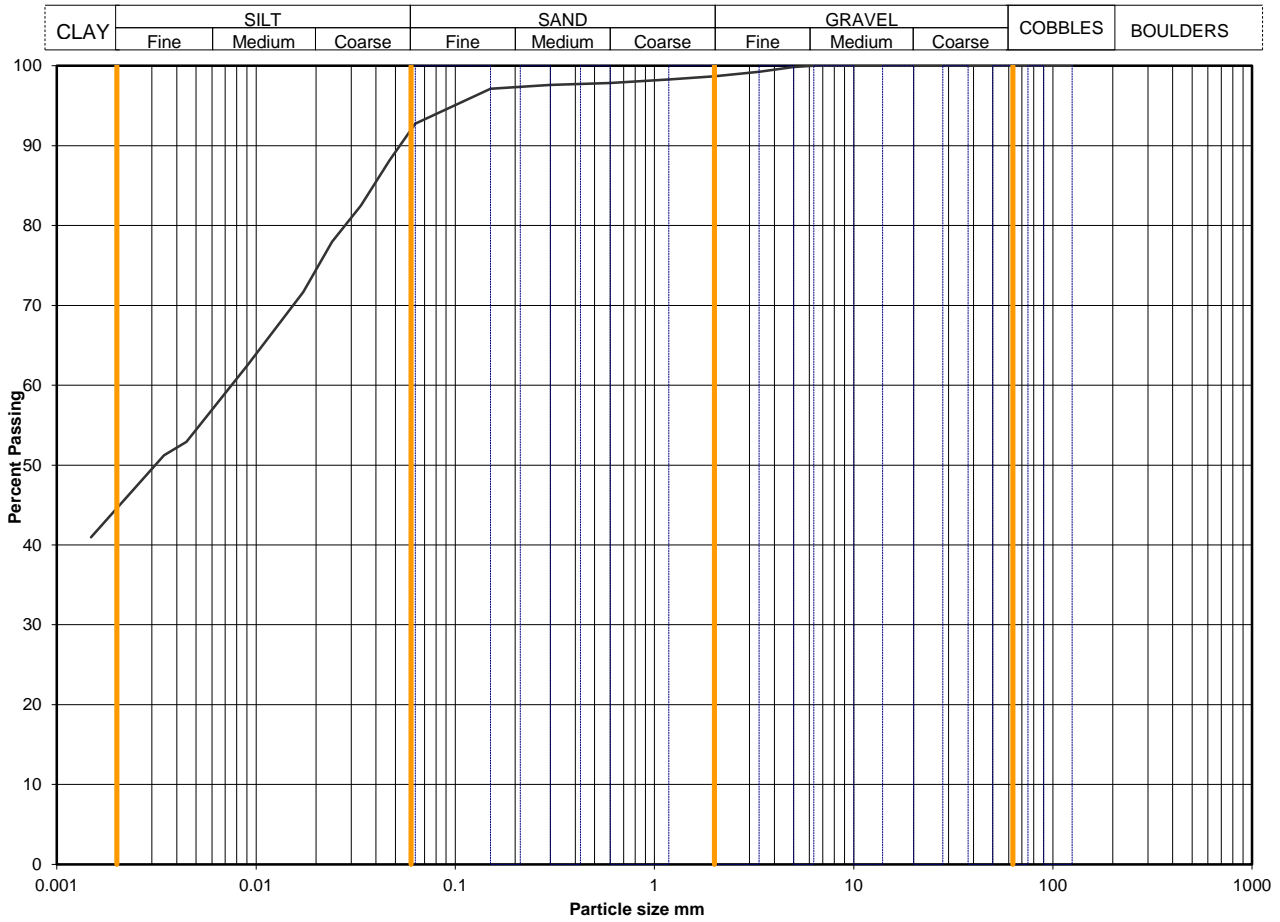
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

Particle Size Distribution Analysis



Sample Details:	SAMPLE ID:	Hole No	BH04B
	H6100-1620161021103808	Sample Depth (m BGL)	7.3
		Sample Type and No	L7
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	93
90	100	0.0469	88
75	100	0.0336	82
63	100	0.0240	78
50	100	0.0173	72
37.5	100	0.0091	63
28	100	0.0045	53
20	100	0.0034	51
14	100	0.0015	41
10	100		
6.3	100		
5.0	100		
3.35	99		
2.00	99		
1.18	98		
0.600	98		
0.425	98	2.65	assumed
0.300	98		
0.212	97		
0.150	97		
0.063	93		

Dry mass of sample, kg
3.4

Soil description	Very stiff brownish grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only	Cobbles / boulders	Whole	*<60mm
	Gravel	0	0
	Sand	1	1
	Silt	6	6
	Clay	48	48

Uniformity Coefficient	D60 / D10	Not applicable
-------------------------------	------------------	----------------

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS WITHOUT MEASUREMENT OF PORE PRESSURE - SUMMARY OF RESULTS



Hole No.	Sample			Soil Description	Density		w %	Test type	Dia. mm	σ ₃ kPa	At failure / end of stage				MODE	Remarks			
	No.	Depth (m)			type	bulk Mg/m ³					dry	Axial strain %	σ ₁ - σ ₃ kPa	CU kPa			M kPa	D kPa	E
		from	to																
BH01	22	9.15		C	Soft brownish grey slightly sandy slightly gravelly CLAY.	1.94	1.4	39	UUM	84.0 84.0 84.0	180 270 360	2.5 4.0 13.0	13 16 19	7 8 10	C				
BH01	24	12.15		C	Very stiff brownish grey slightly sandy CLAY with occasional shell fragments.	2.08	1.75	19	UUM UUM	86.2 86.2	250 375	10.0 20.1	298 368	149 184	C	Ran to 20% on stage 2			
BH02A	16	3.00		L	Stiff grey mottled yellowish brown slightly sandy CLAY with rare gypsum.	2.02	1.6	26	UUM	97.4 97.4 97.4	35 70 140	6.9 7.4 8.4	175 175 174	88 88 87	B				
BH02A	21	10.50		L	Firm brown slightly sandy CLAY.	1.96	1.52	29	UUM	86.1 86.1 86.1	225 340 450	7.0 9.0 11.0	77 82 85	39 41 43	C				
BH03	21	6.80		L	Stiff to very stiff greyish brown slightly gravelly CLAY.	2	1.61	25	UUM	76.0 76.0 76.0	140 210 280	4.5 5.0 6.5	193 201 198	97 101 99	B				
BH03	26	13.40		C	Very stiff friable dark greyish brown CLAY.	2.11	1.77	19	UUM	87.2 87.2 87.2	280 420 560	4.5 5.5 6.5	362 360 359	181 180 180	B				
BH04B	3	2.50		L	Firm to stiff brownish grey mottled yellowish brown slightly sandy CLAY.	2.02	1.64	23	UUM	97.7 97.7 97.7	25 50 100	7.4 9.4 19.3	101 106 118	51 53 59	P				
BH04B	5	4.50		L	Firm greyish brown CLAY.	2	1.58	27	UUM	96.7 96.7 96.7	50 100 200	6.9 8.4 12.9	104 107 111	52 54 56	B				
BH04B	7	7.30		L	Very stiff brownish grey slightly sandy slightly gravelly CLAY.	2.11	1.75	21	UUM	83.5 83.5 83.5	160 240 320	5.5 8.0 19.9	118 152 256	59 76 128	P				

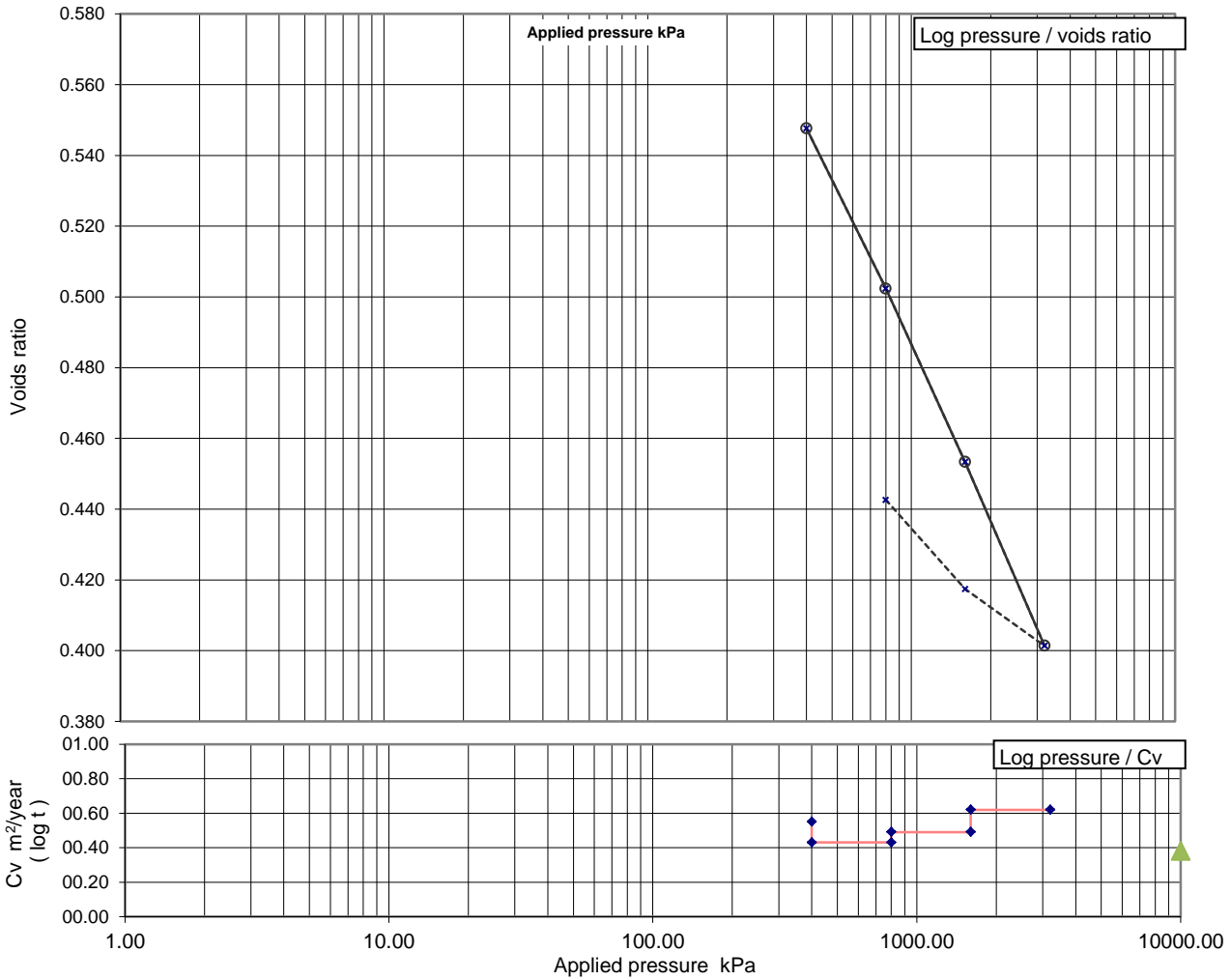
General notes: Tests carried out in accordance with BS1377: Part 7: 1990, clause 8 for single stage, clause 9 for multistage tests. Specimens nominally 2:1 height diameter ratio and tested at a rate of strain of 2%/minute, unless annotated otherwise. See individual test reports for further details.

Legend
 UU - single stage test (may be in sets of specimens) σ₃ cell pressure Mode of failure P plastic
 UUM - multistage test on a single specimen σ₁ - σ₃ deviator stress B brittle
 suffix R - remoulded or recompacted CU undrained shear strength C compound

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

QA Ref SLR 2 Rev 2.6 Apr 15	Project No H6100-16	Project Name Trowbridge GI	Printed:01/12/2016 11:42	Table UUSUM
---------------------------------------------	-------------------------------	--------------------------------------	-----------------------------	------------------------------

Sample Details:	SAMPLE ID:	Hole No	BH02A
	H6100-1620161019093214	Sample Depth (m BGL)	3
		Sample Type and No	L16
		Specimen Ref	



Soil description	Stiff grey mottled yellowish brown slightly sandy CLAY with rare gypsum.		
Preparation	Undisturbed		
Index properties (if available)	Liquid limit %	Plastic limit %	

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m3
Diameter	75.02		mm
Height	19.92	18.16	mm
Voids ratio	0.582	0.443	
Moisture content	23	18	%
Bulk density	2.06	2.16	Mg/m3
Dry density	1.67	1.84	Mg/m3
Saturation	105	105	%
Average temperature for test	21		oC

Swelling pressure >200 kPa

Notes :

Specimen taken 430 mm from base of sample

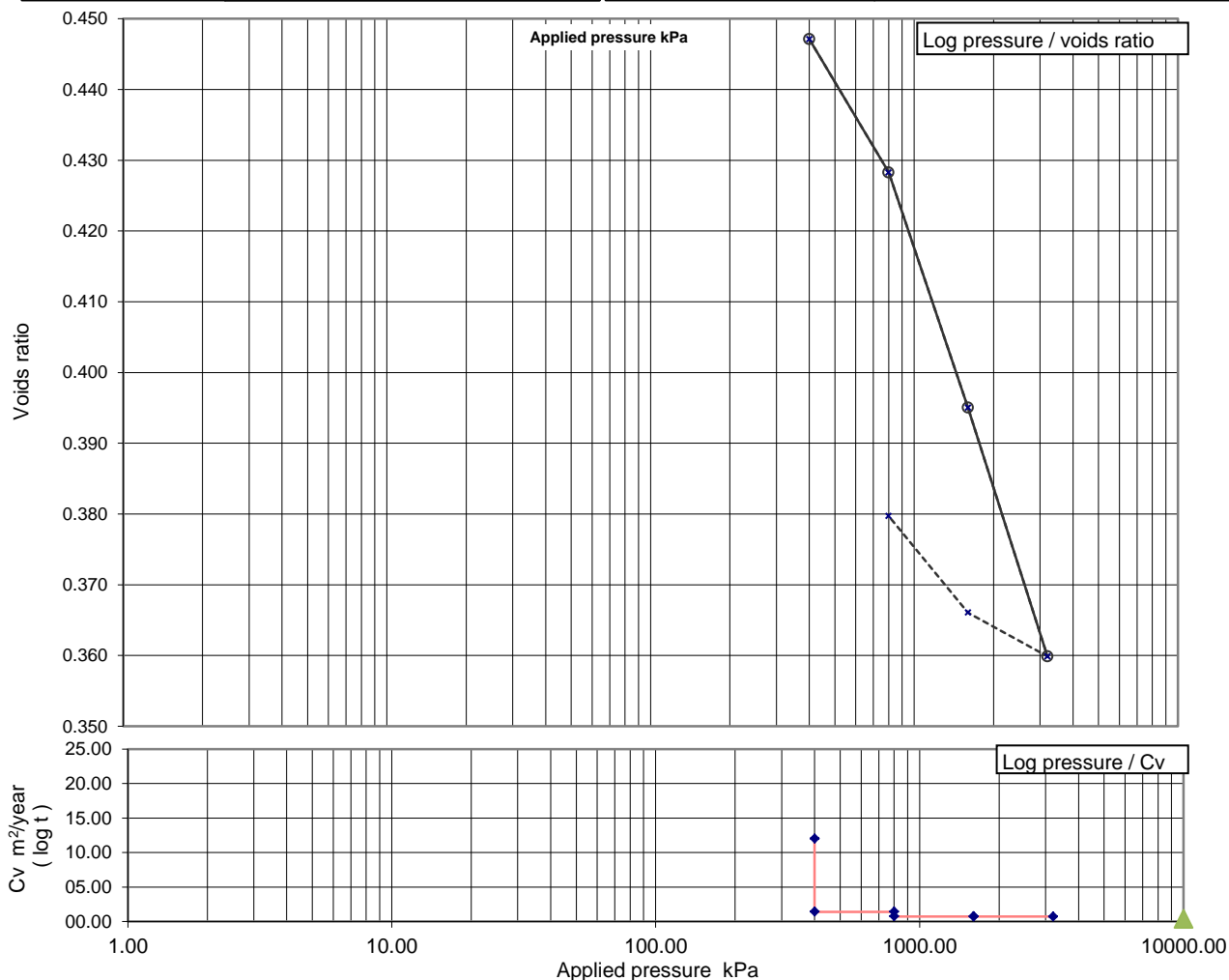
Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/year	Cv (t90, root) m2/year
200	0.5822			
400	0.5476	0.109	0.55	0.58
800	0.5023	0.073	0.43	0.45
1600	0.4533	0.041	0.49	0.53
3200	0.4014	0.022	0.62	0.67
1600	0.4174	0.007	-	-
800	0.4426	0.022	-	-

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

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3



Sample Details:	SAMPLE ID:	Hole No	BH02A
	H6100-1620161019093432	Sample Depth (m BGL)	7.5
		Sample Type and No	L19
		Specimen Ref	



Soil description	Firm greyish brown slightly sandy slightly gravelly CLAY.
Preparation	Undisturbed
Index properties (if available)	Liquid limit % Plastic limit %

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m3
Diameter	75.03		mm
Height	18.96	18.01	mm
Voids ratio	0.453	0.380	
Moisture content	17	15	%
Bulk density	2.14	2.21	Mg/m3
Dry density	1.82	1.92	Mg/m3
Saturation	100	105	%
Average temperature for test	21		oC

Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/year	Cv (t90, root) m2/year
200	0.4527			
400	0.4471	0.019	12	13
800	0.4283	0.033	1.4	1.4
1600	0.3950	0.029	0.73	0.79
3200	0.3599	0.016	0.7	0.75
1600	0.3661	0.003	-	-
800	0.3797	0.012	-	-

Swelling pressure >200 kPa

Notes :

Specimen taken 190 mm from base of sample

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

QA Ref
SLR 5.3
Rev 2.16
Nov 16



Project No H6100-16
Project Name Trowbridge GI

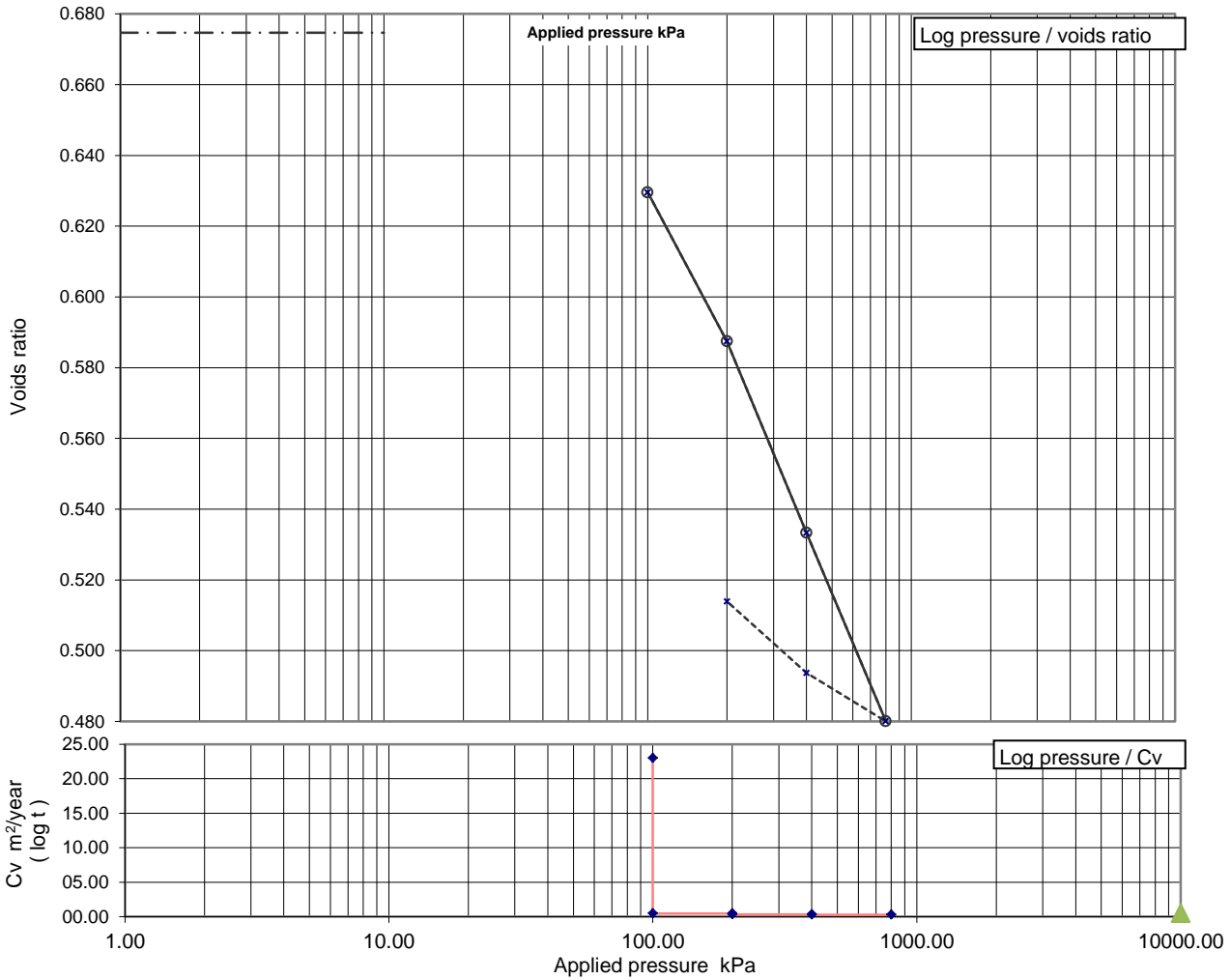
Printed:
01/12/2016
11:49

Figure
OED

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3



Sample Details:	SAMPLE ID:	Hole No	BH02A
	H6100-1620161019093454	Sample Depth (m BGL)	9
		Sample Type and No	L20
		Specimen Ref	



Soil description

Firm greyish brown CLAY.

Preparation

Undisturbed

Index properties
(if available)

Liquid limit %	Plastic limit %
----------------	-----------------

Specimen details

Particle density

Initial	Final
2.65	assumed

Mg/m3

Diameter

75.02

mm

Height

18.98	17.15
-------	-------

mm

Voids ratio

0.675	0.514
-------	-------

Moisture content

23	20
----	----

%

Bulk density

1.95	2.11
------	------

Mg/m3

Dry density

1.58	1.75
------	------

Mg/m3

Saturation

91	105
----	-----

%

Average temperature for test

20

oC

Swelling pressure

not measured kPa

Notes :

Specimen taken 10 mm from base of sample

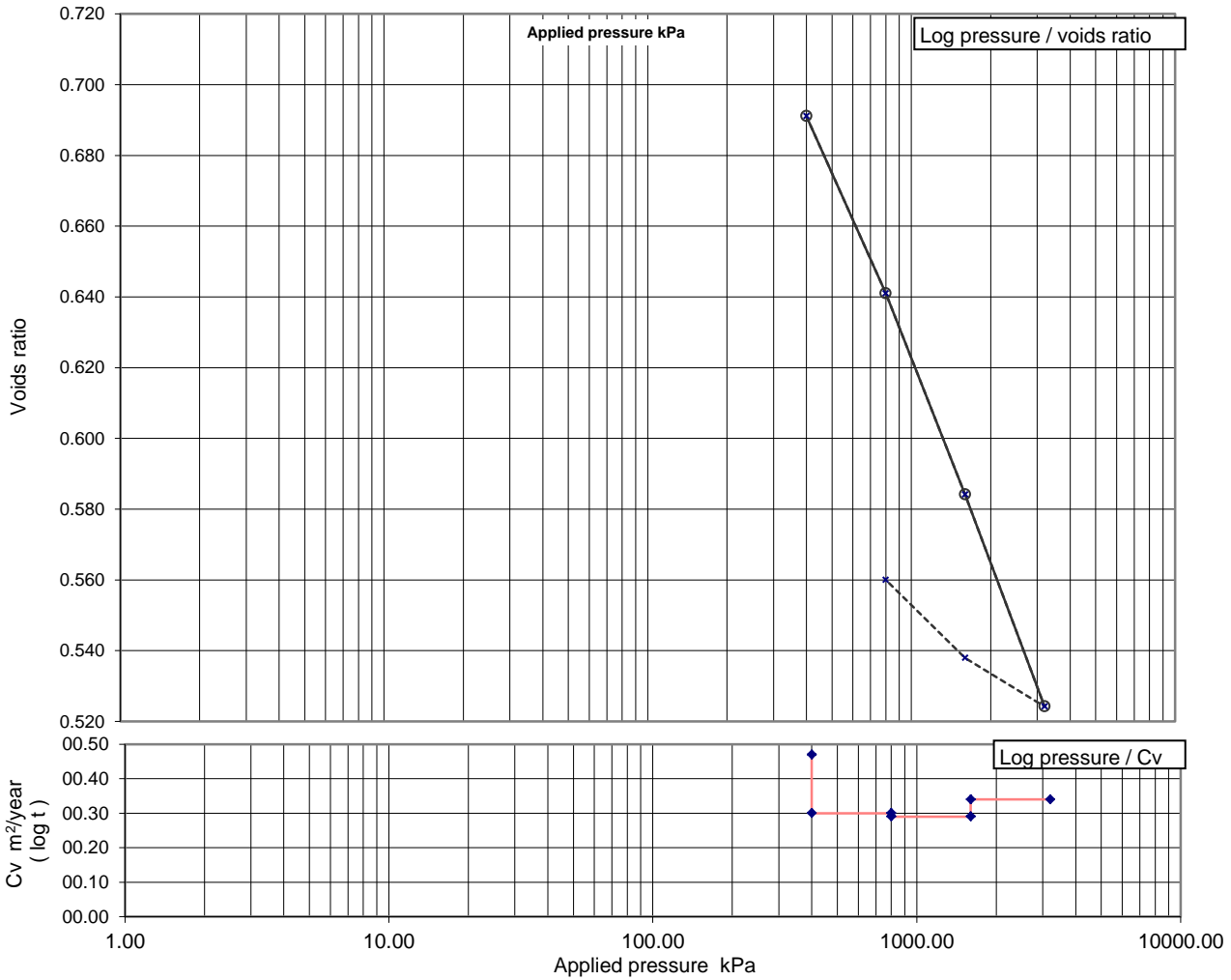
Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/year	Cv (t90, root) m2/year
0	0.6747	/	/	/
100	0.6295	0.270	23	25
200	0.5874	0.258	0.46	0.48
400	0.5333	0.170	0.33	0.35
800	0.4800	0.087	0.28	0.31
400	0.4937	0.023	-	-
200	0.5139	0.068	-	-

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

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3



Sample Details:	SAMPLE ID:	Hole No	BH03
	H6100-1620161013112659	Sample Depth (m BGL)	14.9
		Sample Type and No	C27
		Specimen Ref	



Soil description	Firm grey slightly sandy slightly gravelly CLAY.		
Preparation	Undisturbed		
Index properties (if available)	Liquid limit %	56	Plastic limit %
			27
Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m3
Diameter	74.98		mm
Height	19.04	17.27	mm
Voids ratio	0.720	0.560	
Moisture content	27	22	%
Bulk density	1.95	2.07	Mg/m3
Dry density	1.54	1.70	Mg/m3
Saturation	98	104	%
Average temperature for test	21		oC
Swelling pressure	>200		kPa

Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/year	Cv (t90, root) m2/year
200	0.7204			
400	0.6911	0.085	0.47	0.5
800	0.6410	0.074	0.3	0.32
1600	0.5841	0.043	0.29	0.31
3200	0.5242	0.024	0.34	0.36
1600	0.5379	0.006	-	-
800	0.5600	0.018	-	-

Notes :

Specimen taken 330 mm from base of sample

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

**Point Load Index Test
ISRM:1985**



All specimens tested at as received water content unless shown otherwise

Test Type

D - Diametral, A - Axial, I - Irregular Lump, B - Block

Direction (U = unknown or random)

L - parallel to planes of weakness

P - perpendicular to planes of weakness

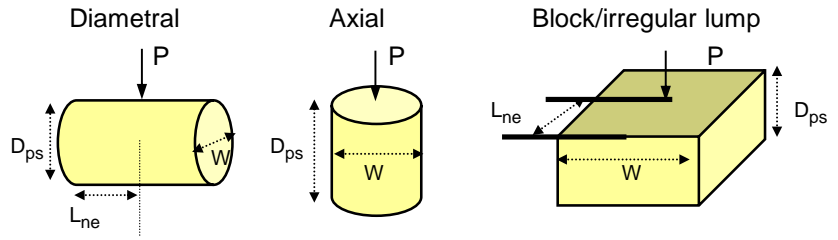
Dimensions

Dps - Distance between platens (platen separation)

Dps' - at failure

Lne - Length from platens to nearest free end

W - Width of shortest dimension perpendicular to load, P



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions				LOAD P kN	De equivalent diameter, mm	Point Load Index MPa $F = (De/50)0.45$		Remarks
							Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is	Is(50)	
BH01	18.15	28	C			LIMESTONE/MUDSTONE	A	U	Y		87.0	45.0	40.0	1.20	66.56	0.27	0.31	
BH01	21.15	30	C			MUDSTONE	A	U	Y		87.4	48.0	45.0	1.40	70.76	0.28	0.33	
BH01	22.65	31	C			MUDSTONE/LIMESTONE	A	U	Y		87.1	47.0	41.0	5.30	67.43	1.17	1.33	
BH02A	16.40	26	C			CLAY	A	U	Y		87.6	62.0	52.0	0.30	76.16	0.05	0.06	
BH02A	17.90	27	C			LIMESTONE	A	U	Y		87.1	47.0	42.0	12.00	68.25	2.58	2.96	
BH02A	19.40	28	C			MUDSTONE/LIMESTONE	A	U	Y		87.3	46.0	43.0	3.80	69.13	0.80	0.92	
BH02A	22.40	30	C			MUDSTONE	A	U	Y		86.7	40.0	35.0	0.20	62.16	0.05	0.06	
BH03	17.90	29	C			MUDSTONE/LIMESTONE	A	U	Y		86.9	48.0	44.0	3.60	69.77	0.74	0.86	
BH03	19.40	30	C			MUDSTONE/LIMESTONE	A	U	Y		87.4	50.0	43.0	6.70	69.17	1.40	1.62	
BH03	20.90	31	C			LIMESTONE	A	U	Y		87.0	57.0	45.0	14.70	70.60	2.95	3.44	
BH03	22.40	32	C			LIMESTONE/MUDSTONE	A	U	Y		86.8	62.0	57.0	1.60	79.37	0.25	0.31	
BH03	23.90	33	C			MUDSTONE	A	U	Y		87.1	53.0	48.0	1.20	72.96	0.23	0.27	
BH04B	9.55	9	C			CLAY	A	U	Y		87.8	50.0	30.0	0.30	57.91	0.09	0.10	
BH04B	10.30	10	C			CLAY	A	U	Y		84.8	60.0	40.0	0.30	65.72	0.07	0.08	
BH04B	13.30	12	C			CLAY	A	U	Y		87.0	57.0	40.0	0.40	66.56	0.09	0.10	
BH04B	14.80	13	C			MUDSTONE	A	U	Y		86.7	49.0	42.0	0.30	68.09	0.06	0.07	
BH04B	17.80	15	C			LIMESTONE	A	U	Y		86.9	54.0	52.0	12.40	75.85	2.16	2.60	
BH04B	22.30	18	C			MUDSTONE	A	U	Y		86.7	56.0	54.0	1.50	77.21	0.25	0.31	

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

QA Ref ISRM 85 Rev 2.4 Nov 16	Project No	H6100-16	Printed:01/12/2016 12:01	Figure PLT
	Project Name	Trowbridge GI		

Shear Strength by Pilcon Hand method - Summary of Results



Hole No.	Sample				Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type				
		from	to					
BH02A	24	13.40		C	Firm brownish grey slightly sandy CLAY.	58		Only one hand vane could be performed.

Notes :

1 Tests carried out in accordance with Manufacturers Instructions

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

<p>QA Ref SLR Lvane Rev 2 Nov 2016</p>	<p>Project No H6100-16 Project Name Trowbridge GI</p>	<p>Printed: 07/11/2016 16:40</p>	<p>Figure HV</p>
-----------------------------------------------------------	------------------------------------------------------------------------------	------------------------------------------	-----------------------------------------

Our Ref: EFS/168818 (Ver. 1)

Your Ref: H6100-16

November 2, 2016



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 09/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT



Report No. EFS/168818 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 3 samples described in this report were registered for analysis by ESG on 28-Oct-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 02-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

A handwritten signature in blue ink, appearing to read 'Tim Barnes'.

Operations Director
Energy & Waste Services

Date of Issue: 02-Nov-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :	mg/kg	mg/l	%	pH Units													
Method Codes :	ICPACIDS	ICPWSS	TSBRE1	WSLM50													
Method Reporting Limits :	20	10	0.005														
UKAS Accredited :	Yes	Yes	No	No													

LAB ID Number CL/	Client Sample Description	Sample Date	SO4-- (acid sol)	SO4-- (H2O sol) mg/l	Total Sulphur.	pH (BS1377)											
1635342	BH02A ES 1 1.20	11-Oct-16	1060	213	0.109	7.9											
1635343	BH03 ES 9 2.00	06-Oct-16	312	39	0.036	8.2											
1635344	BH03 ES 11 3.80	06-Oct-16	2070	332	1.01	7.7											



Bretby Business Park, Ashby Road
 Burton-on-Trent, Staffordshire, DE15 0YZ
 Tel +44 (0) 1283 554400
 Fax +44 (0) 1283 554422

Client Name	ESG Limited Bridgend	Trowbridge GI		Sample Analysis	
Contact	Adam Putt				
		Date Printed	02-Nov-2016		
		Report Number	EFS/168818		
		Table Number	1		

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No S168818

Consignment No S59975
Date Logged 28-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	CustServ	Dep. Opt	DO Cl if pH<5.5	DO Mg if SO4(W)>3000	DO NO3 if pH<5.5	ICPACIDS	ICPBRE	ICPWSS	KONCL	KONNO3	TSBRE1	WISLMS0
								✓		✓				
CL/1635342	BH02A 1.20	11/10/16												
CL/1635343	BH03 2.00	06/10/16												
CL/1635344	BH03 3.80	06/10/16												

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	TSBRE1	Oven Dried @ < 35°C	Determination of Total Carbon and/or Total Sulphur in solid samples by high temperature combustion/infrared detection
Soil	WSLM50	Oven Dried @ < 35°C	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Our Ref: EFS/168933 (Ver. 1)

Your Ref: H6100-16

November 4, 2016



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

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Telephone: 01283 554400

Facsimile: 01283 554422

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Dear Adam Putt

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The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT



Report No. EFS/168933 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 1 sample described in this report were registered for analysis by ESG on 01-Nov-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

A handwritten signature in blue ink, appearing to read 'Tim Barnes'.

Operations Director
Energy & Waste Services

Date of Issue: 04-Nov-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :	mg/kg	mg/l	%	pH Units															
Method Codes :	ICPACIDS	ICPWSS	TSBRE1	WSLM50															
Method Reporting Limits :	20	10	0.005																
UKAS Accredited :	Yes	Yes	No	No															

LAB ID Number	CL/	Client Sample Description	Sample Date	SO4-- (acid sol)	SO4-- (H2O sol) mg/l	Total Sulphur.	pH (BS1377)													
1635755		BH01 ES 11 2.10	18-Oct-16	582	150	0.031	7.3													



Bretby Business Park, Ashby Road
 Burton-on-Trent, Staffordshire, DE15 0YZ
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Client Name	ESG Limited Bridgend	Trowbridge GI		Sample Analysis	
Contact	Adam Putt			Date Printed	04-Nov-2016
		Report Number	EFS/168933		
		Table Number	1		

Analytical and Deviating Sample Overview

Customer **ESG Limited Bridgend**
 Site **Trowbridge GI**
 Report No **S168933**

Consignment No S_NonCon
 Date Logged 01-Nov-2016

Report Due 07-Nov-2016

ID Number	Description	MethodID	CustServ	Dep. Opt	ICPACIDS	ICPBRE	ICPWSS	KONCL	KONNO3	TSBRE1	WISLMS0	
												DO Cl if pH<5.5
CL/1635755	BH01 2.10	18/10/16	REPORT A									

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	TSBRE1	Oven Dried @ < 35°C	Determination of Total Carbon and/or Total Sulphur in solid samples by high temperature combustion/infrared detection
Soil	WSLM50	Oven Dried @ < 35°C	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

APPENDIX F

GEOENVIRONMENTAL LABORATORY TEST RESULTS

Soil Sample Analysis Test Reports

EFS/168812,
EFS/168814
and EFS/168932

Leachate Sample Analysis Report

EXR/229287
and EXR/229296

Water Sample Analysis Report

EFS/235169
and EFS/232019

Our Ref: EFS/168812M (Ver. 1)

Your Ref: H6100-16

November 2, 2016



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied. The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 08/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT



Report No. EFS/168812M (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 2 samples described in this report were registered for analysis by ESG on 27-Oct-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 02-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 6)
Table of PCB Congener Results (Page 7)
GC-FID Chromatograms (Pages 8 to 9)
Table of WAC Analysis Results (Page 10)
Table of Asbestos Screening Results (Page 11)
Analytical and Deviating Sample Overview (Pages 12 to 13)
Table of Method Descriptions (Pages 14 to 15)
Table of Report Notes (Page 16)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services


Date of Issue: 02-Nov-2016


Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked 'A' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg	
		Method Codes :	GROHSA	ICPACIDS	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PHSOIL	SFAPI	SFAPI	SFAPI	
		Method Reporting Limits :	0.2	20	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16		0.5	0.5	0.5	
		Accreditation Code:	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	N	UM	UM	
LAB ID Number	Client Sample Description	Sample Date	GRO (C6-C10)	SO4-- (acid sol)	Boron (H2O Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)	
1635299	BH04B ES 20 1.20	18-Oct-16	<0.2	1050	1.2	6.1	0.60	63.8	673.4	63.9	<0.5	18.9	>0.5	258.2	10.2	>0.6	<0.6	<0.6	
1635300	BH04B ES 22 3.40	18-Oct-16	<0.3	1110	8.1	7.9	0.65	31.3	39.3	20	<0.6	34.1	<0.6	94.1	9	>0.6	<0.6	<0.6	
 Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422			Client Name		ESG Limited Bridgend						Sample Analysis								
			Contact		Adam Putt						Date Printed		02-Nov-2016						
Trowbridge GI											Report Number		EFS/168812M						
											Table Number		1						

LAB ID Number	Client Sample Description	Sample Date	Phenol Index (AR)	Asbestos Screen	Tot. Moisture @ 105C	TPH Band (>C10-C16)	TPH Band (>C10-C40)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH by GCFID (AR)	Acid Neut. Capacity	Chromium (III)	Fraction of non-crushable material %	Fraction of sample above 4 mm %	Chloride (2:1)	Chromium vi:	L.O.I. % @ 450C	PCB-7 Congeners Analysis	Units :																
																			mg/kg		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	Mol/kg	mg/kg	%	%	mg/l	mg/kg	%	µg/kg	
																			Method Codes :	SFAPI	Sub002a	TMSS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	ANC	CALC_CR3	CEN Leachate	CEN Leachate	KONECL	KONECR	LOI(%MM)	PCBUSECDAR
																			Method Reporting Limits :	0.5		0.1	10	10	10	10	10	0.04	0.5			1	0.1	0.2	
Accreditation Code:	U	U	U	N	N	U	N	UM	N	N	N	N	N	N	N	N																			
1635299	BH04B ES 20 1.20	18-Oct-16	<0.6	NAIS	13.0	<11	549	30	446	551	9.13	<63.8	0.0	78.1	28	>0.1	1.6	Req																	
1635300	BH04B ES 22 3.40	18-Oct-16	<0.6		20.4	<13		<13	44	59		<31.3			24	>0.1																			
 Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422			Client Name		ESG Limited Bridgend							Sample Analysis																							
			Contact		Adam Putt																														
			Trowbridge GI										Date Printed	02-Nov-2016																					
													Report Number	EFS/168812M																					
Trowbridge GI										Table Number	1																								

Units :	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg								
Method Codes :	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	PAHMSUS								
Method Reporting Limits :	0.04	10	10	10	20	30	20	10										
Accreditation Code:	N	UM	UM	UM	U	UM	UM	UM										

LAB ID Number	Client Sample Description	Sample Date	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes	o Xylene	PAH (17) by GCMS							
1635299	BH04B ES 20 1.20	18-Oct-16	1.52	<11	<11	<11	<23	<34	<23	<11	Req							
1635300	BH04B ES 22 3.40	18-Oct-16		<13	<13	<13	<25	<38	<25	<13	Req							



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Client Name ESG Limited Bridgend
Contact Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	02-Nov-2016
Report Number	EFS/168812M
Table Number	1

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI	
Sample Details:	BH04B ES 20 1.20	Job Number: S16_8812M
LIMS ID Number:	CL1635299	Date Booked in: 27-Oct-16
QC Batch Number:	161236	Date Extracted: 31-Oct-16
Quantitation File:	Initial Calibration	Date Analysed: 01-Nov-16
Directory:	116PAH.MS17\	Matrix: Soil
Dilution:	1.0	Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	UM
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	5.80	0.10	97	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	7.15	0.28	99	UM
Pyrene	129-00-0	7.44	0.25	98	UM
Benzo[a]anthracene	56-55-3	9.13	0.22	92	UM
Chrysene	218-01-9	9.18	0.17	95	UM
Benzo[b]fluoranthene	205-99-2	10.66	0.26	91	UM
Benzo[k]fluoranthene	207-08-9	10.70	0.10	92	UM
Benzo[a]pyrene	50-32-8	11.09	0.20	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.47	0.20	100	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	12.78	0.16	97	UM
Coronene	191-07-1 *	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	< 2.49	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	118
Acenaphthene-d10	119
Phenanthrene-d10	128
Chrysene-d12	161
Perylene-d12	220

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	86
Terphenyl-d14	75

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI	
Sample Details:	BH04B ES 22 3.40	Job Number: S16_8812M
LIMS ID Number:	CL1635300	Date Booked in: 27-Oct-16
QC Batch Number:	161236	Date Extracted: 31-Oct-16
Quantitation File:	Initial Calibration	Date Analysed: 01-Nov-16
Directory:	116PAH.MS17\	Matrix: Soil
Dilution:	1.0	Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Coronene	191-07-1 *	-	< 0.10	-	N
Total (USEPA16) PAHs	-	-	< 1.61	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	123
Acenaphthene-d10	125
Phenanthrene-d10	134
Chrysene-d12	155
Perylene-d12	193

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	85
Terphenyl-d14	75

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

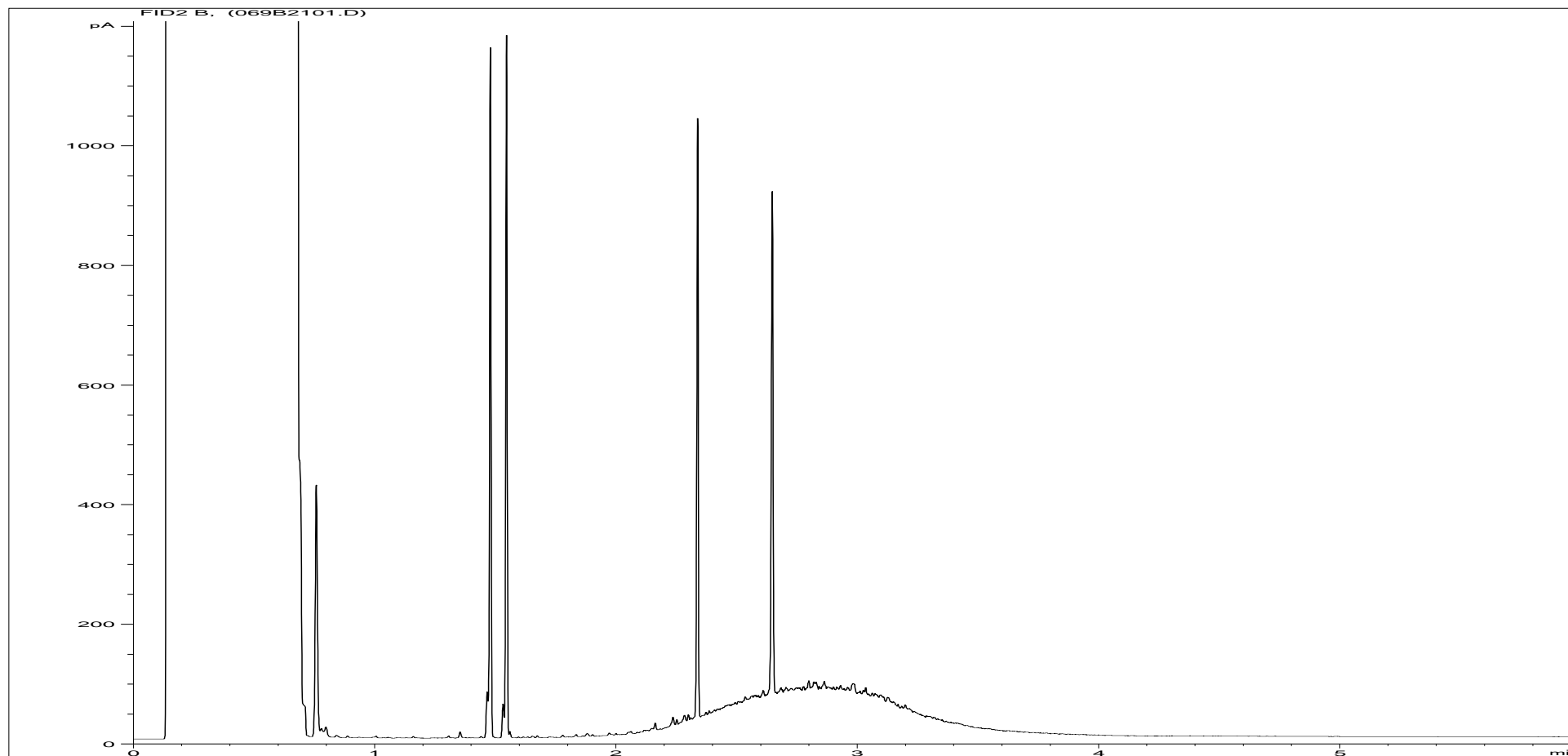
Polychlorinated Biphenyls (congeners)

Customer and Site Details: ESG Limited Bridgend: Trowbridge GI
Job Number: S16_8812M
QC Batch Number: 161236
Directory: 1031PCB.GC70
Method: Ultrasonic
Accreditation code: N

Matrix: Soil
Date Booked in: 27-Oct-16
Date Extracted: 28-Oct-16
Date Analysed: 31-Oct-16

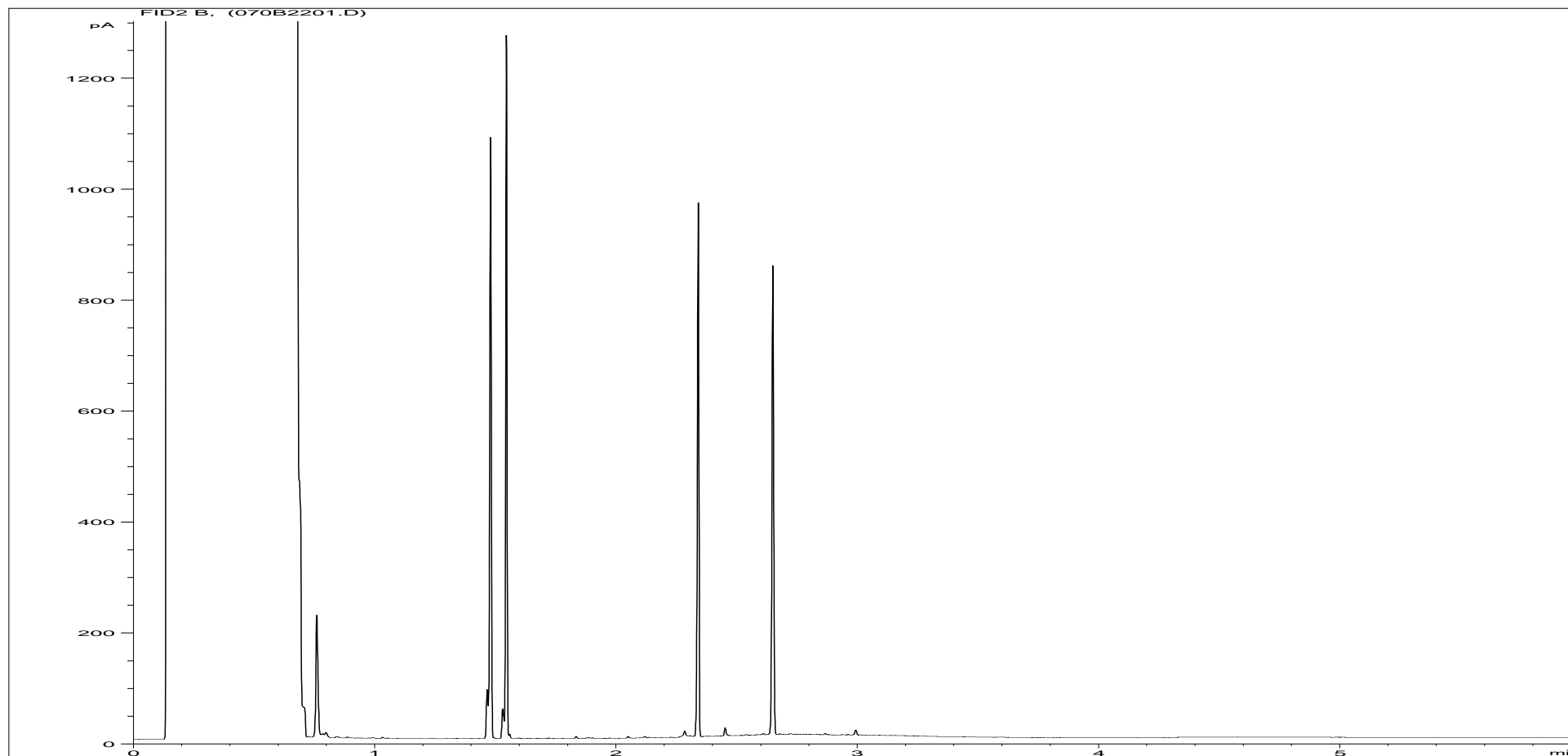
Sample ID	Customer ID	Concentration, ($\mu\text{g}/\text{kg}$)						
		PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
* CL1635299	BH04B ES 20 1.20	<5.7	190.0	<5.7	<5.7	<5.7	<5.7	<5.7

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635299	Job Number:	S16_8812M
Multiplier:	8	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH04B ES 20 1.20
Acquisition Date/Time:	31-Oct-16, 19:01:22		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\069B2101.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635300	Job Number:	S16_8812M
Multiplier:	8	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH04B ES 22 3.40
Acquisition Date/Time:	31-Oct-16, 19:14:41		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\070B2201.D		

WASTE ACCEPTANCE CRITERIA TESTING BSEN 12457/3

Client	ESG Limited Bridgend			Leaching Data	
Contact	Adam Putt			Weight of sample (kg)	0.230
Site	Trowbridge GI			Moisture content @ 105°C (% of Wet Weight)	13.0
				Equivalent Weight based on drying at 105°C (kg)	0.225
				Volume of water required to carry out 2:1 stage (litres)	0.445
				Fraction of sample above 4 mm %	78.100
	Sample Description	Report No	Sample No	Issue Date	Fraction of non-crushable material %
	BH04B ES 20 1.20	s16_8812M	CL/1635299	02-Nov-16	0.000
					Volume to undertake analysis (2:1 Stage) (litres)
					0.300
					Weight of Deionised water to carry out 8:1 stage (kg)
					1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	1.52	3	5	6
N	LOI450	Loss on Ignition (%)	1.6			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.206	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	549	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<2.59	100		
U	PHSOIL	pH (pH units)	10.2		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	9.13		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1		
			mg/l except ⁰⁰		mg/kg (dry weight)		mg/kg (dry weight)		
U	WSLM3	pH (pH units) ⁰⁰	8	8.5	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ⁰⁰	202	<100	Calculated data not UKAS Accredited				
U	ICPMSW	Arsenic	0.003	0.006	0.006	0.06	0.5	2	25
U	ICPWATVAR	Barium	0.11	0.03	0.22	0.4	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.004	0.005	0.008	0.05	0.5	10	70
U	ICPMSW	Copper	0.009	0.007	0.018	0.07	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.016	0.003	0.032	0.05	0.5	10	30
U	ICPMSW	Nickel	<0.001	<0.001	<0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	0.001	0.004	0.002	0.04	0.5	10	50
U	ICPMSW	Antimony	0.003	0.002	0.006	0.02	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.012	0.011	0.024	0.11	4	50	200
U	KONENS	Chloride	17	3	34	49	800	15000	25000
U	ISEF	Fluoride	0.4	0.2	0.8	2	10	150	500
U	ICPWATVAR	Sulphate as SO4	40	10.1	80	141	1000	20000	50000
N	WSLM27	Total Dissolved Solids	157	63.8	314	762	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	7.1	81	14.2	711	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited



ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates



Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	Page 1 of 1	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	Report No:	ANO-0488-13537
For the attention of:	ESG Limited Bridgend	Report Date:	01/11/2016
Site Address:	Trowbridge GI	Project Number:	S168812

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in < 10mm	% Asbestos by weight of Total Dried Sample	Moisture Content	Asbestos Fibre Types Identified
CL/1635299	18/10/16	BH04B 1.20 Soils	01/11/2016							NAIIS

Keys	NAACR = Not Analysed at Clients Request	NAIIS = No Asbestos Identified in Sample (Identification Only)	Name:	Nathan Brough	Authorised Signatory:
	* visible to naked eye	NADIS = No Asbestos Detected in Sample (ID & Quant Only)	Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
 Site Trowbridge GI
 Report No S168812M

Consignment No S60148
 Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	ANC	BTEX-HSA + MTBE analysis	CALC_CRS	CEN Leach(P)1	CEN Leach(P)2	CEN Leach(P)C	Fraction of non-crushable material %	Fraction of sample above 4 mm %	CustServ	GRO-HSA	ICP-ACIDS	ICP-BOR	ICP-MSS	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	KONECL	KONECR	LOI(%MM)
CL/1635299	BH04B 1.20	18/10/16		✓	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CL/1635300	BH04B 3.40	18/10/16																								

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
 Site Trowbridge GI
 Report No S168812M

Consignment No S60148
 Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	MCerts	PAHMSUS	PCBMSUS	PHSOIL	SFAPL	Cyanide(Total) (AR)	Cyanide(Free) (AR)	Phenol Index:(AR)	^Asbestos Screen	TMOSS	TPHMOSS	TPH Band (>C10-C16)	TPH Band (>C10-C40)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH by GC/FID (AR)	Total Organic Carbon	W/S/LMS9
CL/1635299	BH04B 1.20	18/10/16		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CL/1635300	BH04B 3.40	18/10/16																		

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
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C	Headspace present in the sample container
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E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ANC	Oven Dried @ < 35°C	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	CALC_CR3	Oven Dried @ < 35°C	Calculated from the difference between Total Chromium and Hexavalent Chromium
Soil	CEN Leachate	As Received	Determination of Oversize and Inert Material Content prior to leaching sample
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	KONECL	Oven Dried @ < 35°C	Determination of Chloride in Soil using water extraction at the stated water:soil ratio, discrete colorimetric detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	LOI(%MM)	Oven Dried @ < 35°C	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aocloris by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105°C by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity ($\mu\text{S}/\text{cm}$) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Our Ref: EFS/168814M (Ver. 1)

Your Ref: H6100-16

November 4, 2016



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 08/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT



Report No. EFS/168814M (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 4 samples described in this report were registered for analysis by ESG on 27-Oct-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 8)
Table of PCB Congener Results (Page 9)
GC-FID Chromatograms (Pages 10 to 13)
Table of WAC Analysis Results (Pages 14 to 15)
Table of Asbestos Screening Results (Page 16)
Analytical and Deviating Sample Overview (Pages 17 to 18)
Table of Method Descriptions (Pages 19 to 20)
Table of Report Notes (Page 21)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 04-Nov-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked '^' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.


LAB ID Number	Client Sample Description	Sample Date	Units :															
			Method Codes :															
			Method Reporting Limits :															
			Accreditation Code:															
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg
			GROHSA	ICPACIDS	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PHSOIL	SFAPI	SFAPI	SFAPI
			0.2	20	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16		0.5	0.5	0.5
			UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	N	UM	UM
			GRO (C6-C10)	SO4-- (acid sol)	Boron (H2O Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
1635317	BH02A ES 1 1.20	11-Oct-16	<0.3	1090	3.5	12.2	0.5	40.1	22.9	93	<0.53	20.4	0.9	121.5	8.4	<0.6	<0.6	<0.6
1635318	BH03 ES 2 0.10	29-Sep-16	<0.2	1440	1.9	20.4	1.40	45.0	153.1	208.0	<0.52	38.4	0.9	404.3	8.1	<0.6	0.6	<0.6
1635319	BH03 ES 7 1.00	29-Sep-16	<0.2	1120	2.1	18.8	1.62	51.9	109.1	286.6	0.6	38	0.5	389.3	8.5	<0.6	<0.6	<0.6
1635320	BH03 ES 9 2.00	06-Oct-16	<0.3	338	1.6	16.3	<0.2	42.9	14.8	30.9	<0.5	18.5	<0.5	90.4	8.4	<0.7	0.7	<0.7




Bretby Business Park, Ashby Road
 Burton-on-Trent, Staffordshire, DE15 0YZ
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Client Name	ESG Limited Bridgend		Sample Analysis	
	Contact	Adam Putt		
Trowbridge GI			Date Printed	04-Nov-2016
			Report Number	EFS/168814M
			Table Number	1

LAB ID Number	Client Sample Description	Sample Date	Phenol Index,(AR)	Asbestos Screen	Tot.Moisture @ 105C	Units :	mg/kg		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	Mol/kg	mg/kg	%	%	mg/l	mg/kg	%	µg/kg	
						Method Codes :	SFAPI	Sub002a	TMSS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	ANC	CALC_CR3	CEN Leachate	CEN Leachate	KONECL	KONECR	LOI(%MM)	PCBUSECDAR	
						Method Reporting Limits :	0.5		0.1	10	10	10	10	10	0.04	0.5			1	0.1	0.2		
						Accreditation Code:	U	U	U	N	N	U	N	UM	N	N	N	N	N	N	N		
1635317	BH02A ES 1 1.20	11-Oct-16	<0.6	AM	21.9	<13	81	<13	63	82	4.45	<40.1			24	<0.1	5.6		Req				
1635318	BH03 ES 2 0.10	29-Sep-16	<0.6	NAIS	14.6	<12		21	316	317		<45.0	0.0	41.6	14	<0.1							
1635319	BH03 ES 7 1.00	29-Sep-16	<0.6	CH	13.4	15	973	97	766	975	6.38	<51.9			6	<0.1	6.8		Req				
1635320	BH03 ES 9 2.00	06-Oct-16	<0.7		23.2	<13		<13	20	34		<42.9			5	<0.1							

 Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422	Client Name	ESG Limited Bridgend			Sample Analysis							
	Contact	Adam Putt										
	Trowbridge GI					Date Printed			04-Nov-2016			
						Report Number			EFS/168814M			
						Table Number			1			

LAB ID Number CL/	Client Sample Description	Sample Date	Units :															
			Method Codes :															
			Method Reporting Limits :															
			Accreditation Code:															
	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg							
	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	PAHMSUS							
	0.04	10	10	10	20	30	20	10										
	N	UM	UM	UM	U	UM	UM	UM										
	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes	o Xylene	PAH (17) by GCMS									
1635317	BH02A ES 1 1.20	11-Oct-16	2.32	<13	<13	<13	<26	<38	<26	<13	Req							
1635318	BH03 ES 2 0.10	29-Sep-16	6.02	<12	<12	<12	<23	<35	<23	<12	Req							
1635319	BH03 ES 7 1.00	29-Sep-16	5.13	<12	<12	<12	<23	<35	<23	<12	Req							
1635320	BH03 ES 9 2.00	06-Oct-16		<13	<13	<13	<26	<39	<26	<13	Req							

 Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422	Client Name ESG Limited Bridgend	Sample Analysis	
	Contact Adam Putt		
	Trowbridge GI		Date Printed 04-Nov-2016
		Table Number 1	

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI	
Sample Details:	BH02A ES 1 1.20	Job Number: S16_8814M
LIMS ID Number:	CL1635317	Date Booked in: 27-Oct-16
QC Batch Number:	161236	Date Extracted: 31-Oct-16
Quantitation File:	Initial Calibration	Date Analysed: 01-Nov-16
Directory:	116PAH.MS17\	Matrix: Soil
Dilution:	1.0	Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	UM
Acenaphthylene	208-96-8	4.43	0.10	96	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.80	0.44	100	UM
Anthracene	120-12-7	5.85	0.20	97	U
Fluoranthene	206-44-0	7.15	1.40	99	UM
Pyrene	129-00-0	7.44	1.13	97	UM
Benzo[a]anthracene	56-55-3	9.13	0.80	96	UM
Chrysene	218-01-9	9.18	0.56	99	UM
Benzo[b]fluoranthene	205-99-2	10.66	0.83	95	UM
Benzo[k]fluoranthene	207-08-9	10.70	0.32	95	UM
Benzo[a]pyrene	50-32-8	11.09	0.68	96	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.47	0.56	87	UM
Dibenzo[a,h]anthracene	53-70-3	12.49	0.12	95	UM
Benzo[g,h,i]perylene	191-24-2	12.78	0.44	96	UM
Coronene	191-07-1 *	14.98	0.12	1	N
Total (USEPA16) PAHs	-	-	< 7.86	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	116
Acenaphthene-d10	117
Phenanthrene-d10	125
Chrysene-d12	151
Perylene-d12	200

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	88
Terphenyl-d14	76

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI	
Sample Details:	BH03 ES 2 0.10	Job Number: S16_8814M
LIMS ID Number:	CL1635318	Date Booked in: 27-Oct-16
QC Batch Number:	161236	Date Extracted: 31-Oct-16
Quantitation File:	Initial Calibration	Date Analysed: 01-Nov-16
Directory:	116PAH.MS17\	Matrix: Soil
Dilution:	1.0	Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	UM
Acenaphthylene	208-96-8	4.43	0.18	97	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	5.80	1.16	99	UM
Anthracene	120-12-7	5.85	0.43	97	U
Fluoranthene	206-44-0	7.15	4.88	99	UM
Pyrene	129-00-0	7.44	3.84	96	UM
Benzo[a]anthracene	56-55-3	9.13	2.61	94	UM
Chrysene	218-01-9	9.18	2.26	100	UM
Benzo[b]fluoranthene	205-99-2	10.66	3.09	93	UM
Benzo[k]fluoranthene	207-08-9	10.70	1.08	94	UM
Benzo[a]pyrene	50-32-8	11.09	2.31	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.47	2.20	87	UM
Dibenzo[a,h]anthracene	53-70-3	12.50	0.42	82	UM
Benzo[g,h,i]perylene	191-24-2	12.78	1.67	96	UM
Coronene	191-07-1 *	14.98	0.40	73	N
Total (USEPA16) PAHs	-	-	< 26.42	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	116
Acenaphthene-d10	117
Phenanthrene-d10	125
Chrysene-d12	156
Perylene-d12	215

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	87
Terphenyl-d14	75

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI	
Sample Details:	BH03 ES 7 1.00	Job Number: S16_8814M
LIMS ID Number:	CL1635319	Date Booked in: 27-Oct-16
QC Batch Number:	161236	Date Extracted: 31-Oct-16
Quantitation File:	Initial Calibration	Date Analysed: 01-Nov-16
Directory:	116PAH.MS17\	Matrix: Soil
Dilution:	1.0	Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.37	0.14	93	UM
Acenaphthylene	208-96-8	4.43	0.88	99	U
Acenaphthene	83-32-9	4.55	0.21	94	UM
Fluorene	86-73-7	4.94	0.22	97	UM
Phenanthrene	85-01-8	5.80	3.08	99	UM
Anthracene	120-12-7	5.85	1.36	98	U
Fluoranthene	206-44-0	7.15	11.70	99	UM
Pyrene	129-00-0	7.44	9.75	95	UM
Benzo[a]anthracene	56-55-3	9.13	8.14	92	UM
Chrysene	218-01-9	9.18	5.82	99	UM
Benzo[b]fluoranthene	205-99-2	10.67	10.42	96	UM
Benzo[k]fluoranthene	207-08-9	10.70	3.60	95	UM
Benzo[a]pyrene	50-32-8	11.09	8.22	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.47	9.03	86	UM
Dibenzo[a,h]anthracene	53-70-3	12.50	2.02	91	UM
Benzo[g,h,i]perylene	191-24-2	12.78	6.82	95	UM
Coronene	191-07-1 *	14.99	1.81	1	N
Total (USEPA16) PAHs	-	-	81.35	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	119
Acenaphthene-d10	122
Phenanthrene-d10	132
Chrysene-d12	173
Perylene-d12	257

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	86
Terphenyl-d14	74

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI	
Sample Details:	BH03 ES 9 2.00	Job Number: S16_8814M
LIMS ID Number:	CL1635320	Date Booked in: 27-Oct-16
QC Batch Number:	161236	Date Extracted: 31-Oct-16
Quantitation File:	Initial Calibration	Date Analysed: 01-Nov-16
Directory:	116PAH.MS17\	Matrix: Soil
Dilution:	1.0	Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Coronene	191-07-1 *	-	< 0.10	-	N
Total (USEPA16) PAHs	-	-	< 1.67	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	118
Acenaphthene-d10	119
Phenanthrene-d10	128
Chrysene-d12	152
Perylene-d12	193

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	88
Terphenyl-d14	77

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

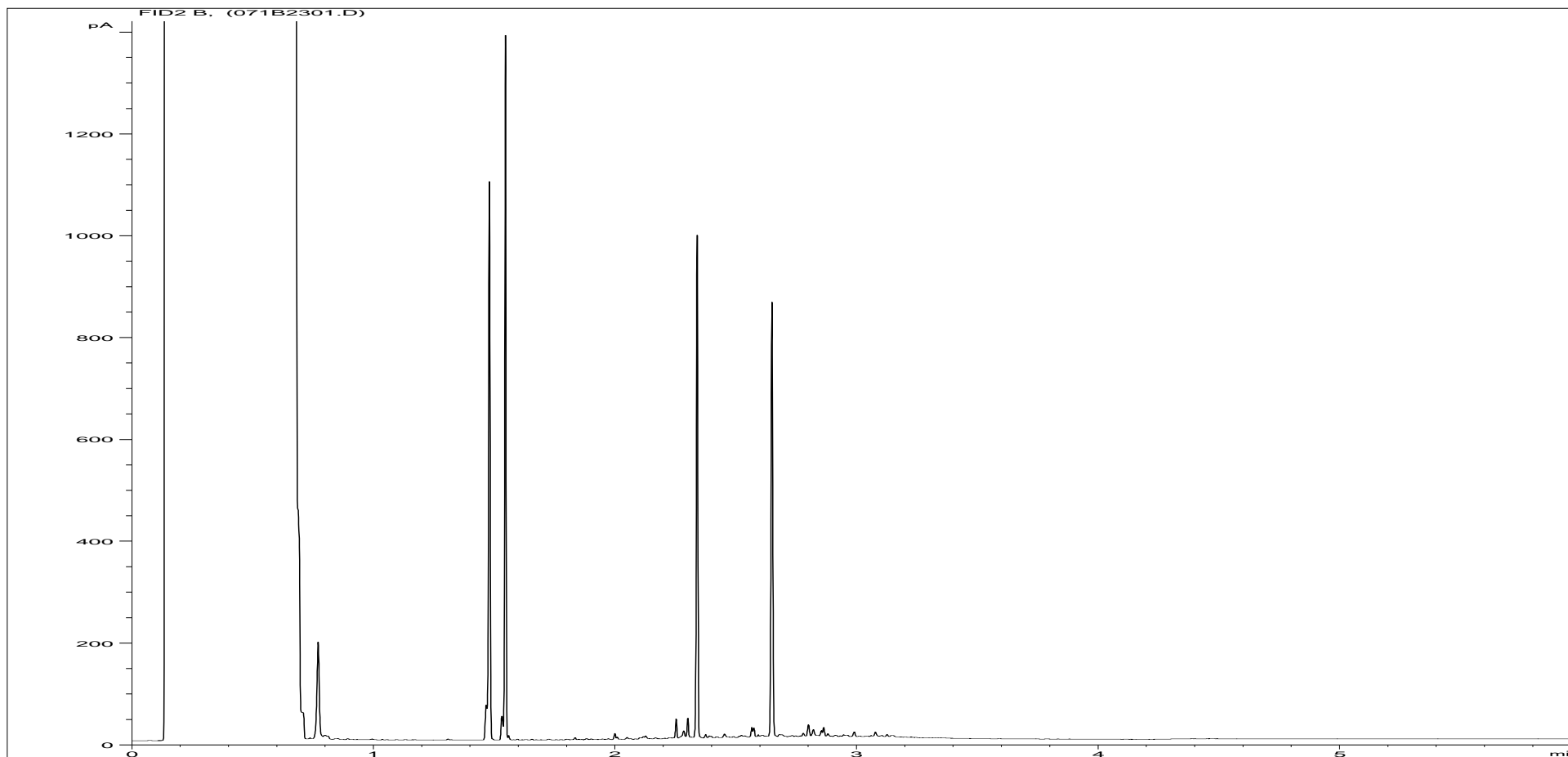
Polychlorinated Biphenyls (congeners)

Customer and Site Details: ESG Limited Bridgend: Trowbridge GI
Job Number: S16_8814M
QC Batch Number: 161236
Directory: 1031PCB.GC70
Method: Ultrasonic
Accreditation code: N

Matrix: Soil
Date Booked in: 27-Oct-16
Date Extracted: 28-Oct-16
Date Analysed: 31-Oct-16

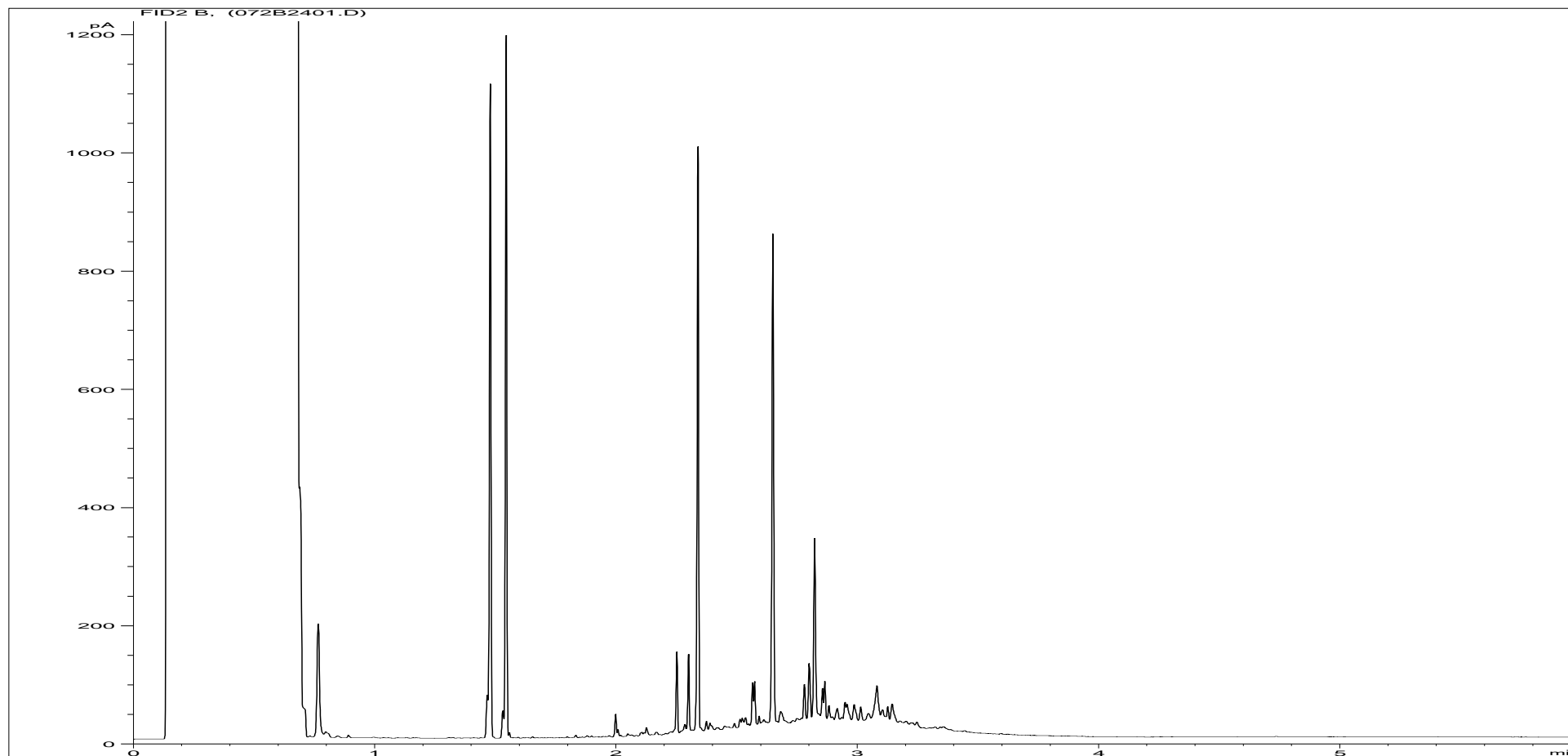
Sample ID	Customer ID	Concentration, ($\mu\text{g}/\text{kg}$)						
		PCB28	PCB52	PCB101	PCB118	PCB153	PCB138	PCB180
* CL1635317	BH02A ES 1 1.20	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4
* CL1635319	BH03 ES 7 1.00	<5.8	<5.8	<5.8	<5.8	9.4	10.6	8.4

Petroleum Hydrocarbons (C8 to C40) by GC/FID



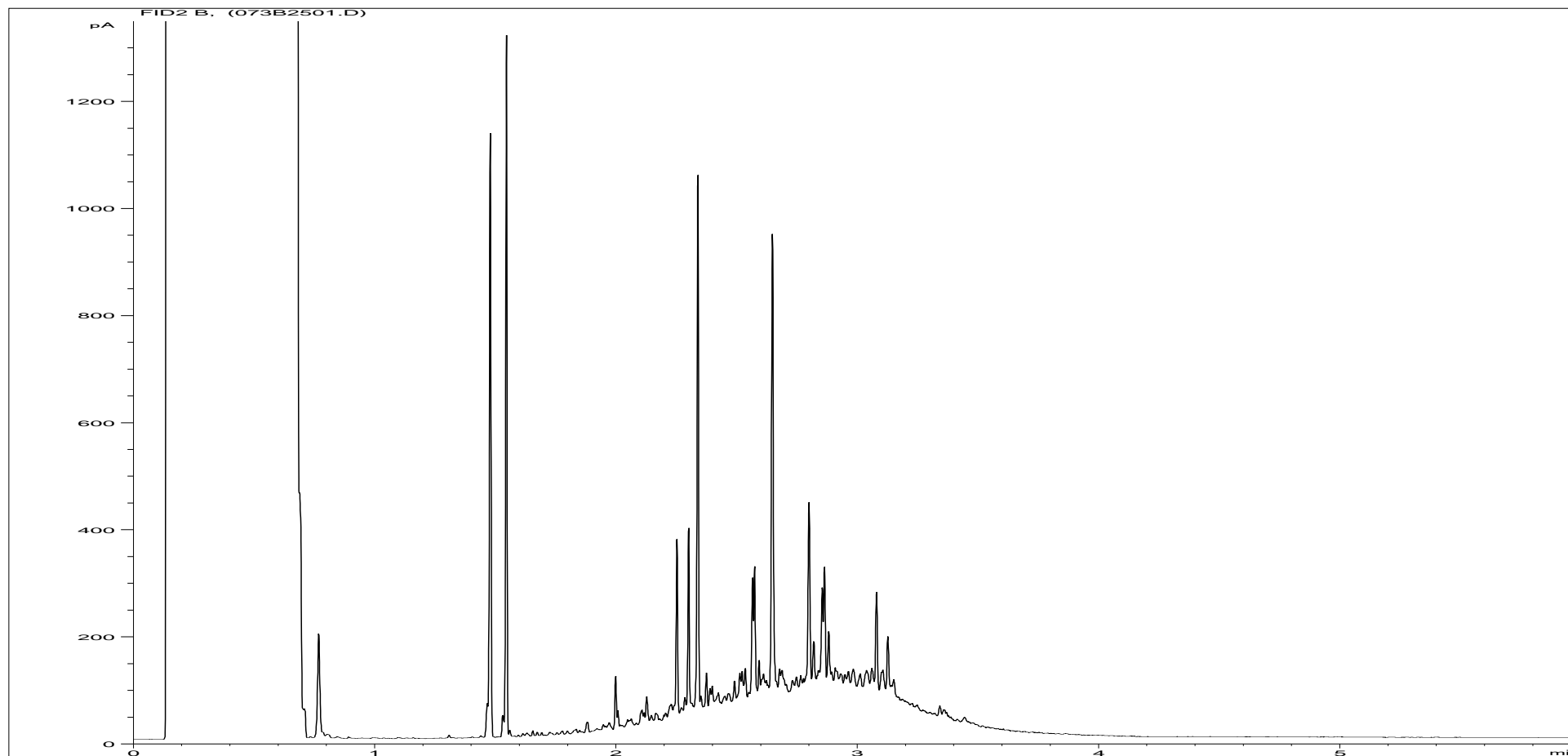
Sample ID:	CL1635317	Job Number:	S16_8814M
Multiplier:	8	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH02A ES 1 1.20
Acquisition Date/Time:	31-Oct-16, 19:27:56		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\071B2301.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID



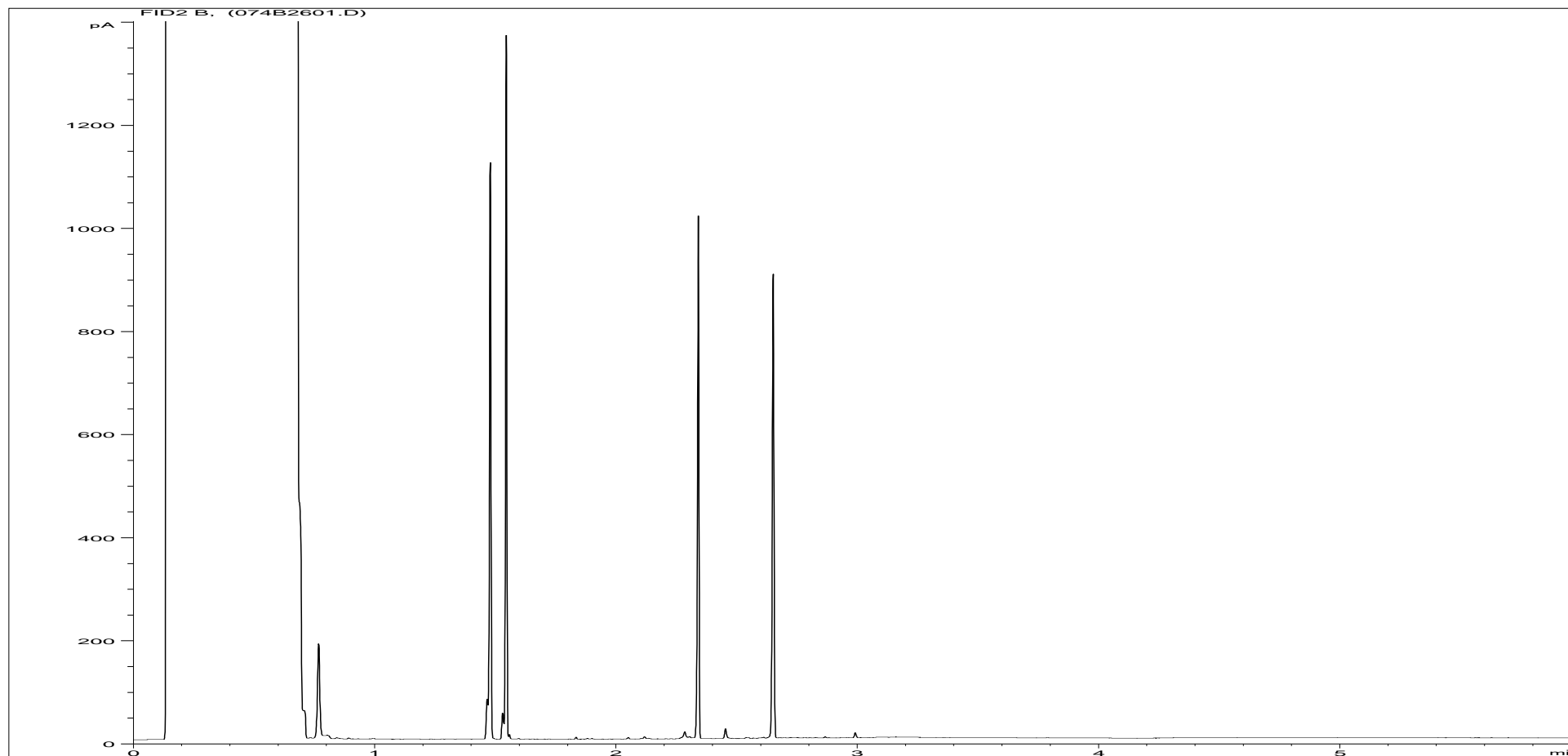
Sample ID:	CL1635318	Job Number:	S16_8814M
Multiplier:	8	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH03 ES 2 0.10
Acquisition Date/Time:	31-Oct-16, 19:41:13		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\072B2401.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635319	Job Number:	S16_8814M
Multiplier:	8	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH03 ES 7 1.00
Acquisition Date/Time:	31-Oct-16, 19:54:26		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\073B2501.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635320	Job Number:	S16_8814M
Multiplier:	8	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH03 ES 9 2.00
Acquisition Date/Time:	31-Oct-16, 20:07:38		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\074B2601.D		

WASTE ACCEPTANCE CRITERIA TESTING BSEN 12457/3

Client	ESG Limited Bridgend				Leaching Data		
Contact	Adam Putt				Weight of sample (kg)	0.296	
Site	Trowbridge GI				Moisture content @ 105°C (% of Wet Weight)	21.9	
Sample Description					Equivalent Weight based on drying at 105°C (kg)	0.225	
					Report No	Sample No	Issue Date
BH02A ES 1 1.20					s16_8814M	CL/1635317	
					04-Nov-16	Fraction of sample above 4 mm %	0.000
						Fraction of non-crushable material %	0.000
						Volume to undertake analysis (2:1 Stage) (litres)	0.300
						Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.32	3	5	6
N	LOI450	Loss on Ignition (%)	5.6			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.07	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	81	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<7.98	100		
U	PHSOIL	pH (pH units)	8.4		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	4.45		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1		
			mg/l except ⁰⁰		mg/kg (dry weight)		mg/kg (dry weight)		
			Calculated data not UKAS Accredited						
U	WSLM3	pH (pH units) ⁰⁰	7.4	7.8					
U	WSLM2	Conductivity (µs/cm) ⁰⁰	607	266					
U	ICPMSW	Arsenic	0.002	0.001	0.004	0.01	0.5	2	25
U	ICPWATVAR	Barium	0.14	0.15	0.28	1.5	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.001	<0.002	<0.01	0.5	10	70
U	ICPMSW	Copper	0.004	0.006	0.008	0.06	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.009	0.011	0.018	0.11	0.5	10	30
U	ICPMSW	Nickel	0.001	0.001	0.002	0.01	0.4	10	40
U	ICPMSW	Lead	0.003	0.003	0.006	0.03	0.5	10	50
U	ICPMSW	Antimony	0.002	0.002	0.004	0.02	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.05	0.034	0.1	0.36	4	50	200
U	KONENS	Chloride	7	1	14	18	800	15000	25000
U	ISEF	Fluoride	0.6	0.7	1.2	7	10	150	500
U	ICPWATVAR	Sulphate as SO4	158	42.4	316	578	1000	20000	50000
N	WSLM27	Total Dissolved Solids	473	207	946	2425	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	7.3	6.6	14.6	67	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

WASTE ACCEPTANCE CRITERIA TESTING BSEN 12457/3

Client	ESG Limited Bridgend				Leaching Data	
Contact	Adam Putt				Weight of sample (kg)	0.262
Site	Trowbridge GI				Moisture content @ 105°C (% of Wet Weight)	13.4
Sample Description					Equivalent Weight based on drying at 105°C (kg)	0.225
					Volume of water required to carry out 2:1 stage (litres)	0.413
BH03 ES 7 1.00					Report No	s16_8814M
					Sample No	CL/1635319
Issue Date					Fraction of sample above 4 mm %	35.000
					Fraction of non-crushable material %	0.000
04-Nov-16					Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	5.13	3	5	6
N	LOI450	Loss on Ignition (%)	6.8			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.0452	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	973	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	83.16	100		
U	PHSOIL	pH (pH units)	8.5		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	6.38		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1		
			mg/l except ⁰⁰		mg/kg (dry weight)		mg/kg (dry weight)		
U	WSLM3	pH (pH units) ⁰⁰	7.5	7.6	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ⁰⁰	281	138					
U	ICPMSW	Arsenic	0.002	0.005	0.004	0.05	0.5	2	25
U	ICPWATVAR	Barium	0.2	0.11	0.4	1.2	20	100	300
U	ICPMSW	Cadmium	<0.0001	0.0003	<0.0002	<0.003	0.04	1	5
U	ICPMSW	Chromium	0.003	0.008	0.006	0.07	0.5	10	70
U	ICPMSW	Copper	0.015	0.027	0.03	0.25	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.008	0.004	0.016	0.05	0.5	10	30
U	ICPMSW	Nickel	0.002	0.002	0.004	0.02	0.4	10	40
U	ICPMSW	Lead	0.011	0.047	0.022	0.42	0.5	10	50
U	ICPMSW	Antimony	0.008	0.005	0.016	0.05	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.036	0.099	0.072	0.91	4	50	200
U	KONENS	Chloride	2	2	4	20	800	15000	25000
U	ISEF	Fluoride	1.3	1.2	2.6	12	10	150	500
U	ICPWATVAR	Sulphate as SO4	33.3	7.3	67	108	1000	20000	50000
N	WSLM27	Total Dissolved Solids	219	107	438	1219	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	6	6.8	12	67	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited



ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates



Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	Page 1 of 1	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	Report No:	ANO-0488-13535
For the attention of:	ESG Limited Bridgend	Report Date:	02/11/2016
Site Address:	Trowbridge GI	Project Number:	S168814

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in < 10mm	% Asbestos by weight of Total Dried Sample	Moisture Content	Asbestos Fibre Types Identified
CL/1635317	11/10/16	BH02A 1.20 Soils	02/11/2016							Amosite, (Insulating Board)
CL/1635318	29/09/16	BH03 0.10 Soils	02/11/2016							NAIIS
CL/1635319	29/09/16	BH03 1.00 Soils	02/11/2016							Chrysotile, (Free Fibres and Lagging)

Keys	NAACR = Not Analysed at Clients Request	NAIIS = No Asbestos Identified in Sample (Identification Only)	Name:	Stacey Innes	Authorised Signatory:
	* visible to naked eye	NADIS = No Asbestos Detected in Sample (ID & Quant Only)	Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No S168814M

Consignment No S59694
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	ANC	BTEX/MSA	CALC_CRS	GEN Leach/leach	CustServ	GRO/MSA	ICP/ACIDS	ICP/BOR	ICP/MS	KONECL	KONECR	LOI(%MM)	Sampled									
															Fraction of sample above 4 mm %	Fraction of non-crushable material %								
			Acid Neut. Capacity	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	Chromium (III)	CEN Leac(P)1	CEN Leac(P)2	CEN Leac(P)C	SO4-- (acid sol)	Boron (H2O Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	Chloride:(2:1)	Chromium vi:	L.O.I. % @ 450C	
CL/1635317	BH02A 1.20	11/10/16		F	F				F															
CL/1635318	BH03 0.10	29/09/16		F	F				F	F														
CL/1635319	BH03 1.00	29/09/16		F	F				F	F														
CL/1635320	BH03 2.00	06/10/16		F	F				F															

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - Note: due date may be affected if triggered
	No analysis scheduled
	Analysis Subcontracted - Note: due date may vary

Analytical and Deviating Sample Overview

Customer **ESG Limited Bridgend**
 Site **Trowbridge GI**
 Report No **S168814M**

Consignment No S59694
 Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	MCerts	PAMISUS	PMSISUS	PHSOIL	SFAPL	Cyanide(Total) (AR)	Cyanide(Free) (AR)	Phenol Index:(AR)	^Asbestos Screen	TMSS	Tot.Moisture @ 105C	TPH Band (>C10-C16)	TPH Band (>C10-C40)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH by GC/FID (AR)	Total Organic Carbon	W/S/LMS9
				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CL/1635317	BH02A 1.20	11/10/16				E	E	E	E	E										
CL/1635318	BH03 0.10	29/09/16		E		E	E	E	E	E										
CL/1635319	BH03 1.00	29/09/16		E		E	E	E	E	E										
CL/1635320	BH03 2.00	06/10/16		E		E	E	E	E	E										

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
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E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
 	Analysis Required
 	Analysis dependant upon trigger result - Note: due date may be affected if triggered
 	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ANC	Oven Dried @ < 35°C	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	CALC_CR3	Oven Dried @ < 35°C	Calculated from the difference between Total Chromium and Hexavalent Chromium
Soil	CEN Leachate	As Received	Determination of Oversize and Inert Material Content prior to leaching sample
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	KONECL	Oven Dried @ < 35°C	Determination of Chloride in Soil using water extraction at the stated water:soil ratio, discrete colorimetric detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	LOI(%MM)	Oven Dried @ < 35°C	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aocloris by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105°C by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity ($\mu\text{S}/\text{cm}$) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Our Ref: EFS/168932M (Ver. 1)

Your Ref: H6100-16

November 7, 2016



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 13/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT



Report No. EFS/168932M (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 1 sample described in this report were registered for analysis by ESG on 01-Nov-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 07-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Page 5)
GC-FID Chromatograms (Page 6)
Analytical and Deviating Sample Overview (Pages 7 to 8)
Table of Method Descriptions (Page 9)
Table of Report Notes (Page 10)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 07-Nov-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked 'A' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Units :		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg
Method Codes :		GROHSA	ICPACIDS	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PHSOIL	SFAPI	SFAPI	SFAPI
Method Reporting Limits :		0.2	20	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16		0.5	0.5	0.5
Accreditation Code:		UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	N	UM	UM

LAB ID Number	Client Sample Description	Sample Date	GRO (C6-C10)	SO4-- (acid sol)	Boron (H2O Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
1635754	BH01 ES 11 2.10	18-Oct-16	<0.2	637	2.0	5.9	<0.2	28.0	12.3	8.7	<0.5	24.3	<0.5	78.9	7.9	>0.6	<0.6	<0.6



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 Burton-on-Trent, Staffordshire, DE15 0YZ
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Client Name	ESG Limited Bridgend	Sample Analysis	
Contact	Adam Putt	Date Printed	07-Nov-2016
Trowbridge GI		Report Number	EFS/168932M
		Table Number	1

Units :	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/kg	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Method Codes :	SFAPI	TMSS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	CALC_CR3	KONECL	KONECR	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
Method Reporting Limits :	0.5	0.1	10	10	10	10	10	0.5	1	0.1	0.04	10	10	10	20	30	20
Accreditation Code:	U	U	N	U	N	UM	N	N	N	N	N	UM	UM	UM	U	UM	UM

LAB ID Number	Client Sample Description	Sample Date	Phenol Index (AR)	Tot. Moisture @ 105C	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH by GC/FID (AR)	Chromium (III)	Chloride:(2:1)	Chromium vi:	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes
1635754	BH01 ES 11 2.10	18-Oct-16	<0.6	15.7	<12	<12	<12	13	<28.0	29	<0.1	0.27	<12	<12	<12	<24	<36	<24



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Client Name	ESG Limited Bridgend		Sample Analysis	
Contact	Adam Putt			
Trowbridge GI			Date Printed	07-Nov-2016
			Report Number	EFS/168932M
			Table Number	1

Units :	µg/kg	mg/kg															
Method Codes :	BTEXHSA	PAHMSUS															
Method Reporting Limits :	10																
Accreditation Code:	UM																

LAB ID Number	Client Sample Description	Sample Date	o Xylene	PAH (17) by GCMS														
1635754	BH01 ES 11 2.10	18-Oct-16	<12	Req														



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 Burton-on-Trent, Staffordshire, DE15 0YZ
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Client Name ESG Limited Bridgend
Contact Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	07-Nov-2016
Report Number	EFS/168932M
Table Number	1

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH01 ES 11 2.10	Job Number:	S16_8932M
LIMS ID Number:	CL1635754	Date Booked in:	01-Nov-16
QC Batch Number:	161254	Date Extracted:	03-Nov-16
Quantitation File:	Initial Calibration	Date Analysed:	04-Nov-16
Directory:	216PAH.MS17\	Matrix:	Soil
Dilution:	1.0	Ext Method:	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	UM
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Coronene	191-07-1 *	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	< 1.52	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

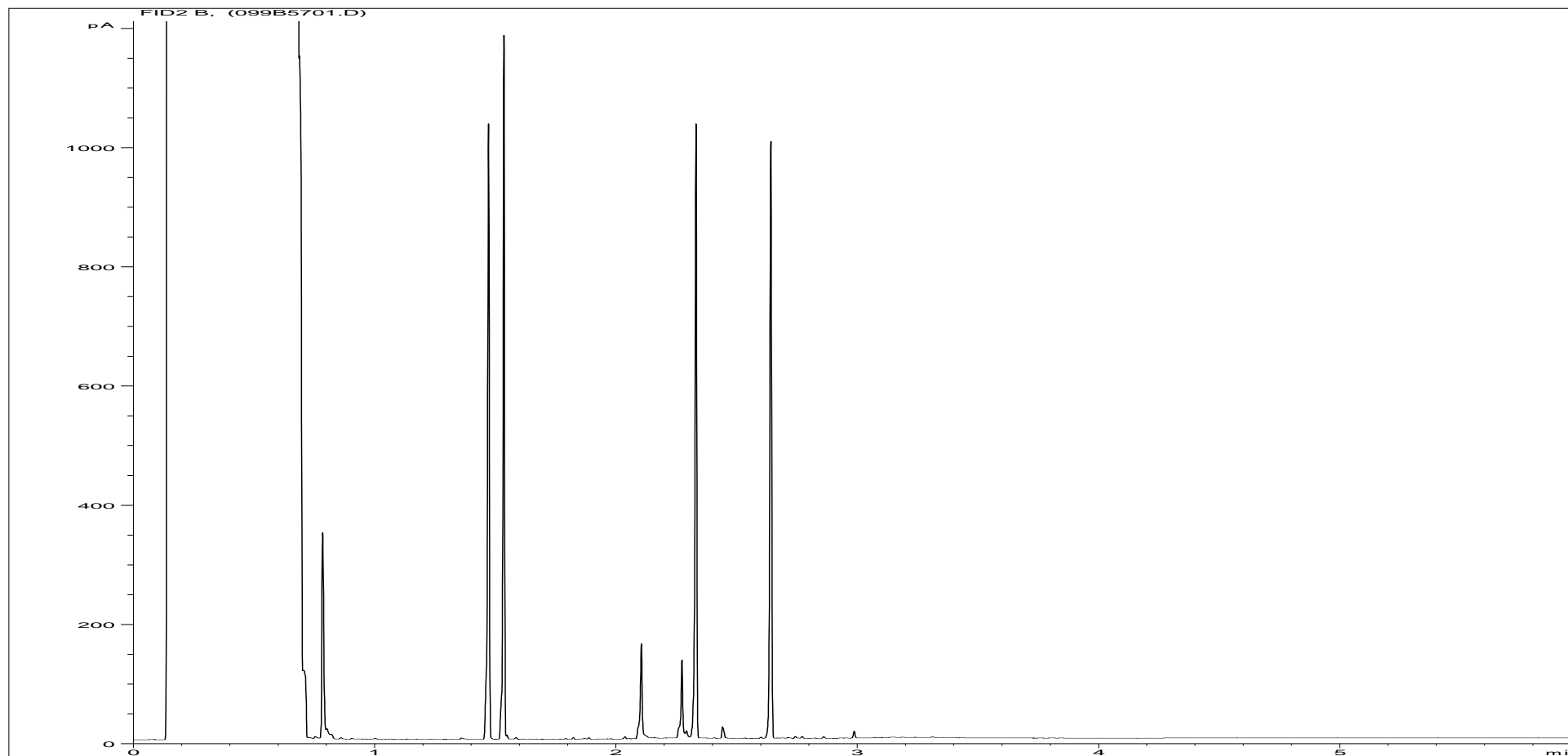
Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	74
Acenaphthene-d10	80
Phenanthrene-d10	83
Chrysene-d12	97
Perylene-d12	112

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	92

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635754	Job Number:	S16_8932M
Multiplier:	8	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH01 ES 11 2.10
Acquisition Date/Time:	04-Nov-16, 03:27:28		
Datafile:	D:\TES\DATA\Y2016\110316TPH_GC3\110316 2016-11-03 15-22-26\099B5701.D		

Analytical and Deviating Sample Overview

Customer **ESG Limited Bridgend**
 Site **Trowbridge GI**
 Report No **S168932M**

Consignment No S60022
 Date Logged 01-Nov-2016

Report Due 07-Nov-2016

ID Number	Description	MethodID	BTEXHSA	CALC_CR3	CustServ	GROHSA	ICPACIDS	ICPBOR	ICPMSS	KONECL	KONECR	MCERTS	PAHMSIS	PHSOIL	SFAPL	Phenol Index:(AR)	Cyanide(Total) (AR)	Cyanide(Free) (AR)																			
			BTEX-HSA + MTBE analysis	MTBE (µg/kg)	Chromium (III)	REPORT A	GRO (C6-C10)	SO4--(acid soil)	Boron (H2O Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)				Nickel (MS)	Selenium (MS)	Zinc (MS)	Chloride:(2:1)	Chromium vi:	MCertS Analysis	PAH (17) by GCMS	pH units (AR)	Cyanide(Complex)(AR)										
CL/1635754	BH01 2.10	18/10/16	E	E		E								E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
 	Analysis Required
 	Analysis dependant upon trigger result - Note: due date may be affected if triggered
 	No analysis scheduled
 	Analysis Subcontracted - Note: due date may vary

Analytical and Deviating Sample Overview

Customer **ESG Limited Bridgend**
 Site **Trowbridge GI**
 Report No **S168932M**

Consignment No S60022
 Date Logged 01-Nov-2016

Report Due 07-Nov-2016

ID Number	Description	MethodID	TMSS	TPH/FIDUS			W/S/LM59
				TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	
Sampled							Total Organic Carbon
CL/1635754	BH01 2.10	18/10/16	✓	✓	✓	✓	✓

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	CALC_CR3	Oven Dried @ < 35°C	Calculated from the difference between Total Chromium and Hexavalent Chromium
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	KONECL	Oven Dried @ < 35°C	Determination of Chloride in Soil using water extraction at the stated water:soil ratio, discrete colorimetric detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	TMSS	As Received	Determination of the Total Moisture content at 105°C by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Our Ref: EXR/229287 (Ver. 1)

Your Ref: H6100-16

November 2, 2016



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

CEN Leachate 10:1 - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT



Report No. EXR/229287 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 1 sample described in this report were registered for analysis by ESG on 27-Oct-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 02-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Page 4)
GC-FID Chromatograms (Page 5)
Analytical and Deviating Sample Overview (Pages 6 to 7)
Table of Additional Report Notes (Page 8)
Table of Method Descriptions (Page 9)
Table of Report Notes (Page 10)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

A handwritten signature in blue ink, appearing to read 'Tim Barnes'.

Operations Director
Energy & Waste Services


Date of Issue: 02-Nov-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

		Units :	pH units	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
		Method Codes :	WSLM3	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	CALCNH4	KONENS	SFAPI	
		Method Reporting Limits :		3	0.001	0.001	0.0001			0.001	0.001	0.002	0.001	0.01	0.0001	0.001	0.01	0.01	0.02	
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
LAB ID Number	EX/	Client Sample Description	Sample Date	pH units w	Total Sulphur as SO4 (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	PAH GC-MS (16) o	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Boron as B (Dissolved) a	Mercury as Hg (Dissolved)	Selenium as Se (Dissolved)	Ammoniacal Nitrogen as NH4	Ammoniacal Nitrogen as N	Cyanide (Free) as CN	
1744016		BH04B ES 20 1.20	27-Oct-16	7.8	8.8	<0.001	0.002	<0.0001	Req §	0.004	0.002	0.016	0.004	0.03	<0.0001	<0.001	0.01	>0.01	<0.02	
 <p>Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422</p>			Client Name		ESG Limited Bridgend							CEN Leachate 10:1				<p>Trowbridge GI</p>				
			Contact		Adam Putt							Date Printed		02-Nov-2016						
												Report Number		EXR/229287						
												Table Number		1						

Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l		
Method Codes :	SFAPI	SFAPI	TPHFID	TPHFID	TPHFID	TPHFID	TPHFID	GROHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA		
Method Reporting Limits :	0.02	0.05		0.01	0.01	0.01	0.01	0.1	5	5	5	10	15	10	5		
UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

LAB ID Number EV/	Client Sample Description	Sample Date	Cyanide (Total) as CN	Phenol Index as C6H5OH	TPH Band >C10-C16	TPH Band >C16-C21	TPH Band (>C21-C35)	TPH GC	GRO >C6->C10	Ethyl Benzene	Benzene	Toluene	MTBE	Xylenes	m/p Xylenes	o Xylene		
1744016	BH04B ES 20 1.20	27-Oct-16	<0.02	<0.05	<0.01	<0.01	0.02	0.03	<0.1	>5	>5	>5	<10	<15	<10	>5		

 <p>Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422</p>	Client Name ESG Limited Bridgend	CEN Leachate 10:1	
	Contact Adam Putt		
	Trowbridge GI		Date Printed 02-Nov-2016
			Report Number EXR/229287
			Table Number 1

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH04B ES 20 1.20	Job Number:	W22_9287
LIMS ID Number:	EX1744016	Date Booked in:	27-Oct-16
QC Batch Number:	160692	Date Extracted:	01-Nov-16
Quantitation File:	Initial Calibration	Date Analysed:	02-Nov-16
Directory:	116PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.05	0.096	87
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.21	0.021	88
Fluorene	86-73-7	4.56	0.015	89
Phenanthrene	85-01-8	5.35	0.070	97
Anthracene	120-12-7	5.40	0.014	95
Fluoranthene	206-44-0	6.63	0.052	94
Pyrene	129-00-0	6.91	0.043	95
Benzo[a]anthracene	56-55-3	8.56	0.030	87
Chrysene	218-01-9	8.60	0.018	91
Benzo[b]fluoranthene	205-99-2	10.06	0.022	78
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	10.48	0.013	91
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.444	-

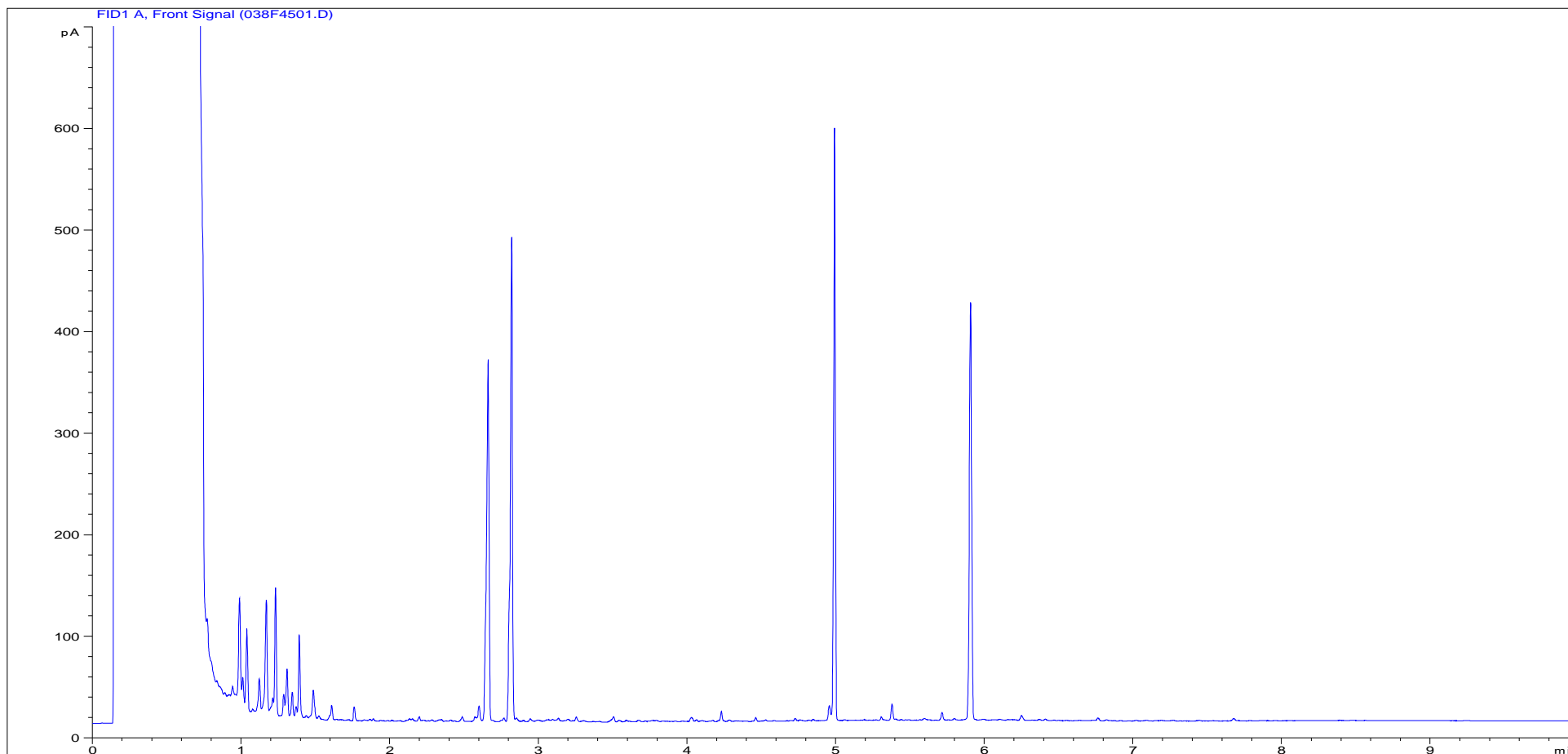
"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	106
Acenaphthene-d10	109
Phenanthrene-d10	109
Chrysene-d12	108
Perylene-d12	124

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	80
Terphenyl-d14	70

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1744016	Job Number:	W22_9287
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	TPH_RUNF.M	Client Sample Ref:	BH04B ES 20 1.20
Acquisition Date/Time:	02-Nov-16, 04:33:17		
Datafile:	D:\TES\DATA\Y2016\110116TPH_GC17\110116 2016-11-01 15-06-52\038F4501.D		

Where individual results are flagged see report notes for status.

Customer **ESG Limited Bridgend**
Site **Trowbridge GI**
Report No **W229287**

Consignment No S60148
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Matrix Type	MethodID	BTEXHSA	CALCNH4	CUSTSERV	GROHSA	ICPMSW	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Total Sulphur as SO4 (Diss) VAR	ICPMSVAR	KONENS	LeachPrep	PAHMSW
EX/1744016	BH04B 1.20	Laboratory Produced Leachate	27/10/16	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
△	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No W229287

Consignment No S60148
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Matrix Type	MethodID	SFAPL			TPHFD			WSLM3
				Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Phenol Index SFA	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH GC
EX/1744016	BH04B 1.20	Laboratory Produced Leachate	27/10/16	✓	✓	✓	✓	✓	✓	✓

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
TPHFID	EX1744016	The Secondary process control result associated with this Test has not wholly met the requirements of the Laboratory Quality Management System (QMS). All other Process controls (including the Primary Process control) are within specification. The Laboratory believes that the validity of the data has not been affected but in line with our QMS policy we have removed accreditation from the affected bandings (>c10->c12). These circumstances should be taken into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	BTEXHSA	As Received	Benzene, Toluene, Ethylbenzene, & Xylenes by headspace extraction GCFID quantitation
Water	CALCNH4	As Received	Ammoniacal Nitrogen expressed as NH ₄ , calculated from Ammoniacal Nitrogen expressed as N
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Our Ref: EXR/229296 (Ver. 1)

Your Ref: H6100-16

November 4, 2016



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

CEN Leachate 10:1 - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT



Report No. EXR/229296 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 1 sample described in this report were registered for analysis by ESG on 27-Oct-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Page 4)
GC-FID Chromatograms (Page 5)
Analytical and Deviating Sample Overview (Pages 6 to 7)
Table of Additional Report Notes (Page 8)
Table of Method Descriptions (Page 9)
Table of Report Notes (Page 10)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

A handwritten signature in blue ink, appearing to read 'Tim Barnes'.

Operations Director
Energy & Waste Services


Date of Issue: 04-Nov-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.


ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

			Units :	pH units	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
			Method Codes :	WSLM3	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW	ICPMSW	CALCNH4	KONENS	SFAPI
			Method Reporting Limits :		3	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001	0.001	0.01	0.01	0.02	
			UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
LAB ID Number	Client Sample Description	Sample Date	pH units w	Total Sulphur as SO4 (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	PAH GC-MS (16) o	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Boron as B (Dissolved) a	Mercury as Hg (Dissolved)	Selenium as Se (Dissolved)	Ammoniacal Nitrogen as NH4	Ammoniacal Nitrogen as N	Cyanide (Free) as CN		
1744047	BH03 ES 2 0.10	27-Oct-16	7.5	6.1	0.002	<0.001	<0.0001	Req §	0.024	0.006	0.05	0.004	0.04	<0.0001	<0.001	<0.01	<0.01	<0.02		
 <p>Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422</p>			Client Name	ESG Limited Bridgend								CEN Leachate 10:1								
			Contact	Adam Putt																
			Trowbridge GI								Date Printed	04-Nov-2016								
								Report Number	EXR/229296											
								Table Number	1											

Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l		
Method Codes :	SFAPI	SFAPI	TPHFID	TPHFID	TPHFID	TPHFID	GROHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA		
Method Reporting Limits :	0.02	0.05		0.01	0.01	0.01	0.1	5	5	5	10	15	10	5			
UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes			

LAB ID Number	Client Sample Description	Sample Date	Cyanide (Total) as CN	Phenol Index as C6H5OH	TPH Band >C10-C16	TPH Band >C16-C21	TPH Band (>C21-C35)	TPH GC	GRO >C6->C10	Ethyl Benzene	Benzene	Toluene	MTBE	Xylenes	m/p Xylenes	o Xylene			
1744047	BH03 ES 2 0.10	27-Oct-16	<0.02	<0.05	<0.01	0.01	0.03	0.06	<0.1	>5	>5	>5	<10	<165	<10	>5			

 <p>Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422</p>	Client Name	ESG Limited Bridgend		CEN Leachate 10:1		
	Contact	Adam Putt				
	Trowbridge GI			Date Printed	04-Nov-2016	
				Report Number	EXR/229296	
			Table Number	1		

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH03 ES 2 0.10	Job Number:	W22_9296
LIMS ID Number:	EX1744047	Date Booked in:	27-Oct-16
QC Batch Number:	160692	Date Extracted:	01-Nov-16
Quantitation File:	Initial Calibration	Date Analysed:	01-Nov-16
Directory:	116PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.05	0.236	96
Acenaphthylene	208-96-8	4.09	0.026	M
Acenaphthene	83-32-9	4.21	0.765	97
Fluorene	86-73-7	4.56	0.368	98
Phenanthrene	85-01-8	5.35	0.738	99
Anthracene	120-12-7	5.40	0.161	98
Fluoranthene	206-44-0	6.63	0.228	94
Pyrene	129-00-0	6.91	0.161	96
Benzo[a]anthracene	56-55-3	8.55	0.050	98
Chrysene	218-01-9	8.60	0.046	97
Benzo[b]fluoranthene	205-99-2	10.06	0.043	75
Benzo[k]fluoranthene	207-08-9	10.10	0.019	76
Benzo[a]pyrene	50-32-8	10.48	0.032	95
Indeno[1,2,3-cd]pyrene	193-39-5	11.85	0.026	76
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	12.13	0.024	89
Total (USEPA16) PAHs	-	-	< 2.933	-

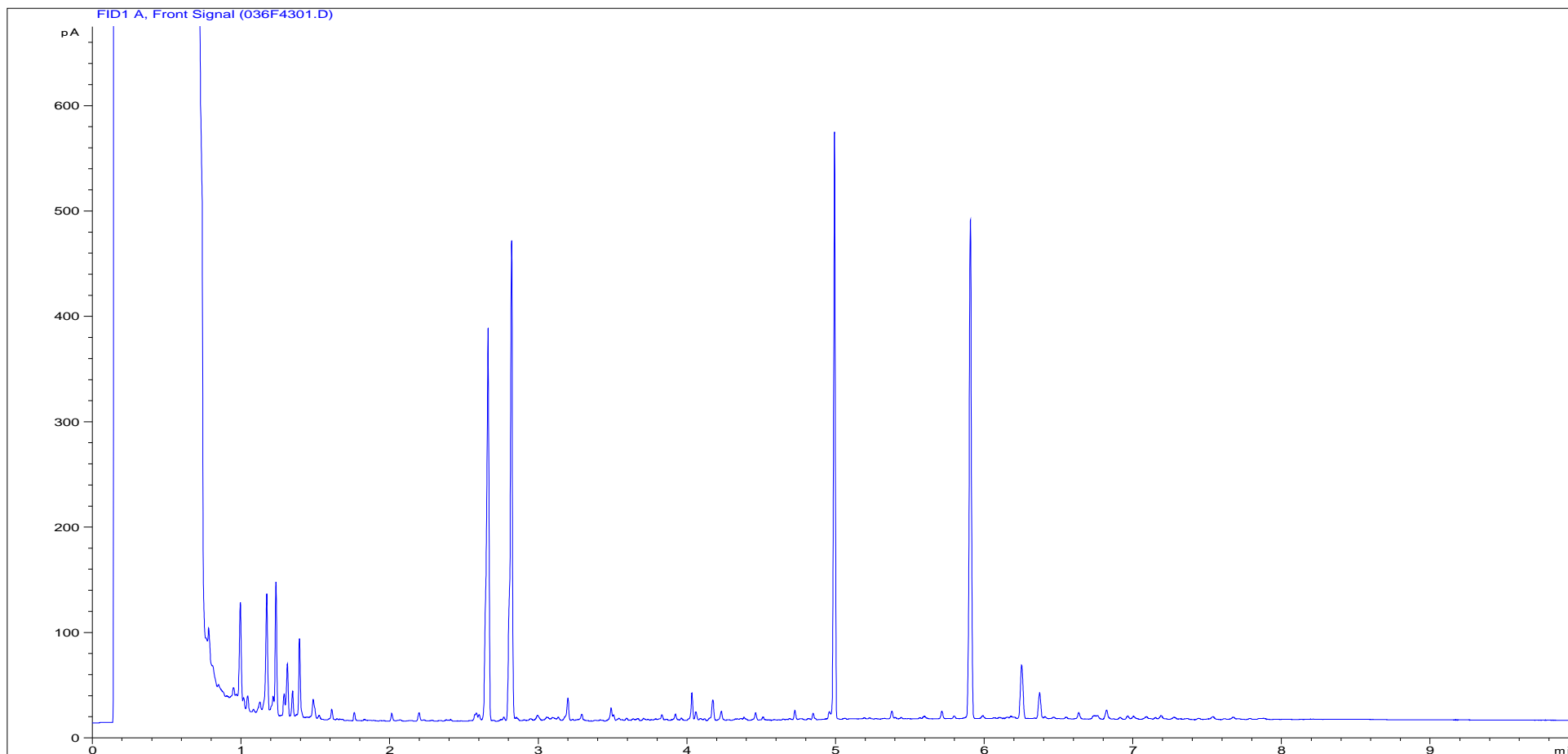
"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	90
Acenaphthene-d10	94
Phenanthrene-d10	94
Chrysene-d12	89
Perylene-d12	102

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	78
Terphenyl-d14	67

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1744047	Job Number:	W22_9296
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge GI
Acquisition Method:	TPH_RUNF.M	Client Sample Ref:	BH03 ES 2 0.10
Acquisition Date/Time:	02-Nov-16, 03:57:39		
Datafile:	D:\TES\DATA\Y2016\110116TPH_GC17\110116 2016-11-01 15-06-52\036F4301.D		

Where individual results are flagged see report notes for status.

Customer **ESG Limited Bridgend**
Site **Trowbridge GI**
Report No **W229296**





Consignment No S59694
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Matrix Type	MethodID	BTEXHSA	CALCNH4	CUSTSERV	GROHSA	ICPMSW	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Total Sulphur as SO4 (Diss) VAR	ICPMSVAR	KONENS	LeachPrep	PAHMSW
EX/1744047	BH03 0.10	Laboratory Produced Leachate	27/10/16	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - Note: due date may be affected if triggered
	No analysis scheduled
	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Customer **ESG Limited Bridgend**
Site **Trowbridge GI**
Report No **W229296**

Consignment No S59694
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Matrix Type	MethodID	SFAPL			TPHFD			W/SLM3
				Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Phenol Index SFA	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH GC
EX/1744047	BH03 0.10	Laboratory Produced Leachate	27/10/16	✓	✓	✓	✓	✓	✓	✓

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Report Number : W/EXR/229296

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
TPHFID	EX1744047	The Secondary process control result associated with this Test has not wholly met the requirements of the Laboratory Quality Management System (QMS). All other Process controls (including the Primary Process control) are within specification. The Laboratory believes that the validity of the data has not been affected but in line with our QMS policy we have removed accreditation from the affected bandings (>c10->c12). These circumstances should be taken into consideration when utilising the data.

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	BTEXHSA	As Received	Benzene, Toluene, Ethylbenzene, & Xylenes by headspace extraction GCFID quantitation
Water	CALCNH4	As Received	Ammoniacal Nitrogen expressed as NH ₄ , calculated from Ammoniacal Nitrogen expressed as N
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Our Ref: EXR/235169 (Ver. 1)

Your Ref: H6100-16

February 15, 2017



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Joss Evans
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Joss Evans

Dear Joss Evans

Sample Analysis - H6100-16 Trowbridge

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink, appearing to read 'K Spencer', with a small horizontal line at the end.

K Spencer
Project Co-ordinator
01283 554463

TEST REPORT

Report No. EXR/235169 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: H6100-16 Trowbridge

The 4 samples described in this report were registered for analysis by ESG on 09-Feb-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 15-Feb-2017

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Pages 4 to 7)
GC-FID Chromatograms (Pages 8 to 11)
Analytical and Deviating Sample Overview (Pages 12 to 13)
Table of Additional Report Notes (Page 14)
Table of Method Descriptions (Page 15)
Table of Report Notes (Page 16)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes



Operations Director
Energy & Waste Services


Date of Issue: 15-Feb-2017


Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

			Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
			Method Codes :	WSLM3	WSLM2	KONENS	ICPWATVART	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSWT	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW		
			Method Reporting Limits :		100	1	3	3	1	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001
LAB ID Number	Client Sample Description	Sample Date	pH units w	Conductivity uS/cm @ 25C w	Chloride as Cl w	Total Sulphur as SO4 (Total) a	Total Sulphur as SO4 (Dissolved) a	Magnesium as Mg (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Total)	Cadmium as Cd (Dissolved)	PAH GC-MS (16) o	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Boron as B (Dissolved) a	Mercury as Hg (Dissolved)	
1768544	BH01 W	06-Feb-17 11:40	7.6	5200	1070	671	747	23	0.004	0.002	0.0004	Req	0.003	<0.001	0.105	0.003	3.59	0.0001	
1768545	BH02A W	06-Feb-17 12:10	7.8	5000	925	625	694	14	0.004	0.002	0.0001	Req	0.002	0.002	0.064	0.005	2.54	0.0001	
1768546	BH03 W	06-Feb-17 12:40	7.5	4000	689	1310	1270	59	0.006	0.037	0.0002	Req	0.003	<0.001	0.105	0.002	4	<0.0001	
1768547	BH04B W	06-Feb-17 13:20	7.4	4000	490	1310	1490	72	0.008	0.024	<0.0001	Req	0.002	<0.001	0.009	0.001	2.75	<0.0001	
 <p>Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422</p>			Client Name	ESG Limited Bridgend								Sample Analysis							
			Contact	Joss Evans															
			H6100-16 Trowbridge								Date Printed	15-Feb-2017							
																			Report Number
											Table Number	1							

		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l			
		Method Codes :	ICPMSW	KONENS	CALC_NO3	KONENS	SFAPI	SFAPI	SFAS	SFAPI	GROHSA	TPHFID	TPHFID	TPHFID	TPHFID	GROHSA		
		Method Reporting Limits :	0.001	0.01	0.9	0.2	0.02	0.02	0.02	0.05	0.1		0.01	0.01	0.01	0.1		
LAB ID Number EX/	Client Sample Description	Sample Date	Selenium as Se (Dissolved)	Ammoniacal Nitrogen as N	Nitrate as NO3 (Kone Calc) w	Nitrate as N	Cyanide (Free) as CN	Cyanide (Total) as CN	Sulphide as S	Phenol Index as C6H5OH	GRO-HSA o	TPH Band >C10-C16	TPH Band >C16-C21	TPH Band (>C21-C35)	TPH GC	GRO >C6->C10		
1768544	BH01 W	06-Feb-17 11:40	0.011	0.5	15.1	3.4	<0.02	<0.02	<0.02	<0.05	<0.1	<0.01	<0.01	0.04	0.05	<0.1		
1768545	BH02A W	06-Feb-17 12:10	0.099	1.0	47.4	10.7	<0.02	<0.02	<0.02	<0.05	<0.1	<0.01	<0.01	0.04	0.06	<0.1		
1768546	BH03 W	06-Feb-17 12:40	0.002	0.8	4.4	1.0	<0.02	<0.02	<0.02	<0.05	<0.1	<0.01	<0.01	<0.01	0.02	<0.1		
1768547	BH04B W	06-Feb-17 13:20	0.001	0.16	<0.9	<0.2	<0.02	<0.02	<0.02	<0.05	<0.1	<0.01	<0.01	0.04	0.06	<0.1		
 Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422			Client Name		ESG Limited Bridgend						Sample Analysis							
			Contact		Joss Evans													
			H6100-16 Trowbridge						Date Printed			15-Feb-2017						
									Report Number			EXR/235169						
H6100-16 Trowbridge						Table Number			1									
						H6100-16 Trowbridge												

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: H6100-16 Trowbridge		
Sample Details:	BH01 W	Job Number:	w23_5169
LIMS ID Number:	EX1768544	Date Booked in:	09-Feb-17
QC Batch Number:	170078	Date Extracted:	13-Feb-17
Quantitation File:	Initial Calibration	Date Analysed:	14-Feb-17
Directory:	\\021317MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	98
Acenaphthene-d10	100
Phenanthrene-d10	107
Chrysene-d12	101
Perylene-d12	100

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	88
Terphenyl-d14	78

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: H6100-16 Trowbridge		
Sample Details:	BH02A W	Job Number:	W23_5169
LIMS ID Number:	EX1768545	Date Booked in:	09-Feb-17
QC Batch Number:	170078	Date Extracted:	13-Feb-17
Quantitation File:	Initial Calibration	Date Analysed:	14-Feb-17
Directory:	\\021317MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	100
Acenaphthene-d10	79
Phenanthrene-d10	121
Chrysene-d12	105
Perylene-d12	108

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	102
Terphenyl-d14	81

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: H6100-16 Trowbridge		
Sample Details:	BH03 W	Job Number:	w23_5169
LIMS ID Number:	EX1768546	Date Booked in:	09-Feb-17
QC Batch Number:	170078	Date Extracted:	13-Feb-17
Quantitation File:	Initial Calibration	Date Analysed:	14-Feb-17
Directory:	\\021317MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	76
Phenanthrene-d10	115
Chrysene-d12	96
Perylene-d12	91

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	117
Terphenyl-d14	79

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: H6100-16 Trowbridge		
Sample Details:	BH04B W	Job Number:	W23_5169
LIMS ID Number:	EX1768547	Date Booked in:	09-Feb-17
QC Batch Number:	170078	Date Extracted:	13-Feb-17
Quantitation File:	Initial Calibration	Date Analysed:	14-Feb-17
Directory:	\\021317MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	6.91	0.012	76
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.172	-

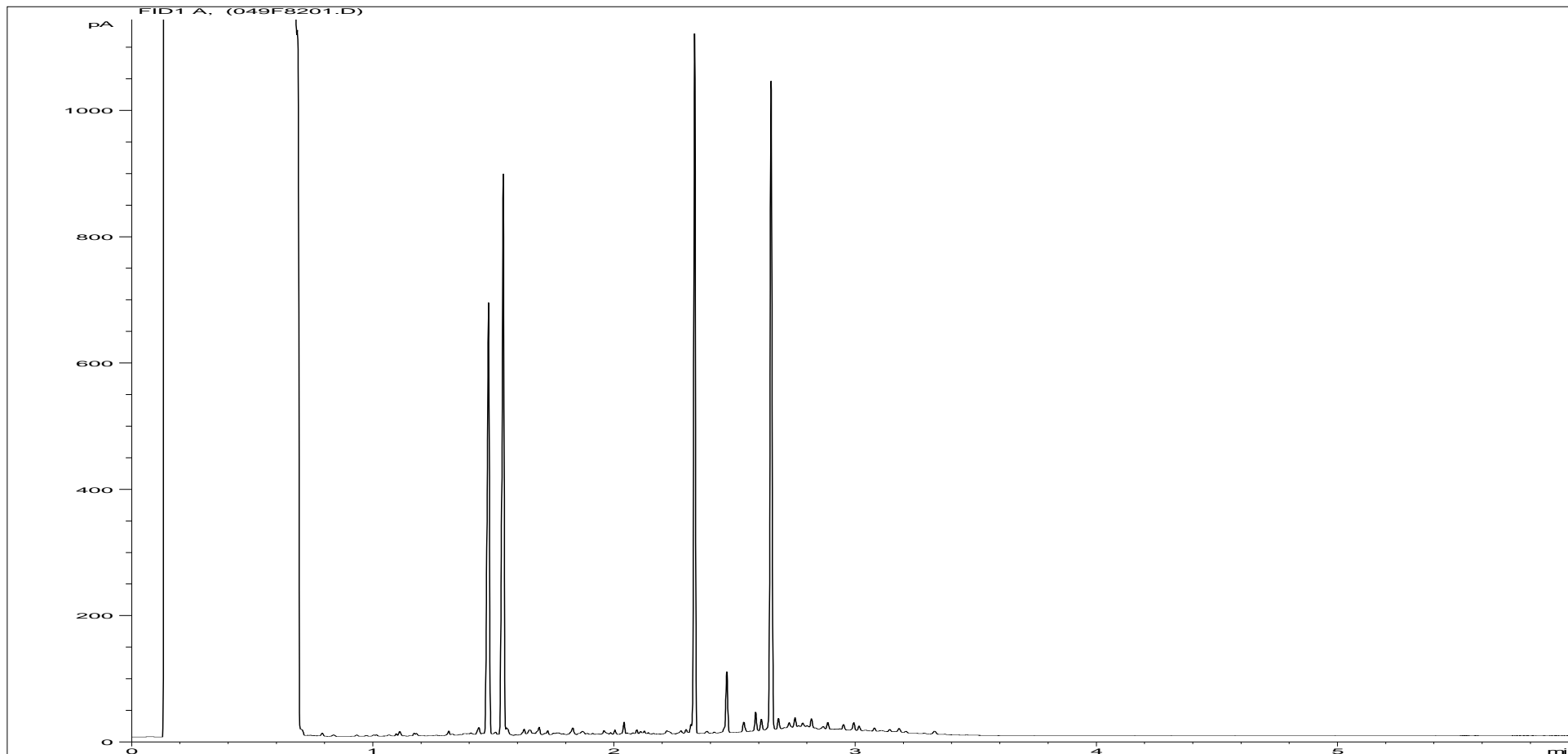
"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	93
Acenaphthene-d10	93
Phenanthrene-d10	111
Chrysene-d12	94
Perylene-d12	93

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	85

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

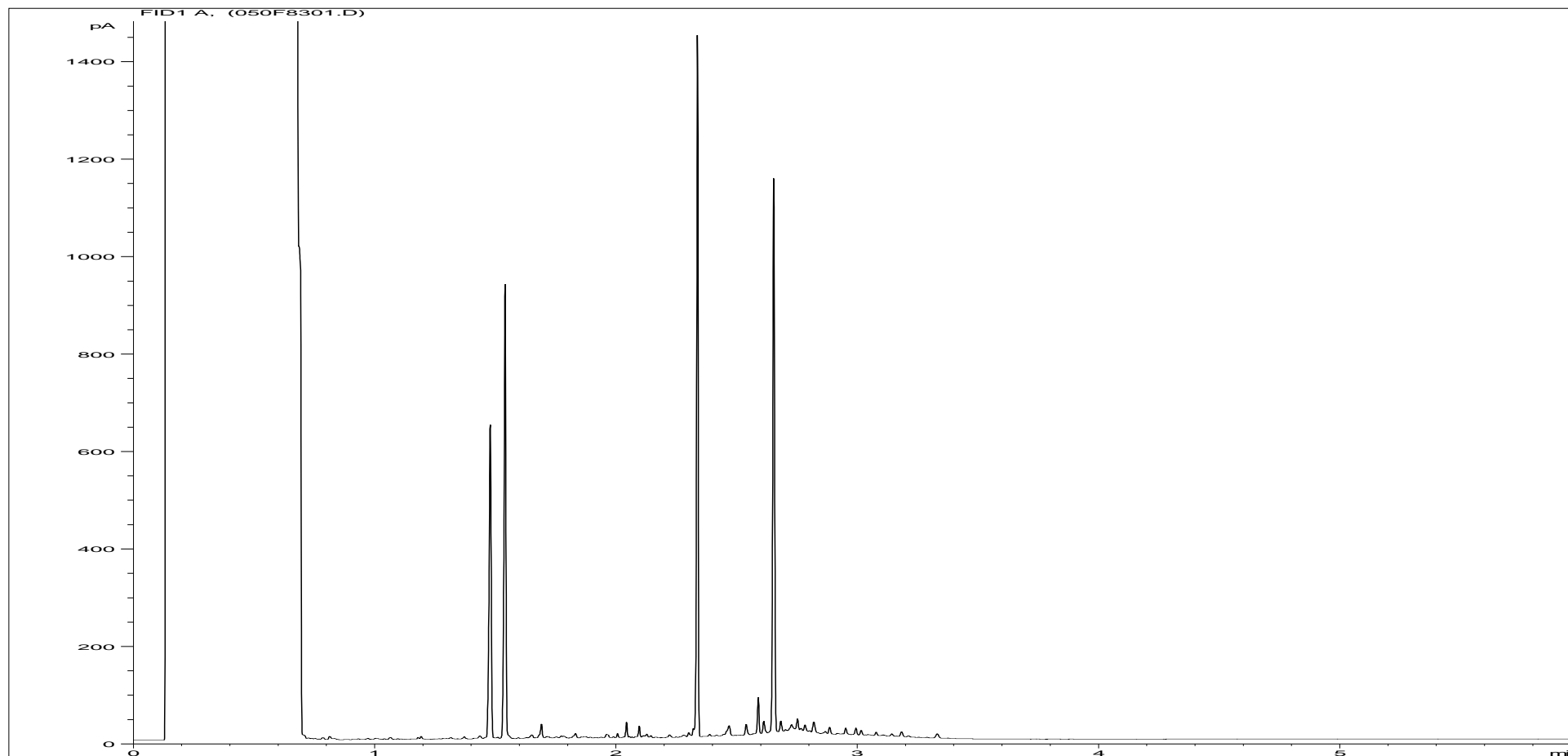
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1768544	Job Number:	W23_5169
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	H6100-16 Trowbridge
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH01 W
Acquisition Date/Time:	14-Feb-17, 04:15:28		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC4\021317 2017-02-13 10-12-39\049F8201.D		

Where individual results are flagged see report notes for status.

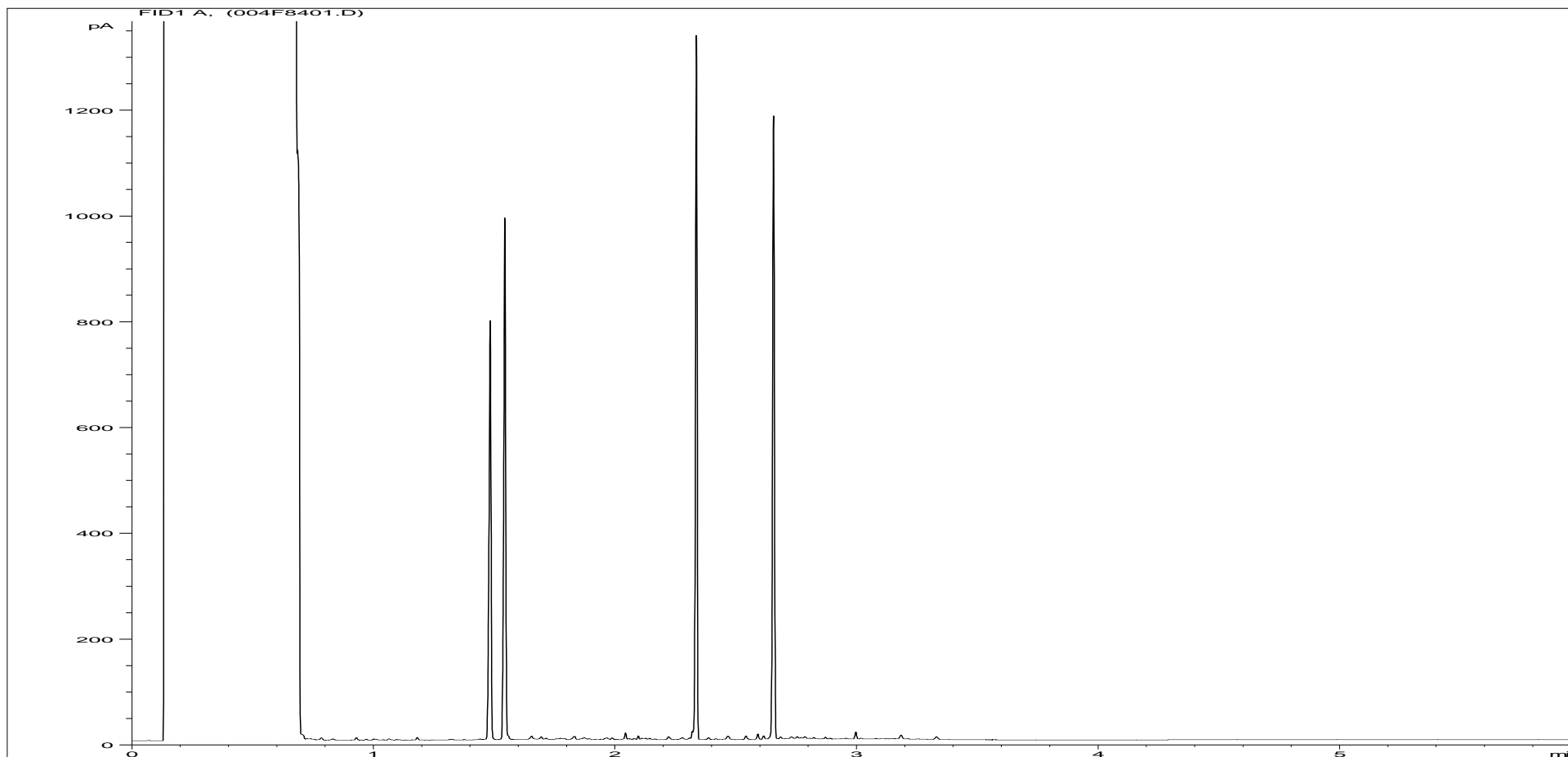
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1768545	Job Number:	W23_5169
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	H6100-16 Trowbridge
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH02A W
Acquisition Date/Time:	14-Feb-17, 04:28:48		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC4\021317 2017-02-13 10-12-39\050F8301.D		

Where individual results are flagged see report notes for status.

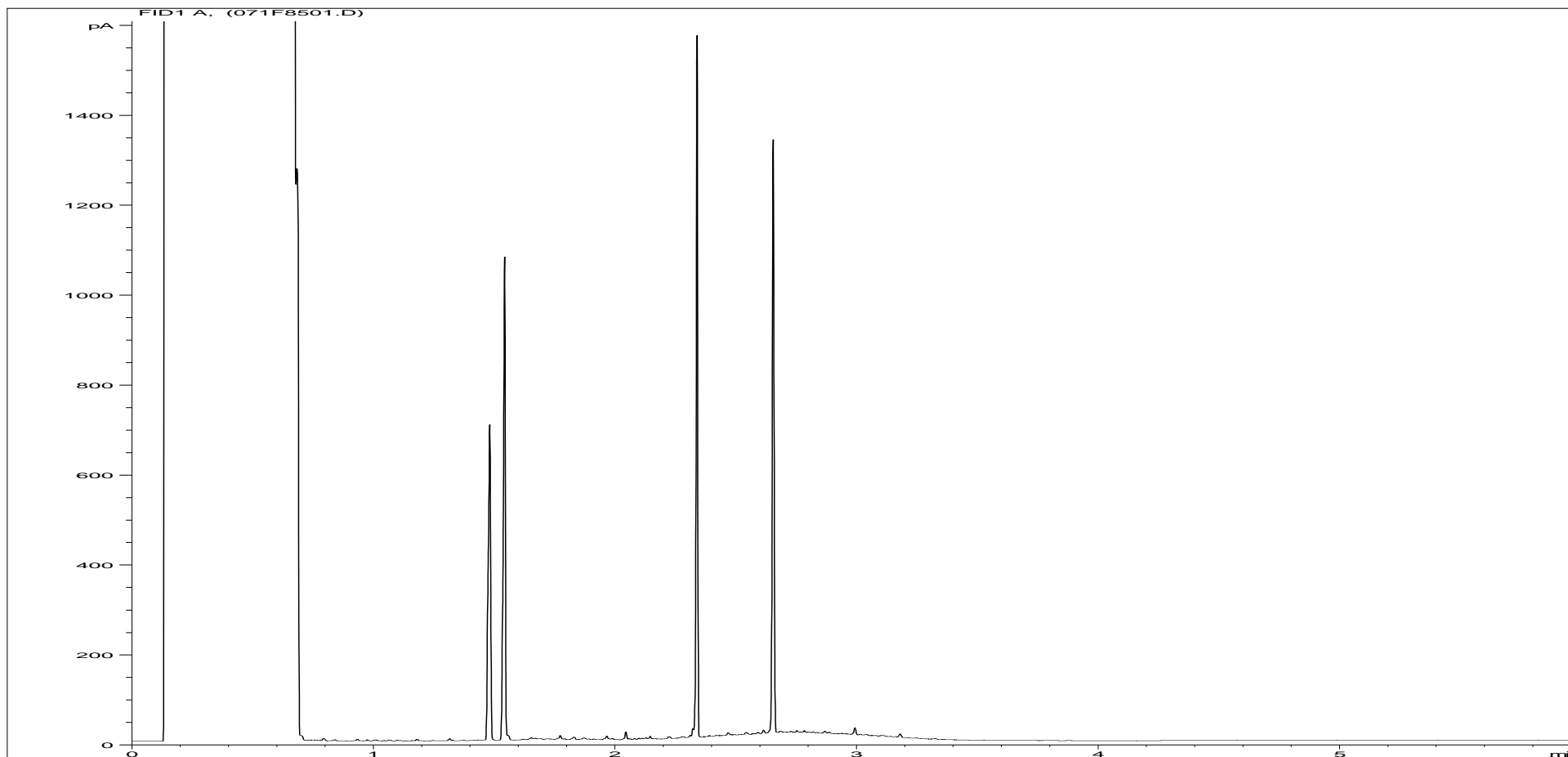
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1768546	Job Number:	W23_5169
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	H6100-16 Trowbridge
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH03 W
Acquisition Date/Time:	14-Feb-17, 04:41:51		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC4\021317 2017-02-13 10-12-39\004F8401.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1768547	Job Number:	W23_5169
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	H6100-16 Trowbridge
Acquisition Method:	5UL_RUNF.M	Client Sample Ref:	BH04B W
Acquisition Date/Time:	14-Feb-17, 04:54:57		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC4\021317 2017-02-13 10-12-39\071F8501.D		

Where individual results are flagged see report notes for status.

Customer **ESG Limited Bridgend**
Site **H6100-16 Trowbridge**
Report No **W235169**

Consignment No W115791
Date Logged 09-Feb-2017

Report Due 15-Feb-2017

ID Number	Description	Matrix Type	MethodID	ICPMSWT							ICPMSWT			ICPMSWT								
				BTEX-HSA	CALC. NO3	CUSTOMER	GRO-HSA	ICPMSWT	ICPMSWT	ICPMSWT	ICPMSWT	ICPMSWT	ICPMSWT	ICPMSWT	ICPMSWT	ICPMSWT	ICPMSWT	ICPMSWT				
			Sampled	BTEX-HSA + MTBE analysis	Nitrate as NO3 (Kone Calc)	Report A	GRO >C6->C10	GRO-HSA	Nickel as Ni MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Chromium as Cr MS (Total)	Total Sulphur as SO4 (Diss) VAR	Magnesium as Mg (Dissolved) VAR	Boron as B (Dissolved) VAR	Total Sulphur as SO4 (Tot) VAR	
EX/1768544	BH01	Unclassified	06/02/17	A			A	A														
EX/1768545	BH02A	Unclassified	06/02/17	A			A	A														
EX/1768546	BH03	Unclassified	06/02/17	A			A	A														
EX/1768547	BH04B	Unclassified	06/02/17	A			A	A														

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
Green	Analysis Required
Yellow	Analysis dependant upon trigger result - Note: due date may be affected if triggered
White	No analysis scheduled
Blue	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Customer **ESG Limited Bridgend**
Site **H6100-16 Trowbridge**
Report No **W235169**

Consignment No W115791
Date Logged 09-Feb-2017

Report Due 15-Feb-2017

ID Number	Description	Matrix Type	MethodID	Sampled	KONENS			PAHMSW	SFAP1	SFAS	TPHFD	W/SLM2			W/SLM3
					Chloride as Cl (Kone)	Ammoniacal Nitrogen (Kone)	Nitrate as N (Kone calc)	PAH GC-MS (16)	Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Phenol Index SFA	Sulphide as S SFA	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)
EX/1768544	BH01	Unclassified	06/02/17				A	B	B	B	A	A	A	A	
EX/1768545	BH02A	Unclassified	06/02/17				A	B	B	B	A	A	A	A	
EX/1768546	BH03	Unclassified	06/02/17				A	B	B	B	A	A	A	A	
EX/1768547	BH04B	Unclassified	06/02/17				A	B	B	B	A	A	A	A	

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
 	Analysis Required
 	Analysis dependant upon trigger result - Note: due date may be affected if triggered
 	No analysis scheduled
 	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Report Number : W/EXR/235169

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHMSW	EX1768544-8547	The Secondary process control result associated with this Test has not wholly met the requirements of the Laboratory Quality Management System (QMS). All other Process controls (including the Primary Process control) are within specification. The Laboratory believes that the validity of the data has not been affected but in line with our QMS policy we have removed accreditation from the affected analytes, Pyrene & Flourene. These circumstances should be taken into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPMSWT	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPMS quantitation
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ICPWATVART	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPOES quantitation
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM2	As Received	Determination of the Electrical Conductivity ($\mu\text{S}/\text{cm}$) by electrical conductivity probe.
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Our Ref: EXR/232019 (Ver. 1)

Your Ref: H6100-16

January 11, 2017



Environmental Chemistry

ESG

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

A handwritten signature in black ink, appearing to read 'K Spencer'.

K Spencer
Project Co-ordinator
01283 554463

TEST REPORT



Report No. EXR/232019 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge

The 3 samples described in this report were registered for analysis by ESG on 12-Dec-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 11-Jan-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (10) Results (Pages 5 to 7)
Table of TPH Texas banding (0.01) (Page 8)
GC-FID Chromatograms (Pages 9 to 11)
Analytical and Deviating Sample Overview (Pages 12 to 14)
Table of Method Descriptions (Page 15)
Table of Report Notes (Page 16)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

A handwritten signature in black ink, appearing to read 'Tim Barnes'.

Operations Director
Energy & Waste Services

Date of Issue: 11-Jan-2017

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.


ESG accepts no responsibility for any sampling not carried out by our personnel.


Where individual results are flagged see report notes for status.

LAB ID Number	EX/	Client Sample Description	Sample Date	pH units w	Conductivity uS/cm @ 25C w	Total Alkalinity as CaCO3 w	Chloride as Cl w	Total Sulphur as SO4 (Dissolved) a	Magnesium as Mg (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Total)	Cadmium as Cd (Dissolved)	PAH GC-MS (16) o	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Boron as B (Dissolved) a	Mercury as Hg (Dissolved)	Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l																				
																				Method Codes :	WSLM3	WSLM2	WSLM12	KONENS	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSWT	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	WSLM3	WSLM2	WSLM12	KONENS	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSWT	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW		
																				Method Reporting Limits :		100		1	3	1	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001																						
																				UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1755772		BH01 W	08-Dec-16	7.4	4160		705	727	33.2	0.01	0.001	0.0003	Req	0.003	<0.001	0.11	<0.001	2.78	<0.0001																																							
1755773		SW1 W	08-Dec-16	7.9	817	268	51	67.4		0.002	0.002	<0.0001	Req	0.002	<0.001	0.013	0.002	0.04	<0.0001																																							
1755774		SW2 W	08-Dec-16	7.8	848	271	54	70.5		0.002	0.004	<0.0001	Req	0.003	<0.001	0.024	0.002	0.04	<0.0001																																							
				Client Name		ESG Limited Bridgend											Sample Analysis																																									
				Contact		Adam Putt											Date Printed		11-Jan-2017																																							
						Trowbridge											Report Number		EXR/232019																																							
																	Table Number		1																																							



Bretby Business Park, Ashby Road
 Burton-on-Trent, Staffordshire, DE15 0YZ
 Tel +44 (0) 1283 554400
 Fax +44 (0) 1283 554422

LAB ID Number	Client Sample Description	Sample Date	Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l		
			Method Codes :	ICPMSW	CALCNH4	KONENS	CALC_NO3	KONENS	SFAPI	SFAPI	SFAS	GROHSA	TPHFID	TPHFID	TPHFID	TPHFID	TPHFID	TPHFID	GROHSA	VOCHSAW
			Method Reporting Limits :	0.001	0.01	0.01	0.9	0.2	0.02	0.02	0.02	0.1		0.01	0.01	0.01	0.01	0.01	0.1	1
			UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
			Selenium as Se (Dissolved)	Ammoniacal Nitrogen as NH4	Ammoniacal Nitrogen as N	Nitrate as NO3 (Kone Calc) w	Nitrate as N	Cyanide (Free) as CN	Cyanide (Total) as CN	Sulphide as S	GRO-HSA o	TPH Band >C10-C16	TPH Band >C16-C21	TPH Band (<C21-C35)	Carbon Banding	TPH GC	GRO >C6->C10	Benzene		
1755772	BH01 W	08-Dec-16	0.006	0.03	0.02	50.5	11.4	<0.02	<0.02	<0.02	<0.1	<0.01	0.01	0.01	Req	0.03	<0.1	<1		
1755773	SW1 W	08-Dec-16	<0.001	0.03	0.02	35.4	8.0	<0.02	<0.02	<0.02	<0.1	<0.01	<0.01	0.01	Req	0.02	<0.1	<1		
1755774	SW2 W	08-Dec-16	<0.001	0.03	0.02	37.2	8.4	<0.02	<0.02	<0.02	<0.1	<0.01	<0.01	0.02	Req	0.03	<0.1	<1		
 Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422			Client Name		ESG Limited Bridgend						Sample Analysis									
			Contact		Adam Putt															
			Trowbridge						Date Printed		11-Jan-2017									
									Report Number		EXR/232019									
									Table Number		1									

LAB ID Number	EX/	Client Sample Description	Sample Date	Units :																								
				μg/l		μg/l		μg/l		μg/l		μg/l		mg/l								mg/l		mg/l		mg/l		
				VOCHSAW	VOCHSAW	VOCHSAW	VOCHSAW	VOCHSAW	VOCHSAW	VOCHSAW	VOCHSAW	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL								PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL
				Method Reporting Limits :				Method Reporting Limits :				Method Reporting Limits :										Method Reporting Limits :						
				UKAS Accredited :				UKAS Accredited :				UKAS Accredited :										UKAS Accredited :						
1		1		2		1		1		2		0.0005		0.0005		0.0005		0.0005										
Yes		Yes		Yes		Yes		Yes		No		No		No		No		No										
Toluene		Ethyl Benzene		Xylenes		m/p Xylenes		o Xylene		MTBE		Phenol		Cresols		Dimethylphenols		Trimethylphenols										
1755772		BH01 W	08-Dec-16	<1	<1	<2	<1	<1	<1	<1	0.0029	<0.0005	<0.0005	<0.0005														
1755773		SW1 W	08-Dec-16	<1	<1	<2	<1	<1	<1	<1	<0.0005	<0.0005	<0.0005	<0.0005														
1755774		SW2 W	08-Dec-16	<1	<1	<2	<1	<1	<1	<1	<0.0005	<0.0005	<0.0005	<0.0005														
 Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422		Client Name		ESG Limited Bridgend										Sample Analysis														
		Contact		Adam Putt																								
		<h1>Trowbridge</h1>										Date Printed		11-Jan-2017														
												Report Number		EXR/232019														
														Table Number		1												

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge		
Sample Details:	BH01 W	Job Number:	w23_2019
LIMS ID Number:	EX1755772	Date Booked in:	12-Dec-16
QC Batch Number:	170005	Date Extracted:	06-Jan-17
Quantitation File:	Initial Calibration	Date Analysed:	09-Jan-17
Directory:	\\010917MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	3.94	0.012	73
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	8.04	0.011	69
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5*	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3*	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2*	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.173	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	121
Acenaphthene-d10	112
Phenanthrene-d10	115
Chrysene-d12	110
Perylene-d12	117

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	77
Terphenyl-d14	71

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge		
Sample Details:	SW1 W	Job Number:	W23_2019
LIMS ID Number:	EX1755773	Date Booked in:	12-Dec-16
QC Batch Number:	170005	Date Extracted:	06-Jan-17
Quantitation File:	Initial Calibration	Date Analysed:	09-Jan-17
Directory:	\\010917MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.18	0.011	97
Pyrene	129-00-0	6.44	0.013	78
Benzo[a]anthracene	56-55-3	8.04	0.016	69
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	9.52	0.011	75
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5*	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3*	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2*	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.181	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	117
Acenaphthene-d10	107
Phenanthrene-d10	107
Chrysene-d12	102
Perylene-d12	109

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	91
Terphenyl-d14	76

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge		
Sample Details:	SW2 W	Job Number:	w23_2019
LIMS ID Number:	EX1755774	Date Booked in:	12-Dec-16
QC Batch Number:	170005	Date Extracted:	06-Jan-17
Quantitation File:	Initial Calibration	Date Analysed:	09-Jan-17
Directory:	\\010917MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.18	0.027	97
Pyrene	129-00-0	6.44	0.027	98
Benzo[a]anthracene	56-55-3	8.03	0.023	65
Chrysene	218-01-9	8.07	0.018	62
Benzo[b]fluoranthene	205-99-2	9.52	0.023	71
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	9.93	0.016	88
Indeno[1,2,3-cd]pyrene	193-39-5*	11.29	0.016	70
Dibenzo[a,h]anthracene	53-70-3*	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2*	11.57	0.011	64
Total (USEPA16) PAHs	-	-	< 0.251	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	115
Acenaphthene-d10	107
Phenanthrene-d10	109
Chrysene-d12	112
Perylene-d12	121

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	88
Terphenyl-d14	74

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

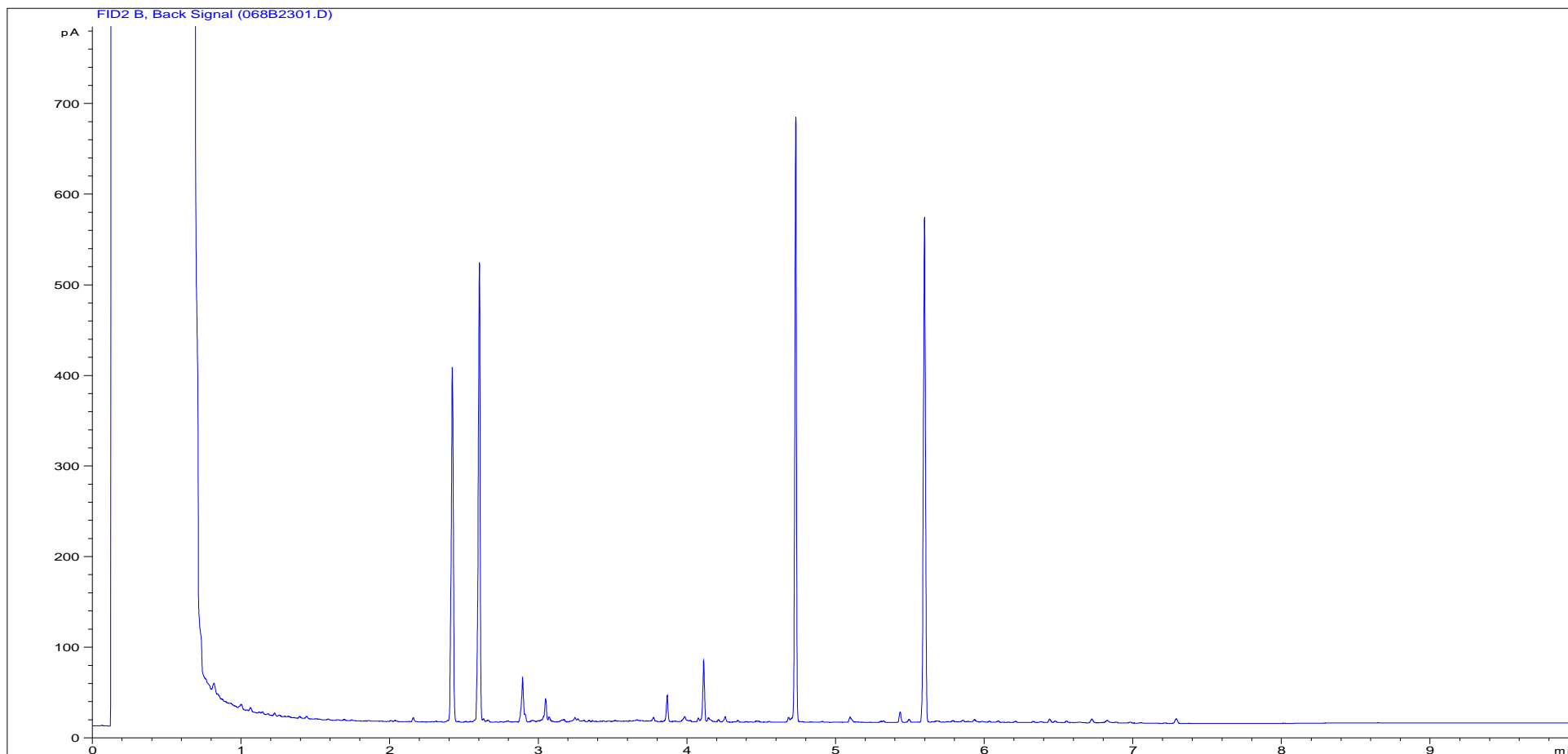
Customer and Site Details: ESG Limited Bridgend : Trowbridge
Job Number: W23_2019
QC Batch Number: 170005
Directory: D:\TES\DATA\Y2017\010617TPH_GC17\010617 2017-01-06 15-31-03\070B2501.D
Method: Bottle

Matrix: Water
Date Booked in: 12-Dec-16
Date Extracted: 06-Jan-17
Date Analysed: 06-Jan-17, 23:01:49

* Sample data with an asterisk are not UKAS accredited.

Sample ID	Client ID	Concentration, (mg/l)				
		>C8 - C10	>C10 - C12	>C12 - C16	>C16 - C21	>C21 - C35
EX1755772	BH01 W	<0.01	<0.01	<0.01	0.01	0.013
EX1755773	SW1 W	<0.01	<0.01	<0.01	<0.01	0.011
EX1755774	SW2 W	<0.01	<0.01	<0.01	<0.01	0.019

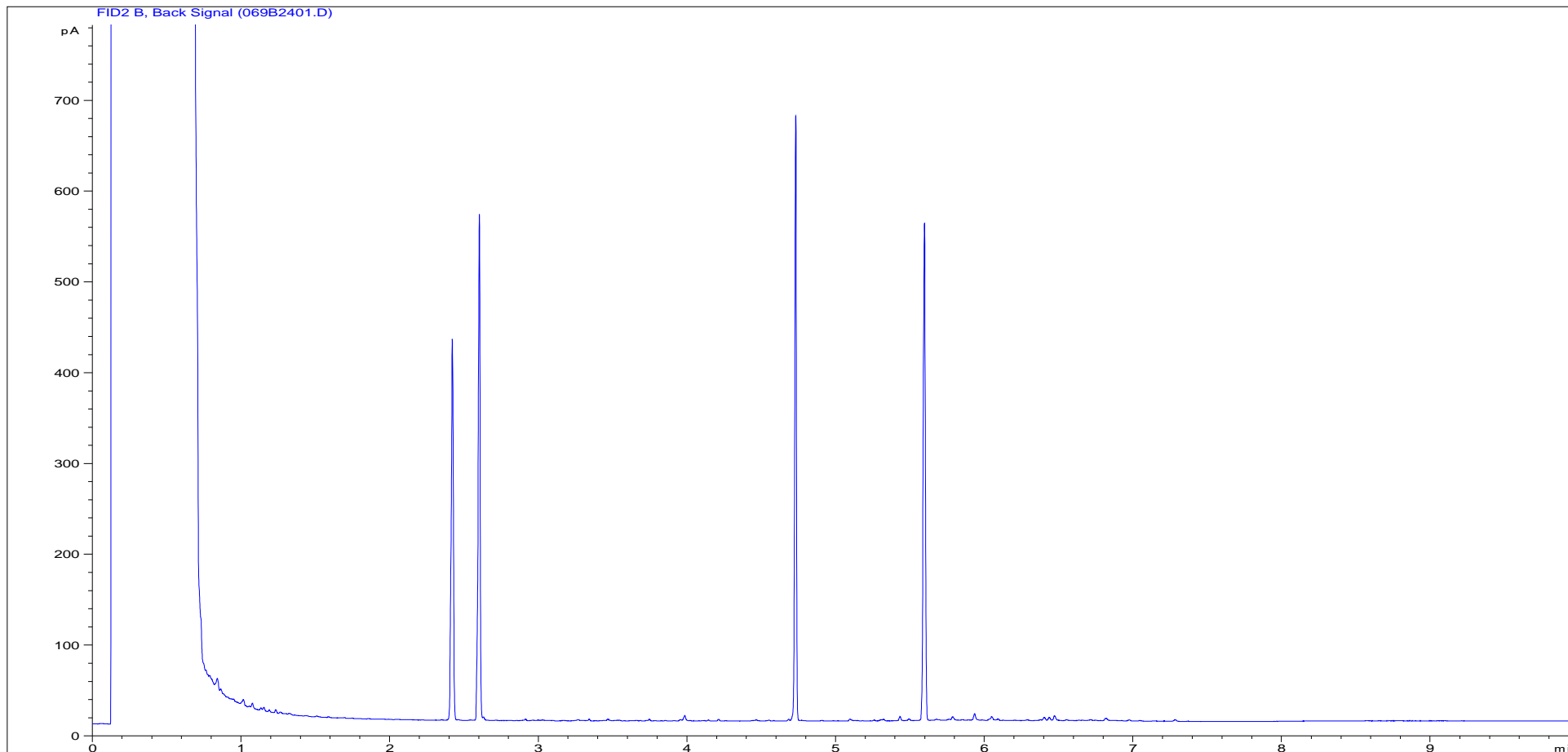
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1755772	Job Number:	W23_2019
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge
Acquisition Method:	TPH_RUNF.M	Client Sample Ref:	BH01 W
Acquisition Date/Time:	06-Jan-17, 22:25:33		
Datafile:	D:\TES\DATA\Y2017\010617TPH_GC17\010617 2017-01-06 15-31-03\068B2301.D		

Where individual results are flagged see report notes for status.

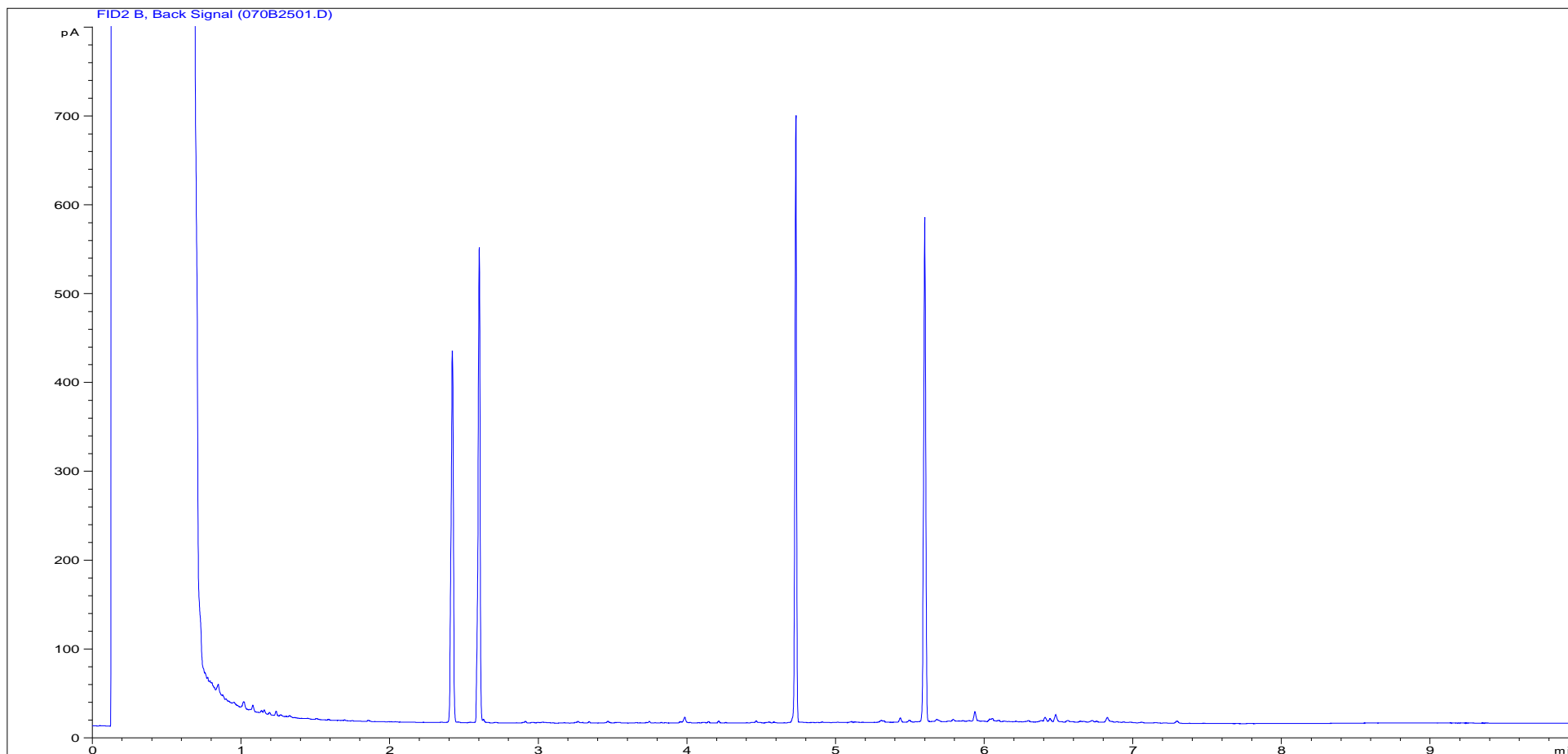
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1755773	Job Number:	W23_2019
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge
Acquisition Method:	TPH_RUNF.M	Client Sample Ref:	SW1 W
Acquisition Date/Time:	06-Jan-17, 22:43:34		
Datafile:	D:\TES\DATA\Y2017\010617TPH_GC17\010617 2017-01-06 15-31-03\069B2401.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1755774	Job Number:	W23_2019
Multiplier:	0.005	Client:	ESG Limited Bridgend
Dilution:	1	Site:	Trowbridge
Acquisition Method:	TPH_RUNF.M	Client Sample Ref:	SW2 W
Acquisition Date/Time:	06-Jan-17, 23:01:49		
Datafile:	D:\TES\DATA\Y2017\010617TPH_GC17\010617 2017-01-06 15-31-03\070B2501.D		

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry Analytical and Deviating Sample Overview

W232019

Customer **ESG Limited Bridgend**
 Site **Trowbridge**
 Report No **W232019**

Consignment No W113284
 Date Logged 12-Dec-2016

Report Due 12-Jan-2017

ID Number	Description	Matrix Type	MethodID	CALC. NOS	CALCH4	CUSRESV	GROHSA	ICPMSW	ICPMSWT	ICPMATVAB	KONENS	GRO >C6->C10	Report A	Nickel as Ni MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Chromium as Cr MS (Total)	Total Sulphur as SO4 (Diss) VAR	Magnesium as Mg (Dissolved) VAR	Boron as B (Dissolved) VAR	Chloride as Cl (Kone)
EX/1755772	BH01	Groundwater	08/12/16	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
EX/1755773	SW1	Surface Water	08/12/16	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
EX/1755774	SW2	Surface Water	08/12/16	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
 	Analysis Required
 	Analysis dependant upon trigger result - Note: due date may be affected if triggered
 	No analysis scheduled
 	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry Analytical and Deviating Sample Overview

W232019

Customer ESG Limited Bridgend
Site Trowbridge
Report No W232019

Consignment No W113284
Date Logged 12-Dec-2016

Report Due 12-Jan-2017

ID Number	Description	Matrix Type	Sampled	MethodID			SFAP1	SFAS	TPHRID	TPH Carbon Banding	TPH Band (>C21-C35)	TPH Band (>C16-C21)	TPH Band (>C10-C16)	Sulphide as S SFA	Cyanide (Total) as CN SFA	Cyanide (Free) as CN SFA	Phenols by HPLC (Low Level)	PAHMSW	KONE	KONENS	VOCMSM	VOCMSM										
				Ammoniacal Nitrogen (Kone)	Nitrate as N (Kone calc)	PAH GC-MS (16)																BTEX + MTBE Analysis HSA GC-MS	TPH GC	Xylenes (ug/l)	MTBE (ug/l)	Ethyl Benzene (ug/l)	Toluene (ug/l)	Benzene (ug/l)	1	2	3	4
EX/1755772	BH01	Groundwater	08/12/16	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
EX/1755773	SW1	Surface Water	08/12/16	E	E	E	BE	BE	BE	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
EX/1755774	SW2	Surface Water	08/12/16	E	E	E	BE	BE	BE	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

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C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
E	Analysis Required
BE	Analysis dependant upon trigger result - Note: due date may be affected if triggered
E	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry Analytical and Deviating Sample Overview

W232019

Customer **ESG Limited Bridgend**
 Site **Trowbridge**
 Report No **W232019**

Consignment No W113284
 Date Logged 12-Dec-2016

Report Due 12-Jan-2017

ID Number	Description	Matrix Type	MethodID Sampled	VOC/SAM		W/SLM12	W/SLM2	W/SLM3
				m/p Xylenes (µg/l)	o Xylene (µg/l)	Total Alkalinity as CaCO3	Conductivity µS/cm @ 25C	pH units
				✓	✓	✓	✓	✓
EX/1755772	BH01	Groundwater	08/12/16	E	E		E	E
EX/1755773	SW1	Surface Water	08/12/16	E	E	E	E	E
EX/1755774	SW2	Surface Water	08/12/16	E	E	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
 	Analysis Required
 	Analysis dependant upon trigger result - Note: due date may be affected if triggered
 	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling. Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	CALCNH4	As Received	Ammoniacal Nitrogen expressed as NH ₄ , calculated from Ammoniacal Nitrogen expressed as N
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPMSWT	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPMS quantitation
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	PHEHPLCVL	As Received	Determination of Phenols by HPLC
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	VOCHSAW	As Received	Determination of Volatile Organics Compounds by Headspace GCMS
Water	WSLM12	As Received	Titration with Sulphuric Acid to required pH
Water	WSLM2	As Received	Determination of the Electrical Conductivity ($\mu\text{S}/\text{cm}$) by electrical conductivity probe.
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

P Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

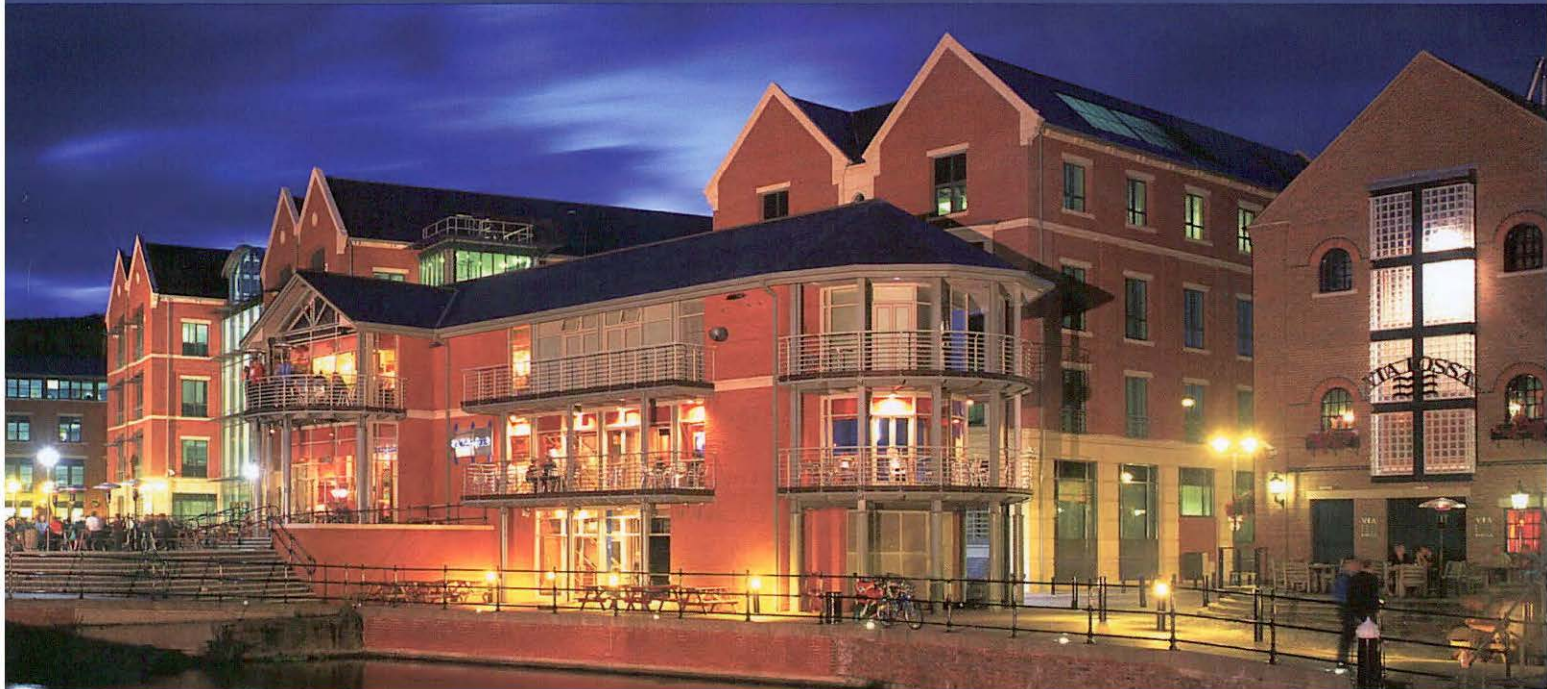
Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

ENVIRONMENTAL

Wessex Water

Trowbridge STW

Ground Investigation and Factual
Report



Integrated Engineering and Environmental Consultants

environmental | water | transportation | civil | structural | highways | infrastructure

BWB
CONSULTING

ENVIRONMENTAL

Wessex Water

Trowbridge STW

Ground Investigation and Factual Report

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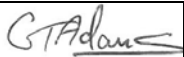
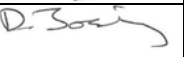
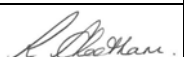
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Date: April 2012

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REPORT REF NO:	BME2019/01/V1	
STATUS:	FINAL	

Document Revision Status

Issue	Date	Comments
01	03/04/2012	Issued to client
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FIGURES

Figure 1	Site Location Plan (included in main text)
Figure 2	Exploratory Hole Location Plan

APPENDICES

Appendix 1	Legal Framework
Appendix 2	Site Photographs
Appendix 3	Drillers Logs
Appendix 4	Borehole Logs
Appendix 5	Trial Pit Logs
Appendix 6	Soil Chemical Laboratory Testing
Appendix 7	Geotechnical Laboratory Testing
Appendix 8	Gas and Groundwater Monitoring Results

1.0 INTRODUCTION

Instruction

1.1 BWB Consulting (BWB) was instructed by Wessex Water (the Client) to carry out a ground investigation at the site at Trowbridge Sewage Treatment Works (STW), Wiltshire. The details of the instruction to undertake the works were received by email confirmation in January 2012 and contained a detailed schedule of works from the client's consultants, Halcrow.

Objectives

1.2 The overall objectives of the investigation are to:

- Confirm prevailing ground and groundwater conditions at the exploratory hole locations;
- Undertake geotechnical and environmental soil testing as requested by the clients consultant;
- Undertake post fieldwork monitoring of ground gas and water; and
- Provide a factual account of the investigation.

1.3 This report presents the factual data relating to the ground investigation completed at the site.

1.4 The report forms part 1 of the Eurocode 7 Ground Investigation Report namely the presentation of geotechnical information.

1.5 Details of the BWB approach and legal framework for the investigation of contaminated land are presented in **Appendix 1**.

Limitations

1.6 The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at that time.

1.7 All of the comments and opinions contained in this report, including any conclusions, are based on the information obtained by BWB during our investigations.

1.8 There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

1.9 Any diagram or opinion of the possible configuration of the findings is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

1.10 Except as otherwise requested by the Client, BWB is not obliged and disclaims any obligation to update the report for events taking place after:

- a) the date on which this assessment was undertaken; and
- b) the date on which the final report is delivered.

- 1.11 BWB makes no representation whatsoever concerning the legal significance of its findings or to other legal matters referred to in the following report.
- 1.12 This report has been prepared for the sole use of Wessex Water. No other third parties may rely upon or reproduce the contents of this report without the written permission of BWB. If any unauthorised third party comes into possession of this report they rely on it at their own risk and the authors do not owe them any Duty of Care or Skill.

2.0 SITE SETTING

Site Location

- 2.1 The site is located within the Trowbridge Sewage Treatment Works in Trowbridge, to the East of Trowle Common, located at national grid reference 384757, 158798. The location of the site is shown below as **Figure 1**.

Figure 1: Site Location Plan



Reproduced from the Ordnance Survey 1:25,000 scale map with the permission of the controller of Her Majesty's Stationery Office Crown Copyright Reserved. OS Licence number 100013665.

Site Description

- 2.2 The site comprises part of the operational Trowbridge sewage treatment works. The site is generally flat, gently sloping from north west to south east, photographs of the site are presented as **Appendix 2**.
- 2.3 Farmers' fields surround the site on all sides with the River Bliss located within 500m to the east of site.

Published Geology

- 2.4 A review of the published geology has found that the local bedrock geology underlying the site is the Kellaway Formation comprising of mudstone.

Site History

- 2.5 The site has been associated with a sewage treatment works as far back as is known about the site.

Proposed Development

- 2.6 It is understood that the proposed development is to extend the existing Trowbridge Sewage Treatment Works with a new digester and sludge storage tanks. The proposed development can be seen as part of **Figure 2**.

3.0 SITE WORK AND LABORATORY TESTING

Scope of Works

- 3.1 The layout of the site and the positioning of all exploratory hole locations are presented as **Figure 2**.
- 3.2 Intrusive works were undertaken between 9th February and 21st February 2012 and comprised the following works:
- 2no cable percussion boreholes followed on with rotary drilling techniques to a maximum depth of 20.53m bgl. The drillers logs are presented as **Appendix 3** and the borehole logs and core photographs are presented as **Appendix 4**;
 - Standard penetration testing (SPT's) carried out within each borehole, results can be found on the appropriate borehole logs;
 - Installation of 2no. 50mm ground gas and water monitoring pipes for the purpose of subsequent ground gas and water monitoring;
 - 5no machine excavated trial pits to a maximum depth of 3.00m bgl, designated TP2 to TP6. The trial pit logs and photographs are presented as **Appendix 5**; and
 - Hand shear vane tests undertaken within each of the trial pits to provide strength characteristics of cohesive materials. The results are presented on the appropriate trial pit logs.
- 3.3 The ground investigation was carried out in general accordance with BS5930: 1999 'Code of practice for Site Investigations', and BS10175: 2000 'Code of Practice for Investigations of Potentially Contaminated Sites'. The ground investigation and exploratory holes were supervised and logged by a BWB geo-environmental engineer.

Sampling and Analytical Strategy

- 3.4 Soil samples were obtained from all exploratory hole locations for geotechnical and chemical testing.
- 3.5 Following correspondence with Halcrow (the client's Consultant), soil samples were sent to a UKAS and MCERTS accredited laboratory and tested for the following suite of chemical analysis:
- 3no. samples tested for sulphate content of acid extract from soil, sulphate content of water extract from soil, water soluble chloride content, acid soluble chloride content and pH value;
 - 2no. samples tested for Total Petroleum Hydrocarbons (TPH) (C6-C40), speciated Polycyclic Aromatic Hydrocarbons (PAH) (16) and asbestos screens; and
 - 3no. samples tested for total waste acceptance criteria.
- 3.6 The results of the chemical analysis are presented as **Appendix 6**.
- 3.7 Groundwater samples were obtained from BH1 using bailers and from BH2 using low flow kit for chemical testing.

3.8 Geotechnical samples collected from all exploratory hole locations were sent to a UKAS accredited laboratory for geotechnical analysis. Geotechnical testing was carried out in general accordance with BS1377: 1990.

3.9 The soil and rock geotechnical tests undertaken comprised of the following:

- 19no. moisture content and Atterberg Limit analyses;
- 11no. particle size distribution tests via wet sieve techniques;
- 11no. particle size distribution tests via sedimentation techniques;
- 3no. one dimensional consolidation tests;
- 5no. 3x38mm diameter triaxial tests;
- 5no. quick undrained triaxial tests; and
- 2no. consolidated undrained triaxial tests.

3.10 The results of the geotechnical laboratory testing are presented as **Appendix 7**.

4.0 ON SITE OBSERVATIONS

Ground Conditions

- 4.1 The ground investigation found the ground conditions present at site to confirm the information reviewed from published geology. The ground conditions encountered comprised topsoil over the weathered Kellaway Formation described as sandy clay, grading into very stiff clay tending to a weak mudstone below 19.0m bgl. Significant thicknesses of made ground were observed to depths of 3.00m bgl, comprising reworked natural material, in the south east of the site.

Visual or Olfactory Evidence of Contamination

- 4.2 No visual or olfactory evidence of contamination was observed within or surrounding any of the exploratory hole locations.

Groundwater

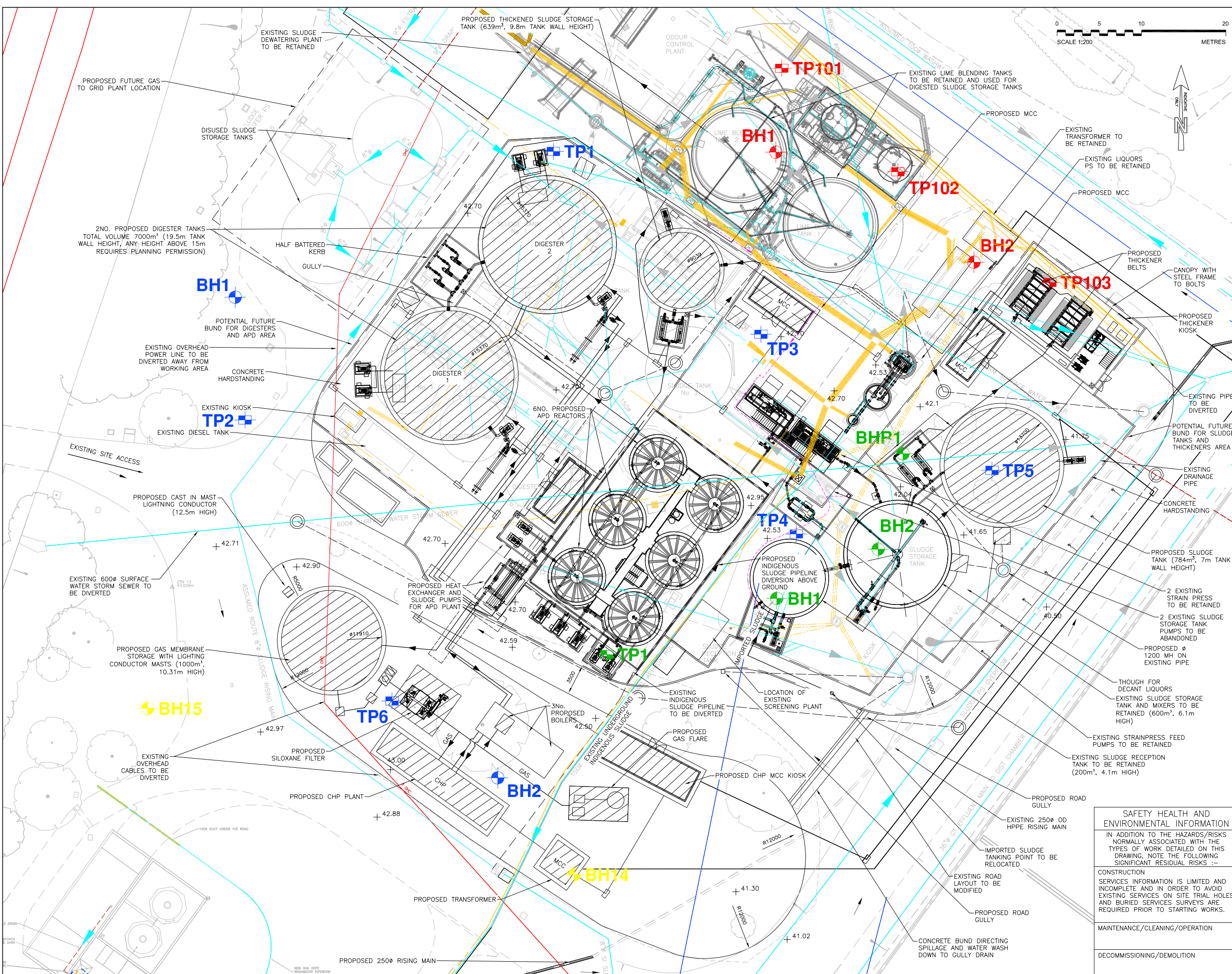
- 4.3 Groundwater was observed within BH2 at 11.14m bgl and within TP6 at 1.50m bgl.
- 4.4 In situ testing of dissolved oxygen, pH, conductivity and redox potential was conducted during the post fieldwork monitoring at both boreholes. The results are presented as **Appendix 8**.

Ground Gas

- 4.5 A single ground gas monitoring event was carried out on the 22nd February 2012, the results are presented as **Appendix 8**.

FIGURES

FIGURE 2
EXPLORATORY HOLE LOCATION PLAN



SITE ID 13318
 NGR ST 84894 58775

NOTES
 1. ANY MAPS SHOWN ON THIS DRAWING ARE REPRODUCED FROM THE ORDANCE SURVEY MAP WITH THE PERMISSION OF HER MAJESTY'S STATIONARY OFFICE © CROWN COPYRIGHT
 2. UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES & ALL LEVELS ARE IN METRES AOD.

- LEGEND:
- SITE ACCESS
 - STRUCTURAL SOILS GROUND INVESTIGATION 2004
 - CJ ASSOCIATES GROUND INVESTIGATION 2008
 - GEOTECHNICS GROUND INVESTIGATION 2008
 - PROPOSED GROUND INVESTIGATION 2011
 - PIPEWORK
 - BT OVERGROUND
 - BT UNDERGROUND
 - BT OTHER
 - GAS
 - CABLE DUCTS
 - WASHWAY
 - CABLE TRAY
 - POTABLE WATER
 - ODOUR PIPEWORK
 - DRAINS
 - DOSING LINES
 - OVERHEAD CABLE

NO.	REVISIONS	DRN	CHK	APP	DATE



	JAR	08/02/12

WUTRAD-HGL-00-XX-DR-CIV-00107-02-00
 TROWBRIDGE STW
 ADVANCED DIGESTION

GROUND INVESTIGATION PLAN

PRELIMINARY
 ORIGINAL DRAWING SIZE A1 SCALE AS SHOWN

DRAWING NUMBER D9542/0107	REV. C
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SAFETY HEALTH AND ENVIRONMENTAL INFORMATION
 IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :-

CONSTRUCTION
 SERVICES INFORMATION IS LIMITED AND INCOMPLETE AND IN ORDER TO AVOID EXISTING SERVICES ON SITE TRIAL HOLES AND BURIED SERVICES SURVEYS ARE REQUIRED PRIOR TO STARTING WORKS.

MAINTENANCE/CLEANING/OPERATION

DECOMMISSIONING/DEMOLITION

APPENDICES

APPENDIX 1
LEGAL FRAMEWORK

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source - pathway - target relationship in accordance with the approach set out in the 1995 Environment Act, The Contaminated Land (England) Regulations 2000 and the DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land. Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

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

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

- Source: Substances that are potential contaminants or pollutants that may cause harm;
- Pathway: A potential route by which contaminants can move from the source to the receptor; and
- Receptor or target: A receptor that may be harmed, for example the water environment, humans, water, flora and fauna.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. Therefore, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the intended use of the site, its characteristics and its surroundings.

The key principle which underpins this approach is the 'suitable for use' criterion. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and appropriate and cost effective remediation techniques exist, taking into account the actual or intended use of the site.

Guidance

BWB Consulting Ltd is a registered Engineering Practice and is regulated by the Institution of Civil Engineers.

This report has been prepared in accordance with:

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

- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002

And any other protocols advised by DEFRA and the EA and guidance's prepared by BSI, CERTA, BURA, and other industry advisory bodies including BS5930 and BS10175.

Judicial Precedents and Legislation

The following non-exhaustive list of legislative framework documents has been considered in the compilation of this document.

- The Environment Act (1995)
- The Environment Protection Act (1990)
- The Water Resources Act (1991)
- The Radioactive Substances Act (1993)
- The Pollution Prevention and Control (England and Wales) Regulations (2000)
- The Contaminated Land (England) Act (2000)
- The Environment Act 1995 (Commencement No.16 and Saving Provision) (England) Order (2000)
- The Contaminated Land (England) (Amendment) Regulations (2001)
- The Landfill Regulations (England and Wales) Regulations (2002)
- The Landfill (England and Wales) (Amendment) Regulations (2004)
- Rylands v Fletcher - Private Nuisance, Escape
- Health and Safety at Work Act
- The Building Regulations 1991, Part C of Schedule 1
- The controlled Waste Regulations 1992
- Special Waste Regulations 1996.

Neither the list of guidance documents nor the list of judicial precedents and legislation should be considered exclusive or comprehensive. There are approximately 85 individual items of legislation regulating contaminated land work. BWB makes every effort to ensure that all are adhered to in the preparation and presentation of this report.

Technical Competence

BWB is a leading specialist multi-disciplinary engineering practice working in the contaminated land market. Most of the workload undertaken by BWB is within the commercial property development market dealing with brownfield re-development and associated environmental and geotechnical issues.

Established in 1990, BWB is at the forefront of environmental asset management providing expertise in environmental risk assessments, environmental site investigations, geotechnical site investigations and remediation strategies.

BWB's staff come from a wide variety of backgrounds within the geotechnical and environmental sectors and are all degree qualified. Specialists include geotechnical engineers, geologists, environmental engineers, IEMA auditors, chartered environmental surveyors, chartered engineers; up to SiLC (Specialist in Land Condition) accreditation.

BWB's technical protocols are described in our reports and are strictly adhered to by quality control checks in the field and in the laboratory. BWB only uses UKAS and

MCERTS accredited laboratories for all methods used to derive determinant concentrations.

BWB operates a quality assurance process under iso9001:2000 which facilitates rigorous in-house administrative and technical protocols and is assessed externally every 6 months. BWB also initiates a robust health and safety program for each site and are an investor in people ensuring the regular training of staff in new guidance's and techniques.

APPENDIX 2
SITE PHOTOGRAPHS



Photo 1 Entrance to site from un-named road



Photo 2 Location of BH1 and TP2



Photo 3 Existing sludge storage tanks



Photo 4 Filter beds located to the south east of site



Photo 5 Location of BH2 and Balfour Beatty contractors on site

APPENDIX 3
DRILLERS LOGS

Daily Report Sheet Rotary

Site: - **TROWBRIDGE STW**
 Job Number: - **AA0125**
 Client: - **BWB**
 Date: - **WED 22.2.2012**
 Rig: - **COMACCHIO 300**

BH
2
 Sheet / of 2

KING ROAD AVENUE
 AVONMOUTH
 BRISTOL BS11 9HF
 Tel: 0117 982 1473
 Fax: 0117 982 8200



TIME RECORD	Total Hours	Start Time	Finish Time
Transport		Dayworks	
Rig Moving		Running Casing/Pulling Casing	
Open Hole Drilling		Repairs & Maintenance	
Core Drilling		Other	
DRILLING RECORD		STRATA & PENETRATION TESTS	

Run No	From	To	Drilled	Recovery	Chkd	Number	Location	From	To	Description of Strata
PICKED UP GAS OIL, GRAVEL AND CORE BOXES AT YARD TRAVELLED TO SITE.								15.20	19.70	FIRM GREY CLAYS.
4	15.20	16.70	1.50	1.50						
	SPT 16.70	7.11.13.19.18								
5	16.70	18.20	1.50	1.50						
	SPT 18.20	7.11.14.18.18								
6	18.20	19.70	1.50	1.50						
	SPT 19.70	8.13.16.18.16								
FOR INSTALLATION DETAILS OF SOMM PIPE INSTALLED IN BH 2 SEE SHEET 2 OF 2										
Depth at end of day										

Water Record			CORE BOXES USED 11.00 - 19.70 3 BOXES			
Depth Struck			Flush Record AIR 400/170cfm COMPRESSOR			
Depth +20mins		Open Hole		Coring		
Type	Return	Type	Return			
		AIR/MIST	GOOD			
BENTONITE USED						
Bit Record						
Daily Water Level Record	Depth Hole	Depth Water	Type & Size	Number	Depth Drilled	
Start of am shift	15.20	13.46	PDC 412		15.20 - 19.70	
End of am shift			CASING RECORD			
Start of pm shift			Size	From	To	
End of pm shift	BW	19.70	SUMMITREX	GL	8.50	
After pulling casing			Water added to assist boring YES	Crew G HADDOCK A EVANS		
After 24hrs			If so depth? 15.20 - 19.70	Signature of driller	Verified by Client	

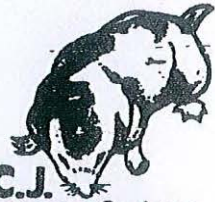
Somm

Stamping ~~XXXXXXXXXX~~

Site TROWBRIDGE STW

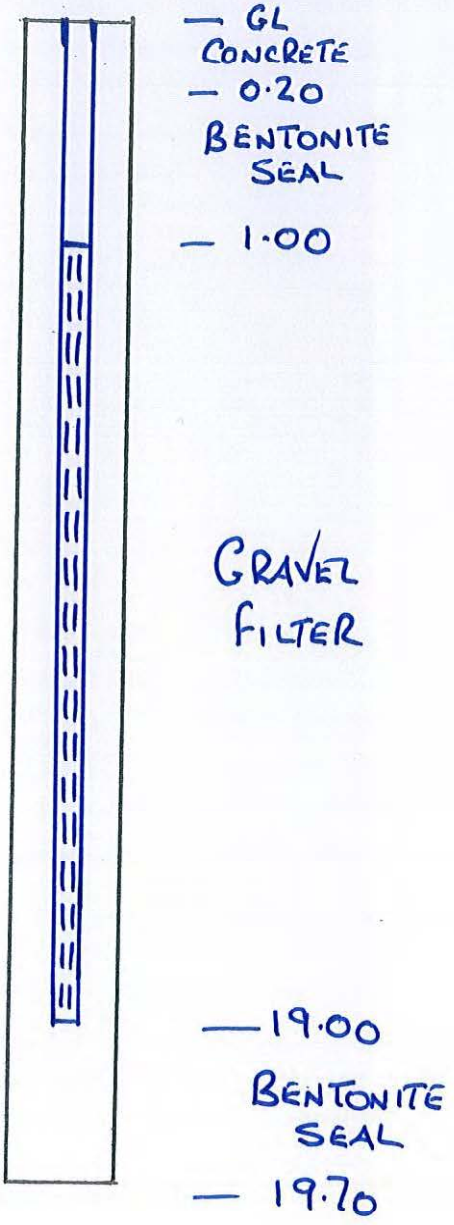
Job Number AA0125

Client BWB



C.J. associates


~~XXXXXXXXXX~~ 2
~~XXXXXXXXXX~~ WEDNESDAY
22.2.2012



GL - 1.00 PLAIN PIPE.
1.00 - 19.00 SLOTTED PIPE.

FLUSH COVER AND GAS VALVE FITTED.

Daily Report Sheet Rotary

Site: - TROWBRIDGE STW	BH / Sheet 1 of 1	KING ROAD AVENUE AVONMOUTH BRISTOL BS11 9HF Tel: 0117 982 1473 Fax: 0117 982 8200 
Job Number: - AA0125		
Client: - BWB		
Date: - MON 20.2.2012		
Rig: - COMACCHIO 300		


TIME RECORD	Total Hours	Start Time	Finish Time
Transport		Dayworks	
Rig Moving		Running Casing/Pulling Casing	
Open Hole Drilling		Repairs & Maintenance	
Core Drilling		Other	

DRILLING RECORD							STRATA & PENETRATION TESTS			
Run No	From	To	Drilled	Recovery	Chkd	Number	Location	From	To	Description of Strata
MOBILIZED TO SITE.										
TRACKED RIG TO BH2										
SET UP										
RUN SIMMITREX CASING IN 2.00MTS.										
REDRILLED CASING DOWN FROM								12.50	19.05	GREY FIRM CLAYS WITH
2.00 - 12.50MTS										SOME SHELLS.
FILLING WATER BOWSER (1HR)										
1	12.50	13.50	1.00	1.00						
SPT	13.50	4.8	11.17	18.4						
2	13.50	15.00	1.50	1.34						
SPT	15.00	5.9	18.24	8/30m						
3	15.00	16.50	1.50	1.40						
SPT	16.50	5.11	13.19	18/63m						
4	16.50	18.00	1.50	1.50						
SPT	18.00	8.15	19.21	10/38m						
5	18.00	19.05	1.05	1.05						
										Depth at end of day

Water Record			CORE BOXES USED			
Depth Struck			Flush Record AIR 400/170 cfm COMPRESSOR			
Depth +20mins			Open Hole		Coring	
			Type	Return	Type	Return
			AIR	GOOD	AIR/MIST	GOOD
			BENTONITE USED			
			Bit Record			
Daily Water Level Record	Depth Hole	Depth Water	Type & Size		Number	Depth Drilled
Start of am shift	/	3.72	PDC 412			12.50 - 19.05
End of am shift			CASING RECORD			
Start of pm shift			Size	From	To	
End of pm shift	19.05	14.72	SIMMITREX	GL	12.50	
After pulling casing			Water added to assist boring YES.	Crew	G HADDOCK A EVANS	
After 24hrs			If so depth? 10.20 - 19.05	Signature of driller	Verified by Client	


(Handwritten Signature)

Daily Report Sheet Rotary

Site: - TROWBRIDGE STW	BH /	KING ROAD AVENUE AVONMOUTH BRISTOL BS11 9HF Tel: 0117 982 1473 Fax: 0117 982 8200 
Job Number: - AA012S		
Client: - BWB		
Date: - TUES 21.2.2012		
Rig: - COMACCHIO 300	Sheet / of 3	

TIME RECORD	Total Hours	Start Time	Finish Time
Transport		Dayworks	
Rig Moving		Running Casing/Pulling Casing	
Open Hole Drilling		Repairs & Maintenance	
Core Drilling		Other	
DRILLING RECORD		STRATA & PENETRATION TESTS	

Run No	From	To	Drilled	Recovery	Chkd	Number	Location	From	To	Description of Strata
FILLING WATER BOWSER (2HR)										
6	19:05	20:30	1.25	1.00						
	SPT 20:30	18. 1/8m	28.	23/50m				19:05	20:30	FIRM GREY CLAYS.
2hr off site, GETTING MATERIALS FOR INSTALLATION										
INSTALLATION DETAILS FOR 50mm PIPE INSTALLED IN BH1 SEE SHEET 2 OF 3										
1HR MOVING EVERYTHING TO BH 2										
Depth at end of day										

Water Record		CORE BOXES USED 12.50 - 20.30 3 BOXES	
Depth Struck		Flush Record AIR 400/170 cfm COMPRESSOR	
Depth +20mins		Open Hole Type Return AIR/MIST GOOD	
		Coring Type Return	
		BENTONITE USED	
		Bit Record	
Daily Water Level Record	Depth Hole	Depth Water	Type & Size PDC 412
Start of am shift	19:05	14:84	Number 19:05 - 20:30
End of am shift			
Start of pm shift			
End of BH1	20:30	17:72	CASING RECORD Size From To SIMMITREX GL 12.50
After pulling casing			Water added to assist boring YES Crew GHADDOCK & EVANS
After 24hrs			If so depth? 19:05 - 20:30 Signature of driller 
		Verified by Client	

50mm

Standpipe installation

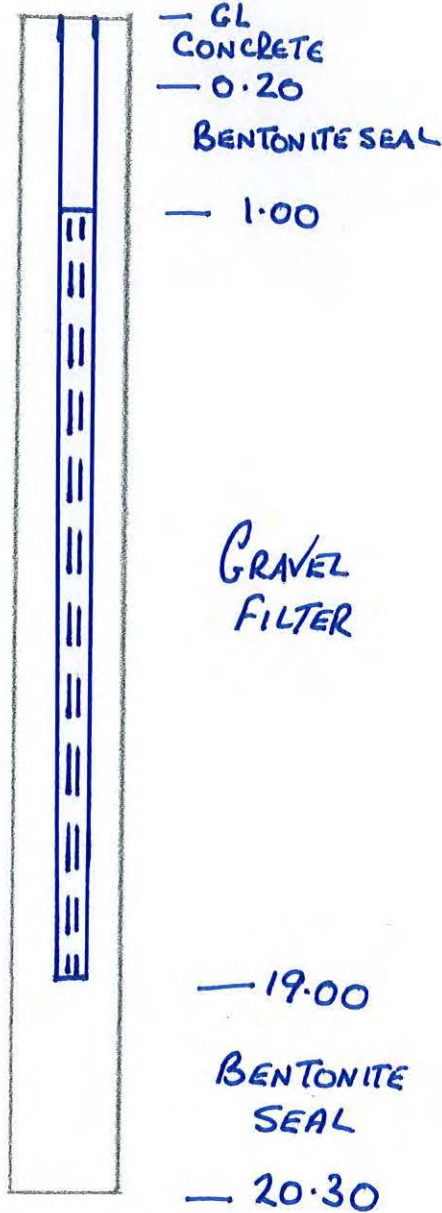
Site TROWBRIDGE STW

Job No AA0125

Client BWB



TUES 21/2/2012



GL - 1.00 PLAIN PIPE.
1.00 - 19.00 SLOTTED PIPE.

FLUSH COVER AND GAS VALVE FILLED.

Cable Percussion Borehole Log Sheet

BH No: 1



Site: Trowbridge STW

Start Date: 10/02/2012

Job Number: AA0125

Finish Date: 10/02/2012

Client: BWB Consulting

Vertical Scale: 1:50

Rig Type: Dando 2000

Total BH Depth: 12.37m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPTs)						U100 Samples: Blows % recovery	Water Strike Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
		Blow Counts			Pen. (mm)									
		Test type	Seat	Test Drive	N-value	Seat	Test							
0.50 - 1.20	B1								0.50	(0.50)		Grass / topsoil (Driller's description).		
1.20 - 1.65	D2 B3	S	1,2	1,2,2,3	N=8	150	300					Orange / brown clay (Driller's description).		
1.70 - 2.00	T4													
2.00 - 2.45	U5							128b 80%		(3.10)				
2.50 - 3.00	T6													
3.00 - 3.45	D7 B8	S	3,3	3,4,4,6	N=17	150	300							
3.50 - 4.00	T9													
4.00 - 4.45	U10							110b 100%		3.60 3.80	(0.20)		grey siltstone (Driller's description).	
4.50 - 5.00	T11												Blue / grey sandy clay (Driller's description).	
5.00 - 5.45	D12 B13	S	4,5	6,6,6,8	N=26	150	300							
6.00 - 6.50	T14													
6.50 - 6.95	U15							109b 60%						
7.50 - 8.00	T16													
8.00 - 8.45	D17 B18	S	5,6	6,7,8,9	N=30	150	300			(8.57)				
8.00 - 8.50														
9.00 - 9.50	T19													
9.50 - 9.95	U20							170b 100%						

(Continued on next sheet)

Hole Progress with Time (Depths in m. below G.L.)					Chiselling			Casing Record		Groundwater Strikes (depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks	From (m)	To (m)	Time (hrs)	Depth (m)	Dia. (mm)	Strike	Casing	Water (20mins)	Sealed	Remarks
		1.65			3.60	3.80		1.65				No Groundwater		

General Remarks:

Drilled By: AN
Logged By:

Cable Percussion Borehole Log Sheet

BH No: 1



Site: Trowbridge STW

Start Date: 10/02/2012

Job Number: AA0125

Finish Date: 10/02/2012

Client: BWB Consulting

Vertical Scale: 1:50

Rig Type: Dando 2000

Total BH Depth: 12.37m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPTs)					U100 Samples: Blows % recovery	Water Strike Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)	
		Test type	Blow Counts			Pen. (mm)								
			Seat	Test Drive	N-value	Seat								Test
10.50 - 11.00	T21										Blue / grey sandy clay (Driller's description).			
11.00 - 11.43	D22	S	8,8	10,10,15,15	N>50	150	145							
11.00 - 11.50	B23													
11.50 - 12.00	T24										BOREHOLE CONTINUED BY ROTARY DRILLING			
12.00 - 12.37	D25	S	10,12	13,15,22,-	N>50	150	220							
12.37														

Hole Progress with Time (Depths in m. below G.L.)					Chiselling			Casing Record		Groundwater Strikes (depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks	From (m)	To (m)	Time (hrs)	Depth (m)	Dia. (mm)	Strike	Casing	Water (20mins)	Sealed	Remarks
	12.37											No Groundwater		

General Remarks: Drilled By: AN
Logged By:

Cable Percussion Borehole Log Sheet

BH No: 2



Site: Trowbridge STW

Start Date: 09/02/2011

Job Number: AA0125

Finish Date: 09/02/2011

Client: BWB Consulting

Vertical Scale: 1:50

Rig Type: Dando 2000

Total BH Depth: 11.14m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPTs)						U100 Samples: Blows % recovery	Water Strike Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
		Blow Counts			Pen. (mm)									
		Test type	Seat	Test Drive	N-value	Seat	Test							
0.50 - 1.20	B1								0.30	(0.30)		Grass / topsoil (Driller's description).		
1.20 - 1.65	D2 B3	S	1.2	3,3,3,3	N=12	150	300			(1.30)		Orange / brown clay (Driller's description).		
1.70 - 2.00	T4								1.60			Orange / green silty / sandy clay (Driller's description).		
2.00 - 2.45	U5							130b 100%		(0.90)				
2.50 - 3.00	T6								2.50			Blue / grey sandy clay (Driller's description).		
3.00 - 3.45	D7 B8	S	2.3	3,4,4,5	N=16	150	300							
3.50 - 4.00	T9													
4.00 - 4.45	U10							63b 70%						
4.50 - 5.00	T11													
5.00 - 5.45	D12 B13	S	4.5	5,5,8,8	N=26	150	300							
5.00 - 5.50														
6.00 - 6.50	T14													
6.50 - 6.95	U15							120b 100%						
7.50 - 8.00	T16													
8.00 - 8.45	D17 B18	S	5.6	6,7,9,9	N=31	150	300							
8.00 - 8.50														
9.00 - 9.50	T19													
9.50 - 9.95	U20							140b 70%						
										(8.64)				

(Continued on next sheet)

Hole Progress with Time (Depths in m. below G.L.)					Chiselling			Casing Record		Groundwater Strikes (depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks	From (m)	To (m)	Time (hrs)	Depth (m)	Dia. (mm)	Strike	Casing	Water (20mins)	Sealed	Remarks
		1.65						1.65			1.65			

General Remarks:

Drilled By: AN
Logged By:

Cable Percussion Borehole Log Sheet

BH No: 2



Site: Trowbridge STW

Start Date: 09/02/2011

Job Number: AA0125

Finish Date: 09/02/2011

Client: BWB Consulting

Vertical Scale: 1:50

Rig Type: Dando 2000

Total BH Depth: 11.14m

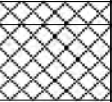
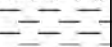
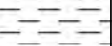
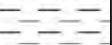

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPTs)						U100 Samples: Blows % recovery	Water Strike Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
		Test type	Blow Counts			Pen. (mm)								
			Seat	Test Drive	N-value	Seat	Test							
10.50 - 11.00	T21											Blue / grey sandy clay (Driller's description).		
11.00 - 11.14	D22	S	13,12	50,-,-	N>50	100	35		11.14			BOREHOLE CONTINUED BY ROTARY DRILLING		

Hole Progress with Time (Depths in m. below G.L.)					Chiselling			Casing Record		Groundwater Strikes (depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks	From (m)	To (m)	Time (hrs)	Depth (m)	Dia. (mm)	Strike	Casing	Water (20mins)	Sealed	Remarks
	11.14		11.14							11.14		10.70		

General Remarks: Drilled By: AN
Logged By:


APPENDIX 4
BOREHOLE LOGS AND PHOTOGRAPHS

Project Title					Trowbridge STW					Hole Ref.		BH1	
Client					Wessex Water					Project No.		BME2019	
Plant used					Dando 2000 / Comacchio 300					Start Date		End Date	
										09/02/2012		21/02/2012	
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing					
Strike	Well					Type	Depth From To	Depth (m) (SPT Type)	Result				
		0.15	MADE GROUND: Grass over dark brown slightly clayey slightly gravelly sandy TOPSOIL. Gravel is subangular fine and medium of flint, mudstone, rare brick and concrete with frequent rootlets.			B DJV	0.50 1.20						
		0.65	MADE GROUND: Reworked soft orangish brown and greyish brown occasionally mottled orange slightly gravelly sandy CLAY with angular cobble of concrete at 0.30m bgl (150x220x260mm). Gravel is angular to subangular fine and medium of mudstone, slate and rare brick with rare rootlets.			DJV	1.50 1.50	1.20 (S)	N=8 (1,2/1,2,2,3)				
			Firm becoming stiff below 4.00m light grey and blueish grey locally silty CLAY with frequent orange mottling and rare rootlets to 1.30m bgl.					3.00 (S)	N=17 (3,3/3,4,4,6)				
								5.00 (S)	N=26 (4,5/6,6,6,8)				
								8.00 (S)	N=30 (5,6/6,7,8,9)				
<i>Continued next sheet</i>													
REMARKS 1. Hand dug service pit to 1.20m bgl. 2. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl. 3. Chiselling undertaken between 3.60m bgl and 3.80m bgl. 4. Simmitrex casing advanced to a depth of 12.50m bgl. 5. No water strike. 6. No visual or olfactory evidence encountered within the exploratory hole. 7. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl.					SOIL SAMPLE TYPE D - 500g to 1kg Disturbed B - 5kg to 20kg Disturbed U - 100mm dia. Undisturbed J - 250ml Amber Glass Jar V - Glass Vial		IN-SITU TESTS SV - Hand Shear Vane HP - Hand Penetrometer N = SPT blows over 300mm S = Split Spoon Sampler C = Solid Cone PID - Photo Ionisation Detector (ppm)		GROUNDWATER ☒ Groundwater strike ▼ Standing groundwater level				
					EASTING -		NORTHING -		GROUND LEVEL -				
					LOGGED BY GA		SCALE 1:50		SHEET Sheet 1 of 3				



BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Environment Group
5th Floor
Waterfront House
Station Street
Nottingham
NG2 3DQ
Tel : 0115 9241100
Fax : 0115 9503966

Project Title					Trowbridge STW		Hole Ref.		BH1			
Client					Wessex Water		Project No.		BME2019			
Plant used					Dando 2000 / Comacchio 300		Start Date		End Date			
					09/02/2012		21/02/2012					
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing				
Strike	Well					Type	Depth From To	Depth (m) (SPT Type)	Result			
			Firm becoming stiff below 4.00m light grey and blueish grey locally silty CLAY with frequent orange mottling and rare rootlets to 1.30m bgl.					11.00 (S)	N=50 (8,8/10,10,15,15)			
			Stiff becoming very stiff below 12.00m, dark greyish blue and dark blue slightly sandy gravelly CLAY locally tending to extremely weak weathered mudstone. Gravel is angular fine to coarse of mudstone.					12.00 (S)	50 (10,12/13,15,22,0 for 0mm)			
			Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly with weak mudstone from 19.00m bgl.					13.50 (S)	50 (4,8/11,17,18,4 for 5mm)			
			Pyrite nodule					15.00 (S)	50 (5,9/18,24,8 for 30mm)			
								16.50 (S)	50 (5,11/13,19,18 for 63mm)			
			Non intact zone					18.00 (S)	50 (8,15/19,21,10 for 38mm)			
			Non intact zone									
			Non intact zone									
			Not silty									
									Continued next sheet			
REMARKS 1. Hand dug service pit to 1.20m bgl. 2. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl. 3. Chiselling undertaken between 3.60m bgl and 3.80m bgl. 4. Simmitrex casing advanced to a depth of 12.50m bgl. 5. No water strike. 6. No visual or olfactory evidence encountered within the exploratory hole. 7. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl.					SOIL SAMPLE TYPE D - 500g to 1kg Disturbed B - 5kg to 20kg Disturbed U - 100mm dia. Undisturbed J - 250ml Amber Glass Jar V - Glass Vial		IN-SITU TESTS SV - Hand Shear Vane HP - Hand Penetrometer N = SPT blows over 300mm S = Split Spoon Sampler C = Solid Cone PID - Photo Ionisation Detector (ppm)		GROUNDWATER ☒ Groundwater strike ☑ Standing groundwater level		 BWB CONSULTANCY ENVIRONMENT INFRASTRUCTURE BUILDINGS Environment Group 5th Floor Waterfront House Station Street Nottingham NG2 3DQ Tel : 0115 9241100 Fax : 0115 9503966	
					EASTING		NORTHING		GROUND LEVEL			
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Project Title					Hole Ref.								
Client					Project No.								
Plant used					Start Date		End Date						
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing					
Strike	Well					Type	Depth From	To	Depth (m) (SPT Type)	Result			
		20.53	Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly with weak mudstone from 19.00m bgl. <i>End of hole at 20.53 m</i>						20.30 (S)	50 (18,7 for 38mm/28,22 for 50mm)			
REMARKS					SOIL SAMPLE TYPE			IN-SITU TESTS					
<ol style="list-style-type: none"> Hand dug service pit to 1.20m bgl. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl. Chiselling undertaken between 3.60m bgl and 3.80m bgl. Simmitrex casing advanced to a depth of 12.50m bgl. No water strike. No visual or olfactory evidence encountered within the exploratory hole. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl. 					D - 500g to 1kg Disturbed B - 5kg to 20kg Disturbed U - 100mm dia. Undisturbed J - 250ml Amber Glass Jar V - Glass Vial			SV - Hand Shear Vane HP - Hand Penetrometer N = SPT blows over 300mm S = Split Spoon Sampler C = Solid Cone PID - Photo Ionisation Detector (ppm)			☒ Groundwater strike ▼ Standing groundwater level		
					EASTING			NORTHING			GROUND LEVEL		
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LOGGED BY					SCALE			SHEET					
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Project Title					Hole Ref.					
Trowbridge STW					BH2					
Client					Project No.					
Wessex Water					BME2019					
Plant used					Start Date		End Date			
Dando 2000 / Comacchio 300					10/02/2012		22/01/2012			
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing		
Strike	Well					Type	Depth From To	Depth (m) (SPT Type)	Result	
		0.20	MADE GROUND: Grass over dark brown clayey slightly gravelly sandy TOPSOIL. Gravel is angular to subangular fine to coarse of flint, mudstone and limestone with frequent rootlets.			B	0.50 1.20			
		0.60	MADE GROUND: Reworked soft brown and greyish brown with occasional orange mottling slightly sandy CLAY with occasional rootlets.			DJV	0.80 0.80			
			Soft becoming firm below 1.20m with depth brown and greyish brown with occasional orange mottling slightly sandy CLAY with occasional rootlets.			D	1.20 1.65	1.20 (S)	N=12 (1,2/3,3,3,3)	
			Occasional orangish brown fine sand pockets			D	1.70 2.00			
		2.50	Firm locally tending to stiff below 3.00m, greyish blue and dark greyish blue slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.			U	2.00 2.45			
			Firm locally tending to stiff greyish blue and dark greyish blue locally slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.			D	2.50 3.00			
						DJV	3.00 3.00	3.00 (S)	N=16 (2,3/3,4,4,5)	
						B	3.50 3.45			
						D	4.00 4.45			
						U	4.00 4.00			
						D	4.50 5.00			
						D	5.00 5.45	5.00 (S)	N=26 (4,5/5,5,8,8)	
						B	5.50 5.50			
		6.00	Becoming stiff locally silty and slightly sandy			D	6.00 6.50			
			Stiff greyish blue and grey locally silty slightly sandy CLAY.			U	6.50 6.95			
			Becoming stiff locally silty and slightly sandy			D	7.50 8.00			
						D	8.00 8.45	8.00 (S)	N=31 (5,6/6,7,9,9)	
						B	8.50 8.50			
						D	9.00 9.50			
						U	9.50 9.95			
<i>Continued next sheet</i>										
REMARKS 1. Hand dug service pit to 1.20m bgl. 2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl. 3. Simmitrex casing advanced to a depth of 8.50m bgl. 4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes. 5. No visual or olfactory evidence encountered within the exploratory hole.					SOIL SAMPLE TYPE D - 500g to 1kg Disturbed B - 5kg to 20kg Disturbed U - 100mm dia. Undisturbed J - 250ml Amber Glass Jar V - Glass Vial		IN-SITU TESTS SV - Hand Shear Vane HP - Hand Penetrometer N = SPT blows over 300mm S = Split Spoon Sampler C = Solid Cone PID - Photo Ionisation Detector (ppm)		GROUNDWATER ☐ Groundwater strike ▼ Standing groundwater level	
					EASTING		NORTHING		GROUND LEVEL	
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Project Title					Hole Ref.					
Client					Project No.					
Plant used					Start Date		End Date			
Groundwater		Depth	Description of Strata	Level	Legend	Samples		In-situ Testing		
Strike	Well	(m)				(mAOD)	Type	Depth From	Depth To	Depth (m) (SPT Type)
		10.70	Firm locally tending to stiff greyish blue and dark greyish blue locally slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.			D	10.70	11.00		
		11.00	Stiff greyish blue and grey locally silty slightly sandy CLAY.			D	11.00	11.06	11.00 (S)	50 (13,12 for 25mm/50 for 35mm)
		11.40	Very stiff dark blue and dark greyish blue sandy gravelly CLAY tending to extremely weak weathered mudstone. Gravel is angular fine to coarse of weathered mudstone.							
			Grey weak silty fossiliferous MUDSTONE. Fractures are horizontal, planar, rough with silt infilling.						12.20 (S)	50 (7,7/12,17,18,3 for 4mm)
			Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly of weak mudstone from 19.00m.							
			Non intact zone						13.70 (S)	50 (5,9/11,13,19,7 for 23mm)
			Non intact zone							
			Non intact zone							
									15.20 (S)	50 (7,13/19,17,14 for 60mm)
			Tending to extremely weak mudstone							
			Tending to extremely weak mudstone						16.70 (S)	50 (7,11/13,19,18 for 66mm)
			Non intact zone							
			Occasional fossils present							
			Horizontal fracture with silt infilling							
									18.20 (S)	50 (7,11/14,18,18 for 61mm)
			Silt band							
			Silt band							
			Tending to extremely weak and weak mudstone							
									19.70 (S)	50 (8,13/16,18,16 for 52mm)
			<i>Continued next sheet</i>							
REMARKS 1. Hand dug service pit to 1.20m bgl. 2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl. 3. Simmitrex casing advanced to a depth of 8.50m bgl. 4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes. 5. No visual or olfactory evidence encountered within the exploratory hole.					SOIL SAMPLE TYPE D - 500g to 1kg Disturbed B - 5kg to 20kg Disturbed U - 100mm dia. Undisturbed J - 250ml Amber Glass Jar V - Glass Vial		IN-SITU TESTS SV - Hand Shear Vane HP - Hand Penetrometer N = SPT blows over 300mm S = Split Spoon Sampler C = Solid Cone PID - Photo Ionisation Detector (ppm)		GROUNDWATER ∇ Groundwater strike ▼ Standing groundwater level	
					EASTING -		NORTHING -		GROUND LEVEL -	
					LOGGED BY GA		SCALE 1:50		SHEET Sheet 2 of 3	

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Project Title					Hole Ref.					
Trowbridge STW					BH2					
Client					Project No.					
Wessex Water					BME2019					
Plant used					Start Date		End Date			
Dando 2000 / Comacchio 300					10/02/2012		22/01/2012			
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing		
Strike	Well					Type	Depth From To	Depth (m) (SPT Type)	Result	
		20.05	Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly of weak mudstone from 19.00m. <i>End of hole at 20.05 m</i>							
REMARKS 1. Hand dug service pit to 1.20m bgl. 2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl. 3. Simmitrex casing advanced to a depth of 8.50m bgl. 4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes. 5. No visual or olfactory evidence encountered within the exploratory hole.					SOIL SAMPLE TYPE D - 500g to 1kg Disturbed B - 5kg to 20kg Disturbed U - 100mm dia. Undisturbed J - 250ml Amber Glass Jar V - Glass Vial		IN-SITU TESTS SV - Hand Shear Vane HP - Hand Penetrometer N = SPT blows over 300mm S = Split Spoon Sampler C = Solid Cone PID - Photo Ionisation Detector (ppm)		GROUNDWATER ☒ Groundwater strike ▼ Standing groundwater level	
EASTING		NORTHING		GROUND LEVEL						
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Job Name: Trowbridge STW
Job No: BME2019
Core Photos



Photo 1 BH1 Core 12.50m to 15.70m



Photo 2 BH1 Core 15.70m to 18.70



Photo 3 BH1 Core 18.70m to 20.00m



Photo 4 BH2 Core 11.00m to 14.00m

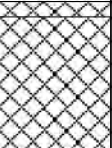
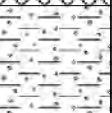
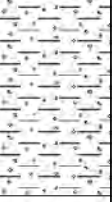




Photo 5 BH2 Core 14.00m to 17.00m



Photo 5 BH2 Core 17.00m to 19.70m

APPENDIX 5
TRIAL PIT LOGS AND PHOTOGRAPHS

Project Title					Hole Ref.					
Client					Project No.					
Plant used					Start Date		End Date			
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing		
Strike	Well					Type	Depth From To	Depth (m) (SPT Type)	Result	
		0.10	MADE GROUND: Grass over dark brown clayey sandy TOPSOIL with frequent rootlets.			DJV	0.40	0.40	0.20	SV = 71 kN/m2 SV = 60 kN/m2 SV = 65 kN/m2
		1.00	MADE GROUND: Firm orangish brown and grey slightly sandy slightly gravelly CLAY. Gravel is angular fine to coarse of brick, siltstone, mudstone and rare coal fragments. Locally gravelly			B	0.60	0.90		
						B	1.20	1.60	1.20	SV = 64 kN/m2 SV = 60 kN/m2 SV = 61 kN/m2
			Soft orangish brown and brownish grey frequently mottled orange locally silty slightly gravelly CLAY. Gravel is angular fine and medium of weathered mudstone. Becoming stiff and gravelly			DJV	1.90	1.90		
						B	2.40	2.70	2.50	SV = 80 kN/m2 SV = 88 kN/m2 SV = 87 kN/m2
		3.00	End of hole at 3.00 m							

REMARKS

1. Trial pit terminated at scheduled depth of 3.00m bgl.
2. No visual or olfactory evidence encountered.
3. Side walls were stable throughout the excavation.
4. No groundwater encountered during excavation.



SOIL SAMPLE TYPE

- D - 500g to 1kg Disturbed
- B - 5kg to 20kg Disturbed
- U - 100mm dia. Undisturbed
- J - 250ml Amber Glass Jar
- V - Glass Vial

IN-SITU TESTS

- SV - Hand Shear Vane
- HP - Hand Penetrometer
- N = SPT blows over 300mm
- S = Split Spoon Sampler
- C = Solid Cone
- PID - Photo Ionisation Detector (ppm)

GROUNDWATER

-  Groundwater strike
-  Standing groundwater level

EASTING

NORTHING

GROUND LEVEL

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Project Title					Hole Ref.				
Trowbridge STW					TP3				
Client					Project No.				
Wessex Water					BME2019				
Plant used					Start Date		End Date		
JCB 3CX					10/02/2012		10/02/2012		
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing	
Strike	Well					Type	Depth From	Depth To	Depth (m) (SPT Type)
		0.15	MADE GROUND: Grey sandy GRAVEL of angular to subangular fine to coarse of mixed lithologies including limestone.			D	0.00	0.10	0.60 SV = 75 kN/m2 SV = 68 kN/m2 SV = 69 kN/m2
		1.00	MADE GROUND: Firm orangish brown and grey occasionally mottled orange slightly sandy slightly gravelly CLAY with rare rootlets. Gravel is angular to subangular fine to coarse of brick and tile fragments.			B	0.50	0.80	
						DJV	0.90	0.90	
						DJV	1.20	1.20	
						B	1.50	1.80	
			MADE GROUND: Firm becoming stiff from 2.00m, dark grey and dark greenish grey with frequent black staining slightly sandy gravelly CLAY with organic odour. Cobble of subangular concrete at 1.60m bgl (350*220*200mm). Gravel is angular to subangular fine to coarse of brick, concrete, mudstone and siltstone.			D	2.30	2.30	2.00 SV = 95 kN/m2 SV = 90 kN/m2 SV = 93 kN/m2
		3.00	End of hole at 3.00 m			D	2.80	2.80	

REMARKS

1. Trial pit terminated at scheduled depth of 3.00m bgl.
2. No visual or olfactory evidence encountered.
3. Side walls were stable throughout the excavation.
4. No groundwater encountered during excavation.



SOIL SAMPLE TYPE

- D - 500g to 1kg Disturbed
- B - 5kg to 20kg Disturbed
- U - 100mm dia. Undisturbed
- J - 250ml Amber Glass Jar
- V - Glass Vial

IN-SITU TESTS

- SV - Hand Shear Vane
- HP - Hand Penetrometer
- N = SPT blows over 300mm
- S = Split Spoon Sampler
- C = Solid Cone
- PID - Photo Ionisation Detector (ppm)

GROUNDWATER

-  Groundwater strike
-  Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
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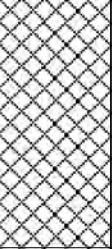
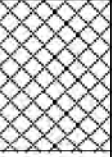


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Project Title					Trowbridge STW					Hole Ref.		TP4	
Client					Wessex Water					Project No.		BME2019	
Plant used					JCB 3CX					Start Date		End Date	
										10/02/2012		10/02/2012	
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing					
Strike	Well					Type	Depth From To	Depth (m) (SPT Type)	Result				
		0.20	MADE GROUND: Grass over dark brown clayey slightly gravelly sandy TOPSOIL. Gravel is subangular fine to coarse of mudstone and brick with frequent rootlets.			DJV	0.10	0.10	0.50	SV = 110 kN/m ² SV = 112 kN/m ² SV = 115 kN/m ²			
						B	0.40	0.70					
						DJV	0.60	0.60					
						D	1.20	1.20					
		1.60	MADE GROUND: Firm tending to stiff from 0.50m, orangish brown and grey mottled orange slightly sandy slightly gravelly CLAY with angular cobble of concrete at 1.50m bgl. Gravel is angular fine to coarse of brick, flint and mudstone with occasional decomposing rootlets and roots. Locally becoming silty			B	1.60	2.00					
						DJV	2.50	2.50					
		3.00	MADE GROUND: Firm dark grey and blueish grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of mudstone and brick with frequent decomposing rootlets and roots. Becoming soft <i>End of hole at 3.00 m</i>										

REMARKS 1. Trial pit terminated at scheduled depth of 3.00m bgl. 2.No visual or olfactory evidence encountered. 3.Side walls were stable throughout the excavation. 4.No groundwater encountered during excavation.	SOIL SAMPLE TYPE D - 500g to 1kg Disturbed B - 5kg to 20kg Disturbed U - 100mm dia. Undisturbed J - 250ml Amber Glass Jar V - Glass Vial	IN-SITU TESTS SV - Hand Shear Vane HP - Hand Penetrometer N = SPT blows over 300mm S = Split Spoon Sampler C = Solid Cone PID - Photo Ionisation Detector (ppm)	GROUNDWATER ☒ Groundwater strike ▼ Standing groundwater level
	EASTING -	NORTHING -	GROUND LEVEL -
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Project Title					Hole Ref.				
Client					Project No.				
Plant used					Start Date		End Date		
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing	
Strike	Well					Type	Depth From	Depth To	Depth (m) (SPT Type)
		0.20	MADE GROUND: Grass over dark brown slightly clayey sandy TOPSOIL with frequent rootlets and angular cobble of brick.			DJV	0.40	0.40	
						B	0.60	0.90	0.60
			MADE GROUND: Stiff orangish brown and grey mottled orange slightly sandy slightly gravelly CLAY with occasional rootlets and rare roots. Gravel is angular to subangular fine to coarse of mudstone, siltstone, sandstone and rare brick fragments.			DJV	1.10	1.10	
						B	1.30	1.70	1.30
		2.00	Firm slightly sandy locally silty Becoming dark grey			DJV	2.10	2.10	
						B	2.50	2.70	
		3.00	MADE GROUND: Firm dark grey and blueish grey occasionally stained black slightly sandy slightly gravelly locally silty CLAY with occasional decomposing rootlets. Gravel is angular fine to coarse of mudstone.			D	3.00	3.00	
			<i>End of hole at 3.00 m</i>						
REMARKS			SOIL SAMPLE TYPE	IN-SITU TESTS	GROUNDWATER				
1. Trial pit terminated at scheduled depth of 3.00m bgl.			D - 500g to 1kg Disturbed	SV - Hand Shear Vane	☒ Groundwater strike				
2.No visual or olfactory evidence encountered.			B - 5kg to 20kg Disturbed	HP - Hand Penetrometer	▼ Standing groundwater level				
3.Side walls were stable throughout the excavation.			U - 100mm dia. Undisturbed	N = SPT blows over 300mm					
4.No groundwater encountered during excavation.			J - 250ml Amber Glass Jar	S = Split Spoon Sampler					
			V - Glass Vial	C = Solid Cone					
			PID - Photo Ionisation Detector (ppm)						
EASTING		NORTHING	GROUND LEVEL						
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Project Title					Hole Ref.					
Trowbridge STW					TP6					
Client					Project No.					
Wessex Water					BME2019					
Plant used					Start Date		End Date			
JCB 3CX					10/02/2012		10/02/2012			
Groundwater		Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples		In-situ Testing		
Strike	Well					Type	Depth From	Depth To	Depth (m) (SPT Type)	Result
		0.20	MADE GROUND: Grass over dark brown slightly clayey sandy TOPSOIL with frequent rootlets and roots. Cobble of angular concrete at 0.15m bgl.			DJV	0.15	0.15	0.70	SV = 68 kN/m2 SV = 70 kN/m2 SV = 67 kN/m2
		0.60				D	0.40	0.40		
			MADE GROUND: Firm orangish brown and grey slightly sandy CLAY. Gravel is fine and medium of rare brick fragments.			B	0.60	0.90	1.20	SV = 72 kN/m2 SV = 70 kN/m2 SV = 60 kN/m2
				DJV		1.20	1.20			
			Firm becoming stiff below 1.50m, grey frequently mottled orangish brown slightly sandy gravelly CLAY. Gravel is angular fine and medium of extremely weak weathered mudstone. Becoming stiff and gravelly			D	1.50	1.50		
						B	1.90	2.20		
						D	2.60	2.60		
				D		3.00	3.00			
		3.00	End of hole at 3.00 m							

REMARKS

1. Trial pit terminated at scheduled depth of 3.00m bgl.
2. No visual or olfactory evidence encountered.
3. Side walls were stable throughout the excavation.
4. Groundwater seepage at 1.50m bgl.

SOIL SAMPLE TYPE

- D - 500g to 1kg Disturbed
- B - 5kg to 20kg Disturbed
- U - 100mm dia. Undisturbed
- J - 250ml Amber Glass Jar
- V - Glass Vial

IN-SITU TESTS

- SV - Hand Shear Vane
- HP - Hand Penetrometer
- N = SPT blows over 300mm
- S = Split Spoon Sampler
- C = Solid Cone
- PID - Photo Ionisation Detector (ppm)

GROUNDWATER

- Groundwater strike
- Standing groundwater level

EASTING

NORTHING

GROUND LEVEL

-

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Photo 1 Back end of TP2



Photo 2 Side of TP2



Photo 3 Side of TP2



Photo 4 Front end of TP2



Photo 5 Spoil from TP2



Photo 6 Back end of TP3



Photo 7 Side of TP3



Photo 8 Base of TP3



Photo 9 Side of TP3



Photo 10 Front end of TP3



Photo 11 Spoil from TP3



Photo 12 Back end of TP4



Photo 13 Side of TP4



Photo 14 Side of TP4



Photo 15 Front end of TP4



Photo 16 Spoil from TP4



Photo 17 Back end of TP5



Photo 18 Side of TP5



Photo 19 Side of TP5



Photo 20 Front end of TP5



Photo 21 Spoil from TP5



Photo 22 Back end of TP6



Photo 23 Side of TP6



Photo 24 Side of TP6



Photo 25 Front end of TP6



Photo 26 Spoil from TP6

APPENDIX 6
SOIL CHEMICAL LABORATORY TESTING



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Colmore Business District
Birmingham
B3 2PB

Attention: Greg Adams

CERTIFICATE OF ANALYSIS

Date: 16 April 2012
Customer: H_BWB_BRM
Sample Delivery Group (SDG): 120216-81
Your Reference: BME2019
Location: Trowbridge
Report No: 177836

This report has been revised and directly supersedes 174209 in its entirety.

We received 18 samples on Tuesday February 14, 2012 and 8 of these samples were scheduled for analysis which was completed on Monday April 16, 2012. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager



SDG: 120216-81
Job: H_BWB_BRM-2
Client Reference: BME2019

Location: Trowbridge
Customer: BWB Consulting
Attention: Greg Adams

Order Number: ne11/493
Report Number: 177836
Superseded Report: 174209

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
5183062	BH 1		0.50	09/02/2012
5183063	BH 1		1.50	09/02/2012
5183060	BH 2		0.80	09/02/2012
5183061	BH 2		3.00	09/02/2012
5183077	BH 2		4.00	10/02/2012
5183072	TP 2		1.90	10/02/2012
5183070	TP 3		0.90	10/02/2012
5183076	TP 3		1.20	10/02/2012
5183067	TP 4		0.10	10/02/2012
5183068	TP 4		0.60	10/02/2012
5183069	TP 4		2.50	10/02/2012
5183064	TP 5		0.40	10/02/2012
5183065	TP 5		1.10	10/02/2012
5183066	TP 5		2.10	10/02/2012
5183073	TP 6		0.15	10/02/2012
5183074	TP 6		0.40	10/02/2012
5183075	TP 6		1.20	10/02/2012

Only received samples which have had analysis scheduled will be shown on the following pages.



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SOLID Results Legend Test No Determination Possible	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	
		5183071	TP 2		0.40	250g Amber Jar (AL 1kg TUB 60g VOC (ALEE215) 250g Amber Jar (AL 1kg TUB
		5183072	TP 2		1.90	250g Amber Jar (AL 1kg TUB
		5183070	TP 3		0.90	250g Amber Jar (AL 1kg TUB
		5183076	TP 3		1.20	60g VOC (ALEE215) 250g Amber Jar (AL 1kg TUB
	5183068	TP 4		0.60	250g Amber Jar (AL 1kg TUB	
	5183064	TP 5		0.40	250g Amber Jar (AL 1kg TUB	
	5183065	TP 5		1.10	60g VOC (ALEE215) 250g Amber Jar (AL 1kg TUB	
	5183075	TP 6		1.20	250g Amber Jar (AL 1kg TUB	
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 3				
Anions by Kone (soil)	All	NDPs: 0 Tests: 3				
Anions by Kone (w)	All	NDPs: 0 Tests: 3				
Asbestos Identification (Soil)	All	NDPs: 0 Tests: 2				
CEN 2:1 Readings	All	NDPs: 0 Tests: 3				
CEN 8:1 Readings	All	NDPs: 0 Tests: 3				
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 3				
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 3				
Fluoride	All	NDPs: 0 Tests: 3				
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3				
Loss on Ignition in soils	All	NDPs: 0 Tests: 3				
Mercury Dissolved	All	NDPs: 0 Tests: 3				
Mineral Oil	All	NDPs: 0 Tests: 3				
PAH by GCMS	All	NDPs: 0 Tests: 2				
PAH Value of soil	All	NDPs: 0 Tests: 3				



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SOLID Results Legend Test No Determination Possible	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	
		5183071	TP 2		0.40	250g Amber Jar (AL) 1kg TUB
		5183072	TP 2		1.90	60g VOC (ALEE215) 250g Amber Jar (AL) 1kg TUB
		5183070	TP 3		0.90	250g Amber Jar (AL) 1kg TUB
		5183076	TP 3		1.20	60g VOC (ALEE215) 250g Amber Jar (AL) 1kg TUB
	5183068	TP 4		0.60	250g Amber Jar (AL) 1kg TUB	
	5183064	TP 5		0.40	250g Amber Jar (AL) 1kg TUB	
	5183065	TP 5		1.10	60g VOC (ALEE215) 250g Amber Jar (AL) 1kg TUB	
	5183075	TP 6		1.20	250g Amber Jar (AL) 1kg TUB	
PCBs by GCMS	All	NDPs: 0 Tests: 3				
pH	All	NDPs: 0 Tests: 6				
Phenols by HPLC (W)	All	NDPs: 0 Tests: 3				
Sample description	All	NDPs: 0 Tests: 8				
Total Dissolved Solids	All	NDPs: 0 Tests: 3				
Total Organic Carbon	All	NDPs: 0 Tests: 3				
Total Sulphate	All	NDPs: 0 Tests: 3				
TPH c6-40 Value of soil	All	NDPs: 0 Tests: 2				

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Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
5183071	TP 2	0.40	Light Brown	Clay	<0.063 mm	Stones	None
5183072	TP 2	1.90	Light Brown	Silty Clay Loam	0.063 - 0.1 mm	None	None
5183070	TP 3	0.90	Dark Brown	Silty Clay	0.063 - 0.1 mm	None	None
5183076	TP 3	1.20	Light Brown	Clay	<0.063 mm	None	None
5183068	TP 4	0.60	Light Brown	Silty Clay	0.063 - 0.1 mm	None	None
5183064	TP 5	0.40	Dark Brown	Silty Clay	0.063 - 0.1 mm	None	None
5183065	TP 5	1.10	Light Brown	Silty Clay	0.063 - 0.1 mm	Stones	None
5183075	TP 6	1.20	Light Brown	Silty Clay Loam	0.063 - 0.1 mm	None	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



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Results Legend		Customer Sample R	TP 2	TP 2	TP 3	TP 3	TP 4	TP 5
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	TP 2	TP 2	TP 3	TP 3	TP 4	TP 5
M	mCERTS accredited.		0.40	1.90	0.90	1.20	0.60	0.40
\$	Deviating sample.		Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
aq	Aqueous / settled sample.		10/02/2012	10/02/2012	10/02/2012	10/02/2012	10/02/2012	10/02/2012
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
				5183071	5183072	5183070	5183076	5183068
Component	LOD/Units	Method						
Loss on ignition	<0.7 %	TM018	4.92			4.38		
			M			M		
Mineral oil >C10-C40	<1 mg/kg	TM061	32.7			52		
			\$ #			\$ #		
Organic Carbon, Total	<0.2 %	TM132	0.513			0.568		
			\$			\$		
pH	1 pH Units	TM133	8.06	4.84		7.86	7.78	
			\$ M	M		\$ M	M	
TPH >C6-C40	<10 mg/kg	TM154			164			<10
					#			#
PCB congener 28	<3 µg/kg	TM168	<3			<3		
			\$ M			\$ M		
PCB congener 52	<3 µg/kg	TM168	<3			<3		
			\$ M			\$ M		
PCB congener 101	<3 µg/kg	TM168	<3			<3		
			\$ M			\$ M		
PCB congener 118	<3 µg/kg	TM168	<3			<3		
			\$ M			\$ M		
PCB congener 138	<3 µg/kg	TM168	<3			<3		
			\$ M			\$ M		
PCB congener 153	<3 µg/kg	TM168	<3			<3		
			\$ M			\$ M		
PCB congener 180	<3 µg/kg	TM168	<3			<3		
			\$ M			\$ M		
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21			<21		
ANC @ pH 4	<0.03 mol/kg	TM182	0.118			0.0809		
ANC @ pH 6	<0.03 mol/kg	TM182	0.044			0.0375		
Polyaromatic hydrocarbons, Total 17	<10 mg/kg	TM213	<10			<10		
Sulphate, Total	<48 mg/kg	TM221		1120			1200	
				M			M	
Water Soluble Sulphate as SO4 2:1 Extract	<0.008 g/l	TM243		0.0423			0.625	
				M			M	
Chloride (soluble)	<5 mg/kg	TM243		6.46			21.9	
				M			M	



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Report Number: 177836
Superseded Report: 174209

Results Legend		Customer Sample R	TP 5	TP 6			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference					
M	mCERTS accredited.		1.10	1.20			
S	Deviating sample.		Soil/Solid	Soil/Solid			
aq	Aqueous / settled sample.		10/02/2012	10/02/2012			
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		14/02/2012	14/02/2012			
(F)	Trigger breach confirmed		120216-81	120216-81			
			5183065	5183075			
Component	LOD/Units	Method					
Loss on ignition	<0.7 %	TM018	4.61				
				M			
Mineral oil >C10-C40	<1 mg/kg	TM061	34.6				
				#			
Organic Carbon, Total	<0.2 %	TM132	0.357				
				#			
pH	1 pH Units	TM133	8.22		4.86		
				M		M	
PCB congener 28	<3 µg/kg	TM168	<3				
				M			
PCB congener 52	<3 µg/kg	TM168	<3				
				M			
PCB congener 101	<3 µg/kg	TM168	<3				
				M			
PCB congener 118	<3 µg/kg	TM168	<3				
				M			
PCB congener 138	<3 µg/kg	TM168	<3				
				M			
PCB congener 153	<3 µg/kg	TM168	<3				
				M			
PCB congener 180	<3 µg/kg	TM168	<3				
				M			
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21				
ANC @ pH 4	<0.03 mol/kg	TM182	0.0757				
ANC @ pH 6	<0.03 mol/kg	TM182	<0.03				
Polyaromatic hydrocarbons, Total 17	<10 mg/kg	TM213	<10				
Sulphate, Total	<48 mg/kg	TM221			1190		
						M	
Water Soluble Sulphate as SO4 2:1 Extract	<0.008 g/l	TM243			0.0494		
						M	
Chloride (soluble)	<5 mg/kg	TM243			19.6		
						M	



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GRO by GC-FID (S)

Table with columns for Component, LOD/Units, Method, and sample types TP 2, TP 3, TP 5. Includes a Results Legend and Customer Sample R header.



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PAH by GCMS

Results Legend		Customer Sample R	TP 3	TP 5			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference					
M	mCERTS accredited.		0.90	0.40			
\$	Deviating sample.		Soil/Solid	Soil/Solid			
aq	Aqueous / settled sample.		10/02/2012	10/02/2012			
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.		14/02/2012	14/02/2012			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		120216-81	120216-81			
(F)	Trigger breach confirmed		5183070	5183064			
Component	LOD/Units		Method				
Naphthalene-d8 % recovery**	%	TM218	92	91.1			
Acenaphthene-d10 % recovery**	%	TM218	91.4	90.5			
Phenanthrene-d10 % recovery**	%	TM218	88.4	88.6			
Chrysene-d12 % recovery**	%	TM218	83.1	82.3			
Perylene-d12 % recovery**	%	TM218	81.9	82			
Naphthalene	<9 µg/kg	TM218	12.5	<9			
Acenaphthylene	<12 µg/kg	TM218	<12	<12			
Acenaphthene	<8 µg/kg	TM218	<8	<8			
Fluorene	<10 µg/kg	TM218	<10	<10			
Phenanthrene	<15 µg/kg	TM218	25.2	<15			
Anthracene	<16 µg/kg	TM218	<16	<16			
Fluoranthene	<17 µg/kg	TM218	38	<17			
Pyrene	<15 µg/kg	TM218	32.2	<15			
Benz(a)anthracene	<14 µg/kg	TM218	27.7	<14			
Chrysene	<10 µg/kg	TM218	19	<10			
Benzo(b)fluoranthene	<15 µg/kg	TM218	29.1	<15			
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14	<14			
Benzo(a)pyrene	<15 µg/kg	TM218	20.8	<15			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18	<18			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23	<23			
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24	<24			
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	204	<118			



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Asbestos Identification - Soil

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP 3 NS Z 0.90 SOLID 10/02/2012 00:00:00 120216-81 5,183,070 TM048	12/03/12	Martin Cotterell	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP 5 NS Z 0.40 SOLID 10/02/2012 00:00:00 120216-81 5,183,064 TM048	12/03/12	Martin Cotterell	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

SDG: 120216-81
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CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference		Site Location	Trowbridge
Mass Sample taken (kg)	0.220	Moisture Content Ratio (%)	26
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	79.4
Particle Size <4mm	>95%		

Case	
SDG	120216-81
Lab Sample Number(s)	5183065
Sampled Date	10-Feb-2012
Customer Sample Ref.	TP 5
Depth (m)	1.10

Landfill Waste Acceptance Criteria Limits		
Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6 or >9	-
-	-	-
-	-	-

Solid Waste Analysis

Total Organic Carbon (%)	0.357
Loss on Ignition (%)	4.61
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	34.6
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.22
ANC to pH 6 (mol/kg)	<0.03
ANC to pH 4 (mol/kg)	0.0757

Eluate Analysis	C ₂ Conc ⁿ in 2:1 eluate	C ₈ Conc ⁿ in 8:1 eluate	A ₂ 2:1 conc ⁿ leached	A ₂₋₁₀ Cumulative conc ⁿ leached	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	mg/l		mg/kg				
Arsenic	0.000548	0.000433	0.0011	0.00446	0.5	2	25
Barium	0.0118	0.00659	0.0236	0.0719	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	<0.00022	<0.00022	<0.000441	<0.0022	0.5	10	70
Copper	0.00374	0.00308	0.0075	0.0316	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	0.00039	0.000487	0.000781	0.00476	0.5	10	30
Nickel	0.000949	0.00123	0.0019	0.012	0.4	10	40
Lead	0.000031	0.0019	0.0000621	0.0168	0.5	10	50
Antimony	<0.00016	<0.00016	<0.000321	<0.0016	0.06	0.7	5
Selenium	0.00148	0.000443	0.00295	0.00562	0.1	0.5	7
Zinc	0.00454	0.0013	0.00909	0.0167	4	50	200
Chloride	2.9	3.3	5.81	32.6	800	15000	25000
Fluoride	0.943	1.13	1.89	11.1	10	150	500
Sulphate (soluble)	59.5	21.2	119	256	1000	20000	50000
Total Dissolved Solids	197	97.3	394	1090	4000	60000	100000
Total Monohydric Phenols (W)	0.05	<0.016	0.1	<0.16	1	-	-
Dissolved Organic Carbon	6.17	3.54	12.4	38.4	500	800	1000

Leach Test Information	2:1	8:1
Date Prepared	06-Mar-2012	08-Mar-2012
pH (pH Units)	8.854	7.839
Conductivity (µS/cm)	248.00	121.00
Temperature (°C)	21.10	14.70
Volume Leachant (Litres)	0.305	1.400
Volume of Eluate VE1 (Litres)	0.200	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates
 16/04/2012 16:13:33

SDG: 120216-81
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CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference		Site Location	Trowbridge
Mass Sample taken (kg)	0.213	Moisture Content Ratio (%)	21.6
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	82.3
Particle Size <4mm	>95%		

Case	
SDG	120216-81
Lab Sample Number(s)	5183071
Sampled Date	10-Feb-2012
Customer Sample Ref.	TP 2
Depth (m)	0.40

Landfill Waste Acceptance Criteria Limits		
Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6 or >9	-
-	-	-
-	-	-

Solid Waste Analysis

Total Organic Carbon (%)	0.513
Loss on Ignition (%)	4.92
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	32.7
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	8.06
ANC to pH 6 (mol/kg)	0.044
ANC to pH 4 (mol/kg)	0.118

Eluate Analysis	C ₂ Conc ⁿ in 2:1 eluate	C ₈ Conc ⁿ in 8:1 eluate	A ₂ 2:1 conc ⁿ leached	A ₂₋₁₀ Cumulative conc ⁿ leached	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	mg/l		mg/kg				
Arsenic	0.00104	0.000499	0.00207	0.00536	0.5	2	25
Barium	0.0231	0.00893	0.0463	0.099	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	0.00299	0.00223	0.00597	0.0228	0.5	10	70
Copper	0.0127	0.00208	0.0253	0.0281	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	0.00243	0.00198	0.00485	0.0201	0.5	10	30
Nickel	0.00192	0.000655	0.00384	0.00742	0.4	10	40
Lead	0.000766	0.000691	0.00153	0.00696	0.5	10	50
Antimony	0.000517	0.00037	0.00103	0.0038	0.06	0.7	5
Selenium	0.000607	<0.00039	0.00121	<0.0039	0.1	0.5	7
Zinc	0.00277	0.00222	0.00553	0.0226	4	50	200
Chloride	3.5	-	7	-	800	15000	25000
Fluoride	0.572	-	1.14	-	10	150	500
Sulphate (soluble)	<2	-	<4	-	1000	20000	50000
Total Dissolved Solids	162	-	324	-	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.032	<0.16	1	-	-
Dissolved Organic Carbon	12.3	-	24.5	-	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	07-Apr-2012	11-Apr-2012
pH (pH Units)	8.424	8.157
Conductivity (µS/cm)	216.00	82.10
Temperature (°C)	21.10	20.00
Volume Leachant (Litres)	0.312	1.400
Volume of Eluate VE1 (Litres)	0.120	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

16/04/2012 16:13:33

16:13:18 16/04/2012

SDG: 120216-81
 Job: H_BWB_BRM-2
 Client Reference: BME2019

Location: Trowbridge
 Customer: BWB Consulting
 Attention: Greg Adams

Order Number: ne11/493
 Report Number: 177836
 Superseded Report: 174209

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference		Site Location	Trowbridge
Mass Sample taken (kg)	0.216	Moisture Content Ratio (%)	23.8
Mass of dry sample (kg)	0.175	Dry Matter Content Ratio (%)	80.8
Particle Size <4mm	>95%		

Case	
SDG	120216-81
Lab Sample Number(s)	5183076
Sampled Date	10-Feb-2012
Customer Sample Ref.	TP 3
Depth (m)	1.20

Landfill Waste Acceptance Criteria Limits		
Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6 or >9	-
-	-	-
-	-	-

Solid Waste Analysis

Total Organic Carbon (%)	0.568
Loss on Ignition (%)	4.38
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	52
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	7.86
ANC to pH 6 (mol/kg)	0.0375
ANC to pH 4 (mol/kg)	0.0809

Eluate Analysis	C ₂ Conc ⁿ in 2:1 eluate	C ₈ Conc ⁿ in 8:1 eluate	A ₂ 2:1 conc ⁿ leached	A ₂₋₁₀ Cumulative conc ⁿ leached	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	mg/l		mg/kg				
Arsenic	0.00352	0.00134	0.00704	0.0162	0.5	2	25
Barium	0.326	0.034	0.651	0.707	20	100	300
Cadmium	0.000132	<0.0001	0.000264	<0.001	0.04	1	5
Chromium	0.00161	0.000946	0.00322	0.0103	0.5	10	70
Copper	0.0188	0.00242	0.0376	0.0448	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	0.00433	0.00302	0.00865	0.0318	0.5	10	30
Nickel	0.0133	0.00387	0.0266	0.0505	0.4	10	40
Lead	0.0142	0.000108	0.0284	0.0188	0.5	10	50
Antimony	0.000636	0.000803	0.00127	0.00782	0.06	0.7	5
Selenium	0.00378	0.000536	0.00754	0.00944	0.1	0.5	7
Zinc	0.132	0.00251	0.264	0.188	4	50	200
Chloride	8.9	<2	17.8	<20	800	15000	25000
Fluoride	<0.5	-	<0.999	-	10	150	500
Sulphate (soluble)	926	151	1850	2480	1000	20000	50000
Total Dissolved Solids	1240	336	2480	4500	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.032	<0.16	1	-	-
Dissolved Organic Carbon	26.4	7.75	52.8	101	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	04-Apr-2012	08-Apr-2012
pH (pH Units)	8.109	8.019
Conductivity (µS/cm)	1,634.00	445.00
Temperature (°C)	20.50	21.10
Volume Leachant (Litres)	0.308	1.400
Volume of Eluate VE1 (Litres)	0.220	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
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16:13:18 16/04/2012

SDG: 120216-81
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Notification of Deviating Samples

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5309181	TP 3	0.90	SOLID	PAH by GCMS	Acenaphthene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Acenaphthene-d10 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Acenaphthylene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Anthracene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benz(a)anthracene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benzo(a)pyrene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benzo(b)fluoranthene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benzo(g,h,i)perylene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benzo(k)fluoranthene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Chrysene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Chrysene-d12 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Dibenzo(a,h)anthracene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Fluoranthene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Fluorene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Indeno(1,2,3-cd)pyrene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Naphthalene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Naphthalene-d8 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	PAH, Total Detected USEPA 16	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Perylene-d12 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Phenanthrene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Phenanthrene-d10 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Pyrene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Acenaphthene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Acenaphthene-d10 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Acenaphthylene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Anthracene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benz(a)anthracene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benzo(a)pyrene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benzo(b)fluoranthene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benzo(g,h,i)perylene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benzo(k)fluoranthene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Chrysene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Chrysene-d12 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Dibenzo(a,h)anthracene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Fluoranthene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Fluorene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Indeno(1,2,3-cd)pyrene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Naphthalene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Naphthalene-d8 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	PAH, Total Detected USEPA 16	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Perylene-d12 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Phenanthrene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Phenanthrene-d10 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Pyrene	Sample holding time exceeded
5426084	TP 3	1.20	SOLID	pH	pH	Sample holding time exceeded
5426091	TP 2	0.40	SOLID	pH	pH	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 101	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 118	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 138	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 153	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 180	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 28	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 52	Sample holding time exceeded
5429653	TP 3	1.20	SOLID	Mineral Oil	Mineral oil >C10-C40	Sample holding time exceeded
5429660	TP 3	1.20	SOLID	Total Organic Carbon	Organic Carbon, Total	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 101	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 118	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 138	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 153	Sample holding time exceeded



CERTIFICATE OF ANALYSIS

SDG: 120216-81
Job: H_BWB_BRM-2
Client Reference: BME2019

Location: Trowbridge
Customer: BWB Consulting
Attention: Greg Adams

Order Number: ne11/493
Report Number: 177836
Superseded Report: 174209

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 180	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 28	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 52	Sample holding time exceeded
5429664	TP 2	0.40	SOLID	Mineral Oil	Mineral oil >C10-C40	Sample holding time exceeded
5429670	TP 2	0.40	SOLID	Total Organic Carbon	Organic Carbon, Total	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	Benzene	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	Ethylbenzene	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	m,p-Xylene	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	o-Xylene	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	Toluene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	Benzene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	Ethylbenzene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	m,p-Xylene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	o-Xylene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	Toluene	Sample holding time exceeded

Note : Test results may be compromised



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Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM114		Leaching Procedure for CEN Two Stage BatchTest 2:1/8:1 Cumulative		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM154	In - house Method	Determination of Petroleum Hydrocarbons by EZ Flash GC-FID in the Carbon range C6- C40		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer		
TM243		Mixed Anions In Soils By Kone		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



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Test Completion Dates

Lab Sample No(s)	5183071	5183072	5183070	5183076	5183068	5183064	5183065	5183075
Customer Sample Ref.	TP 2	TP 2	TP 3	TP 3	TP 4	TP 5	TP 5	TP 6
AGS Ref.								
Depth	0.40	1.90	0.90	1.20	0.60	0.40	1.10	1.20
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
ANC at pH4 and ANC at pH 6	11-Apr-2012			11-Apr-2012			09-Mar-2012	
Anions by Kone (soil)		09-Mar-2012			09-Mar-2012			09-Mar-2012
Anions by Kone (w)	16-Apr-2012			13-Apr-2012			14-Mar-2012	
Asbestos Identification (Soil)			12-Mar-2012			12-Mar-2012		
CEN 2:1 Leachate (2 Stage)	11-Apr-2012			05-Apr-2012			06-Mar-2012	
CEN 2:1 Readings	13-Apr-2012			10-Apr-2012			09-Mar-2012	
CEN 8:1 Leachate (2 Stage)	13-Apr-2012			10-Apr-2012			09-Mar-2012	
CEN 8:1 Readings	13-Apr-2012			13-Apr-2012			12-Mar-2012	
Dissolved Metals by ICP-MS	16-Apr-2012			13-Apr-2012			13-Mar-2012	
Dissolved Organic/Inorganic Carbon	14-Apr-2012			13-Apr-2012			13-Mar-2012	
Fluoride	16-Apr-2012			13-Apr-2012			14-Mar-2012	
GRO by GC-FID (S)	14-Apr-2012			14-Apr-2012			13-Mar-2012	
Loss on Ignition in soils	11-Apr-2012			13-Apr-2012			09-Mar-2012	
Mercury Dissolved	16-Apr-2012			13-Apr-2012			13-Mar-2012	
Mineral Oil	12-Apr-2012			12-Apr-2012			09-Mar-2012	
PAH by GCMS			14-Mar-2012			14-Mar-2012		
PAH Value of soil	13-Apr-2012			13-Apr-2012			09-Mar-2012	
PCBs by GCMS	11-Apr-2012			11-Apr-2012			10-Mar-2012	
pH	14-Apr-2012	08-Mar-2012		14-Apr-2012	08-Mar-2012		12-Mar-2012	08-Mar-2012
Phenols by HPLC (W)	16-Apr-2012			13-Apr-2012			13-Mar-2012	
Sample description	06-Apr-2012	07-Mar-2012	12-Mar-2012	06-Apr-2012	07-Mar-2012	12-Mar-2012	07-Mar-2012	07-Mar-2012
Total Dissolved Solids	13-Apr-2012			12-Apr-2012			12-Mar-2012	
Total Organic Carbon	12-Apr-2012			12-Apr-2012			09-Mar-2012	
Total Sulphate		12-Mar-2012			12-Mar-2012			12-Mar-2012
TPH c6-40 Value of soil			13-Mar-2012			13-Mar-2012		

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Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5 -C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D&C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENTEXTRACTABLE MATTER	D&C	DOM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
ELEMENTAL SULPHUR	D&C	DOM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DOM	SOX THERM	GC-MS
HERBICIDES	D&C	HEXANE ACETONE	SOX THERM	GC-MS
PESTICIDES	D&C	HEXANE ACETONE	SOX THERM	GC-MS
EPH (DFO)	D&C	HEXANE ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE ACETONE	END OVER END	GC-FID
EPH CWGBY GC	D&C	HEXANE ACETONE	END OVER END	GC-FID
PCBAROCLOR 1254/PCB CON	D&C	HEXANE ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE ACETONE	MICROWAVE TM218.	GC-MS
>C6-C40	WET	HEXANE ACETONE	SHAKER	GC-FID
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE ACETONE	SHAKER	GC-FID
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DOM ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
PCB7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
PCBAROCLOR 1254	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC-MS
FREESULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PESTOCPOPP	DCM	LIQUID/LIQUID SHAKE	GC-MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC-MS
PHENOLS MS	ACETONE	SOLID PHASE EXTRACTION	GC-MS
TPH by INFRARED (IR)	TCE	STIRRED EXTRACTION (STIR-BAR)	R
MINERAL OIL BY R	TCE	STIRRED EXTRACTION (STIR-BAR)	R
GLYCOLS	NONE	DIRECT INJECTION	GC-FID

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anorthophyllite	-
Fibrous Tremolite	-

APPENDIX 7
GEOTECHNICAL LABORATORY TESTING

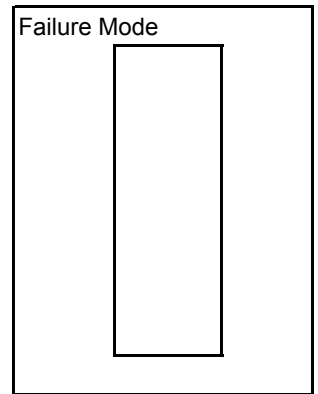
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH1	Description Slightly sandy CLAY.
Sample	U	
Depth	m 4.00	
Depth within original sample	mm 60	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.7
Mean initial sample diameter	mm 38.6
Sample mass	g 204.31
Initial moisture content	% 18
Rate of strain	%/min 4.13
Initial bulk density	Mg/m ³ 2.07
Initial dry density	Mg/m ³ 1.76



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	100
Membrane correction	kPa	2.3
Deviator stress	kPa	324
Cumulative strain at failure	%	14
Shear strength	kPa	162
Consistency		Very Stiff

Checked

Approved

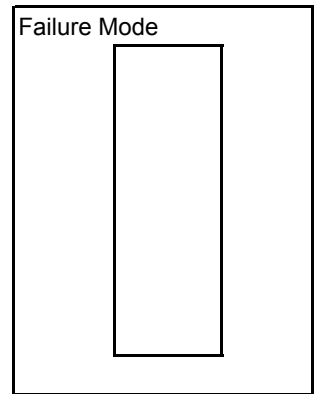
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH1	Description Slightly sandy CLAY.
Sample	U	
Depth	m 4.00	
Depth within original sample	mm 60	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.3
Mean initial sample diameter	mm 37.7
Sample mass	g 202.62
Initial moisture content	% 16
Rate of strain	%/min 4.15
Initial bulk density	Mg/m ³ 2.16
Initial dry density	Mg/m ³ 1.86



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	150
Membrane correction	kPa	2.5
Deviator stress	kPa	467
Cumulative strain at failure	%	15
Shear strength	kPa	234
Consistency		Very Stiff

Checked

Approved

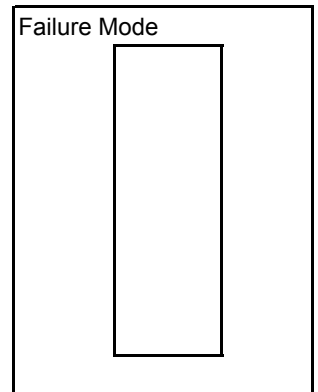
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH1	Description Grey, slightly sandy CLAY.
Sample	U	
Depth	m 4.00	
Depth within original sample	mm 60	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.9
Mean initial sample diameter	mm 38.0
Sample mass	g 205.58
Initial moisture content	% 17
Rate of strain	%/min 4.12
Initial bulk density	Mg/m ³ 2.14
Initial dry density	Mg/m ³ 1.83



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	200
Membrane correction	kPa	2.5
Deviator stress	kPa	489
Cumulative strain at failure	%	15
Shear strength	kPa	244
Consistency		Very Stiff

Checked

Approved

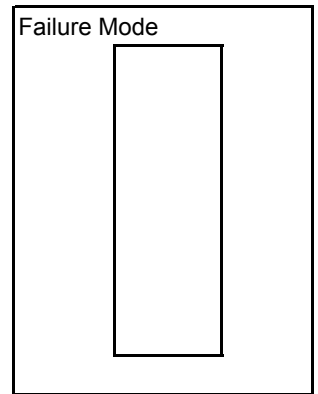
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH1	Description Grey CLAY.
Sample	U	
Depth	m 6.50	
Depth within original sample	mm 160	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.6
Mean initial sample diameter	mm 37.7
Sample mass	g 195.83
Initial moisture content	% 13
Rate of strain	%/min 4.14
Initial bulk density	Mg/m ³ 2.08
Initial dry density	Mg/m ³ 1.84



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	150
Membrane correction	kPa	1.9
Deviator stress	kPa	476
Cumulative strain at failure	%	11
Shear strength	kPa	238
Consistency		Very Stiff

Checked

Approved

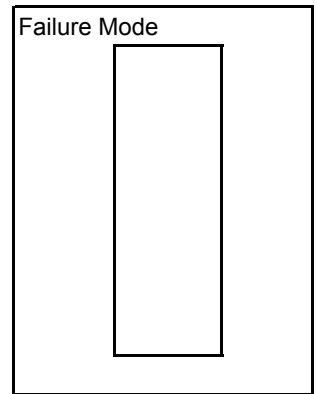
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9489

Hole	BH1	Description Grey CLAY.
Sample	U	
Depth	m 6.50	
Depth within original sample	mm 200	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 85.3
Mean initial sample diameter	mm 38.2
Sample mass	g 182.66
Initial moisture content	% 15
Rate of strain	%/min 4.10
Initial bulk density	Mg/m ³ 1.87
Initial dry density	Mg/m ³ 1.63



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	200
Membrane correction	kPa	2.8
Deviator stress	kPa	260
Cumulative strain at failure	%	18
Shear strength	kPa	130
Consistency		Stiff

Checked

Approved

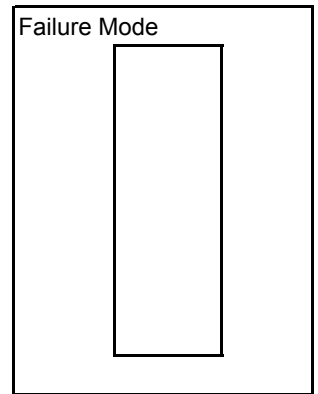
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH1	Description Grey CLAY.
Sample	U	
Depth	m 6.50	
Depth within original sample	mm 260	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.5
Mean initial sample diameter	mm 38.6
Sample mass	g 164.91
Initial moisture content	% 19
Rate of strain	%/min 4.14
Initial bulk density	Mg/m ³ 1.67
Initial dry density	Mg/m ³ 1.40



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	400
Membrane correction	kPa	2.7
Deviator stress	kPa	343
Cumulative strain at failure	%	18
Shear strength	kPa	172
Consistency		Very Stiff

Checked

Approved

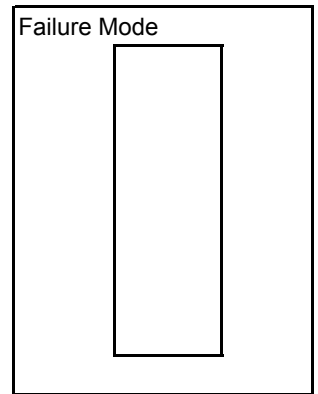
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH1	Description Grey CLAY.
Sample	U	
Depth	m 9.50	
Depth within original sample	mm 70	

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.3
Mean initial sample diameter	mm	38.2
Sample mass	g	194.41
Initial moisture content	%	22
Rate of strain	%/min	4.15
Initial bulk density	Mg/m ³	2.02
Initial dry density	Mg/m ³	1.65



Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	250
Membrane correction	kPa	1.3
Deviator stress	kPa	287
Cumulative strain at failure	%	7
Shear strength	kPa	143
Consistency		Stiff

Checked

Approved

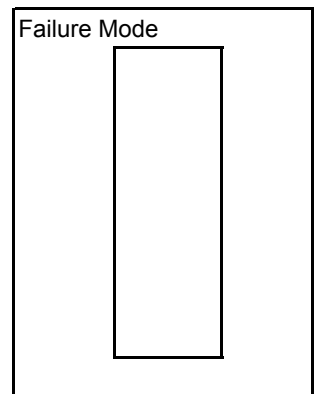
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH1	Description Grey CLAY.
Sample	U	
Depth	m 9.50	
Depth within original sample	mm 70	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 82.8
Mean initial sample diameter	mm 38.3
Sample mass	g 186.79
Initial moisture content	% 23
Rate of strain	%/min 4.23
Initial bulk density	Mg/m ³ 1.96
Initial dry density	Mg/m ³ 1.60



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	300
Membrane correction	kPa	1.7
Deviator stress	kPa	277
Cumulative strain at failure	%	10
Shear strength	kPa	138
Consistency		Stiff

Checked

Approved

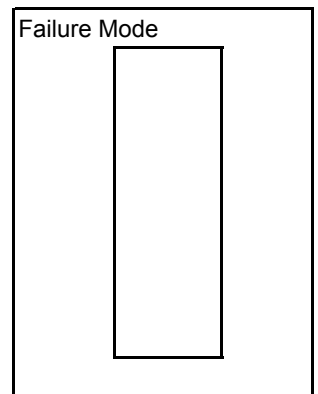
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH1	Description Grey CLAY.
Sample	U	
Depth	m 9.50	
Depth within original sample	mm 70	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 83.9
Mean initial sample diameter	mm 37.8
Sample mass	g 189.65
Initial moisture content	% 22
Rate of strain	%/min 4.17
Initial bulk density	Mg/m ³ 2.02
Initial dry density	Mg/m ³ 1.66



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	200
Membrane correction	kPa	1.6
Deviator stress	kPa	347
Cumulative strain at failure	%	8
Shear strength	kPa	173
Consistency		Very Stiff

Checked

Approved

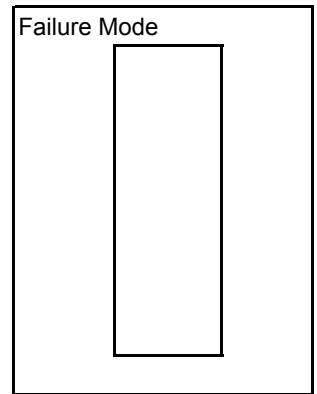
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH2	Description Dark grey CLAY.
Sample	U	
Depth	m 6.50	
Depth within original sample	mm 140	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.5
Mean initial sample diameter	mm 38.5
Sample mass	g 190.02
Initial moisture content	% 19
Rate of strain	%/min 4.14
Initial bulk density	Mg/m ³ 1.94
Initial dry density	Mg/m ³ 1.62



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	150
Membrane correction	kPa	1.4
Deviator stress	kPa	532
Cumulative strain at failure	%	8
Shear strength	kPa	266
Consistency		Very Stiff

Checked

Approved

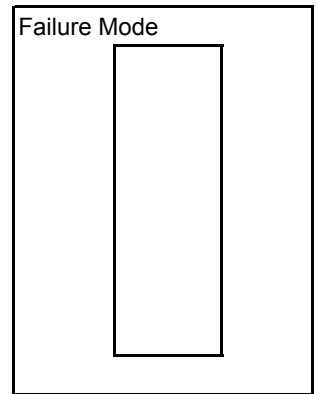
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH2	Description Dark grey CLAY.
Sample	U	
Depth	m 6.50	
Depth within original sample	mm 140	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.4
Mean initial sample diameter	mm 38.8
Sample mass	g 189.73
Initial moisture content	% 20
Rate of strain	%/min 4.15
Initial bulk density	Mg/m ³ 1.90
Initial dry density	Mg/m ³ 1.58



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	200
Membrane correction	kPa	1.6
Deviator stress	kPa	511
Cumulative strain at failure	%	9
Shear strength	kPa	255
Consistency		Very Stiff

Checked

Approved

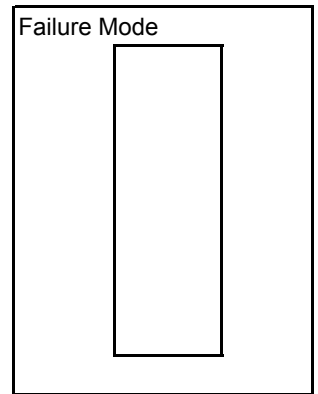
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH2	Description Grey CLAY.
Sample	U	
Depth	m 6.50	
Depth within original sample	mm 140	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 82.8
Mean initial sample diameter	mm 38.5
Sample mass	g 184.03
Initial moisture content	% 20
Rate of strain	%/min 4.23
Initial bulk density	Mg/m ³ 1.91
Initial dry density	Mg/m ³ 1.59



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	250
Membrane correction	kPa	3.0
Deviator stress	kPa	279
Cumulative strain at failure	%	20
Shear strength	kPa	140
Consistency		Stiff

Checked

Approved

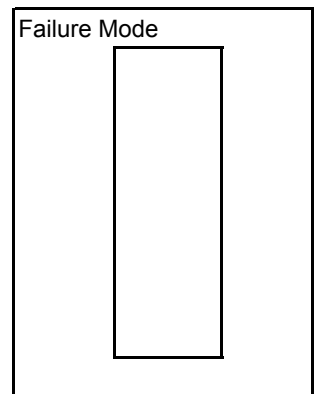
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH2	Description Mottled orange-grey CLAY.
Sample	U	
Depth	m 2.00	
Depth within original sample	mm 60	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.6
Mean initial sample diameter	mm 37.6
Sample mass	g 197.93
Initial moisture content	% 22
Rate of strain	%/min 4.14
Initial bulk density	Mg/m ³ 2.11
Initial dry density	Mg/m ³ 1.73



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	50
Membrane correction	kPa	2.8
Deviator stress	kPa	162
Cumulative strain at failure	%	18
Shear strength	kPa	81
Consistency	Mottled o	Firm to Stiff

Checked

Approved

Issue Date 15/03/2012 16:35

Triaxial test Result Page [] of []

Lab Report Page [] of []

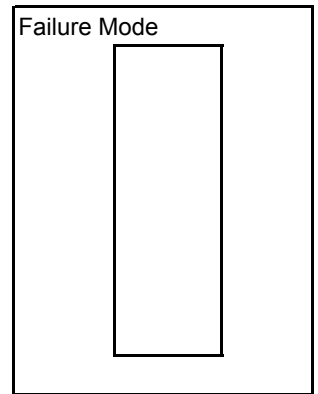
Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH2	Description Medium brown, mottled orange CLAY.
Sample	U	
Depth	m 2.00	
Depth within original sample	mm 60	

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.5
Mean initial sample diameter	mm	37.3
Sample mass	g	184.73
Initial moisture content	%	23
Rate of strain	%/min	4.14
Initial bulk density	Mg/m ³	2.00
Initial dry density	Mg/m ³	1.62



Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	100
Membrane correction	kPa	2.8
Deviator stress	kPa	160
Cumulative strain at failure	%	18
Shear strength	kPa	80
Consistency		Firm to Stiff

Checked

Approved

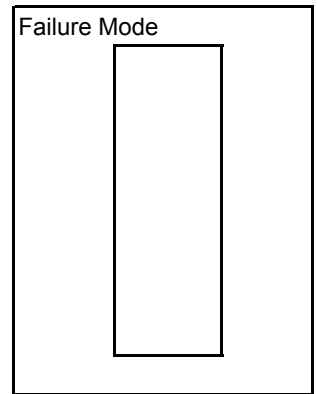
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BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole	BH2	Description Medium brown, mottled orange CLAY.
Sample	U	
Depth	m 2.00	
Depth within original sample	mm 160	

Orientation within original sample	Vertical
Preparation	Undisturbed
Mean initial sample height	mm 84.1
Mean initial sample diameter	mm 37.4
Sample mass	g 193.26
Initial moisture content	% 20
Rate of strain	%/min 4.16
Initial bulk density	Mg/m ³ 2.09
Initial dry density	Mg/m ³ 1.74



Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	150
Membrane correction	kPa	2.9
Deviator stress	kPa	391
Cumulative strain at failure	%	19
Shear strength	kPa	196
Consistency		Very Stiff

Checked

Approved



Laboratory Report



Contract Number: 15507

Client's Reference: AA0125-L9481-S3954

Report Date: 02-04-2012

Client Name: C J Associates
King Roads Avenue
Bristol
BS11 9HF

Contract Title: Trowbridge STW
For the attention of: Vince Simmonds

Date Received: 19-03-2012
Date Commenced: 19-03-2012
Date Completed: 18-04-2012

Test Description	Quantity	Checked	Approved
One-dimensional Consolidation 75mm or 50mm diameter specimens (5 days) 1377 : 1990 Part 5 : 3 *	3		
CU SS 100mm single stage test on a 102 mm diameter Part 8 Continued specimen at one confining pressure, test duration four days. 1377:1990 Part 8 : 8	2		

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
* - Denotes test included in laboratory scope of accreditation
- Denotes test carried out by approved contractor

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 in full, without the prior written approval of the laboratory.

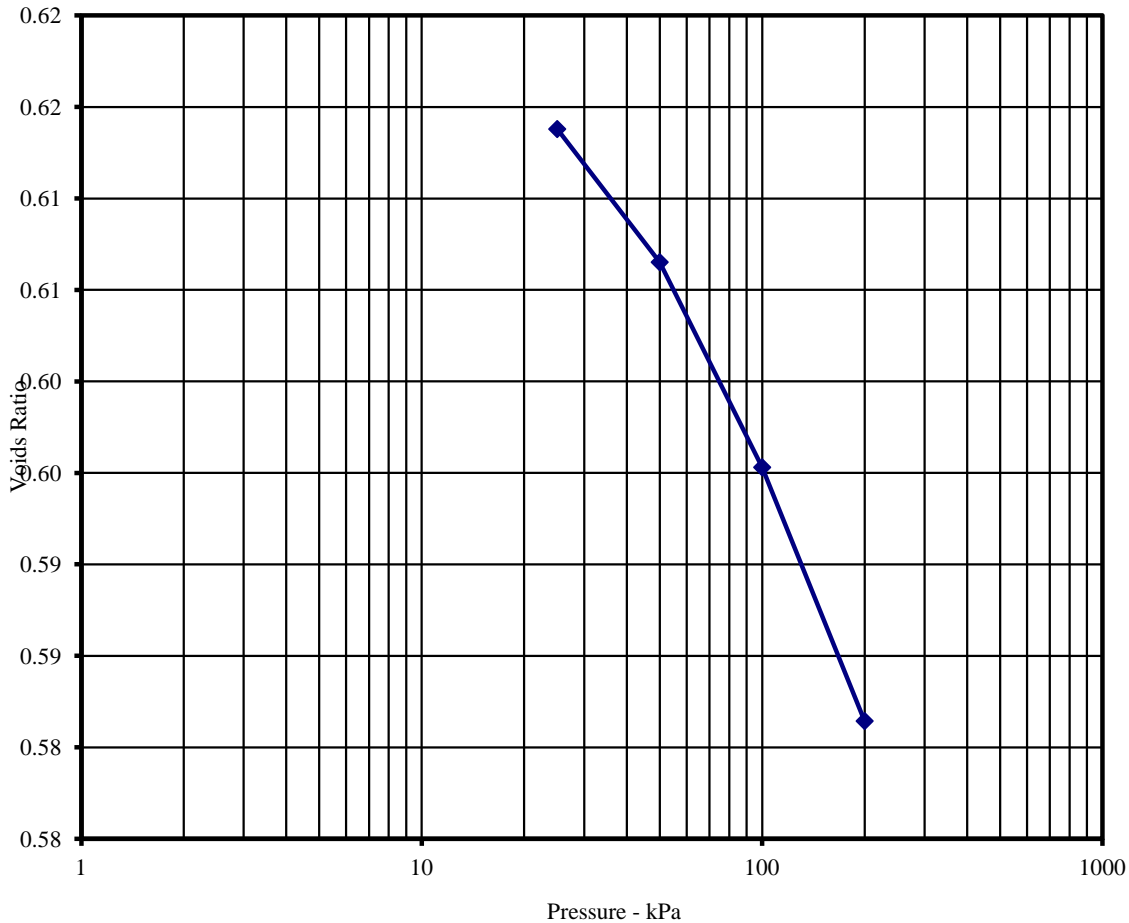
Approved Signatories:
Paul Evans (Quality Manager), Emma Williams (Office Manager),
Benjamin Sharp (Laboratory Coordinator), Alex Wynn (Business Development Manager).

ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Client ref: AA0125-L9481-S3954
 Location: Trowbridge STW
 Contract Number: 15507-190312
 Hole/Sample Number: BH1
 Depth (m) : 2.00 - 2.45
 Sample Type: U

Initial Conditions		Pressure Range	Mv	Cv	Method of time fitting used
Moisture Content (%):	21	kPa	m2/MN	m2/yr	Cv Calculated using t90
Bulk Density (Mg/m3):	1.98	0 - 25	0.099	2.435	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.64	25 - 50	0.180	10.446	20°C
Voids Ratio:	0.6178	50 - 100	0.140	3.211	Location of specimen with sample
Degree of saturation:	90.6	100 - 200	0.087	1.548	top
Height (mm):	18.9				Remarks:
Diameter (mm)	75				
Particle Density (Mg/m3):	2.65				
Assumed					



B. Sharp
 Checked by

D.P. Gans
 Approved by

Date approved

11/04/12

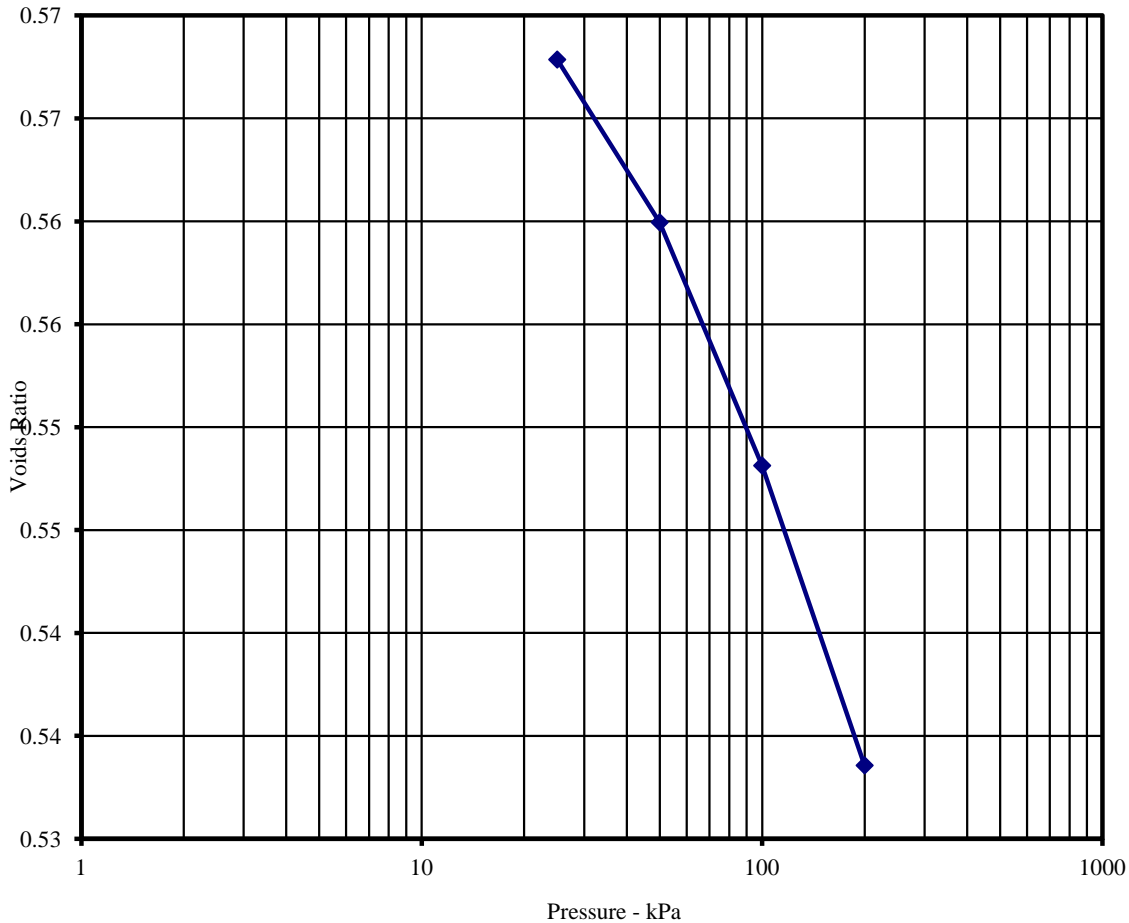


ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Client ref: AA0125-L9481-S3954
 Location: Trowbridge STW
 Contract Number: 15507-190312
 Hole/Sample Number: BH1
 Depth (m) : 2.00 - 2.45
 Sample Type: U

Initial Conditions		Pressure Range	Mv	Cv	Method of time fitting used
Moisture Content (%):	20	kPa	m2/MN	m2/yr	Cv Calculated using t90
Bulk Density (Mg/m3):	2.01	0 - 25	0.135	2.433	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.68	25 - 50	0.202	10.421	20°C
Voids Ratio:	0.5732	50 - 100	0.152	3.200	Location of specimen with sample
Degree of saturation:	90.4	100 - 200	0.094	1.541	top
Height (mm):	18.9				Remarks:
Diameter (mm)	75				
Particle Density (Mg/m3):	2.65				
Assumed					



B. Sharp
 Checked by

D.P. Gnan
 Approved by

Date approved

11/04/12

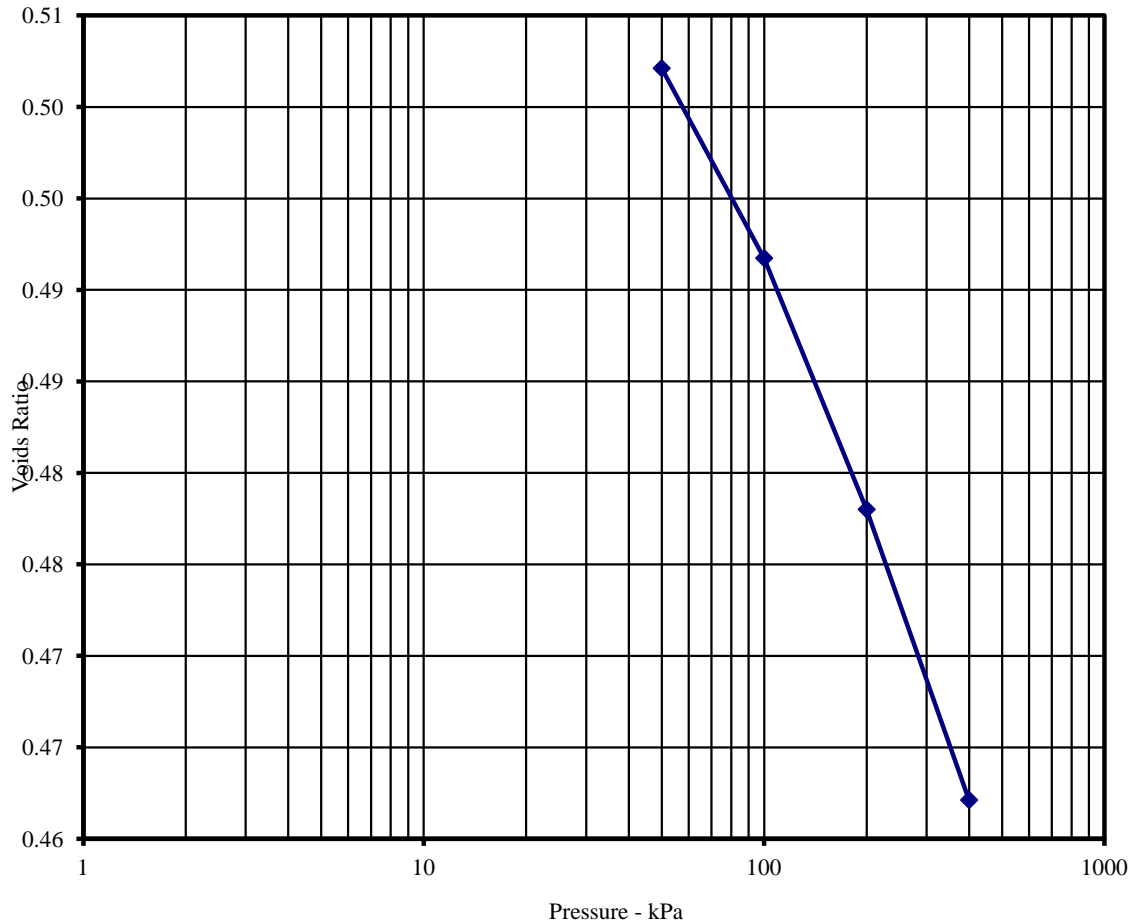


ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Client ref: AA0125-L9481-S3954
 Location: Trowbridge STW
 Contract Number: 15507-190312
 Hole/Sample Number: BH2
 Depth (m) : 4.00 - 4.45
 Sample Type: U

Initial Conditions		Pressure Range	Mv	Cv	Method of time fitting used
Moisture Content (%):	18	kPa	m2/MN	m2/yr	Cv Calculated using t90
Bulk Density (Mg/m3):	2.07	0 - 50	0.089	2.431	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.76	50 - 100	0.138	10.380	20°C
Voids Ratio:	0.5088	100 - 200	0.092	3.176	Location of specimen with sample
Degree of saturation:	92.3	200 - 400	0.054	1.524	top
Height (mm):	18.9				Remarks:
Diameter (mm)	75				
Particle Density (Mg/m3):	2.65				
Assumed					



B. Sharp
 Checked by

D.P. Gnan
 Approved by

Date approved

11/04/12



Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Brown sandy silty CLAY

Initial Specimen Conditions

Height	mm	206.00
Diameter	mm	100.00
Area	mm ²	7853.98
Volume	cm ³	1617.92
Mass	g	3245.60
Dry Mass	g	2625.20
Density	Mg/m ³	2.01
Dry Density	Mg/m ³	1.62
Moisture Content	%	24
Specific Gravity	kN/m ³	2.65
	(assumed/measured)	assumed

Final Specimen Conditions

Moisture Content	%	24
Density	Mg/m ³	2.04
Dry Density	Mg/m ³	1.65

DP Grant

Checked and Approved By

18/04/12

Date

Client Ref

AA0125

Contract No

15507- 190312



Trowbridge

Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Test Setup

Date started		24/03/2012
Date Finished		14/04/2012
Top Drain Used		y
Base Drain Used		y
Side Drains Used		y
Pressure System Number		P6
Cell Number		C6

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	95.00
Differential Pressure	kPa	5.00
Final Cell Pressure	kPa	600.00
Final Pore Pressure	kPa	600.00
Final B Value		0.98

Consolidation

Effective Pressure	kPa	50.00	100.00	200.00
Cell Pressure	kPa	600.00	600.00	600.00
Back Pressure	kPa	550.00	500.00	400.00
Excess Pore Pressure	kPa	50.00	100.00	200.00
Pore Pressure at End	kPa	550.00	500.00	400.00
Consolidated Volume	cm ³	1613.32	1605.52	1592.62
Consolidated Height	mm	205.80	201.47	195.81
Consolidated Area	mm ²	7839.09	7968.88	8133.66
Vol. Compressibility	m ² /MN	0.00517	0.00967	0.02009
Consolidation Coef.	m ² /yr.	45.83801	4.93520	2.10481

D P Grant

Checked and Approved By

18/04/12

Date

Client Ref

AA0125

Contract No

15507- 190312



Trowbridge

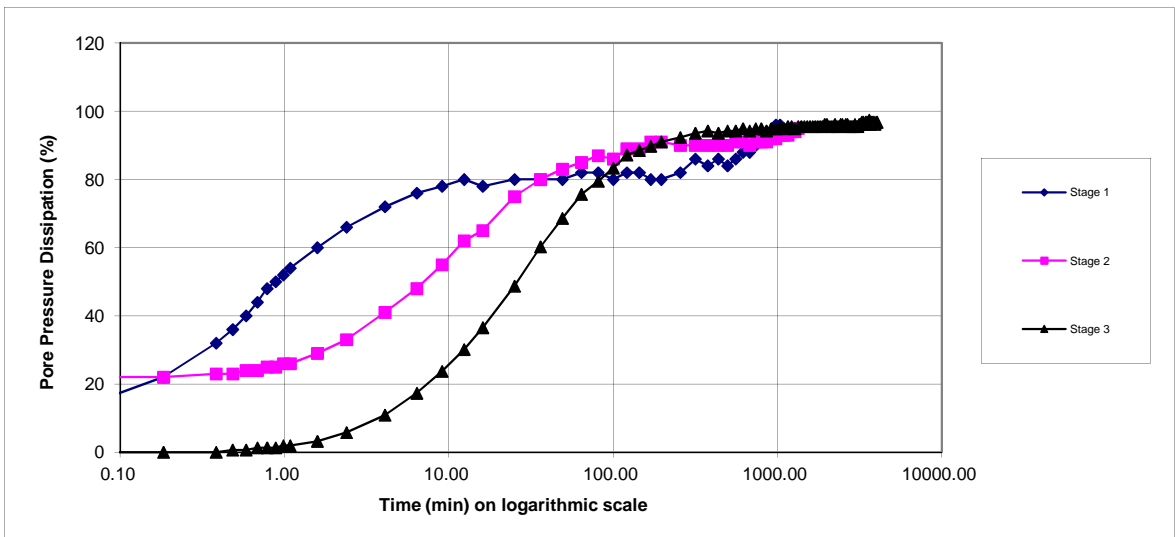
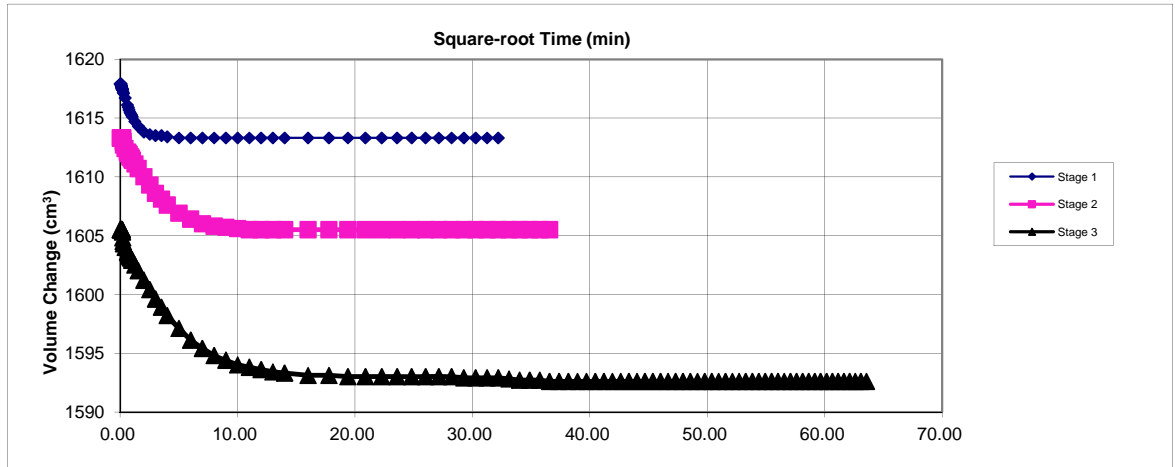
Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole	BH1
Sample No.	U5
Depth	m
Date	18/04/2012

Consolidation Stage



D P Gnan

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18/04/12
Date



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Client Ref
AA0125

Contract No

15507- 190312

Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Shearing

Initial Cell Pressure	kPa	600	600	600
Initial Pore Pressure	kPa	550	500	400
Rate of Strain	mm/min	0.0858	0.0839	0.0434
Max Deviator Stress				
Axial Strain		1.997	4.929	7.549
Axial Stress	kPa	91.813	139.51	257.17
Cor. Deviator stress	kPa	89.005	135.47	252.88
Effective Major Stress	kPa	112.005	189.47	376.88
Effective Minor Stress	kPa	24.000	54.00	124.00
Effective Stress Ratio		4.667	3.509	3.04
s'	kPa	68.003	121.74	250.44
t'	kPa	44.003	67.74	126.44
Max Effective Principle Stress Ratio				
Axial Strain		1.890	3.535	6.737
Axial Stress	kPa	91.012	131.500	245.069
Cor. Deviator stress	kPa	87.213	127.617	240.829
Effective Major Stress	kPa	110.213	176.617	357.829
Effective Minor Stress	kPa	23.000	49.000	117.000
Effective Stress Ratio		4.792	3.604	3.058
s'	kPa	66.606	112.808	237.414
t'	kPa	43.606	63.808	120.414
Shear Resistance Angle	degs	25.0		
Cohesion c'	kPa	20		

D P Grant

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18/04/12

Date

Client Ref

AA0125

Contract No

15507- 190312



Trowbridge

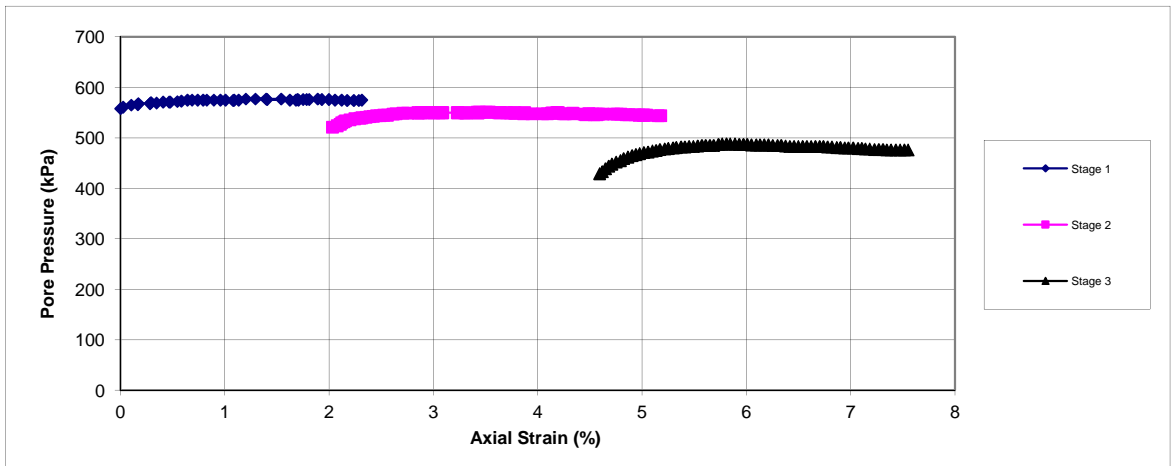
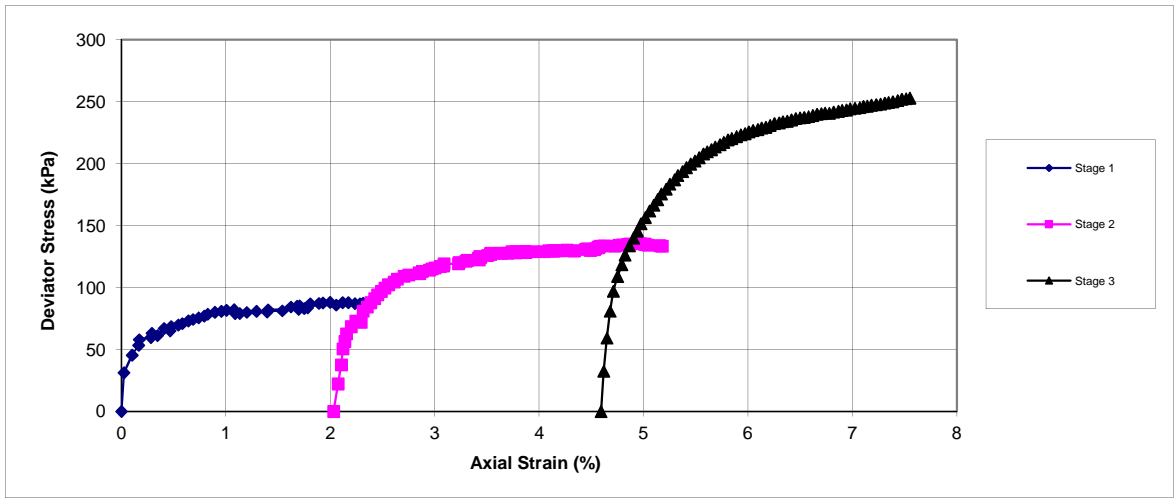
Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole	BH1
Sample No.	U5
Depth	2.00-2.45
Date	18/04/2012

Shearing Stage



D P Gans

Checked and Approved By

18/04/12

Date

Client Ref

AA0125

Contract No

15507- 190312



Trowbridge

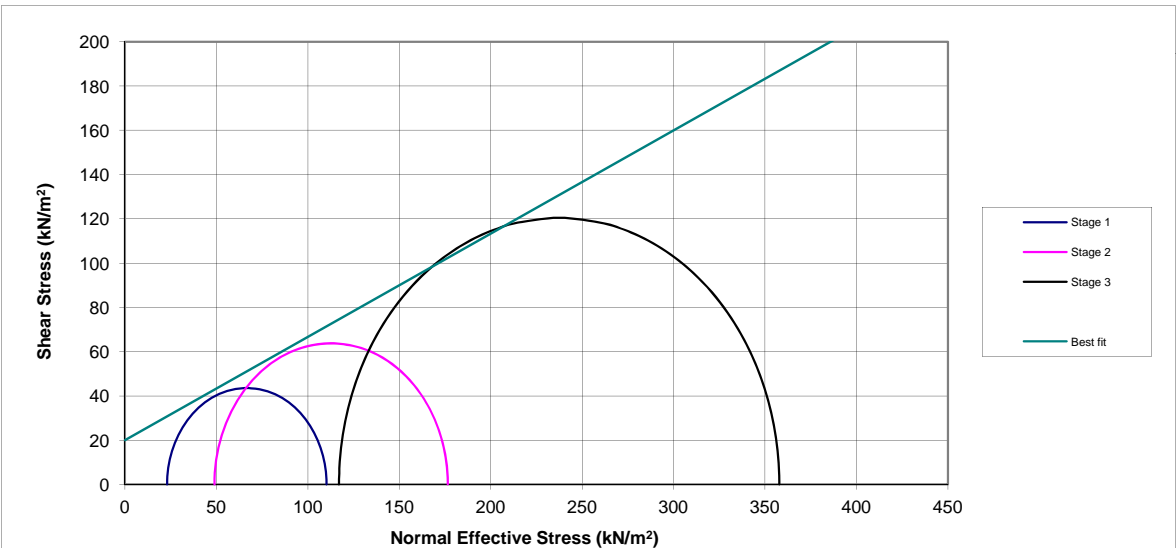
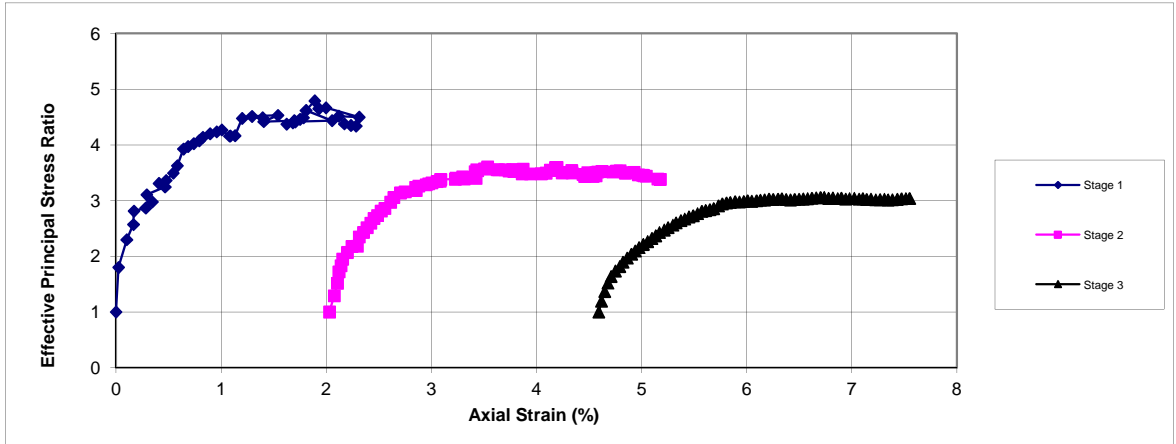
Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole	BH1
Sample No.	U5
Depth	m 2.00-2.45
Date	18/04/2012

Shearing Stage



D P Gnan

Checked and Approved By

18/04/12
Date



Trowbridge

Client Ref

AA0125

Contract No

15507- 190312

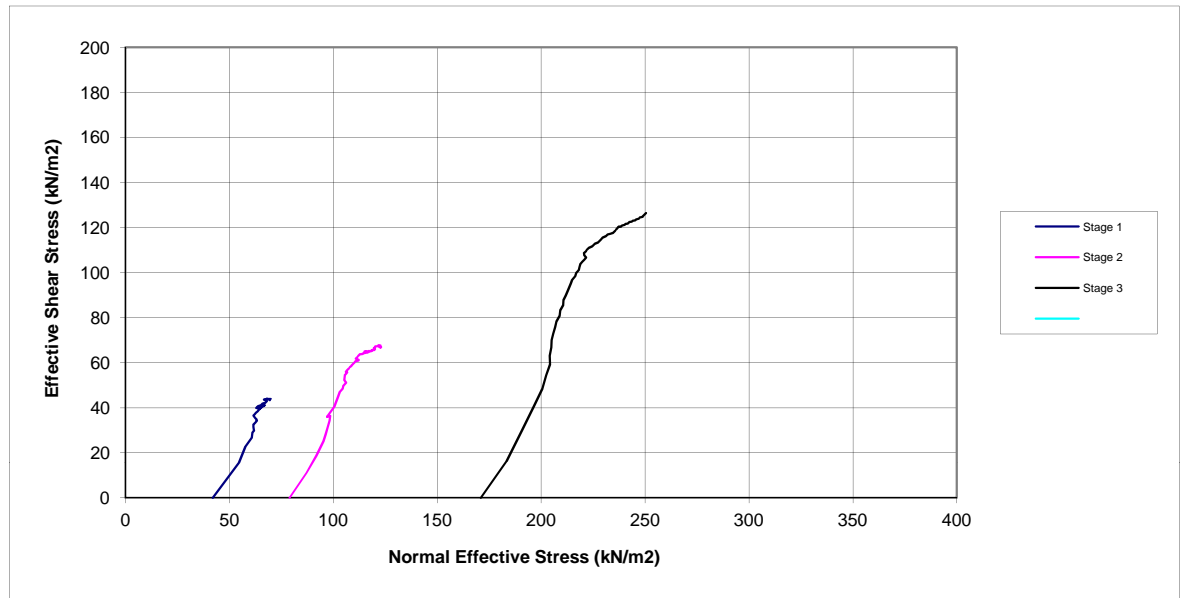
Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Shearing Stage



D P Gans

Checked and Approved By

18/04/12

Date



Trowbridge

Client Ref

AA0125

Contract No

15507- 190312

Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012
Disturbed / Undisturbed		undisturbed

Description of Specimen

Brown silty sandy Clay.

Initial Specimen Conditions

Height	mm	206.00
Diameter	mm	102.00
Area	mm ²	8171.28
Volume	cm ³	1683.28
Mass	g	3448.20
Dry Mass	g	2802.40
Density	Mg/m ³	2.05
Dry Density	Mg/m ³	1.66
Moisture Content	%	23
Specific Gravity	kN/m ³	2.65
	(assumed/measured)	assumed

Final Specimen Conditions

Moisture Content	%	22
Density	Mg/m ³	2.08
Dry Density	Mg/m ³	1.70

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18/04/12
Date



Trowbridge STW

Client Ref

AA0125

Contract No

15507 - 190312

Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Test Setup

Date started		24/03/2012
Date Finished		12/04/2012
Top Drain Used		y
Base Drain Used		y
Side Drains Used		y
Pressure System Number		P4
Cell Number		C4

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	95.00
Differential Pressure	kPa	5.00
Final Cell Pressure	kPa	500.00
Final Pore Pressure	kPa	487.00
Final B Value		1.00

Consolidation

Effective Pressure	kPa	50.00	100.00	200.00
Cell Pressure	kPa	500.00	500.00	500.00
Back Pressure	kPa	450.00	400.00	300.00
Excess Pore Pressure	kPa	50.00	100.00	200.00
Pore Pressure at End	kPa	450.00	400.00	300.00
Consolidated Volume	cm ³	1674.58	1662.98	1646.08
Consolidated Height	mm	205.65	197.04	189.42
Consolidated Area	mm ²	8143.13	8439.75	8690.32
Vol. Compressibility	m ² /MN	0.01149	0.01732	0.03387
Consolidation Coef.	m ² /yr.	10.86324	3.45681	2.26784

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Client Ref

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Trowbridge STW

Contract No

15507 - 190312

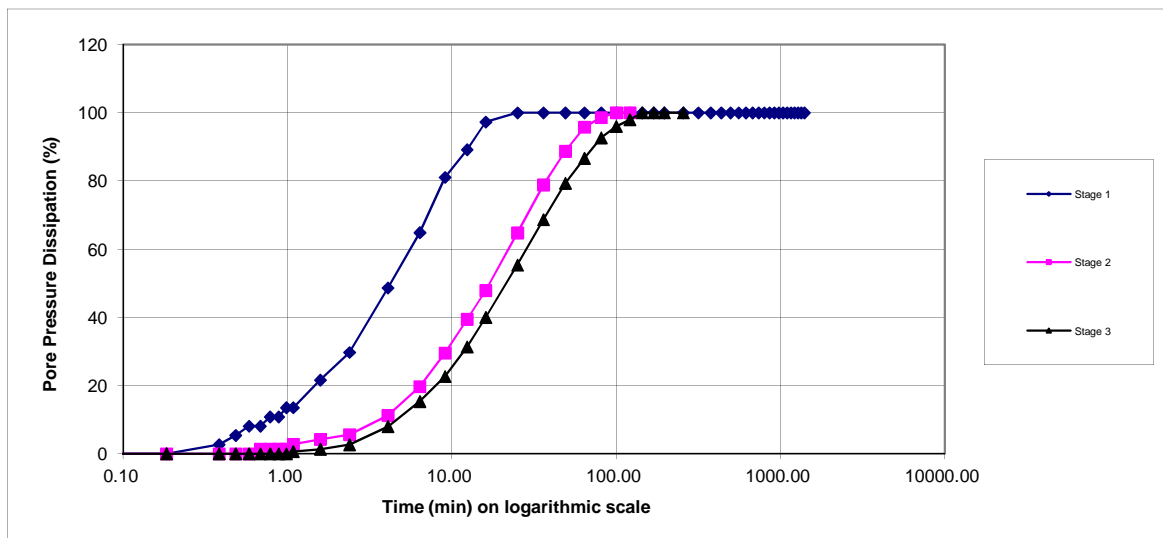
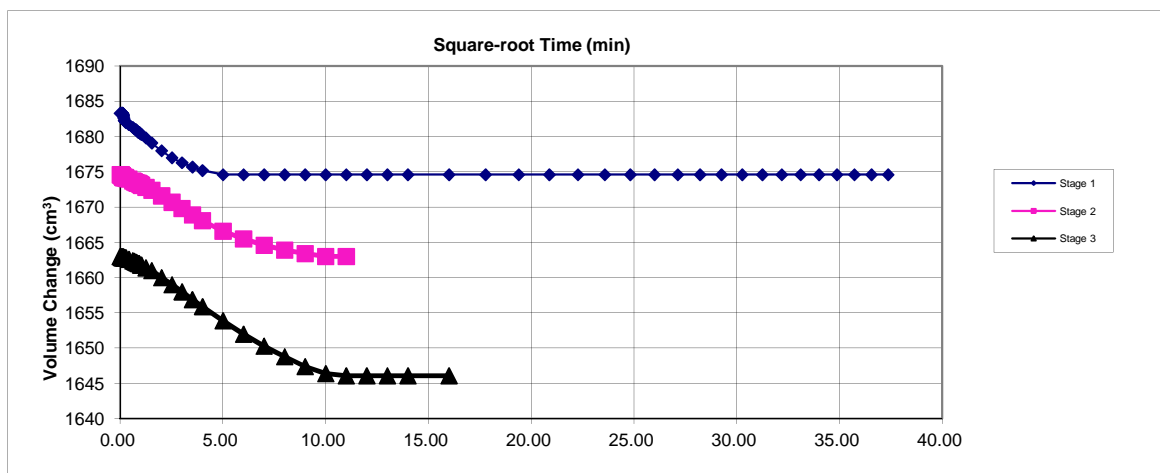
Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole	BH2
Sample No.	U10
Depth	m
Date	18/04/2012

Consolidation Stage



DP Gans

Checked and Approved By

18/04/12
Date



Trowbridge STW

Client Ref
AA0125

Contract No

15507 - 190312

Consolidated Undrained Triaxial Compression Test
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Shearing

Initial Cell Pressure	kPa	500	500	500
Initial Pore Pressure	kPa	450	400	300
Rate of Strain	mm/min	0.0857	0.0690	0.0435
Max Deviator Stress				
Axial Strain		4.697	7.498	10.363
Axial Stress	kPa	114.389	177.99	301.13
Cor. Deviator stress	kPa	111.381	173.69	296.69
Effective Major Stress	kPa	154.381	245.69	423.69
Effective Minor Stress	kPa	44.000	72.00	127.00
Effective Stress Ratio		3.509	3.412	3.34
s'	kPa	99.191	158.85	275.34
t'	kPa	55.191	86.85	148.34
Max Effective Principle Stress Ratio				
Axial Strain		3.516	6.280	8.552
Axial Stress	kPa	113.888	171.467	277.171
Cor. Deviator stress	kPa	109.970	167.300	272.837
Effective Major Stress	kPa	148.970	231.300	380.837
Effective Minor Stress	kPa	39.000	64.000	108.000
Effective Stress Ratio		3.820	3.614	3.526
s'	kPa	93.985	147.650	244.418
t'	kPa	54.985	83.650	136.418
Shear Resistance Angle	degs	32.0		
Cohesion c'	kPa	8		

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Client Ref

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Contract No

15507 - 190312



Trowbridge STW

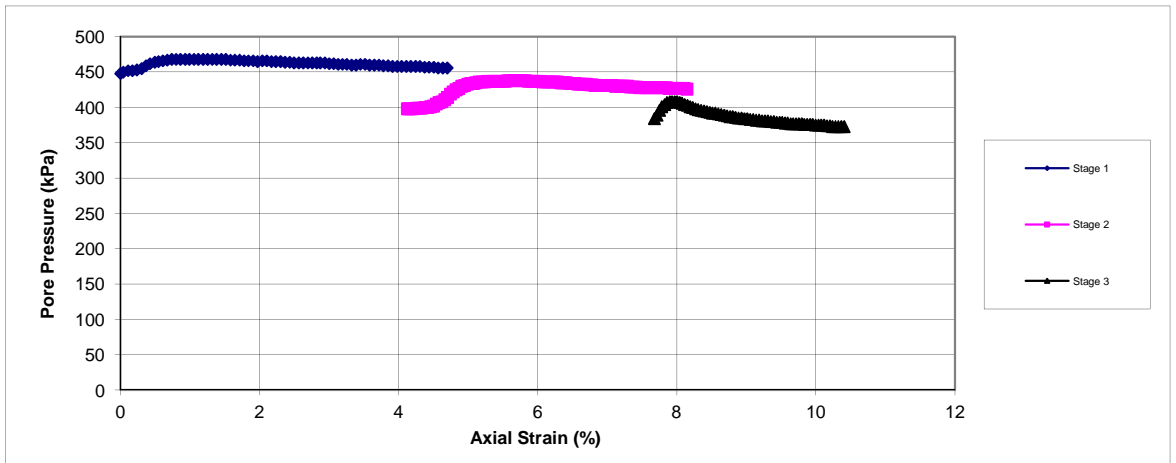
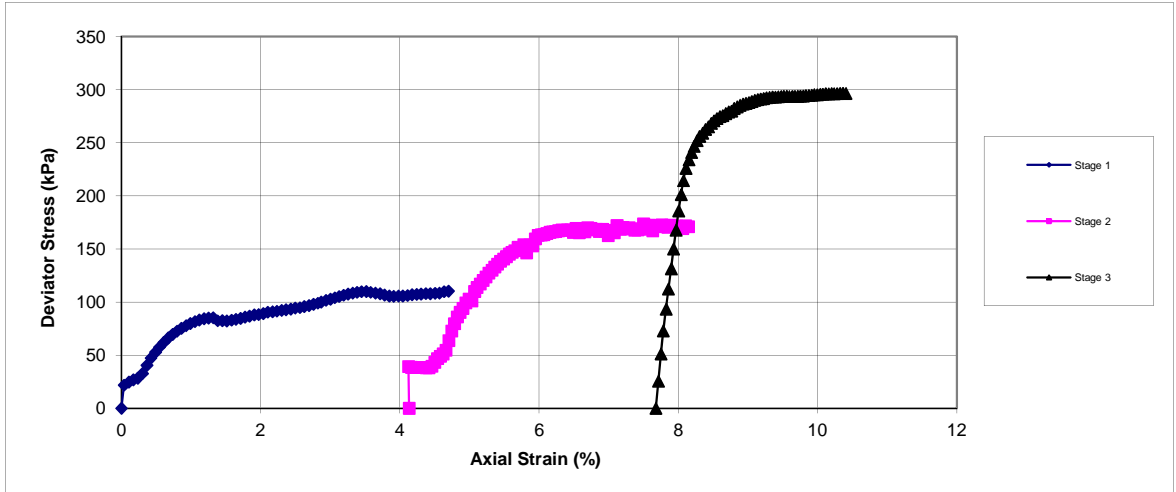
Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole	BH2
Sample No.	U10
Depth	4.00-4.45 m
Date	18/04/2012

Shearing Stage



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18/04/12

Date



Trowbridge STW

Client Ref

AA0125

Contract No

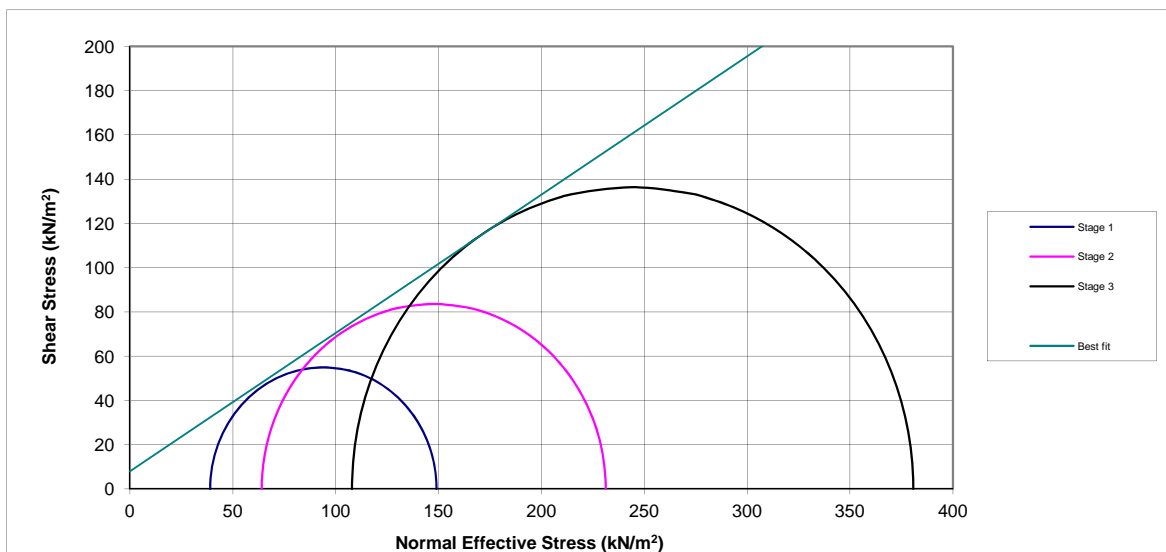
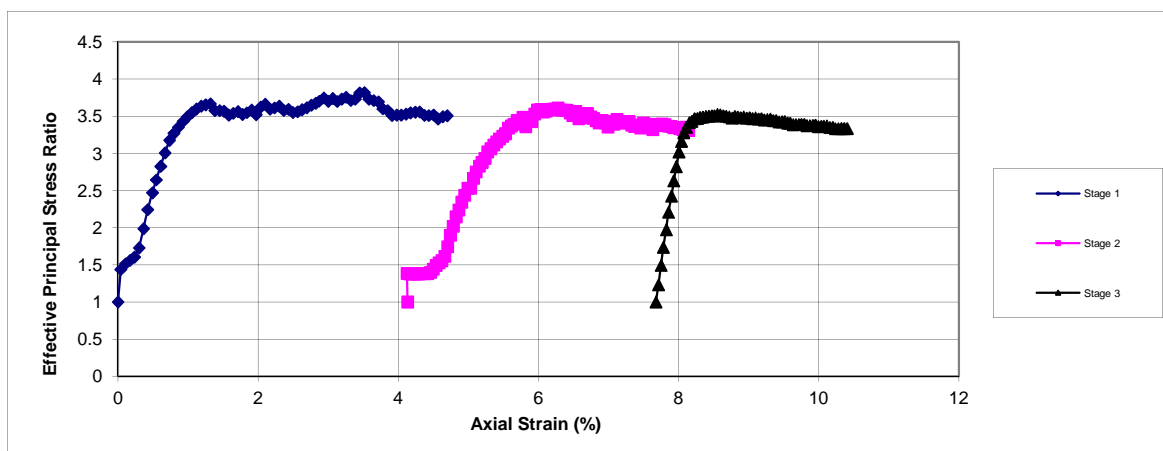
15507 - 190312

Consolidated Undrained Triaxial Compression Test BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Shearing Stage



D P Grant

Checked and Approved By

18/04/12

Date



Trowbridge STW

Client Ref

AA0125

Contract No

15507 - 190312

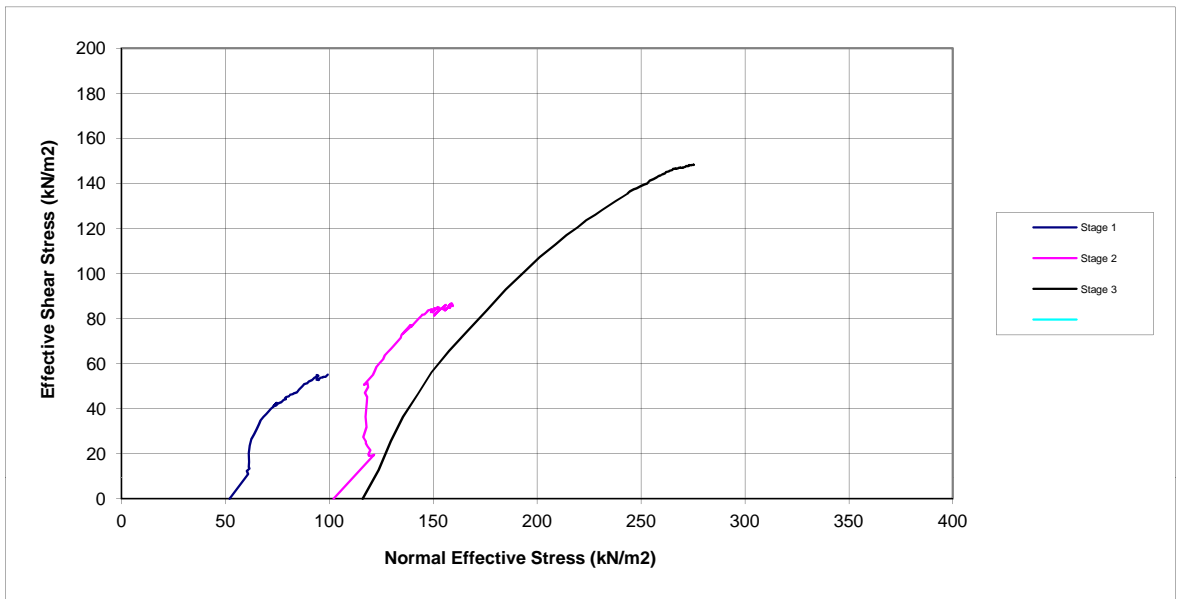
Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Shearing Stage



D P Gans

Checked and Approved By

18/04/12

Date

GSTL
Geo Site & Testing Services Limited

Trowbridge STW

Client Ref

AA0125

Contract No

15507 - 190312

Index Property Test Results

Site **Trowbridge STW**
 Client **BWB Consulting**
 Job Number AA0125
 Lab Number

UKAS Testing Laboratory 1429

Hole	Sample	Depth (m)	Method	History	MC (%)	LL (%)	Ret (%)	PL (%)	Pa (%)	PI (%)	Class	Description
BH1	D	1.70	1	1	20	55	0	28	100	27	CH	Refer to log sheets
BH1	D	3.50	1	2	11	39	56	19	44	20	CI	Refer to log sheets
BH1	D14	6.00	1	1	23	38	3	20	97	18	CI	Refer to log sheets
BH1	D	9.00	1	1	30	48	2	24	98	24	CI	Refer to log sheets
BH2	D	1.20	1	1	24	51	0	23	100	28	CH	Refer to log sheets
BH2	D	1.70	1	1	21	49	0	26	100	23	CI	Refer to log sheets
BH2	D	3.50	1	1	21	40	0	20	100	20	CI	Refer to log sheets

Key

MC - Moisture content
 LL - Liquid Limit
 Ret - Percentage retained on 425 micron test sieve
 PL - Plastic limit
 Pa - Percentage passing the 425 micron test sieve
 PI - Plasticity Index

History

(1) Sample was tested from the natural state. Particles greater than 425 microns removed by hand (BS1377:Part2:1990:4.2.3)
 (2) Sample was wet sieved through 425 micron test sieve (BS1377:Part2:1990:4.2.4)
 (3) Sample was air dried at less than 50 degrees Centigrade and passed through the 425 micron sieve
 (4) Unknown

Methods

[1] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by One point Cone Penetrometer
 [2] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by Four Point Cone Penetrometer

Samples were prepared in accordance with BS1377:Part1:1990

Classification is based on the plasticity chart - Fig 2.6 of Manual of Soil Laboratory Testing - Volume 1 by K.H.Head.

NOTE - 'O' is added to the symbol for soils containing a significant amount of organic material (determined by visual inspection) e.g. MHO

Checked

Approved

Index Property Test Results

Site **Trowbridge STW**
 Client **BWB Consulting**
 Job Number AA0125
 Lab Number

UKAS Testing Laboratory 1429

Hole	Sample	Depth (m)	Method	History	MC (%)	LL (%)	Ret (%)	PL (%)	Pa (%)	PI (%)	Class	Description
BH2	D	6.00	1	1	26	53	1	25	99	28	CH	Refer to log sheets
BH2	D	9.00	1	1	28	55	0	26	100	29	CH	Refer to log sheets
TP2	B	0.60	1	1	31	57	0	27	100	30	CH	Refer to log sheets
TP2	B	2.40	1	1	20	49	0	24	100	25	CI	Refer to log sheets
TP3	B	0.50	1	2	27	48	14	27	86	21	CI	Refer to log sheets
TP3	B	1.50	1	1	25	59	0	25	100	34	CH	Refer to log sheets
TP4	B	0.40	1	1	24	45	0	23	100	22	CI	Refer to log sheets

Key

MC - Moisture content
 LL - Liquid Limit
 Ret - Percentage retained on 425 micron test sieve
 PL - Plastic limit
 Pa - Percentage passing the 425 micron test sieve
 PI - Plasticity Index

History

(1) Sample was tested from the natural state. Particles greater than 425 microns removed by hand (BS1377:Part2:1990:4.2.3)
 (2) Sample was wet sieved through 425 micron test sieve (BS1377:Part2:1990:4.2.4)
 (3) Sample was air dried at less than 50 degrees Centigrade and passed through the 425 micron sieve
 (4) Unknown

Methods

[1] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by One point Cone Penetrometer
 [2] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by Four Point Cone Penetrometer

Samples were prepared in accordance with BS1377:Part1:1990

Classification is based on the plasticity chart - Fig 2.6 of Manual of Soil Laboratory Testing - Volume 1 by K.H.Head.

NOTE - 'O' is added to the symbol for soils containing a significant amount of organic material (determined by visual inspection) e.g. MHO

Checked

Approved

Index Property Test Results

Site **Trowbridge STW**
 Client **BWB Consulting**
 Job Number AA0125
 Lab Number

UKAS Testing Laboratory 1429

Hole	Sample	Depth (m)	Method	History	MC (%)	LL (%)	Ret (%)	PL (%)	Pa (%)	PI (%)	Class	Description
TP4	B	1.60	1	2	27	51	4	24	96	27	CH	Refer to log sheets
TP5	B	0.60	1	1	15	44	0	22	100	22	CI	Refer to log sheets
TP5	B	2.50	1	1	32	53	0	25	100	28	CH	Refer to log sheets
TP6	B	1.90	1	1	24	49	0	22	100	27	CI	Refer to log sheets
TP6	D	2.90	1	2	18	45	4	26	96	19	CI	Refer to log sheets

Key

MC - Moisture content
 LL - Liquid Limit
 Ret - Percentage retained on 425 micron test sieve
 PL - Plastic limit
 Pa - Percentage passing the 425 micron test sieve
 PI - Plasticity Index

History

(1) Sample was tested from the natural state. Particles greater than 425 microns removed by hand (BS1377:Part2:1990:4.2.3)
 (2) Sample was wet sieved through 425 micron test sieve (BS1377:Part2:1990:4.2.4)
 (3) Sample was air dried at less than 50 degrees Centigrade and passed through the 425 micron sieve
 (4) Unknown

Methods

[1] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by One point Cone Penetrometer
 [2] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by Four Point Cone Penetrometer

Samples were prepared in accordance with BS1377:Part1:1990

Classification is based on the plasticity chart - Fig 2.6 of Manual of Soil Laboratory Testing - Volume 1 by K.H.Head.

NOTE - 'O' is added to the symbol for soils containing a significant amount of organic material (determined by visual inspection) e.g. MHO

Checked

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Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

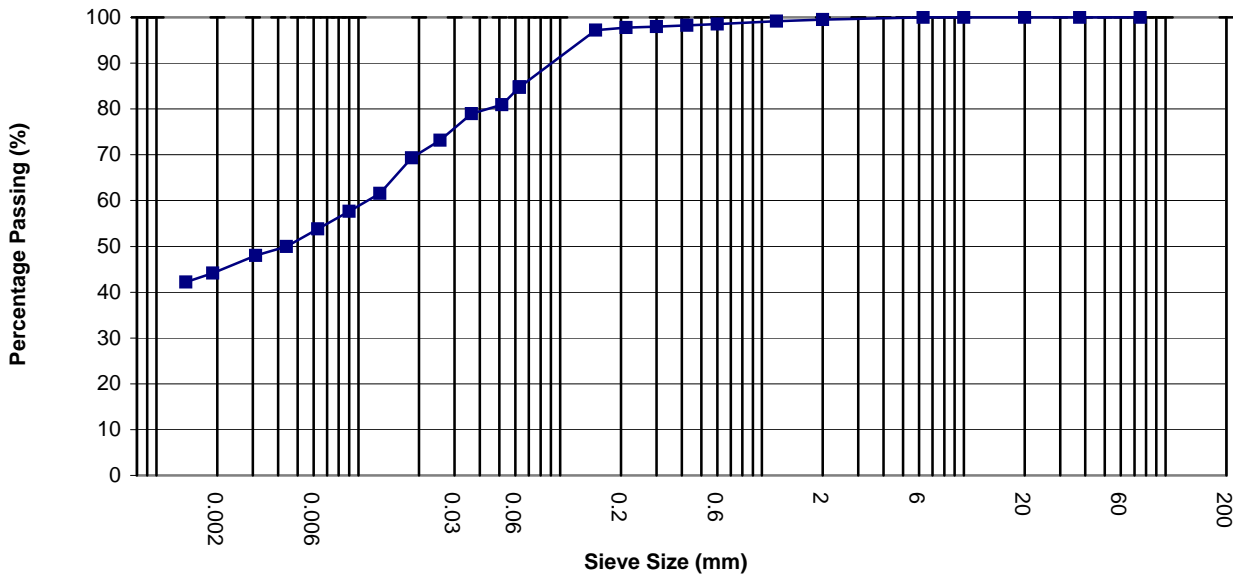
Lab Number L9481

Hole BH1

Sample D

Depth (m) 2.50

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	85
37.5	100	0.063	85
20	100	0.052	81
10	100	0.036	79
6.3	100	0.025	73
2	100	0.018	69
1.18	99	0.013	62
0.6	99	0.009	58
0.425	98	0.006	54
0.3	98	0.004	50
0.212	98	0.003	48
0.15	97	0.002	44
0.063	85	0.001	42

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.5
Sand	15.7
Silt	39.3
Clay	44.5

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

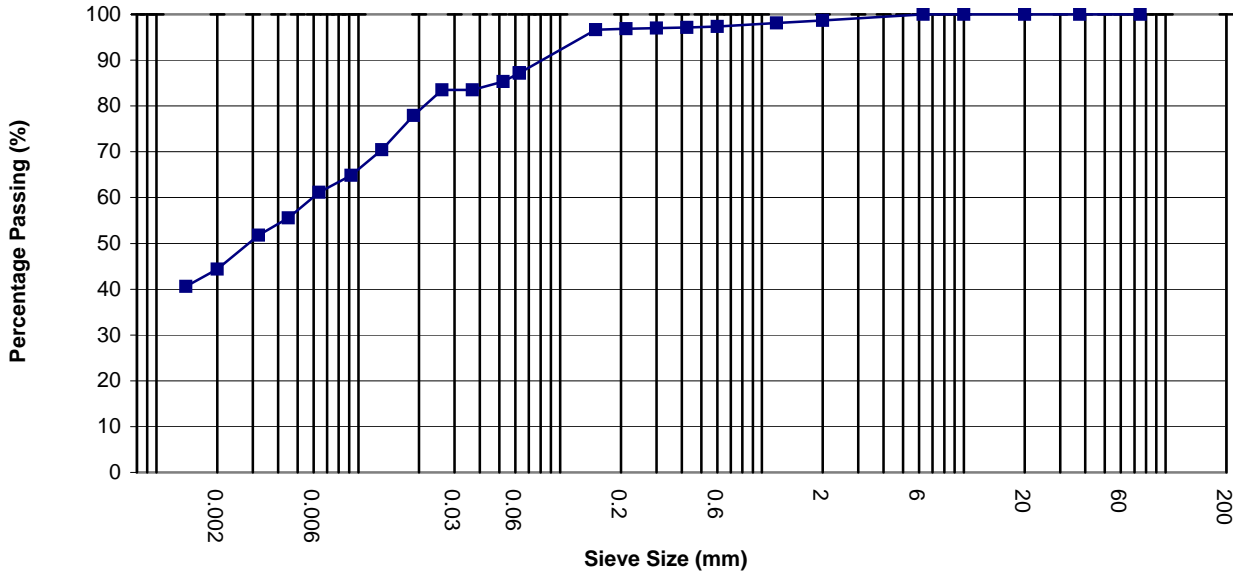
Lab Number L9481

Hole BH1

Sample D

Depth (m) 7.50

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	87
37.5	100	0.063	87
20	100	0.052	85
10	100	0.037	83
6.3	100	0.026	83
2	99	0.019	78
1.18	98	0.013	70
0.6	97	0.009	65
0.425	97	0.006	61
0.3	97	0.005	56
0.212	97	0.003	52
0.15	97	0.002	44
0.063	87	0.001	41

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	1.3
Sand	12.0
Silt	42.3
Clay	44.4

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

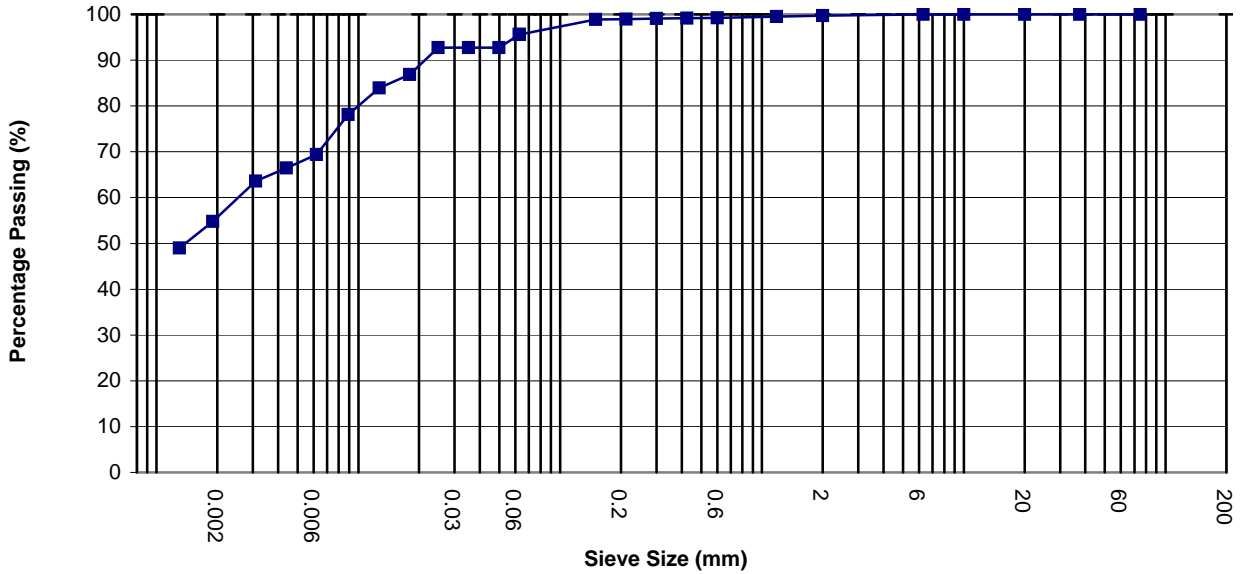
Lab Number L9481

Hole BH1

Sample D

Depth (m) 10.50

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	96
37.5	100	0.063	96
20	100	0.050	93
10	100	0.035	93
6.3	100	0.025	93
2	100	0.018	87
1.18	100	0.013	84
0.6	99	0.009	78
0.425	99	0.006	69
0.3	99	0.004	66
0.212	99	0.003	64
0.15	99	0.002	55
0.063	96	0.001	49

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.2
Sand	4.8
Silt	39.4
Clay	55.5

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

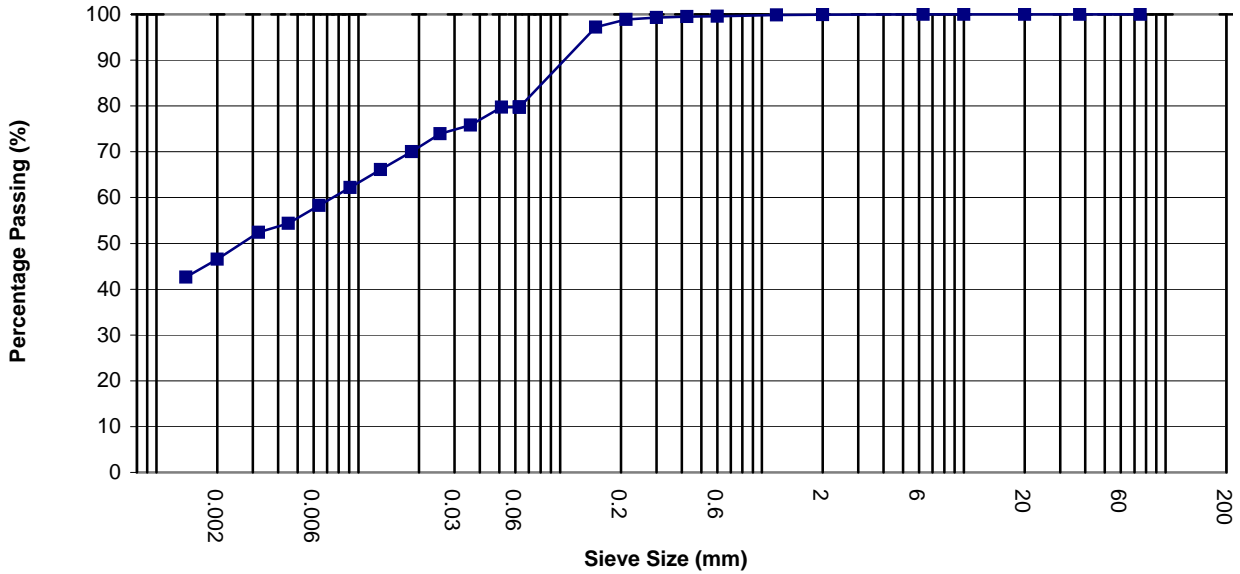
Lab Number L9481

Hole BH2

Sample B

Depth (m) 0.50

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	80
37.5	100	0.063	80
20	100	0.051	80
10	100	0.036	76
6.3	100	0.025	74
2	100	0.018	70
1.18	100	0.013	66
0.6	100	0.009	62
0.425	99	0.006	58
0.3	99	0.005	54
0.212	99	0.003	52
0.15	97	0.002	47
0.063	80	0.001	43

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.1
Sand	20.2
Silt	33.2
Clay	46.5

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

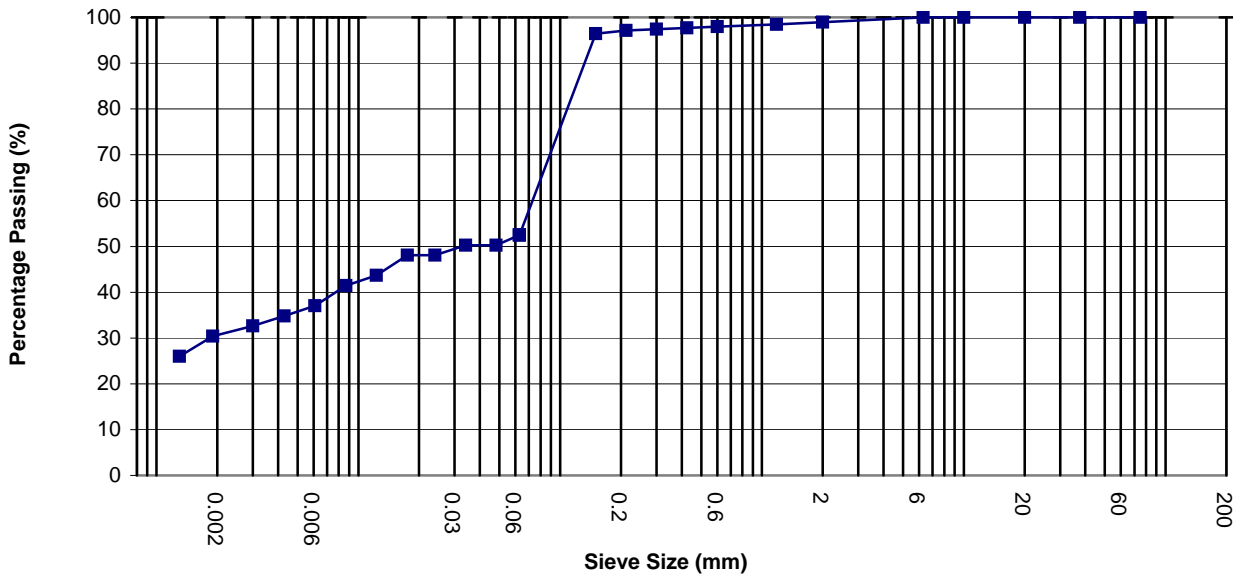
Lab Number L9481

Hole BH2

Sample D

Depth (m) 4.50

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	52
37.5	100	0.063	52
20	100	0.048	50
10	100	0.034	50
6.3	100	0.024	48
2	99	0.018	48
1.18	98	0.012	44
0.6	98	0.009	41
0.425	98	0.006	37
0.3	97	0.004	35
0.212	97	0.003	33
0.15	96	0.002	30
0.063	52	0.001	26

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	1.1
Sand	46.9
Silt	21.4
Clay	30.6

Grading Analysis	
D100	6.3
D60	0.1
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

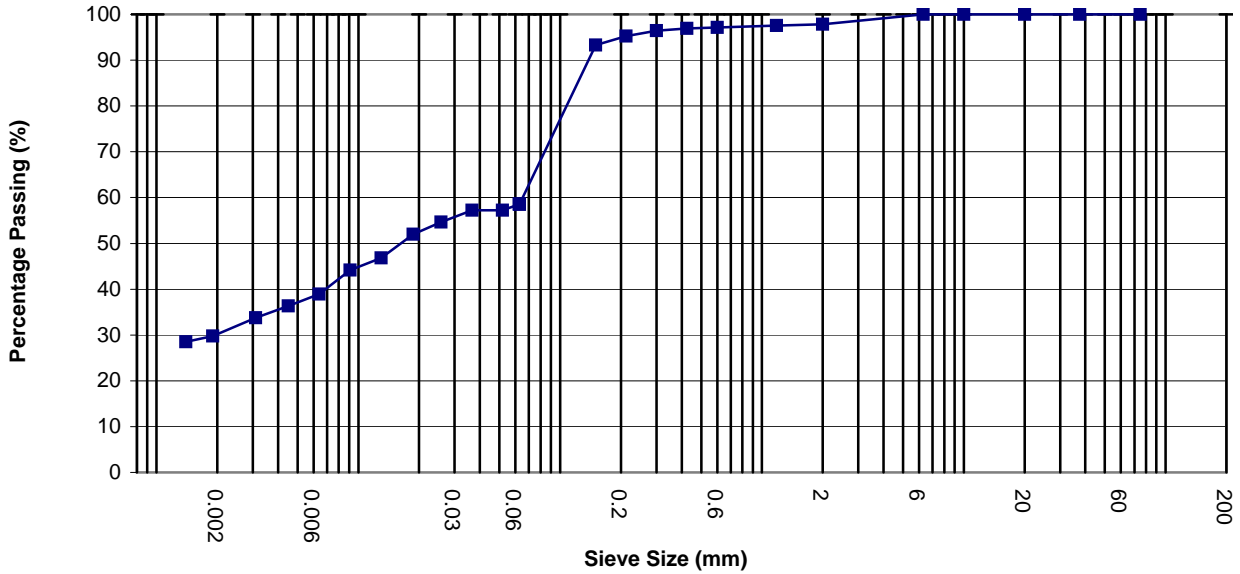
Lab Number L9481

Hole BH2

Sample D

Depth (m) 2.50

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	59
37.5	100	0.063	59
20	100	0.052	57
10	100	0.037	57
6.3	100	0.026	55
2	98	0.019	52
1.18	98	0.013	47
0.6	97	0.009	44
0.425	97	0.006	39
0.3	96	0.005	36
0.212	95	0.003	34
0.15	93	0.002	30
0.063	59	0.001	29

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	2.2
Sand	39.6
Silt	28.1
Clay	30.1

Grading Analysis	
D100	6.3
D60	0.1
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

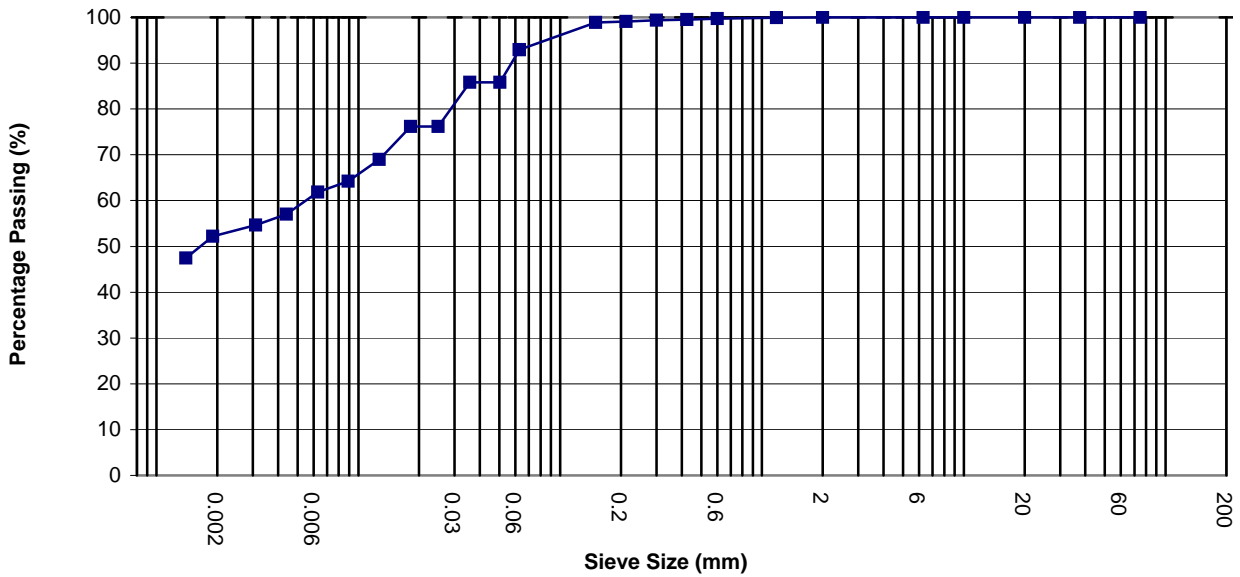
Lab Number L9481

Hole TP2

Sample B

Depth (m) 2.40

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	93
37.5	100	0.063	93
20	100	0.050	86
10	100	0.036	86
6.3	100	0.025	76
2	100	0.018	76
1.18	100	0.013	69
0.6	100	0.009	64
0.425	100	0.006	62
0.3	99	0.004	57
0.212	99	0.003	55
0.15	99	0.002	52
0.063	93	0.001	47

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.0
Sand	8.7
Silt	38.8
Clay	52.4

Grading Analysis	
D100	2.0
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

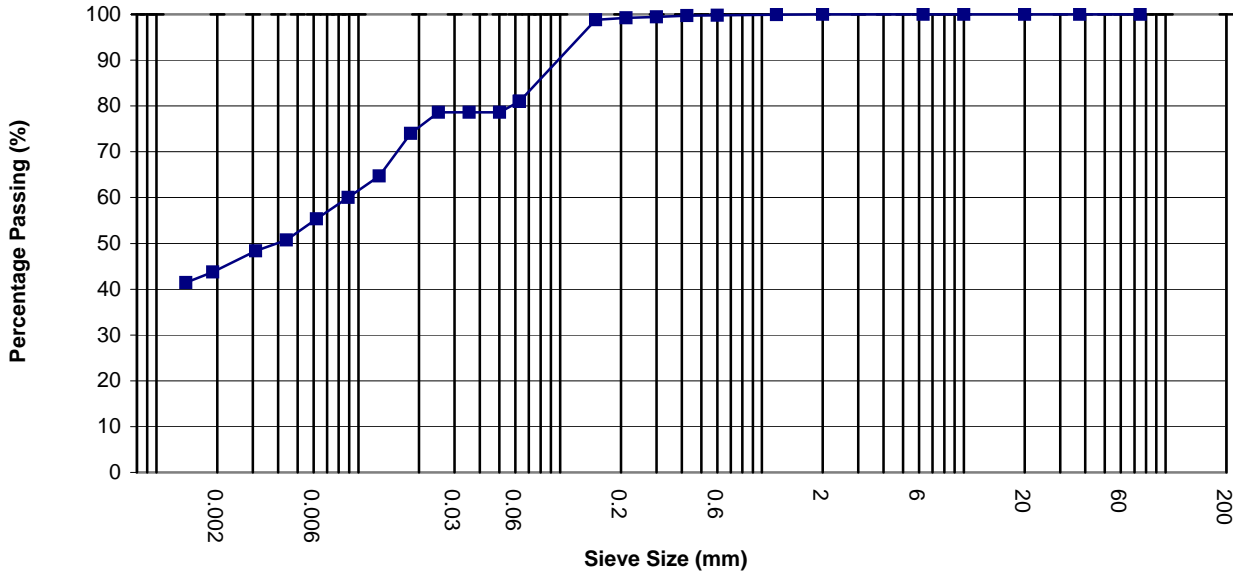
Lab Number L9481

Hole TP3

Sample B

Depth (m) 1.50

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	81
37.5	100	0.063	81
20	100	0.050	79
10	100	0.035	79
6.3	100	0.025	79
2	100	0.018	74
1.18	100	0.013	65
0.6	100	0.009	60
0.425	100	0.006	55
0.3	99	0.004	51
0.212	99	0.003	48
0.15	99	0.002	44
0.063	81	0.001	41

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.0
Sand	19.6
Silt	36.3
Clay	44.1

Grading Analysis	
D100	2.0
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

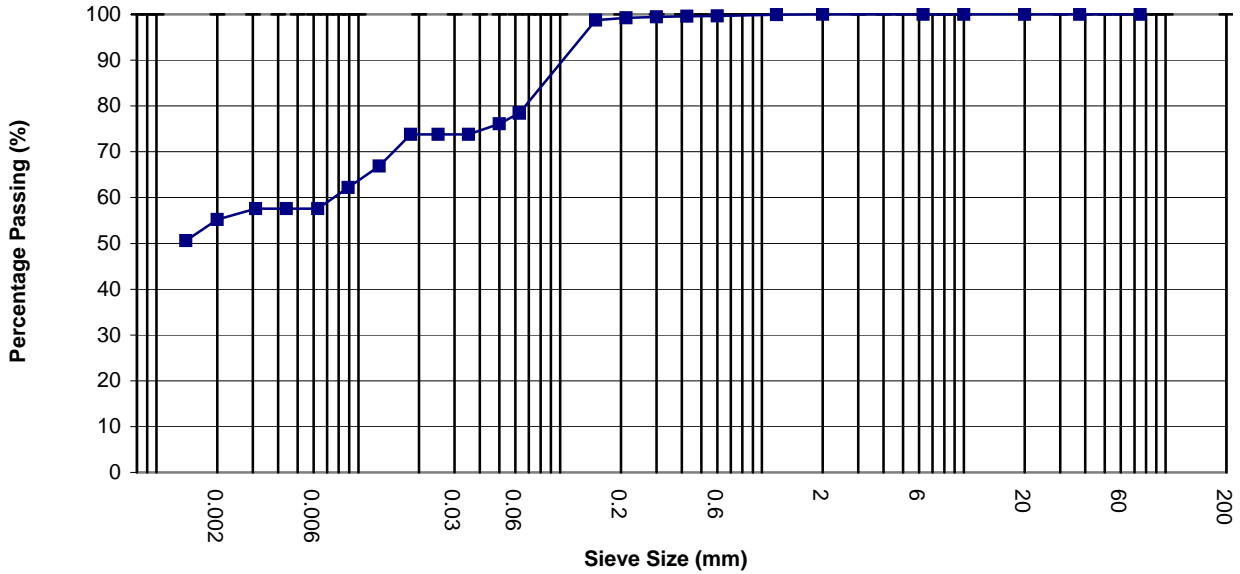
Lab Number L9481

Hole TP4

Sample B

Depth (m) 0.40

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	78
37.5	100	0.063	78
20	100	0.050	76
10	100	0.035	74
6.3	100	0.025	74
2	100	0.018	74
1.18	100	0.013	67
0.6	100	0.009	62
0.425	100	0.006	58
0.3	99	0.004	58
0.212	99	0.003	58
0.15	99	0.002	55
0.063	78	0.001	51

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.0
Sand	22.1
Silt	22.7
Clay	55.2

Grading Analysis	
D100	2.0
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

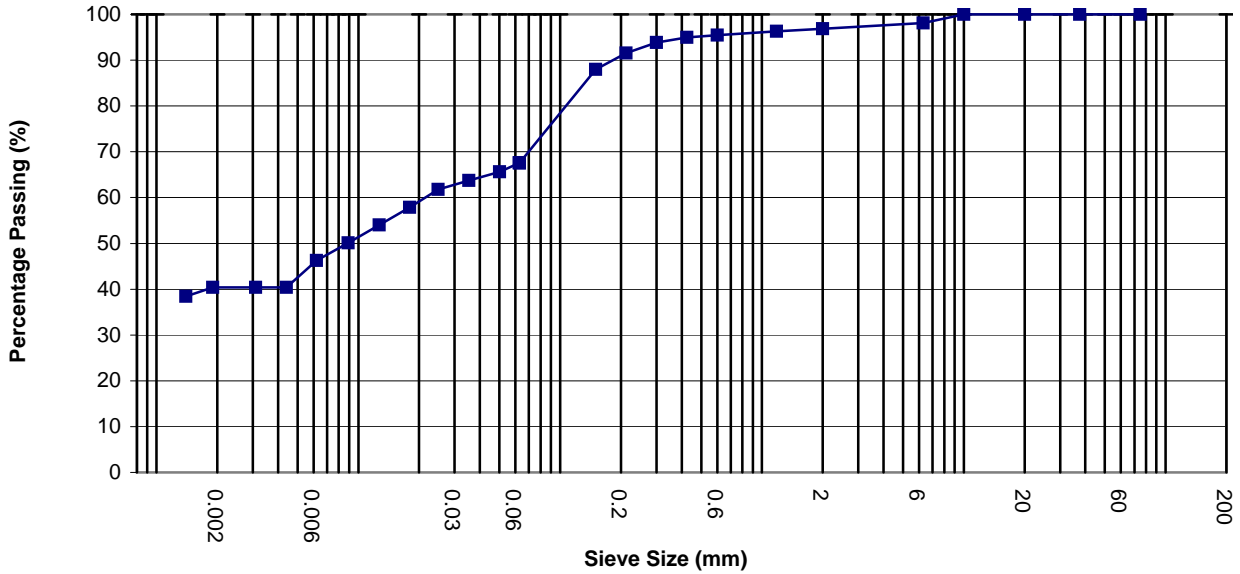
Lab Number L9481

Hole TP5

Sample B

Depth (m) 2.50

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	68
37.5	100	0.063	68
20	100	0.050	66
10	100	0.035	64
6.3	98	0.025	62
2	97	0.018	58
1.18	96	0.013	54
0.6	95	0.009	50
0.425	95	0.006	46
0.3	94	0.004	40
0.212	92	0.003	40
0.15	88	0.002	40
0.063	68	0.001	38

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	3.1
Sand	29.7
Silt	26.7
Clay	40.4

Grading Analysis	
D100	10.0
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis



Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

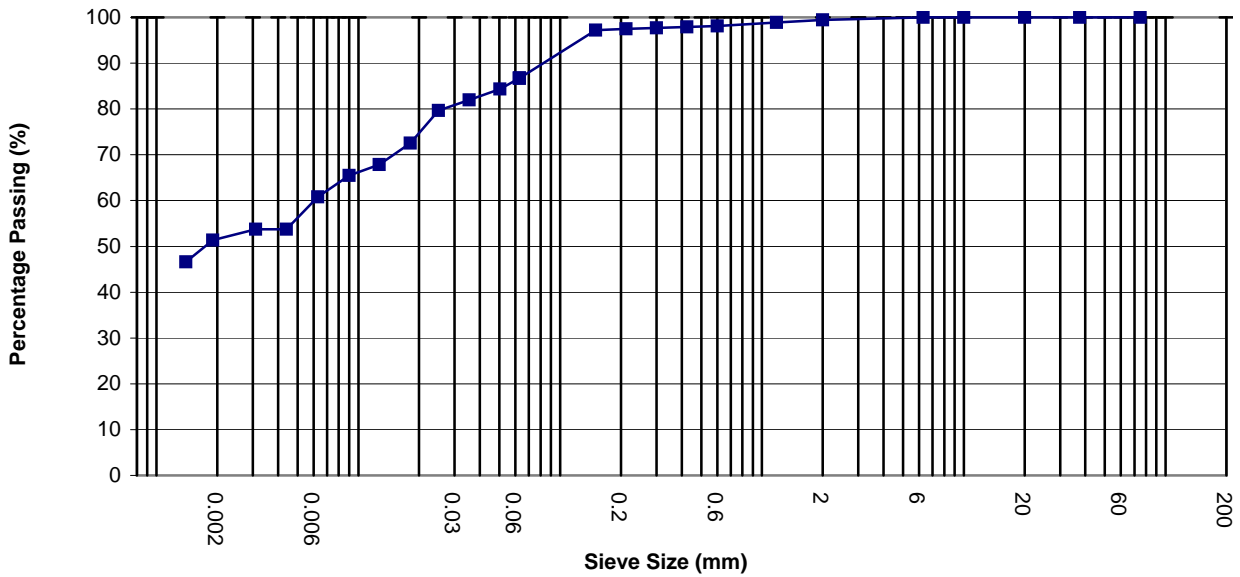
Lab Number L9481

Hole TP6

Sample B

Depth (m) 1.90

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	87
37.5	100	0.063	87
20	100	0.050	84
10	100	0.036	82
6.3	100	0.025	80
2	99	0.018	73
1.18	99	0.013	68
0.6	98	0.009	65
0.425	98	0.006	61
0.3	98	0.004	54
0.212	97	0.003	54
0.15	97	0.002	51
0.063	87	0.001	47

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.6
Sand	13.3
Silt	34.6
Clay	51.6

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

APPENDIX 8
GAS AND GROUNDWATER MONITORING RESULTS

BWB WATER MONITORING

SITE	Trowbridge STW
CLIENT	Wessex Water
JOB No	BME2019
DATE	22/02/2012
START TIME/FINISH TIME	12:00/13:00
ENGINEER	GA
INSTALLATION DEPTH	19.00m
MONITORING EQUIPMENT	HI 9828 Multiparameter, dip metre, bailers, low flow eqipment

WEATHER CONDITIONS	START	FINISH
Dry/raining etc	Dry	Dry
Cloud Cover	2/8	2/8
Wind strength (m/s)	2.0	3.0
Wind Direction (from)	South	South
Temperature (oC)	11.5	11.5
Barometric Pressure (mb)	1021	1021

BH Ref	Conductivity (μ S/cm)	Oxidisation Reduction Potential (ORP)	Dissolved Oxygen (mg/l)	pH	Temperature ($^{\circ}$ C)	Pressure (mbar)	Water Level (mbgl)	Base of Response Zone (mbgl)
BH1	1762	-169.3	9.70%	7.93	11.66	1021	15.07	19
BH2	1700	-158.4	9.70	7.86	11.54	1021.0	1.75	19.00

BWB GAS AND GROUNDWATER MONITORING

Site:	Trowbridge STW
Client:	Wessex Water
Job No.:	BME2019
Date:	22 February 2012
Start / End Time:	12:00/13:00
Engineer:	GA
Installation Details:	50mm HDPE Standpipe and Gas Valve
Monitoring Equipment:	GA2000 Gas Analyser, GF60 Flow Monitor, MiniRAE PID & Dip Meter

Weather Conditions	Start	End
(Dry / Raining)	Dry	Dry
Cloud Cover	2/8	2/8
Wind strength (m/s)	2.0	3.0
Wind Direction (from)	South	South
Temperature (°C)	11.5	11.5
Barometric Pressure (mb)	1021	1021
(Rising / Falling)	Falling	Falling

Ref.	Flow (l/hr)	Methane (%v/v) (%LEL)		Carbon Dioxide (%v/v)	Oxygen (%v/v)	Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Groundwater elevation (mAOD)	Notes
BH1	0.1	<0.1	<0.1	0.1	20.1	0	3	NR	15.07	19.00	#VALUE!	
BH2	0.1	<0.1	<0.1	<0.1	19.8	<0.1	<0.1	NR	1.75	19.00	#VALUE!	

LEL Lower Explosive limit (100% LEL = 5% Flammable gas)
NR Not recorded
Dry No Groundwater Detected



Date	Version	Author	Checked	Authorisa	Notes
01/06/2010	1	SS	TJH	TJH	Issue to division
05/01/2012	2	SS	TJH	TJH	Number formatting amended and borehole specific classification added



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BETTER SOLUTIONS, INTELLIGENTLY ENGINEERED

ENVIRONMENT

Wessex Water Services Ltd
Trowbridge WRC
Trowbridge

Ground Investigation Factual Report

ENVIRONMENT

Wessex Water Services Ltd
Trowbridge WRC
Trowbridge
Ground Investigation Factual Report

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December 2020

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Revision	Date of Issue	Status	Author:	Checked:	Approved:
1	December 2020	S1	Imogen Wort BSc. MSc.	Luke Cross BSc (Hons)	Peter Mason BSc MSc CGeol FGS
					

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FIGURES

Figure 2.1: Site Location Plan

DRAWINGS

Drawing 1: Exploratory Hole Location Plan

APPENDICES

Appendix 1: Exploratory Hole Records
Appendix 2: Driller's Logs
Appendix 3: SPT Calibration Certificates
Appendix 4: Permeability Testing
Appendix 5: Ground Gas and Groundwater Monitoring Results
Appendix 6: TRL DCP Testing Results
Appendix 7: Soil Chemical Testing Results
Appendix 8: Geotechnical Testing Results
Appendix 9: Water Chemical Testing Results

1. INTRODUCTION

Instruction

- 1.1 BWB Consulting (BWB) was instructed by **Wessex** Water Services Ltd (the Client) to carry out a ground investigation and produce a factual report for Trowbridge Water Recycling Centre (WRC), Trowbridge.
- 1.2 The purpose of this investigation is to provide information on the ground and groundwater conditions at the site in order to enable the detailed design of proposed new structures for the existing WRC. No proposed development plan has been provided to BWB at the time of writing this report.

Objectives

- 1.3 The objectives of the project are to:
- Confirm the prevailing ground and groundwater conditions at exploratory hole locations as selected by the Client.
 - Undertake environmental and geotechnical testing as specified by the Client.
 - Undertake in-situ geotechnical testing, comprising standard penetration testing (SPTs).
 - Install monitoring wells for subsequent monitoring of groundwater levels beneath the site as specified by the Client.
 - Provide a factual account of the ground investigation (this report).
- 1.4 The report has been completed in accordance with BS10175:2011(+A2:2017) 'Investigation of Potentially Contaminated Sites, Code of Practice' and EA Guidance on Land Contamination Risk Management (LCRM, 2020).

Scope of Works

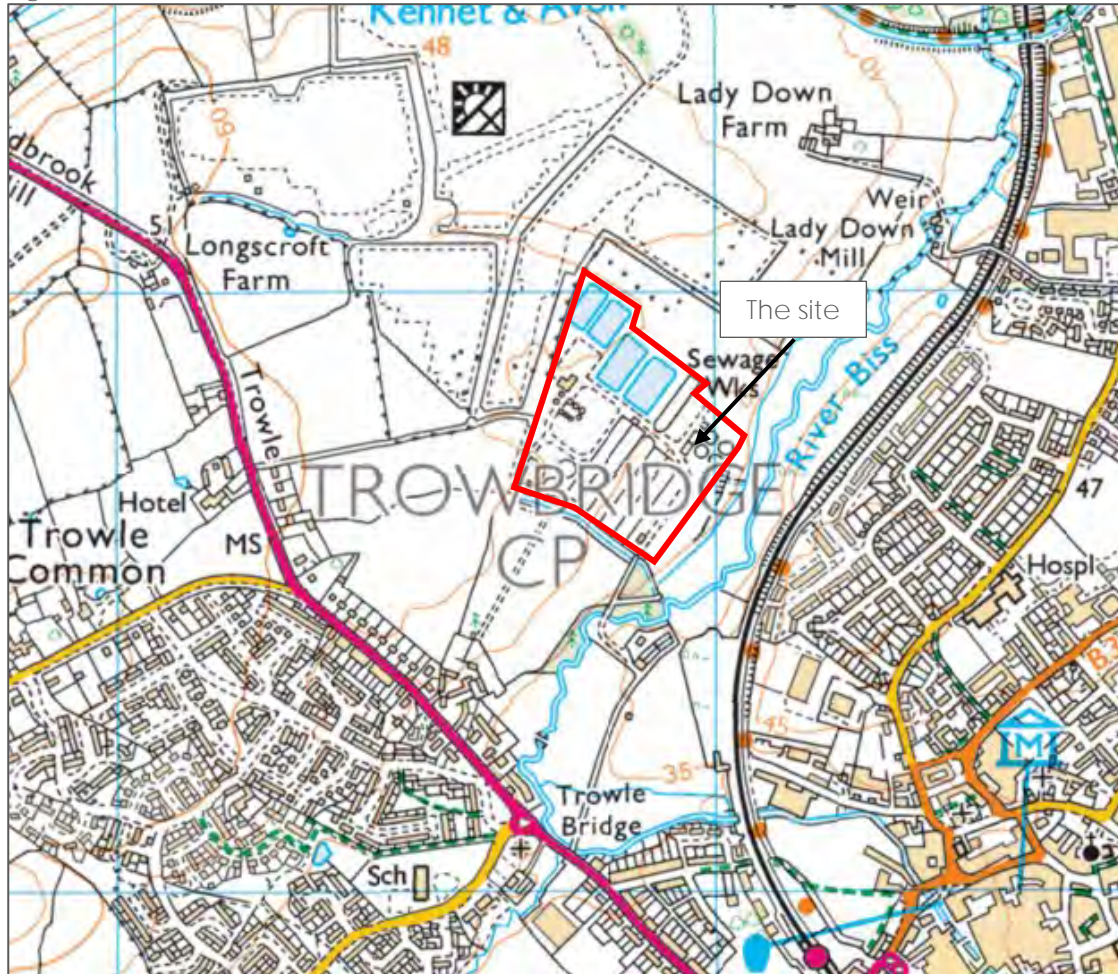
- 1.5 The ground investigation scope of works was completed between the 10th and 12th November 2020 and comprised the following:
- Non-intrusive survey of excavation locations for underground utilities.
 - Three cable percussive boreholes, two with rotary core follow-on.
 - Excavation of seven hand pits.
 - Six dynamic cone penetration tests.
 - Rising and falling head permeability testing.
 - Chemical analysis of soils and groundwater.
 - Geotechnical testing of soils.
 - Four gas and groundwater monitoring visits.

2. THE SITE

Site Location

- 2.1 The site is located at Trowbridge Water Recycling Centre (WRC), approximately 1km north-west of the centre of Trowbridge at approximate National Grid Reference 384865, 158726. The location of the site is shown in Figure 2.1 below.

Figure 2.1: Site Location Plan



Site Description

- 2.2 The site comprises an area within the existing operational Trowbridge WRC, covering an area of approximately 400m x 250m.
- 2.3 Access to the site is via an unnamed road off the A363 (Trowle) to the west of the site.
- 2.4 The site is generally flat, with a slight fall in levels from west to east and a typical elevation of approximately 45m above ordnance datum (AOD).
- 2.5 The site is bound to the south-west by agricultural land, to the north and west by a solar farm and to the east by the River Biss and its floodplain.

3. ENVIRONMENTAL AND GEOTECHNICAL GROUND INVESTIGATION

3.1 Intrusive ground investigation works were completed between the 10th and 12th November 2020 and comprised the following:

- Clearance of investigation locations by a specialist buried services tracing company.
- Collection of coordinates and elevations of exploratory hole locations.
- The advancement of three cable percussive boreholes (BH01 to BH03) to a maximum depth of 16.50m below ground level (bgl), with rotary core follow-on to a maximum depth of 25.00 bgl within BH01 and BH02. Completion of standard penetration testing (SPTs), in-situ permeability testing and the installation of gas and groundwater monitoring wells.
- The advancement of seven hand excavated trial pits (HP01 to HP07) to a maximum depth of 1.20m bgl
- Six TRL dynamic cone penetrometer (TRL DCP) tests undertaken in order to infer CBR values.
- Collection of environmental soil and groundwater samples for chemical analysis at a UKAS and MCERTS accredited laboratory.
- Collection of undisturbed and disturbed soil and rock samples for geotechnical analysis at a UKAS accredited laboratory.
- Four gas and groundwater monitoring visits.

3.2 An exploratory hole location plan is presented as Drawing 1. BWB exploratory hole records are presented as Appendix 1, drillers' logs are presented as Appendix 2, the SPT calibration certificate is presented in Appendix 3, the permeability worksheets are presented as Appendix 4, the ground gas and groundwater monitoring data is presented as Appendix 5 and the DCP data sheets are presented as Appendix 6.

3.3 The site investigation works were carried out in general accordance with BS5930:2015 'Code of Practice for Site Investigations' and BS10175:2017 'Investigation of Potentially Contaminated Sites'.

Chemical Analytical Strategy

3.4 Draft logs and chain of custody forms were sent to the projects appointed consultants (Sweco) for scheduling following completion of the ground investigation.

Soil Strategy

3.5 Selected soil samples collected from exploratory hole locations were sent to i2 Analytical (UKAS and MCERTS accredited) for chemical analysis. The following chemical analytical testing was undertaken:

- Nineteen soil samples tested in line with Wessex Water Suite 1 comprising pH, Total Organic Carbon, asbestos screen and ID, TPH CWG (aliphatic and aromatic) (<C40), PAH (speciated – 16 USEPA), BTEX & MTBE, arsenic, antimony, barium,

cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, vanadium and zinc.

- Four soil samples tested for asbestos quantification analysis (gravimetric).
- Eleven soil samples tested for a leachable component analysis soil Suite F (ICE UK Specification for Ground Investigation) comprising arsenic, boron, cadmium, chromium (total), hexavalent chromium, copper, lead, mercury, nickel, sulphate, selenium, zinc, pH, phenol (total), TPH (C10-40), PAH (speciated – 16 USAEPA), cyanide (total), TPH CWG (inc BTEX) and ammoniacal nitrogen.

3.6 The results of the soil chemical testing are presented as Appendix 7.

Geotechnical Strategy

3.7 In-situ soil strength testing comprising SPTs were undertaken within the cable percussive boreholes. SPT 'N' values are included on the exploratory hole logs presented as Appendix 1.

3.8 Selected undisturbed and disturbed samples were collected from the investigation locations and sent to i2 Analytical Limited (UKAS accredited). The following geotechnical testing was undertaken;

- Seventeen samples tested for moisture content.
- Ten samples tested for Atterberg (liquid and plastic) limits.
- Six samples tested for particle size distribution by sieve wet/dry and sedimentation.
- Two samples submitted for California Bearing Ratio (CBR) testing.
- One sample submitted for one-dimensional consolidation testing.
- Six samples submitted for multistage triaxial testing.
- Fourteen samples submitted for point load testing.
- Two samples submitted for unconfined compressive strength (UCS) testing
- Four samples tested for BRE Suite D analysis.
- Six samples tested for organic content.

3.9 The results of the geotechnical testing are included as Appendix 8.

Groundwater Sampling Strategy

3.10 Water samples were collected from BH101 (S), BH102 (D) & BH102 (D) and sent to i2 Analytical (UKAS and MCERTS accredited) for chemical analysis. The following chemical analytical testing was undertaken:

- 3 water samples tested for a suite in line with Suite F water suite (ICE UK Specification for Ground Investigation) comprising arsenic, cadmium, chromium III, chromium hexavalent, lead, mercury, selenium, boron, copper, nickel, zinc, cyanide (total, complex & free), thiocyanate, phenols, sulphate, sulphur, pH, PAH (speciated – 16 USAEPA), antimony, barium, beryllium, vanadium chloride, chloride, ammoniacal nitrogen, nitrate, nitrogen, chemical oxygen demand, biochemical oxygen

demand, total organic carbon, volatile fatty acids, iron, manganese, calcium, sodium, magnesium and potassium.

- 3.11 The results of the water chemical testing are included as Appendix 9.

Limitations and Uncertainty

- 3.12 Several hand pits were terminated at shallow depths including HP02 and HP07 at 0.50m on limestone cobbles, and HP05 at 0.70m bgl and HP06 at 1.00m on concrete obstructions.

4. REFERENCES

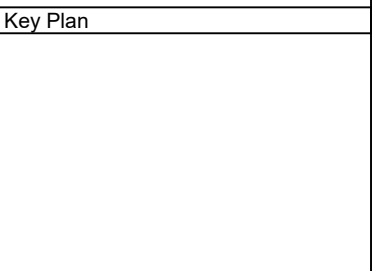
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13. NHBC Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66: 2008.

DRAWINGS

Drawing 1: Exploratory Hole Location Plan



- Notes**
1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
 2. This drawing is to be read in conjunction with all relevant architects, engineers and specialist drawings and specifications.
 3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 4. Any discrepancies noted on site are to be reported to the engineer immediately.



- Legend**
- BH01 Borehole Location
 - DCP01 DCP TRL Test Location
 - HP01 Hand Pit Location

Rev	Date	Details of issue / revision	Drawn	Reviewed
P1	17.12.20	FINAL	IW	LC

Issues & Revisions

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Client
WESSEX WATER SERVICES LTD

Project Title
TROWBRIDGE WRC

Drawing Title
EXPLORATORY HOLE LOCATION PLAN

Drawn: I. WORT	Reviewed: L. CROSS
BWB Ref: BMG2109	Date: 17.12.20
Scale: A3	NTS
Drawing Status	
FINAL	
Project - Originator - Zone - Level - Type - Role - Number	Status Rev
TBWRC-BWB-ZZ-XX-DR-YE-0001	S1 R1

APPENDICES

Appendix 1: Exploratory Hole Records

BOREHOLE LOG

Scale 1:50

Sheet 1 of 3

LOCATION ID BH01	Project Name: Trowbridge WRC		Ground Level (m AOD): 36.19		
	Project Number: BMG2109		Eastings: 385008.60		
	Client: Wessex Water Services Ltd		Northings: 158786.11		
Hole Type: CP+RC	Rig: Dando 3000 and Comacchio GEO205	Start & End Date: 10/11/2020 - 11/11/2020		Engineer: IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing				
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	# (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
		[0.20] 35.99 [0.30]	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)		0.20						B1	0.20 - 0.50m		
		35.69 [2.00]	Soft greyish brown slightly gravelly CLAY. Gravel is angular to subangular fine to coarse brick, concrete and limestone. (Made Ground)		0.50						D1 ES1	0.50 - 0.70m 0.70 - 0.70m		
			Loose dark greyish brown gravelly silty fine to coarse SAND with a moderate cobble content. Gravel is angular to subangular fine to coarse brick, concrete, mudstone and ash with frequent glass and ceramic inclusions. Cobbles are angular to subangular concrete. (Made Ground)								S D2	1.20 - 1.20m 1.20 - 1.65m	N=5 (1,1/2,1,1,1)	
											D3	1.70 - 1.70m		
											S D4	2.00 - 2.00m 2.00 - 2.45m	N=0 (1,1/0,0,0,0)	1.70m (NR)
		33.69 [1.00]	Very soft orangish brown and dark brown silty CLAY. (Kellaways Formation)		2.50						D5	2.50 - 2.50m		
											S B2 D6 ES2 D7	3.00 - 3.00m 3.00 - 3.45m 3.00 - 3.50m 3.50 - 3.50m 3.50 - 4.45m	N=2 (1,0/0,0,1,1)	3.00m (NR)
		32.69 [1.20]	Very soft to soft orangish brown mottled grey silty CLAY with frequent fine sandy lenses. (Kellaways Formation)		3.50						UT1 (17)	3.50 - 3.50m 4.00 - 4.45m		
											D8 D9	4.50 - 4.50m 4.50 - 4.70m		
		31.49 [0.80]	Soft greyish brown sandy CLAY. Sand is fine and medium. (Kellaways Formation)		4.70						S D10	4.70m - 5.00m 5.00 - 5.45m	N=6 (0,1/1,1,2,2)	4.70m (NR)
											D11	5.50 - 5.50m		
		30.69 [11.00]	Firm dark grey mottled light grey thinly laminated slightly sandy CLAY. Sand is fine and medium. (Kellaways Formation)		5.50						UT2 (29)	6.00 - 6.45m		
											D12	6.50 - 6.50m		
											B3 D13	7.00 - 7.00m 7.00 - 7.50m		
											S D14	7.50 - 7.50m 7.50 - 7.95m	N=16 (2,2/2,4,4,6)	6.00m (NR)
											D15	8.50 - 8.50m		
											UT3 (37)	9.00 - 9.45m		
											D16	9.50 - 9.50m		

<table border="1"> <tr> <th colspan="3">Chiseling</th> </tr> <tr> <td>From (m bgl)</td> <td>To (m bgl)</td> <td>Time (hh:mm)</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>			Chiseling			From (m bgl)	To (m bgl)	Time (hh:mm)				Remarks Reason for Termination: Terminated at target depth. Groundwater Remarks: No groundwater encountered. Other Remarks: 1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.
Chiseling												
From (m bgl)	To (m bgl)	Time (hh:mm)										
<table border="1"> <tr> <th colspan="3">Water Added</th> </tr> <tr> <td>From (m bgl)</td> <td>To (m bgl)</td> <td>Volume (l)</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>			Water Added			From (m bgl)	To (m bgl)	Volume (l)				
Water Added												
From (m bgl)	To (m bgl)	Volume (l)										



BOREHOLE LOG

Scale 1:50

Sheet 2 of 3

LOCATION ID BH01	Project Name: Trowbridge WRC		Ground Level (m AOD): 36.19		
	Project Number: BMG2109		Eastings: 385008.60		
	Client: Wessex Water Services Ltd		Northings: 158786.11		
Hole Type: CP+RC	Rig: Dando 3000 and Comacchio GEO205	Start & End Date: 10/11/2020 - 11/11/2020		Engineer: IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing				
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	R (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Firm dark grey mottled light grey thinly laminated slightly sandy CLAY. Sand is fine and medium. (Kellaways Formation)									D17 10.00 - 10.00m		
												S D18 10.50 - 10.95m	N=36 (1,4/8,9,10)	6.00m (NR)
												D19 11.50 - 11.50m		
												UT4 12.00 - 12.45m		
												D20 12.40 - 12.40m		
												D21 13.00 - 13.00m		
												S D22 13.50 - 13.95m	N=36 (3,4/6,8,10,12)	6.00m (NR)
												D23 14.00 - 14.00m		
												S D24 15.00 - 15.45m	N=44 (4,7/9,10,10,15)	6.00m (NR)
												D25 16.00 - 16.00m		
		19.69 [1.80]	Strong thinly laminated grey sandy MUDSTONE with frequent fine and medium shell fragments. Sand is fine and medium. Medium and coarse sand along fractures. (Kellaways Formation)		16.50							S D26 16.50 - 16.95m	50 (7,11/50 for 150mm)	6.00m (NR)
						16.50 - 18.00	87	80	80	2		C2 17.20 - 17.61m		
		17.89 [2.10]	Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds.		18.30							C3 18.18 - 18.40m		
						18.00 - 19.50	99	73	63	12		C4 18.45 - 18.61m		
												C5 18.88 - 19.20m		

Chiselling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			<p>Reason for Termination: Terminated at target depth.</p> <p>Groundwater Remarks: No groundwater encountered.</p> <p>Other Remarks: 1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.</p>
Water Added			
From (m bgl)	To (m bgl)	Volume (l)	



BOREHOLE LOG

Scale 1:50

Sheet 3 of 3

LOCATION ID BH01	Project Name: Trowbridge WRC		Ground Level (m AOD): 36.19		
	Project Number: BMG2109		Eastings: 385008.60		
	Client: Wessex Water Services Ltd		Northings: 158786.11		
Hole Type: CP+RC	Rig: Dando 3000 and Comacchio GEO205	Start & End Date: 10/11/2020 - 11/11/2020		Engineer: IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing					
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	#1 (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)	
			Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds. (Kellaways Formation)									C6 19.20 - 19.46m			
			Very weak light greenish grey MUDSTONE recovered as very stiff clay. (Kellaways Formation) <i>20.70m - 21.00m: Becoming dark grey.</i>		20.40	19.50 - 21.00	99	85	76	10		C7 19.58 - 19.72m			
		15.79 [1.10]											C8 19.85 - 20.10m		
		14.69 [3.50]		Strong thinly laminated greenish grey MUDSTONE mottled reddish brown along fractures. Fractures filled with clay and gravel. (Kellaways Formation)		21.50	21.00 - 22.50	99	34	85	10		C9 20.27 - 20.39m		
			<i>23.00m - 24.00m: Becoming slightly sandy.</i>									C10 20.40 - 20.55m			
							22.50 - 24.00	89	83	83	6		C11 20.55 - 20.90m		
													C12 21.07 - 21.20m		
			Hole Terminated at 25.00m bgl.									C13 21.23 - 21.43m			
							24.00 - 25.00	60	47	35	9		C14 21.50 - 22.22m		
		11.19											C15 22.23 - 22.63m		
												C16 22.70 - 22.82m			
												C17 24.16 - 24.39m			
												C18 24.40 - 24.45m			
												C19 24.52 - 24.56m			

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
Reason for Termination:			Terminated at target depth. Groundwater Remarks: No groundwater encountered. Other Remarks: 1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.
Water Added			
From (m bgl)	To (m bgl)	Volume (l)	



BOREHOLE LOG

Scale 1:50

Sheet 1 of 3

LOCATION ID BH02	Project Name: Trowbridge WRC	Ground Level (m AOD): 36.10		
	Project Number: BMG2109	Eastings: 385021.58		
	Client: Wessex Water Services Ltd	Northings: 158787.55		
Hole Type: CP+RC	Rig: Dando 3000 and Comacchio GEO205	Start & End Date: 11/11/2020 - 12/11/2020	Engineer: IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing				
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	# (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
		0.20 35.90 [0.50]	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)		0.20							B1 ES1 D1 0.30 - 0.30m 0.30 - 0.50m 0.50 - 0.50m		
		35.40 [2.30]	Dark greyish brown sandy clayey GRAVEL of angular to subangular fine to coarse brick, concrete, mudstone, limestone with rare glass and ceramic inclusions. (Made Ground)		0.70							ES2 S D2 0.50m 1.00 - 1.00m 1.20 - 1.20m 1.20 - 1.65m	N=4 (1,0/1,1,1,1)	
		33.10 [1.50]	Soft friable dark greyish black gravelly very sandy CLAY. Gravel is angular to subangular fine to coarse brick, ash and concrete with rare glass, ceramic and wood inclusions. Sand is fine to coarse. (Made Ground)									S B2 D3 2.00 - 2.00m 2.45m - 2.00m 3.00m - 3.00m	N=3 (1,2/1,1,0,1)	1.70m (NR)
		31.60 [1.00]	Soft dark greyish brown and reddish brown slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse brick, ash and concrete with rare glass, ceramic and wood inclusions. Sand is fine to coarse. (Made Ground)		3.00							S D4 D5 3.00 - 3.00m 3.45m - 3.50m 3.50m - 3.50m	N=2 (1,0/1,0,1,0)	3.00m (NR)
		30.60 [3.50]	Soft to firm orangish brown mottled light grey silty CLAY with frequent orangish brown fine sandy lenses. (Kellaways Formation)		4.50							S B3 D6 ES3 D7 4.00 - 4.00m 4.00m - 4.00m 4.45m - 4.45m 4.45m - 4.50m 4.50m - 4.50m 5.00 - 5.45m	N=4 (0,0/1,1,1,1)	3.00m (NR)
		27.10 [6.00]	Firm dark grey silty CLAY with rare orangish brown mottling and fine sandy lenses. (Kellaways Formation)		5.50							D8 D9 S D10 D11 B4 UT2 (23) D12 D13 7.00 - 5.50m 5.50m - 5.70m 5.70m - 6.00m 6.00 - 6.45m 6.45m - 6.50m 7.00 - 7.50m 7.50 - 7.95m 8.00 - 8.00m 8.50 - 8.50m	N=18 (1,2/3,4,5,6)	4.70m (NR)
			Firm to stiff dark grey silty CLAY with frequent fine and medium shell fragments and dark and light grey		9.00							S D14 9.00 - 9.45m	N=21 (2,3/4,5,6,6)	4.70m (NR)

<table border="1"> <tr> <th colspan="3">Chiseling</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Time (hh:mm)</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			Chiseling			From (m bgl)	To (m bgl)	Time (hh:mm)				Remarks Reason for Termination: Terminated at target depth. Groundwater Remarks: No groundwater encountered. Other Remarks: 1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.
Chiseling												
From (m bgl)	To (m bgl)	Time (hh:mm)										
<table border="1"> <tr> <th colspan="3">Water Added</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Volume (l)</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			Water Added			From (m bgl)	To (m bgl)	Volume (l)				
Water Added												
From (m bgl)	To (m bgl)	Volume (l)										
<table border="1"> <tr> <th colspan="3">Chiseling</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Time (hh:mm)</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			Chiseling			From (m bgl)	To (m bgl)	Time (hh:mm)				
Chiseling												
From (m bgl)	To (m bgl)	Time (hh:mm)										



BOREHOLE LOG

Scale 1:50

Sheet 2 of 3

LOCATION ID BH02	Project Name: Trowbridge WRC		Ground Level (m AOD): 36.10		
	Project Number: BMG2109		Eastings: 385021.58		
	Client: Wessex Water Services Ltd		Northings: 158787.55		
Hole Type: CP+RC	Rig: Dando 3000 and Comacchio GEO205	Start & End Date: 11/11/2020 - 12/11/2020		Engineer: IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing				
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	#1 (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Firm to stiff dark grey silty CLAY with frequent fine and medium shell fragments and dark and light grey fine sandy lenses. (Kellaways Formation)	[Pattern]								D15 10.00 - 10.00m		
												UT3 (48) 10.50 - 10.95m		
												D16 11.00 - 11.00m		
												D17 11.50 - 11.50m		
												S D18 12.00 - 12.45m	N=32 (2,4/6,8,8,10)	4.70m (NR)
												D19 13.00 - 13.00m		
												S D20 13.50 - 13.95m	N=42 (3,6/6,9,12,15)	4.70m (NR)
												D21 14.00 - 14.00m		
		21.10 [1.65]	Very stiff dark grey silty CLAY. Weathered reddish brown along fractures. (Kellaways Formation)	[Pattern]	15.00							S D22 15.00 - 15.45m	50 (8,9/50 for 150mm)	4.70m (NR)
						15.00 - 16.50	97	93	91	1				
		19.45 [2.05]	Strong thinly laminated grey sandy MUDSTONE with frequent fine and medium shell fragments. Sand is fine and medium. Medium and coarse sand along fractures. (Kellaways Formation)	[Pattern]	16.65							C1 C2 16.63 - 16.81m 16.81 - 17.14m		
						16.50 - 18.00	89	89	89	2				
												C3 C4 18.00 - 18.27m 18.29 - 18.53m		
		17.40 [2.15]	Moderately strong light and dark grey fine grained	[Pattern]	18.70							C5 18.72 - 18.96m		
						18.00 - 19.50	97	86	82	11				

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			Reason for Termination: Terminated at target depth.
			Groundwater Remarks: No groundwater encountered.
Water Added			Other Remarks: 1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.
From (m bgl)	To (m bgl)	Volume (l)	



BOREHOLE LOG

Scale 1:50

Sheet 3 of 3

LOCATION ID BH02	Project Name: Trowbridge WRC		Ground Level (m AOD): 36.10		
	Project Number: BMG2109		Eastings: 385021.58		
	Client: Wessex Water Services Ltd		Northings: 158787.55		
Hole Type: CP+RC	Rig: Dando 3000 and Comacchio GEO205	Start & End Date: 11/11/2020 - 12/11/2020		Engineer: IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing				
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	#1 (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds. (Kellaways Formation)	[Pattern]							C6	19.20 - 19.45m		
						19.50 - 21.00	98	85	80	10	C7	19.83 - 21.04m		
		15.25 [3.15]	Very weak light greenish grey MUDSTONE recovered as very stiff clay. (Kellaways Formation)	[Pattern]	20.85						C8	21.20 - 21.67m		
						21.00 - 22.50	93	87	87	7	C9	21.82 - 22.05m		
						22.50 - 24.00	95	79	88	11	C10	22.05 - 22.27m		
						22.50 - 24.00	95	79	88	11	C11	23.30 - 23.62m		
		12.10 [1.00]	Strong thinly laminated greenish grey MUDSTONE mottled reddish brown along fractures. Fractures filled with clay and gravel. (Kellaways Formation)	[Pattern]	24.00						C12	24.00 - 24.33m		
						24.00 - 25.00	100	70	46	15	C13	24.57 - 24.70m		
											C14	24.84 - 24.93m		
		11.10	Hole Terminated at 25.00m bgl.		25.00									

<table border="1"> <tr> <th colspan="3">Chiseling</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Time (hh:mm)</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			Chiseling			From (m bgl)	To (m bgl)	Time (hh:mm)				<p>Remarks</p> <p>Reason for Termination: Terminated at target depth.</p> <p>Groundwater Remarks: No groundwater encountered.</p> <p>Other Remarks: 1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.</p>
Chiseling												
From (m bgl)	To (m bgl)	Time (hh:mm)										
<table border="1"> <tr> <th colspan="3">Water Added</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Volume (l)</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			Water Added			From (m bgl)	To (m bgl)	Volume (l)				
Water Added												
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Chiseling												
From (m bgl)	To (m bgl)	Time (hh:mm)										




BOREHOLE LOG

Scale 1:50

Sheet 1 of 2

LOCATION ID BH03	Project Name: Trowbridge WRC	Ground Level (m AOD): 35.73		
	Project Number: BMG2109	Eastings: 385014.77		
	Client: Wessex Water Services Ltd	Northings: 158701.01		
Hole Type: CP	Rig: Dando 3000	Start & End Date: 12/11/2020	Engineer: IW	Checker: LC

Boring		Strata				Samples			In-Situ Tests				
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)	
		0.50	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)		0.50	1	0.50	0.50					
		35.23 (0.50)	Soft brown, orangish brown and reddish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick, mudstone, concrete and quartzite. (Made Ground)		0.50	1	0.50	1.00					
		34.73 (3.50)			1.00	1	0.70	0.70					
			Very soft dark greyish black slightly gravelly slightly sandy silty CLAY with rare rootlets. Gravel is angular fine to coarse brick and concrete. Sand is fine to coarse. (Made Ground)		1.00	2	1.20	1.65	SPT	1.20	N=3 (1,0/0,1,1,1)		
						1.70	3	1.70					
						2.00	4	2.00	2.45	SPT	2.00	N=3 (0,0/3,0,0,0)	1.70m (NR)
						2.50	5	2.50					
						3.00	2	3.00	3.45	SPT	3.00	N=4 (1,0/1,1,1,1)	3.00m (NR)
					3.50	6	3.50	3.50					
					3.50	2	3.50	3.50					
					3.50	7	3.50						
					4.00	8	4.00	4.45	SPT	4.00	N=5 (1,1/1,1,1,2)	3.00m (NR)	
					4.50	9	4.50	4.50					
		31.23 (3.00)	Soft light greyish brown mottled orangish brown and black sandy silty CLAY. Sand is fine and medium. (Made Ground)		4.50	1	5.00	5.45					
			5.50m: Clay pipe fragment.		5.50	10	5.50	5.50					
					5.50	3	5.50	6.00					
					5.50	3	5.50						
					6.00	11	6.00	6.45	SPT	6.00	N=16 (3,5/4,4,4,4)	6.00m (NR)	
			6.50m: Metal fragment.		6.50	12	6.50	6.50					
					6.80	13	6.80	6.80					
		28.23 (4.95)	Stiff dark grey silty CLAY with fine and medium shell fragments. (Kellaways Formation)		7.50	2	7.50	7.45					
					7.50	4	7.50	7.50					
					7.50	4	7.50	8.00					
					7.50	(29)							
					8.50	14	8.50	8.50					
					9.00	15	9.00	9.45	SPT	9.00	N=27 (3,3/8,8,5,6)	7.50m (NR)	

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
Reason for Termination:			Terminated at target depth, as specified by consultant engineer.
Groundwater Remarks:			
No groundwater encountered.			
Water Added			Other Remarks:
From (m bgl)	To (m bgl)	Volume (l)	
1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole cased to 7.5m bgl using 150mm casing and to 15.00m bgl using rotary casing.			

BOREHOLE LOG

Scale 1:50

Sheet 2 of 2

LOCATION ID BH03	Project Name: Trowbridge WRC	Ground Level (m AOD): 35.73		
	Project Number: BMG2109	Eastings: 385014.77		
	Client: Wessex Water Services Ltd	Northings: 158701.01		
Hole Type: CP	Rig: Dando 3000	Start & End Date: 12/11/2020	Engineer: IW	Checker: LC

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
			Stiff dark grey silty CLAY with fine and medium shell fragments. (Kellaways Formation)									
					16		10.00	10.00				
					3 (39)		10.50	10.95				
					17		11.00	11.00				
					18		11.50	11.50				
					19		12.00	12.45	SPT	12.00	N=30 (2,4/6,7,7,10)	7.50m (NR)
		23.28	Hole Terminated at 12.45m bgl.		12.45							

<table border="1"> <tr> <th colspan="3">Chiseling</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Time (hh:mm)</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			Chiseling			From (m bgl)	To (m bgl)	Time (hh:mm)				<p align="center">Remarks</p> <p>Reason for Termination: Terminated at target depth, as specified by consultant engineer.</p> <p>Groundwater Remarks: No groundwater encountered.</p> <p>Other Remarks: 1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole cased to 7.5m bgl using 150mm casing and to 15.00m bgl using rotary casing.</p>
Chiseling												
From (m bgl)	To (m bgl)	Time (hh:mm)										
<table border="1"> <tr> <th colspan="3">Water Added</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Volume (l)</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			Water Added			From (m bgl)	To (m bgl)	Volume (l)				
Water Added												
From (m bgl)	To (m bgl)	Volume (l)										
<table border="1"> <tr> <th colspan="3">Water Added</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Volume (l)</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>			Water Added			From (m bgl)	To (m bgl)	Volume (l)				
Water Added												
From (m bgl)	To (m bgl)	Volume (l)										



TRIAL PIT LOG

Scale: 1:20

Sheet 1 of 1

HP01	LOCATION ID:	Project Name: Trowbridge WRC	0.50 Pit Dimensions (m) Degrees
		Project Number: BMG2109	
		Client: Wessex Water Services Ltd	
	Plant: Hand tools	Start & End Date: 10/11/2020	
Ground Level (m AOD): 43.04		Eastings & Northings: 384716E 158696N	Engineer: IW Checker: LC

Strata					Samples			In-Situ Tests	
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Type	From (m)	To (m)	Type	Result
		0.20m	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)		D1 ES1	0.10 0.10	0.10 0.10		
		42.84 0.30m	Soft to firm brown and orangish brown slightly gravelly silty CLAY. Gravel is angular medium and coarse concrete and limestone. (Made Ground)		D2 ES2	0.30 0.30	0.30 0.30		
		42.54 0.70m	Soft light orangish brown mottled greyish brown silty CLAY. Frequent orangish brown sandy lenses throughout. (Kellaways Formation)		D3 ES3 B1	0.60 0.60 0.80	0.60 0.60 0.80		
		41.84	Hole Terminated at 1.20m bgl.						

Remarks

Reason for Termination:
Terminated at target depth.

Groundwater Notes:
No groundwater encountered.

Other Remarks:
1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

TRIAL PIT LOG

Scale: 1:20

Sheet 1 of 1

HP02	LOCATION ID:	Project Name: Trowbridge WRC	0.50 Pit Dimensions (m) Degrees
		Project Number: BMG2109	
		Client: Wessex Water Services Ltd	
	Plant: Hand tools	Start & End Date: 10/11/2020	
Ground Level (m AOD): 42.49		Eastings & Northings: 384758E 158724N	Engineer: IW Checker: LC

Strata					Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)		D1 ES1	0.10 0.10	0.10 0.10			
		42.29	Soft to firm brown and orangish brown slightly gravelly silty CLAY. Gravel is angular medium and coarse concrete and limestone. Limestone cobble at base. (Made Ground)		D2 ES2	0.30 0.30	0.30 0.30			
		0.30m								
		41.99	0.30m - 0.50m: <i>Becoming very gravelly.</i> Hole Terminated at 0.50m bgl.							

Remarks

Reason for Termination:
Terminated on limestone cobble.

Groundwater Notes:
No groundwater encountered.

Other Remarks:
1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.



TRIAL PIT LOG

Scale: 1:20

Sheet 1 of 1

HP03	LOCATION ID:	Project Name: Trowbridge WRC	0.50 Pit Dimensions (m) Degrees
		Project Number: BMG2109	
		Client: Wessex Water Services Ltd	
	Plant: Hand tools	Start & End Date: 10/11/2020	
Ground Level (m AOD): 41.94		Eastings & Northings: 384846E 158813N	Engineer: IW Checker: LC

Strata					Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)		D1	0.10	0.10			
		41.74	Soft light orangish brown mottled greyish brown silty CLAY. Frequent orangish brown sandy lenses throughout. (Kellaways Formation)		ES1	0.10	0.10			
		1.00m				D2	0.50	0.50		
		40.74	Hole Terminated at 1.20m bgl.		B1	1.00	1.00			

Remarks	
Reason for Termination:	Terminated at target depth.
Groundwater Notes:	No groundwater encountered.
Other Remarks:	1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.




TRIAL PIT LOG

Scale: 1:20

Sheet 1 of 1

HP04	LOCATION ID:	Project Name: Trowbridge WRC	0.50 Pit Dimensions (m) Degrees
		Project Number: BMG2109	
		Client: Wessex Water Services Ltd	
	Plant: Hand tools	Start & End Date: 10/11/2020	
Ground Level (m AOD): 38.10	Eastings & Northings: 384919E 158761N		Engineer: IW Checker: LC

Strata					Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m	Grass covered soft friable dark brown very gravelly CLAY with a moderate cobble content. Gravel is angular to rounded fine to coarse mudstone, quartzite and concrete. Cobbles are subangular concrete. Woven plastic membrane at base. Rootlets present throughout. (Made Ground)		D1	0.10	0.10			
		37.90			Soft friable orangish brown slightly gravelly silty CLAY. Gravel is angular fine to coarse brick and flint. Frequent orange sandy lenses throughout. (Made Ground)	ES1	0.10	0.10		
		1.00m			D2	0.50	0.50			
					ES2	0.50	0.50			
		36.90	Hole Terminated at 1.20m bgl.		B1	1.00	1.00			

Remarks
<p>Reason for Termination: Terminated at target depth.</p> <p>Groundwater Notes: No groundwater encountered.</p> <p>Other Remarks: 1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.</p>


TRIAL PIT LOG

Scale: 1:20

Sheet 1 of 1

LOCATION ID:	Project Name: Trowbridge WRC	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> 0.50 Pit Dimensions (m) Degrees </div>	
HP05	Project Number: BMG2109		
	Client: Wessex Water Services Ltd		
Plant: Hand tools	Start & End Date: 10/11/2020		Stability: Fair
Ground Level (m AOD): 37.20	Eastings & Northings: 384970E 158822N	Engineer: IW	Checker: LC

Strata				Samples			In-Situ Tests				
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Type	From (m)	To (m)	Type	Depth (m)	Result	
		0.30m	Grass covered soft friable dark greyish brown sandy gravelly CLAY with a moderate cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse asphalt, brick, concrete, quartzite and mudstone with frequent glass and ceramic inclusions. Cobbles are angular to subangular brick and concrete. Rootlets present throughout. (Made Ground)		ES1	0.10	0.10				
		36.90			B1	0.20	0.20				
		0.15m			D1	0.20	0.20				
		36.75			ES2	0.20	0.20				
			Dark greyish brown slightly clayey GRAVEL of angular coarse limestone. (Made Ground)		D2	0.35	0.35				
		0.25m	Soft friable orangish brown mottled brown slightly gravelly silty CLAY. Gravel is angular to subangular fine and medium brick, mudstone and rare ash. (Made Ground)		ES3	0.35	0.35				
		36.50			B2	0.50	0.50				
		36.50			D3	0.50	0.50				
		0.00m			ES4	0.50	0.50				
			Concrete. (Made Ground)								
			Hole Terminated at 0.70m bgl.								

Remarks
<p>Reason for Termination: Terminated on concrete obstruction.</p> <p>Groundwater Notes: No groundwater encountered.</p> <p>Other Remarks: 1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.</p>






TRIAL PIT LOG

Scale: 1:20

Sheet 1 of 1

HP06	LOCATION ID:	Project Name: Trowbridge WRC	0.50 Pit Dimensions (m) Degrees
		Project Number: BMG2109	
		Client: Wessex Water Services Ltd	
	Plant: Hand tools	Start & End Date: 10/11/2020	
Ground Level (m AOD): 35.72		Eastings & Northings: 385033E 158747N	Engineer: IW Checker: LC

Strata				Samples			In-Situ Tests				
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Type	From (m)	To (m)	Type	Depth (m)	Result	
		0.15m	Grass covered soft dark brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick, mudstone, ash and rare asphalt. Woven plastic membrane at base. Rootlets present throughout. (Made Ground)		D1	0.10	0.10				
		35.57			ES1	0.10	0.10				
					D2	0.20	0.20				
					ES2	0.20	0.20				
		0.35m	Soft orangish brown mottled brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse flint and mudstone. Rootlets present throughout. (Made Ground)					HSV	0.40	(91, 73, 70)kPa	
		35.22	0.40m: Plastic pipe, approximately 30mm diameter. (Made Ground)								
		0.50m	Soft dark brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick and flint with rare glass and metal inclusions. (Made Ground)			B1	0.60				0.60
					D3	0.60	0.60				
					ES3	0.60	0.60				
		34.72	Obstruction. (Made Ground)								
		34.72									
		0.00m									
Hole Terminated at 1.00m bgl.											

Remarks

Reason for Termination:

Terminated on obstruction.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.



TRIAL PIT LOG

Scale: 1:20

Sheet 1 of 1

HP07	LOCATION ID:	Project Name: Trowbridge WRC	<div style="text-align: center;">0.50</div> <div style="border: 1px solid black; width: 100px; height: 30px; margin: 0 auto;">Pit Dimensions (m)</div> Degrees
		Project Number: BMG2109	
		Client: Wessex Water Services Ltd	
	Plant: Hand tools.	Start & End Date: 10/11/2020	
Ground Level (m AOD): 36.32		Eastings & Northings: 384962E 158727N	Engineer: IW Checker: LC

Strata				Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.30m	Light orangish brown clayey sandy GRAVEL of angular to subrounded fine to coarse flint, mudstone and concrete. Sand is fine to coarse. (Made Ground)		ES1	0.10	0.10			
		36.02	Soft to firm friable dark blackish grey with rare lightly grey and orangish brown mottling gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick, concrete and mudstone with frequent wood, metal and glass inclusions. Concrete at base. (Made Ground)		D1	0.20	0.20			
		0.20m			ES2	0.20	0.20			
		35.82			B1	0.40	0.40			
			Hole Terminated at 0.50m bgl.		D2	0.40	0.40			
					ES3	0.40	0.40			

Remarks
Reason for Termination: Terminated on limestone cobble.
Groundwater Notes: No groundwater encountered.
Other Remarks: 1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.



Appendix 2: **Driller's Logs**

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DRILLER'S LOG

Site Name: Trussbridge Bldg 2109		Job No:		Date: 10.11.20		Sheet						of		Borehole No. 1							
Depth (m)	Soil Description	Sample/Test Type	No.	From	To	Standard Penetration Tests						Casing Depth (m)	Water Level (m)	Depth (m)		Chiselling Time		Hours			
						U100s	1	2	3	4	5			6	Ren	From	To		From	To	
0.2	Hardcore.	B	1	2.5																	
2	clay stone	B	3	1.2																	
2.5	Brick ASL Fall.	B	5	2																	
2.5	Very soft Brown Clay	B	7	3																	
3.5	silt	B	9	3.5																	
3.5	0. Soft Brown Clay	UT	10	4																	
4.7	Clay	B	12	4.7																	
4.7	Brown Clay	B	13	5																	
5.5	Sandy clay.	B	14	5.5																	
5.5	Brown Clay	UT	15	6																	
5.5	firm Clay	B	16	6.5																	
5.5	Clay	B	17	7																	
5.5	Clay	B	18	7.5																	
5.5	Clay	B	19	7.5																	
5.5	Clay	B	20	8.5																	
End of Shift - Borehole Complete/Incomplete																					

Remarks: (Standing time, day works, visitors, weather etc.)

08.00 to 09.45 induction/cast
 As BM Pos.
 1hr Pit.

Driller's Name	Driller's Signature	Client's Signature	Received:	Approved:
Driller:	D. Smart	Rig:	Dando 3000	
Crew:	S. Jones	Additional Equipment:	R002	
Excavation:		Backfill:		
Local Number of Samples				
SPT	U	D	B	W
5	2	10	3	
B.H. No.				

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DRILLER'S LOG

Depth (m)	Soil Description	Sample/Test Type	No.	Depth (m)		U100s Blows	Length	Standard Penetration Tests						Casing Depth (m)	Water Level (m)	Borehole No.		Chiselling		Hours	
				From	To			1	2	3	4	5	6			Pen	From	To	From		To
9	Run 1st shift Grey Clay	UT	21	9		37		Shoe									1	2	3		
16.8		UT	22	9.5				Shoe													
		UT	23	10				Shoe													
		UT	24	10.5				Shoe													
		UT	25	11.5				Shoe													
		UT	26	12				Shoe													
		UT	27	12.4				Shoe													
		UT	28	13				Shoe													
		UT	29	13.5				Shoe													
		UT	30	14				Shoe													
		UT	31	15				Shoe													
		UT	32	16				Shoe													
		UT	33	16.5				Shoe													

End of Shift - Borehole Complete/Incomplete

Remarks: (Standing time, day works, visitors, weather etc.)

Run in Rotary casing 3/4hr

Driller's Name	Driller's Signature	Client's Signature	Received:	Approved:

Driller:	D. Smart	Rg:	Dando 3000				
Crew:	S. Jones	Additional Equipment:	ROO2				
Excavation:		Total Number of Samples					
Backfill:		SPT	U	D	B	W	P
		4	2	7			

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DRILLER'S LOG

Site Name	Job No.	Date	Sheet	of	Borehole No.	Chiselling	Time	Hours							
Crainsbridge	RMC 2109	11.11.20			2										
Depth (m)	Soil Description	Sampler/Test Type	No.	Depth (m) From	To	Blows	U100s Length	Standard Penetration Tests 1 2 3 4 5 6	Pen	Casing Depth (m)	Water Level (m)	Depth (m) From	To	From	To
0	Start of Shift														
0.3	Hardcore	B	1	0.5											
3		B	2	1.2											
3		S	3	2											
3	Clay, soil, stone Brick	S	4	3											
4-	ASh loose All.	S	5	3											
4-		B	6	3.5											
4-		S	7	4											
4-		B	8	4.5											
4-	Green Brown Black	B	9	4.5											
4.5	V soft Clay	B	10	4.5											
4.5		UT	11	5											
4.5		UT	12	5.5											
4.5	V. Soft Green	B	13	5.7											
5.5	Brown clay	B	14	6											
5.5		B	15	6.5											
5.5		B	16	7											
5.5		B	17	7.5											
5.5		UT	18	8											
5.5		UT	19	8.5											
9	Clay	B	20	9											

End of Shift - Borehole Complete/Incomplete

Remarks: (Standing time, day works, visitors, weather etc.)
 1 hr Pit.

Driller's Name	Driller's Signature	Client's Signature	Received:	Approved:

Driller: S. Smart	Rig: Danale 3000
Crew: S. Jones	Additional Equipment: R002
Excavation:	Backfill:

Total Number of Samples				
SPT	U	D	B	W
	2	8	4	

Borehole Diameter (mm)	
From	To
	150

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DRILLER'S LOG

Depth (m)	Soil Description	Sample/Test Type	No.	Depth (m)		Blows	U100s Length	Standard Penetration Tests						Casing Depth (m)	Water Level (m)	Borehole No.		Chiselling Time	Hours
				From	To			1	2	3	4	5	6			Pen	From		
9	SHRP / v SHRP	0	21	10															
	Start of Shift	ut	22	10.5		48													
		0	23	11															
		0	24	11.5															
		0	25	12															
		0	26	13															
		0	27	13.5															
		0	28	14															
		0	29	15															
		0	30	15															
End of Shift - Borehole Complete/Incomplete																			

Remarks: (Standing time, day works, visitors, weather etc.)
 Run in Rotary casing 3/4 Hr.

Driller: D. Smart Rig: Danolo 3000

Crew: S. Jones Additional Equipment: RO02

Excavation: _____ Backfill: _____

Received: _____ Approved: _____

Total Number of Samples					BH No.
SPT	U	D	B	W	
3	1	5			

Driller's Name: _____ Driller's Signature: 

Client's Signature: _____

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DRILLER'S LOG

Site Name: Trasbridge Bwg 210q

Job No:

Date: 12.11.20 Sheet

of

Borehole No. 3

Depth (m)	Soil Description	Sample/Test Type	No.	Depth (m)		Blows	U100s Length	Standard Penetration Tests						Casing Depth (m)	Water Level (m)	Depth (m)		Chiselling Time		Hours
				From	To			1	2	3	4	5	6			Pen	From	To	From	
0.1	Hardware.	DB	1	5	1															
0.5		SB	2	1.2	1															
0.5		SB	3	1.7	1															
0.5		SB	4	2	1															
0.5		SB	5	2.5	1															
0.5	Clay, Stone, Brick metal	SB	6	3	1															
0.5	Silty Clay	SB	7	3	1															
0.5		SB	8	3.5	1															
0.5		SB	9	4	1															
0.5		SB	10	4.5	2															
0.5	Firm Grey Clay	SB	11	5	2															
0.5		SB	12	5.5	2															
0.5		SB	13	5.5	2															
0.5		SB	14	5.5	2															
0.5		SB	15	6	2															
0.5		SB	16	6.5	2															
0.5		SB	17	6.8	2															
0.5		SB	18	7.5	2															
0.5		SB	19	7.5	2															
0.5		SB	20	8	2															
End of Shift - Borehole Complete/Incomplete																				

Remarks: (Standing time, day works, visitors, weather etc.)

1hr P.t.

Driller: D. Smeat
Crew: Z. Jones

Rig: Dando 3000
Additional Equipment: R002

Excavation:

Backfill:

Total Number of Samples

SPT	U	D	B	W	P
5	2	9	4		

BH No.

Driller's Name

Driller's Signature

Client's Signature

Received:

Approved:

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Email: info@jacksondrilling.co.uk • Telephone: 01458 851276 • Fax: 01458 850544

DRILLER'S LOG

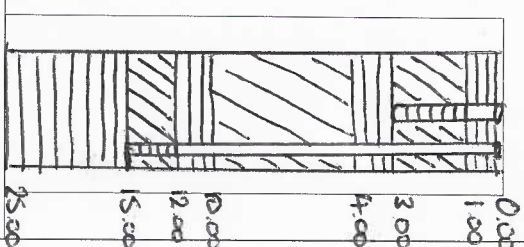
Strata Record		Drill Run Record						Groundwater Records											
Depth	Description	Depth from	Depth to	OH/Core	Time o'clock	Run (mins)	Core Length	Core Recov	Flush return	Casing Depth	Water Level	WATER ENCOUNTERED	PIEZOMETER / STANDPIPE						
16.50	Clearing out casing																		
18.00	Mudstone	15.00	16.50	OH	10:00	15	-	-	-	16.50		Depth Struck							
19.50	"	16.50	18.00	OH		20	1.50	1.50	100%			Casing Depth							
21.00	"	18.00	19.50	"		15	"	"	"			Inflow							
22.50	"	19.50	21.00	"		20	"	"	"			Depth 5 mins							
24.00	"	21.00	22.50	"		20	"	"	"			Depth 10 mins							
25.00	"	22.50	24.00	"		15	"	"	"			Depth 15 mins							
		24.00	25.00	"		30	1.00	0.90	"			Depth 20 mins							
												Cut off at							
Penetration Testing and Sampling												FIELD RECORDS							
												Piezometer/Standpipe	From	To	FLUSH				
												Plain Pipe			Flush Type	From	To		
												Slotted Pipe				16.50	25.00		
												Filter							
												Bentonite Seal							
												Cement/Backfill	0.20	25.00					
												Borehole Dia.							
												Excavation Dimensions:							
												Backfill:							
												S/C	Core	O/Hole	Case	W			
												Move	Drill	Stand	Break	Work			
												Crew	D. CUT P. MARELOW			DAY	WEDNESDAY	DATE	11/11/20
												Driller's Signature				Move From:		BH No.	BH21
Remarks: Visitors, Instructions, Weather, etc.		1 hour set up 45 mins filling water-bousser, 30 mins pulling casing 30 mins backfilling hole.										SITE		TROUBRIDGE WWTW		RIG TYPE/COMPARHO 205			
Borehole Complete / Incomplete												Excavation Dimensions:							
Jackson Drilling Limited		Rotary Drilling Daily Record				Driller's Signature				Move From:				BH No. BH21					

Strata Record

Drill Run Record

Groundwater Records

Depth	Description	Depth		OH/Core	Time o'clock	Run (mins)	Core Length	Core Recover	Flush return	Casing Depth	Water Level	WATER ENCOUNTERED		
		from	to									1	2	3
15.00	Clearing out casing	13.50	15.00	OH	09:00	10	-	-	-	15.00		Depth Struck		
16.50	Mudstone (PMT)	15.00	16.50	COAL		20	1.50	1.50	100%			Casing Depth		
18.00	"	16.50	18.00	"		15	"	"	"			Inflow		
19.50	"	18.00	19.50	"		20	"	"	"			Depth 5 mins		
21.00	"	19.50	21.00	"		20	"	"	"			Depth 10 mins		
22.50	"	21.00	22.50	"		20	"	"	"			Depth 15 mins		
24.00	"	22.50	24.00	"		15	"	"	"			Depth 20 mins		
25.00	"	24.00	25.00	"		10	"	"	"			Cut off at		



Penetration Testing and Sampling

Depth	Type	Penetration Testing and Sampling						Sample Length	Casing Depth	Water Level	SITE																		
		1	2	3	4	5	6																						
<p>Gas bungs and level caps on both 19mm pipe and 50mm pipe with flush cover.</p>																													
<p>Piezometer/Standpipe</p> <table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>1.00</td> </tr> <tr> <td>0.00</td> <td>12.00</td> </tr> <tr> <td>1.00</td> <td>3.00</td> </tr> <tr> <td>12.00</td> <td>15.00</td> </tr> <tr> <td>1.00</td> <td>3.00</td> </tr> <tr> <td>12.00</td> <td>15.00</td> </tr> <tr> <td>0.10</td> <td>1.00</td> </tr> <tr> <td>3.00</td> <td>4.00</td> </tr> </tbody> </table>												From	To	0.00	1.00	0.00	12.00	1.00	3.00	12.00	15.00	1.00	3.00	12.00	15.00	0.10	1.00	3.00	4.00
From	To																												
0.00	1.00																												
0.00	12.00																												
1.00	3.00																												
12.00	15.00																												
1.00	3.00																												
12.00	15.00																												
0.10	1.00																												
3.00	4.00																												
<p>Excavation Dimensions:</p>																													
<p>Backfill:</p>																													

Remarks: Visitors, Instructions, Weather etc.

1 hour set up
45 mins installing

Borehole Complete / Incomplete

SIC	Core	OH/Hole	Case	W	DAY	DATE	
	Move	Drill	Stand	Break	Work		
Crew	D. Coy	JOB No.				Tuesday	12/11/20
Driller's Signature	<i>P. Maxwell</i>	SITE				RIG TYPE	CONCRETE BENDER
		TRAWBRIDGE NW TM				CONCRETE BENDER	
		Excavation Dimensions:				CONCRETE BENDER	
		Backfill:				CONCRETE BENDER	

Jackson Drilling Limited

Rotary Drilling Daily Record

Move From:

BH No. BH02

Appendix 3: SPT Calibration Certificates

SPT Calibration Report

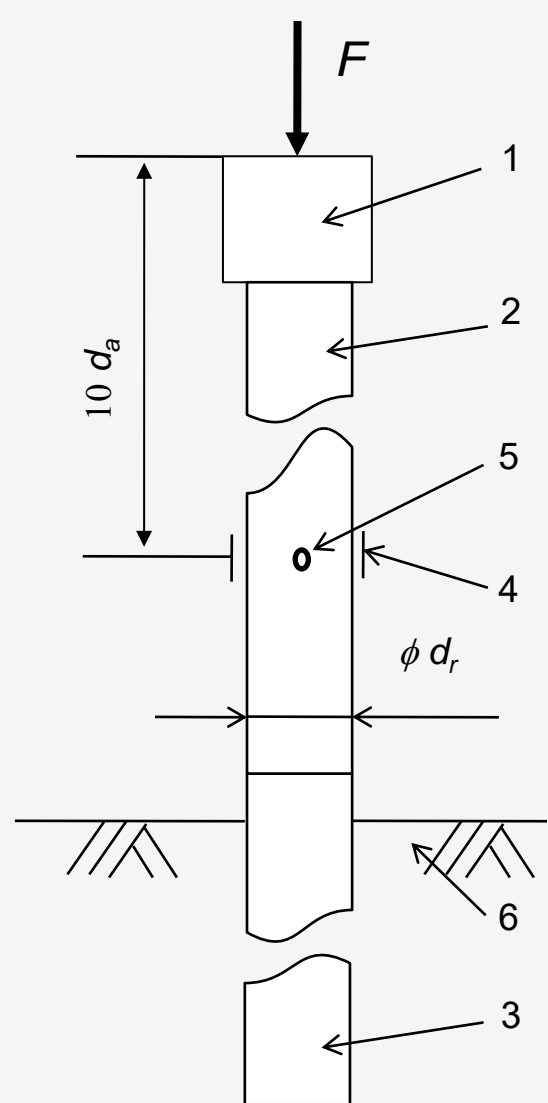
Hammer Energy Measurement Report

Type of Hammer SPT HAMMER
 Test No EQU2430
 Client RD DRILLING

Test Depth (m) 8.00
 Mass of hammer $m = 63.5\text{kg}$
 Falling height $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter $d_r = 0.052\text{ m}$
 Length of instrumented rod 0.558 m
 Area $A = 11.61\text{ cm}^2$
 Modulus $E_a = 206843\text{ MPa}$



Key

- 1 Anvil
- 2 Part of instrumented rod
- 3 Drive Rod
- 4 Strain Gauge
- 5 Accelerometer
- 6 Ground

F Force
 d_r Diameter of rod

Fig. B.1 and B.2
 BS EN ISO 22476-3 : 2005 + A1 : 2011

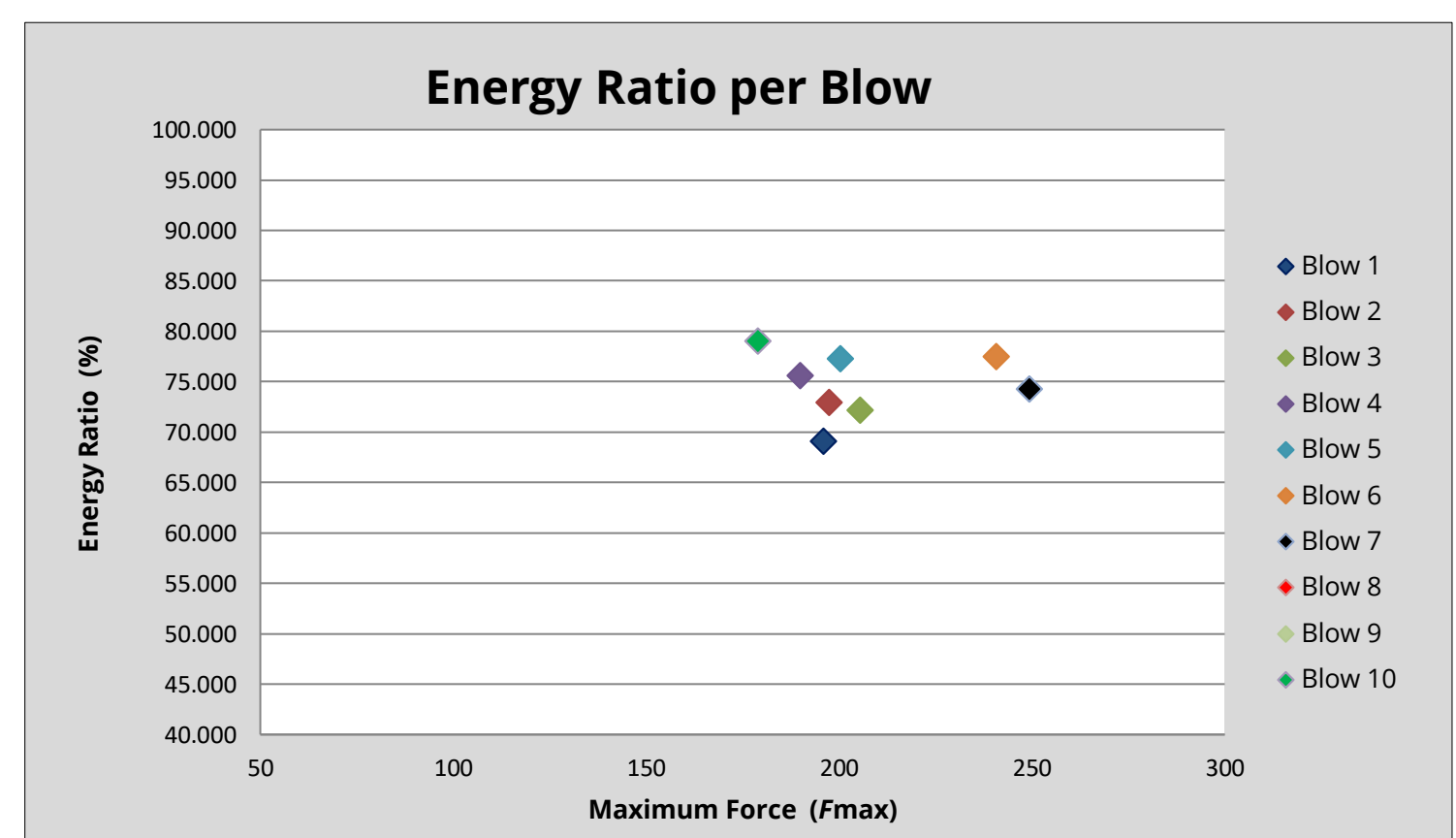
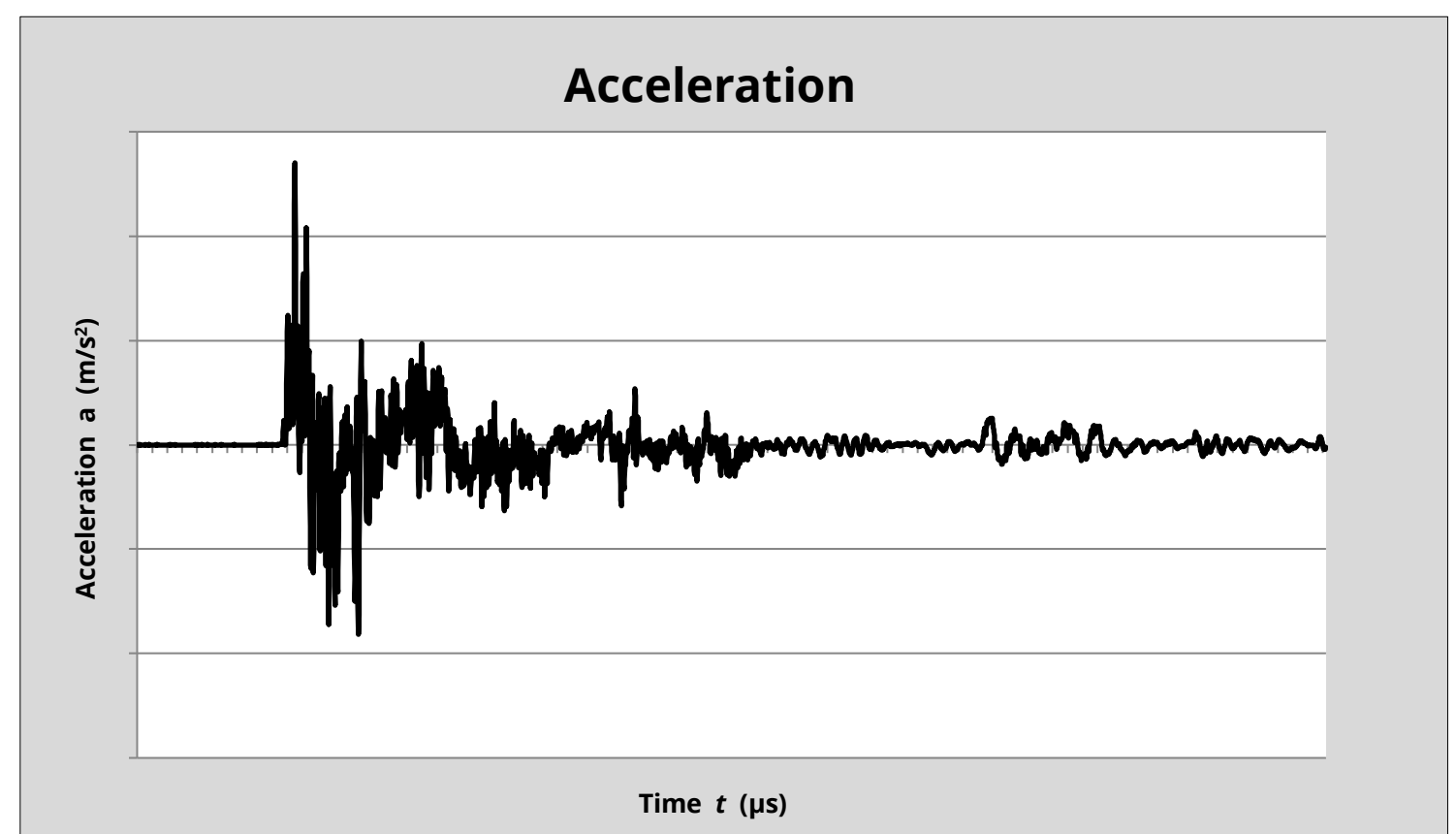
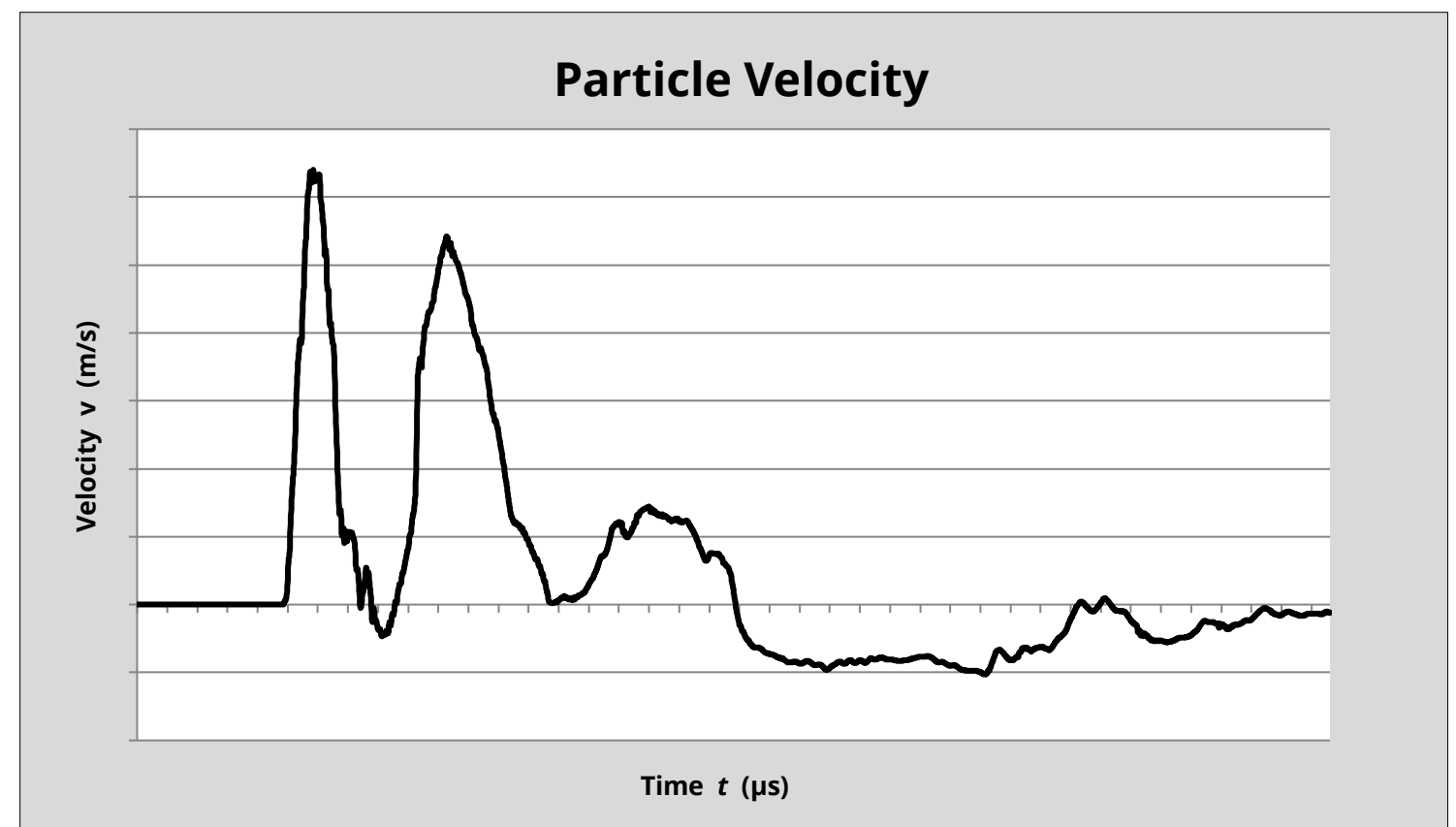
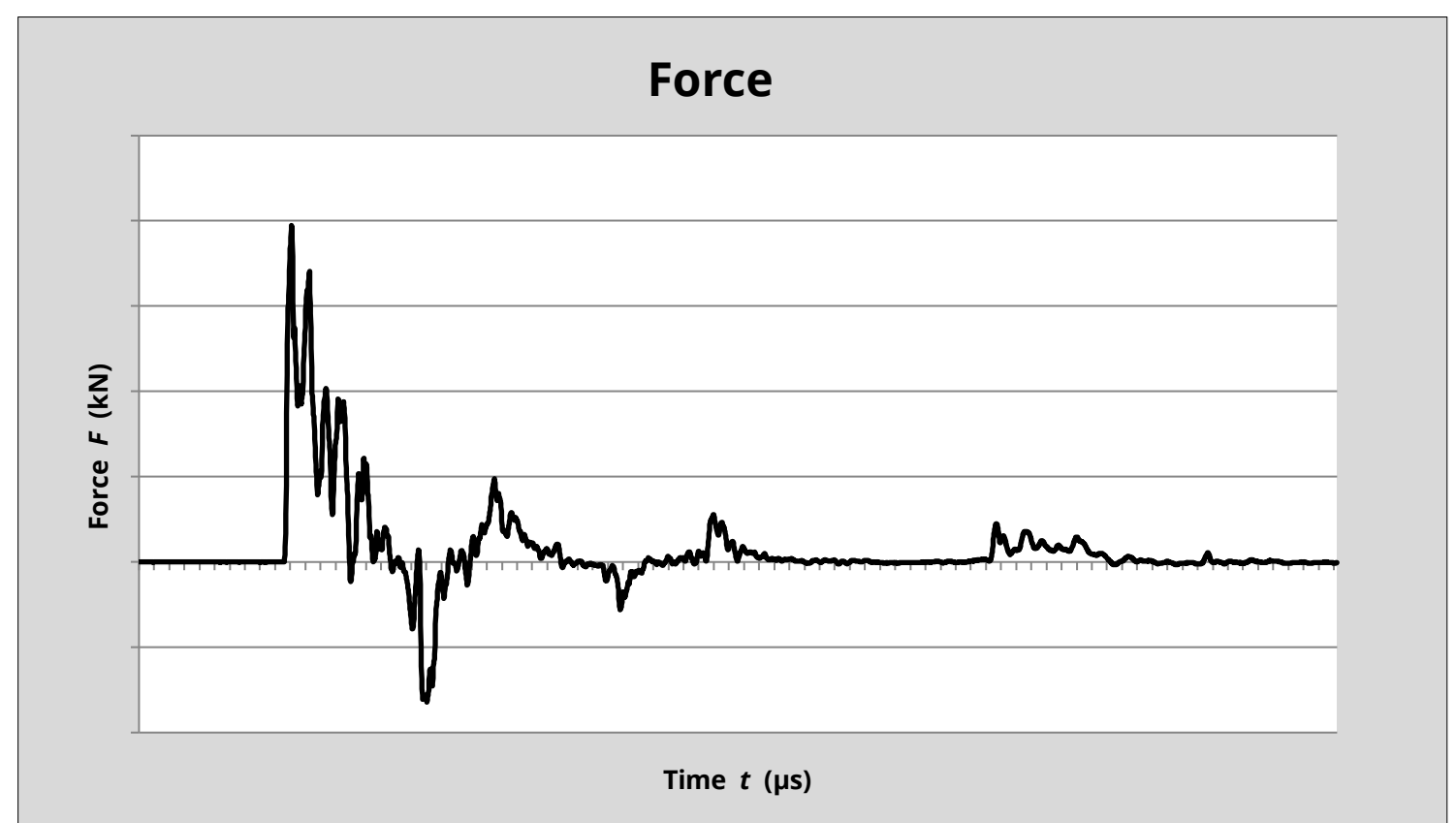
DATE OF TEST VALID UNTIL HAMMER ID

20/12/2019	19/12/2020	RD02
------------	------------	------

$E_{\text{meas}} = 0.352\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

Comments



Energy Ratio (Er) = $\frac{E_{\text{meas}}}{E_{\text{theor}}}$

74.43%

© COPYRIGHT 2020

Equipe SPT Analyzer Operator

AF

Certificate prepared by

Certificate checked by

Certificate date

03/01/2020

Appendix 4: Permeability Testing

PIEZOMETER FALLING HEAD PERMEABILITY TEST



Project Name:	Trowbridge WRC
Project Number:	BMG2109
Borehole Ref:	BH03
Date:	13-Nov-20
Borehole Diameter (mm):	50
Resting Water Level (m bd):	3.35
Length (L) of Response Zone (m):	3.00

Base of Standpipe (m):	6.00
Geology:	Made Ground
Borehole Diameter (D) (m):	5.00E-02
Scenario (F):	d2
F Value	4.50E+00
Area (A) of Borehole (m ²):	1.96E-03

Time (mins)	Hi(mbd)	H(head)	H/Ho
0.00	1.300	2.050	1.000
1.00	1.380	1.970	0.961
3.00	1.500	1.850	0.902
5.00	1.610	1.740	0.849
7.50	1.910	1.440	0.702
10.00	2.210	1.140	0.556
15.00	2.620	0.730	0.356
20.00	2.900	0.450	0.220
25.00	3.070	0.280	0.137
30.00	3.140	0.210	0.102
35.00	3.180	0.170	0.083
40.00	3.220	0.130	0.063
45.00	3.250	0.100	0.049
50.00	3.270	0.080	0.0390
55.00	3.290	0.060	0.029
60.00	3.300	0.050	0.024
65.00	3.310	0.040	0.020
70.00	3.310	0.040	0.020
90.00	3.330	0.020	0.010
120.00	3.350	0.000	0.000

Basic Time Lag Method (after BS5930:1999)

$$K = A / (F * T)$$

T = TIME FOR H/Ho:0.37

T = 15.00 (min)
 T = 900.00 (sec)

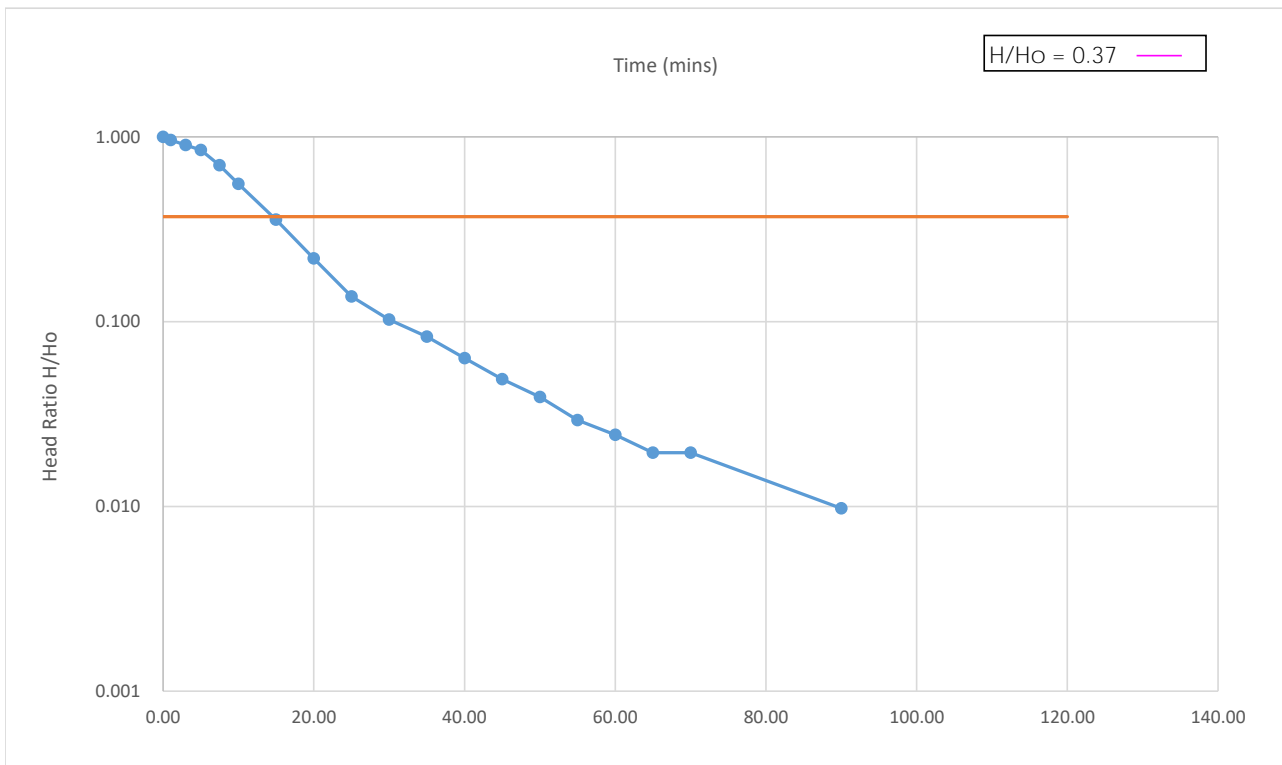
K = 4.85E-07 (m/s)
 K = 0.042 (m/d)

General Method (after BS5930:1999)

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

t1 = 25.00 (min)
 t2 = 65.00 (min)
 H(head)1 = 0.28 (m)
 H(head)2 = 0.04 (m)

K = 3.54E-07 (m/s)
 K = 0.031 (m/d)



PIEZOMETER RISING HEAD PERMEABILITY TEST



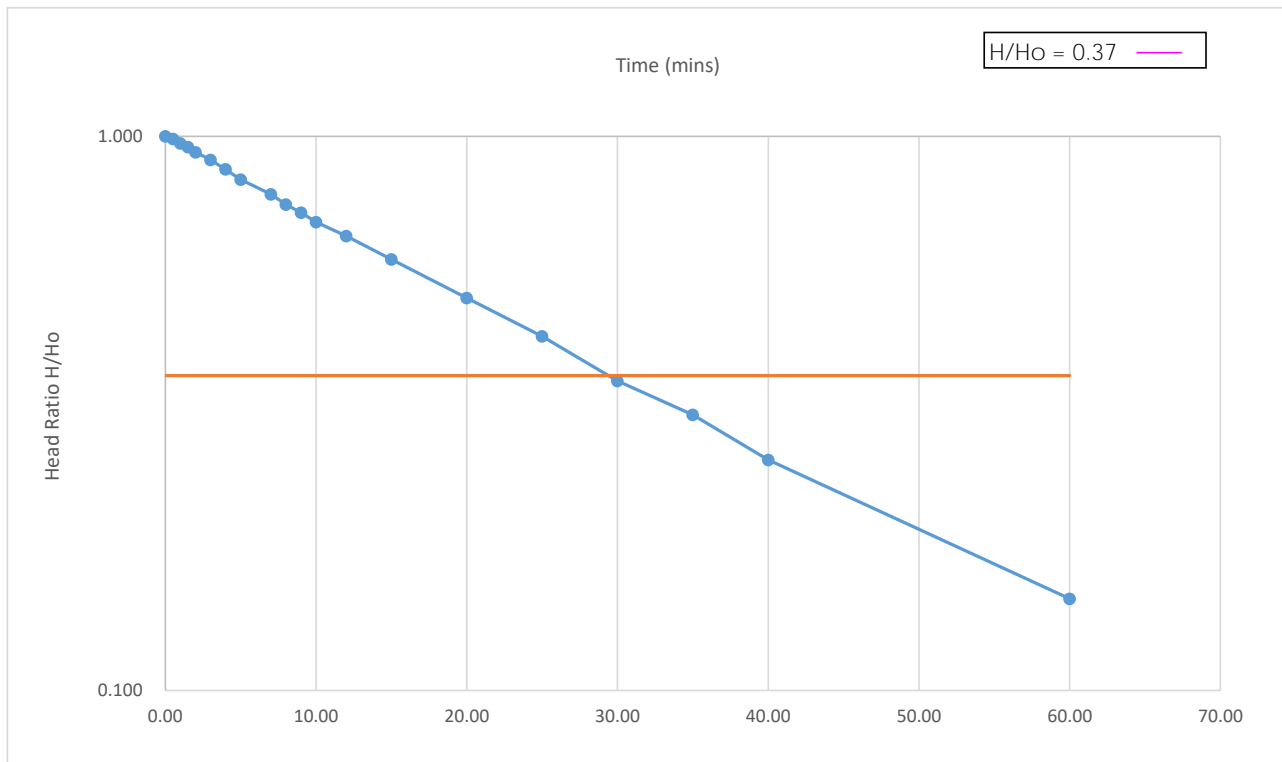
Project Name:	Trowbridge WRC
Project Number:	BMG2109
Borehole Ref:	BH03
Date:	13-Nov-20
Borehole Diameter (mm):	50
Resting Water Level (m bd):	3.35
Length (L) of Response Zone (m):	3.00

Base of Standpipe (m):	6.00
Geology:	Made Ground
Borehole Diameter (D) (m):	5.00E-02
Scenario (F):	d2
F Value	4.50E+00
Area (A) of Borehole (m ²)	1.96E-03

Time (mins)	Hi(mbd)	H(head)	H/Ho
0.00	4.750	-1.400	1.000
0.50	4.735	-1.385	0.989
1.00	4.710	-1.360	0.971
1.50	4.690	-1.340	0.957
2.00	4.660	-1.310	0.936
3.00	4.620	-1.270	0.907
4.00	4.570	-1.220	0.871
5.00	4.520	-1.170	0.836
7.00	4.450	-1.100	0.786
8.00	4.405	-1.055	0.754
9.00	4.370	-1.020	0.729
10.00	4.330	-0.980	0.700
12.00	4.275	-0.925	0.661
15.00	4.190	-0.840	0.6000
20.00	4.065	-0.715	0.511
25.00	3.960	-0.610	0.436
30.00	3.857	-0.507	0.362
35.00	3.790	-0.440	0.314
40.00	3.715	-0.365	0.261
60.00	3.555	-0.205	0.146

Basic Time Lag Method (after BS5930:1999)	
$K = A / (F * T)$	
T = TIME FOR H/Ho:0.37	
T =	30.00 (min)
T =	1800.00 (sec)
K =	2.42E-07 (m/s)
K =	0.021 (m/d)

General Method (after BS5930:1999)	
$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$	
t1 =	0.00 (min)
t2 =	60.00 (min)
H(head)1 =	-1.40 (m)
H(head)2 =	-0.25 (m)
K =	2.09E-07 (m/s)
K =	0.018 (m/d)



Appendix 5: Ground Gas and Groundwater Monitoring Results

BWB GAS AND GROUNDWATER MONITORING

NR = Not Recorded
Dry = No Groundwater



Site:	Trowbridge WRC	
Client:	Wessex Water Services Ltd	
Job No.:	BMG2109	
Date:	13th November 2020	
Start / End Time:	8.30/9.00	
Engineer:	IW	
Monitoring Equipment:	Gas Meter ID	BWB00960
	PID ID	BWB00946
	Dip Tape	BWB00978
	Other	

Weather Conditions	Start	End
(Dry / Raining)	DRY	DRY
Wind Strength (m/s)	4.0	4.0
Wind Direction (from)	W	W
Temperature (°C)	8.0	8.0
Barometric Pressure (h Pa / mB)	1007.0	1006.0
App 12 Hour Pressure (h Pa / mB)	1008.0	
12 Hour Pressure Trend	FALLING	
PID - Air		
PID - Calibration Gas		

Location Reference	Relative Pressure (Pa)	Flow (l/hr)		Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Free-Phase Product Level Top (m)	Groundwater Elevation (m AOD)	Notes
		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
Ambient Air Start (Calibration)	<0.1		<0.1		<0.1		<0.1		18.4	<1	<1	<0.1					
Ambient Air Finish (Calibration)	<0.1		<0.1		<0.1		<0.1		18.5	<1	10	<0.1					
BH02 (S)	<0.1		<0.1		<0.1		2.4		14.0	<1	<1	0.4	1.97	3.07		34.13	
BH02 (D)	<0.1		<0.1		<0.1		0.1		17.2	<1	110.0	<0.1	NR	NR			Could not get dip tape in to measure groundwater level.
BH03 (S)	<0.1		<0.1		<0.1		1.1		17.5	<1	39.0	0.8	3.35	6.08		32.38	
BH03 (D)	<0.1		<0.1		<0.1		0.3		17.7	<1	20.0	0.3	3.60	12.08		32.13	

BWB GAS AND GROUNDWATER MONITORING

NR = Not Recorded
Dry = No Groundwater



Site:	Trowbridge WRC
Client:	Wessex Water Services Ltd
Job No.:	BMG2109
Date:	20th November 2020
Start / End Time:	
Engineer:	JD
Monitoring Equipment:	Gas Meter ID
	PID ID
	Dip Tape
	Other

Weather Conditions	Start	End
(Dry / Raining)	DRY	DRY
Wind Strength (m/s)	5.4	5.4
Wind Direction (from)	SW	SW
Temperature (°C)	9.0	9.0
Barometric Pressure (h Pa / mB)	1029.0	1029.0
App 12 Hour Pressure (h Pa / mB)	1034.0	
12 Hour Pressure Trend	FALLING	
PID - Air		
PID - Calibration Gas		

Location Reference	Relative Pressure (Pa)	Flow (l/hr)		Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Free-Phase Product Level Top (m)	Groundwater Elevation (m AOD)	Notes
		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
Ambient Air Start (Calibration)																	
Ambient Air Finish (Calibration)																	
BH02 (S)	-0.0500		<0.1		<0.1		4.1		14.1	<1	1	NR	2.53	2.99		33.57	
BH02 (D)																	Borehole flooded, unable to monitor.
BH03 (S)	0.0200		-0.8		0.2		0.6		19.6	<1	8	NR	3.07	6.01		32.67	
BH03 (D)	0.0300		-0.1		<0.1	1.4	0.3	19.7	20.7	<1	<1	NR	3.26	12.04		32.47	

BWB GAS AND GROUNDWATER MONITORING

NR = Not Recorded
Dry = No Groundwater



Site:	Trowbridge WRC
Client:	Wessex Water Services Ltd
Job No.:	BMG2109
Date:	26th November 2020
Start / End Time:	
Engineer:	JD
Monitoring Equipment:	Gas Meter ID
	PID ID
	Dip Tape
	Other

Weather Conditions	Start	End
(Dry / Raining)	DRY	DRY
Wind Strength (m/s)	1.3	1.3
Wind Direction (from)	NE	NE
Temperature (°C)	8.0	8.0
Barometric Pressure (h Pa / mB)	1018.0	1018.0
App 12 Hour Pressure (h Pa / mB)	1020.0	
12 Hour Pressure Trend	FALLING	
PID - Air		
PID - Calibration Gas		

Location Reference	Relative Pressure (Pa)	Flow (l/hr)		Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Free-Phase Product Level Top (m)	Groundwater Elevation (m AOD)	Notes
		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
Ambient Air Start (Calibration)																	
Ambient Air Finish (Calibration)																	
BH02 (S)	<0.1		<0.1		<0.1		5.9		12.4	<1	4		1.57	2.96		34.53	
BH02 (D)	0.0200		<0.1		<0.1		0.6		20.8	<1	2		1.26	13.97		34.84	
BH03 (S)	0.0200		<0.1	0.1	<0.1		3.4		12.7	<1	<1		3.33	6.01		32.40	
BH03 (D)	<0.1		<0.1		<0.1	0.5	0.4	19.9	20.6	<1	1						

BWB GAS AND GROUNDWATER MONITORING

NR = Not Recorded
Dry = No Groundwater



Site:	Trowbridge WRC		
Client:	Wessex Water Services Ltd		
Job No.:	BMG2109		
Date:	7th December 2020		
Start / End Time:			
Engineer:	JD		
Monitoring Equipment:	Gas Meter ID		
	PID ID		
	Dip Tape		
	Other		

Weather Conditions	Start	End
(Dry / Raining)	DRY	DRY
Wind Strength (m/s)	2.5	2.5
Wind Direction (from)	NE	NE
Temperature (°C)	3.0	3.0
Barometric Pressure (h Pa / mB)	996.0	996.0
App 12 Hour Pressure (h Pa / mB)	999.0	
12 Hour Pressure Trend	FALLING	
PID - Air		
PID - Calibration Gas		

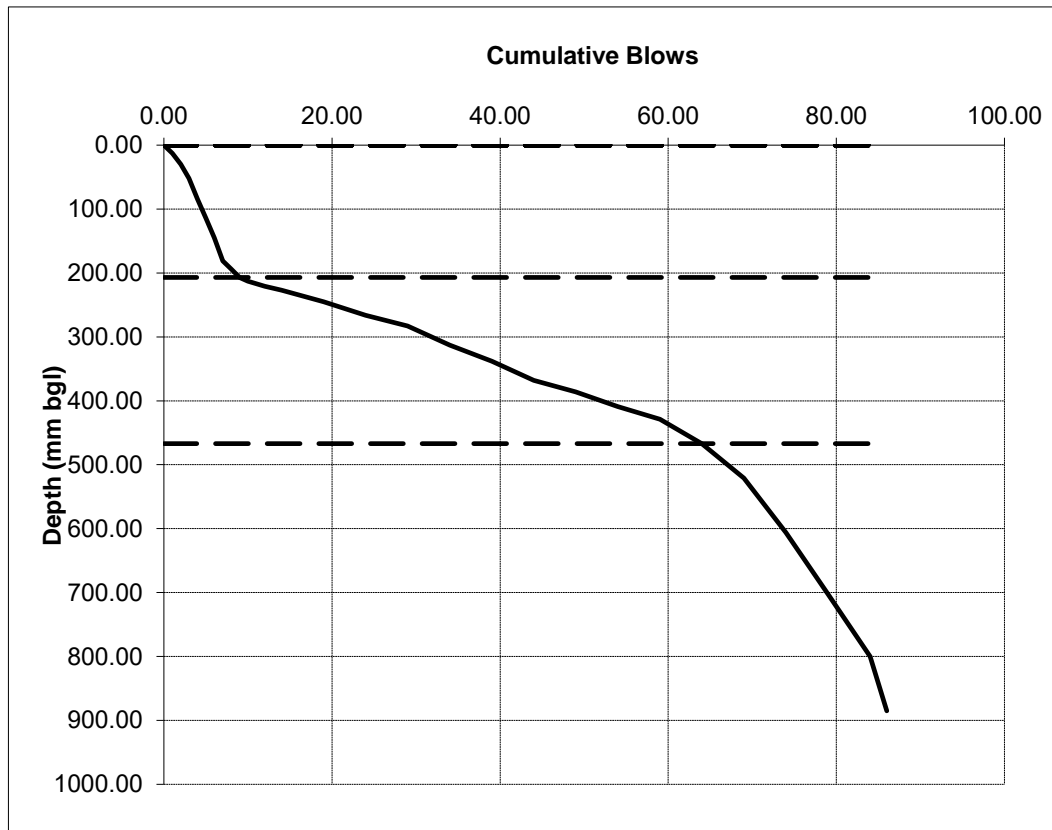
Location Reference	Relative Pressure (Pa)	Flow (l/hr)		Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Free-Phase Product Level Top (m)	Groundwater Elevation (m AOD)	Notes
		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
Ambient Air Start (Calibration)																	
Ambient Air Finish (Calibration)																	
BH02 (S)	0.0300		<0.1		<0.1		5.4		8.3	<1	<1		2.36	2.98		33.74	
BH02 (D)	0.0500		<0.1		<0.1		0.2	20.1	21.9	<1	<1		3.36	13.96		32.74	
BH03 (S)	0.0200		<0.1		<0.1		2.3		18.9	<1	12			6.01			
BH03 (D)	<0.1		<0.1		<0.1	0.2	0.1	21.1	22.1	<1	4		2.90	12.06		32.83	

Appendix 6: TRL DCP Testing Results

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109	 BWB CONSULTANCY ENVIRONMENT INFRASTRUCTURE BUILDINGS
PROJECT TITLE	Trowbridge WRC	
TEST REFERENCE	DCP01	
DATE	10-Nov-20	
MATERIAL/ STRATA TYPE	Made Ground	
START DEPTH (mm bgl)	0	
WEATHER/ GROUND CONDITION	Dry	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	9	9	207	207	11.0
2	55	64	260	467	58.5
3	22	86	418	885	13.4

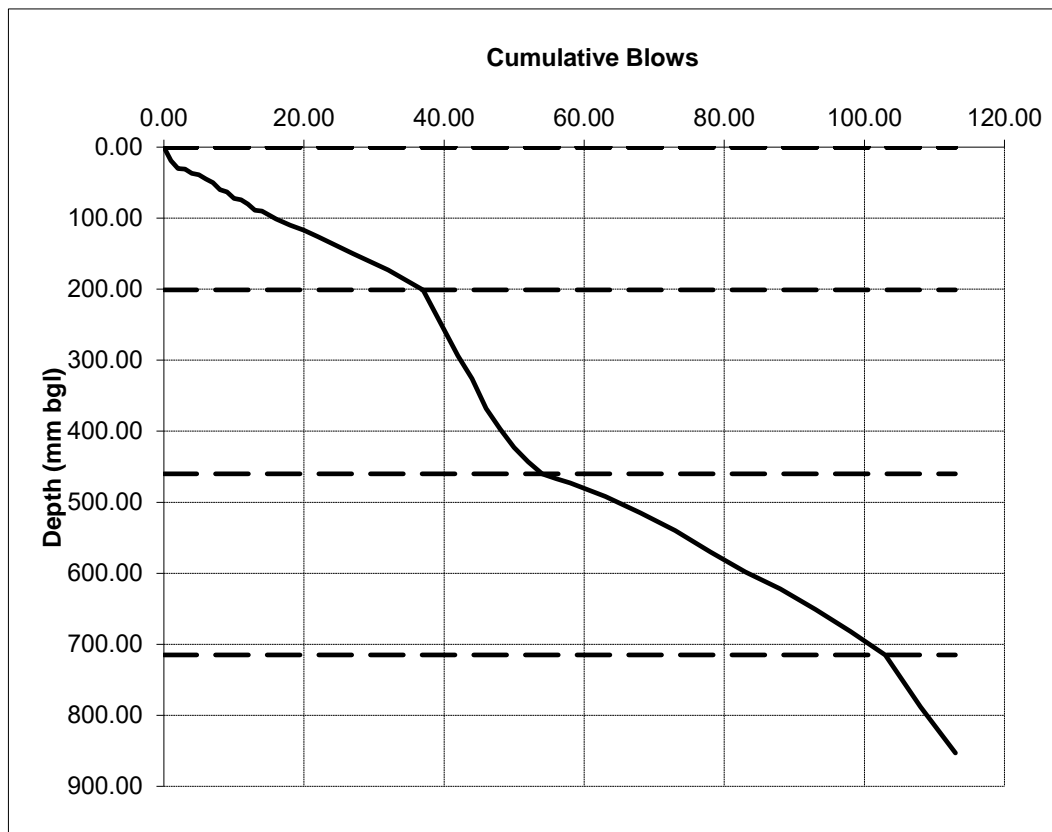


CBR Interpretation based on the TRL Equation: $\text{Log}_{10}(\text{CBR}) = 2.480 - [1.057 \times \text{Log}_{10}(\text{DCP Strength})]$

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109	
PROJECT TITLE	Trowbridge WRC	
TEST REFERENCE	DCP02	
DATE	10-Nov-20	
MATERIAL/ STRATA TYPE	Made Ground	
START DEPTH (mm bgl)	0	
WEATHER/ GROUND CONDITION	Dry	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	37	37	201	201	50.5
2	17	54	259	460	17.0
3	49	103	255	715	52.8
4	10	113	138	853	18.8

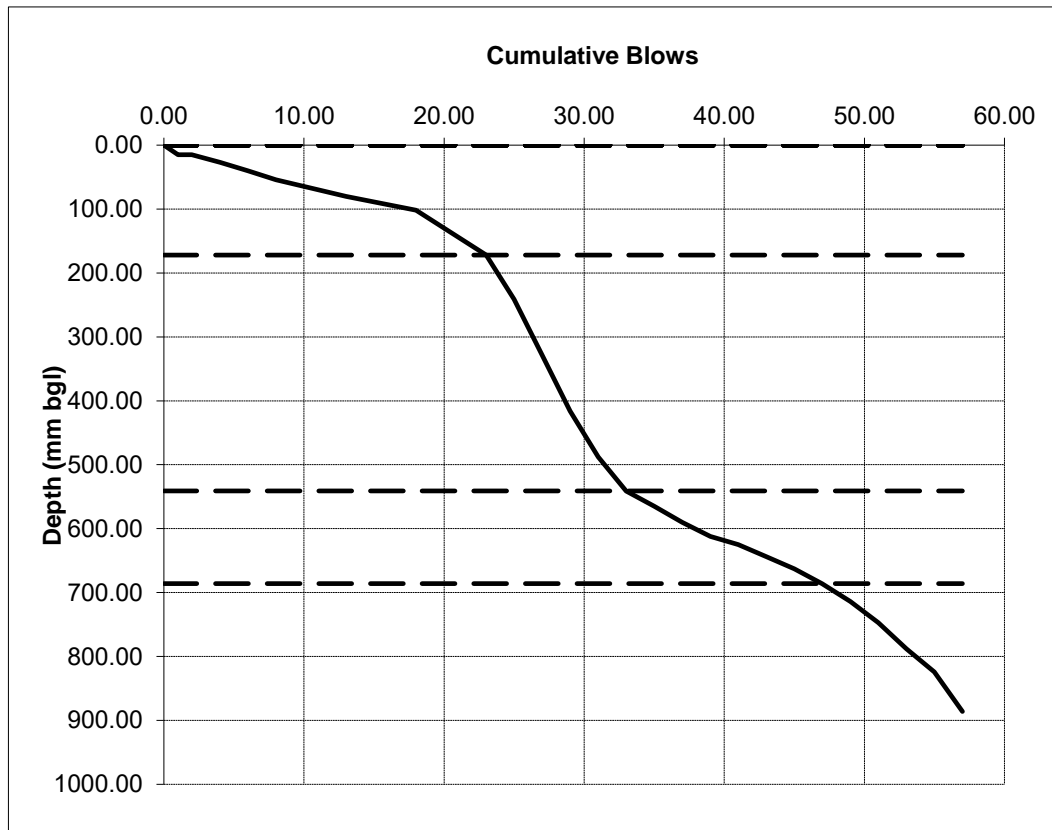


CBR Interpretation based on the TRL Equation: $\text{Log}_{10}(\text{CBR}) = 2.480 - [1.057 \times \text{Log}_{10}(\text{DCP Strength})]$

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109	 BWB CONSULTANCY ENVIRONMENT INFRASTRUCTURE BUILDINGS
PROJECT TITLE	Trowbridge WRC	
TEST REFERENCE	DCP02	
DATE	10-Nov-20	
MATERIAL/ STRATA TYPE	Made Ground	
START DEPTH (mm bgl)	0	
WEATHER/ GROUND CONDITION	Dry	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	23	23	172	172	36.0
2	10	33	369	541	6.7
3	14	47	145	686	25.5
4	10	57	200	886	12.7

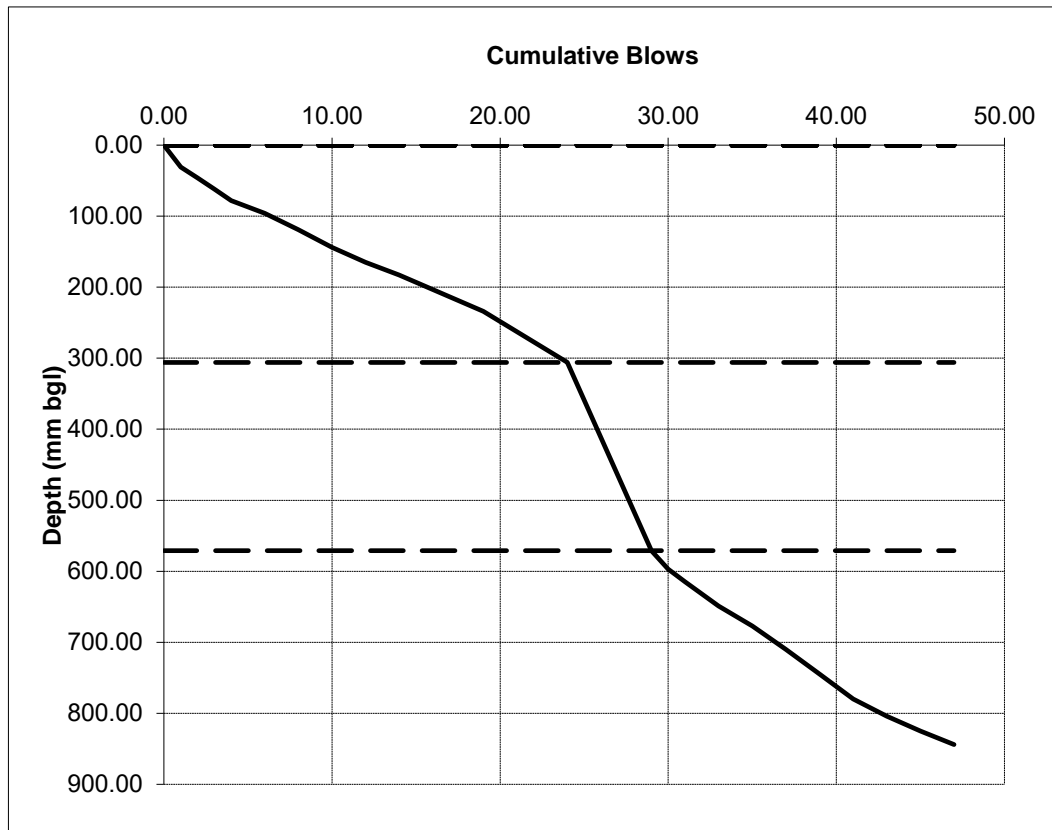


CBR Interpretation based on the TRL Equation: $\text{Log}_{10}(\text{CBR}) = 2.480 - [1.057 \times \text{Log}_{10}(\text{DCP Strength})]$

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109	 <p>BWB CONSULTANCY ENVIRONMENT INFRASTRUCTURE BUILDINGS</p>
PROJECT TITLE	Trowbridge WRC	
TEST REFERENCE	DCP04	
DATE	10-Nov-20	
MATERIAL/ STRATA TYPE	Made Ground	
START DEPTH (mm bgl)	0	
WEATHER/ GROUND CONDITION	Dry	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	24	24	306	306	20.5
2	5	29	265	571	4.5
3	18	47	273	844	17.1

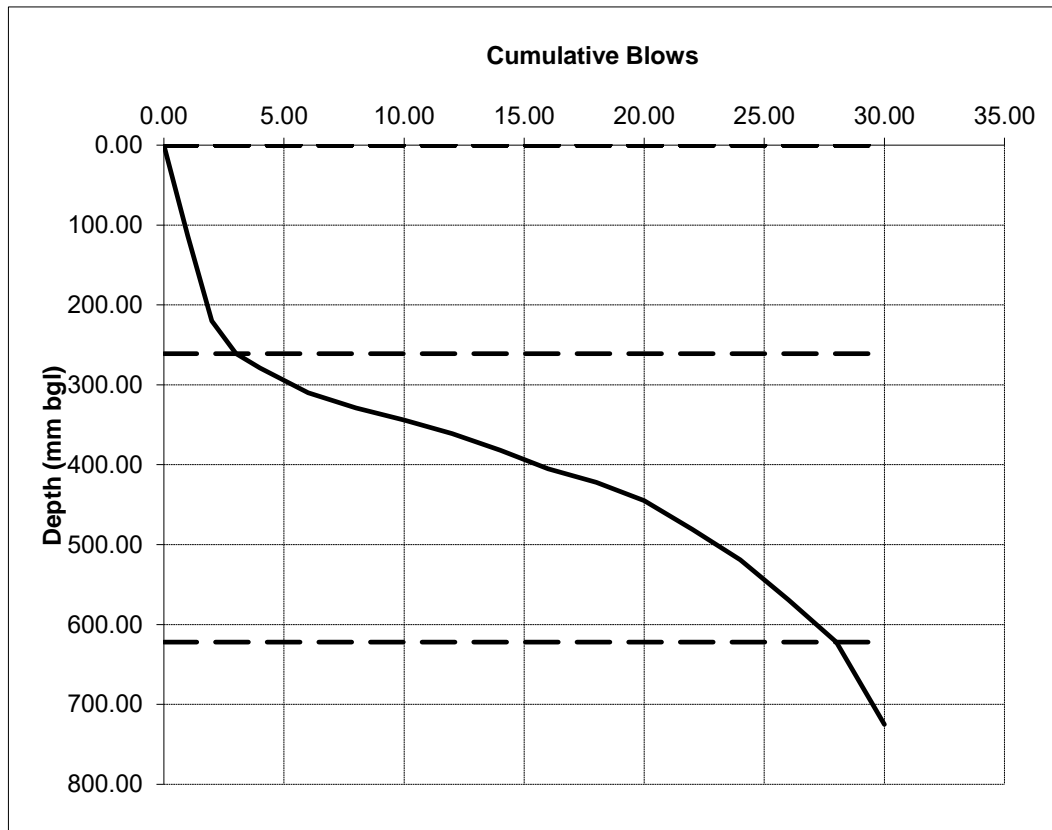


CBR Interpretation based on the TRL Equation: $\text{Log}_{10}(\text{CBR}) = 2.480 - [1.057 \times \text{Log}_{10}(\text{DCP Strength})]$

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109	 BWB CONSULTANCY ENVIRONMENT INFRASTRUCTURE BUILDINGS
PROJECT TITLE	Trowbridge WRC	
TEST REFERENCE	DCP05	
DATE	10-Nov-20	
MATERIAL/ STRATA TYPE	Made Ground	
START DEPTH (mm bgl)	0	
WEATHER/ GROUND CONDITION	Dry	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	3	3	261	261	2.7
2	25	28	361	622	18.0
3	2	30	103	725	4.7

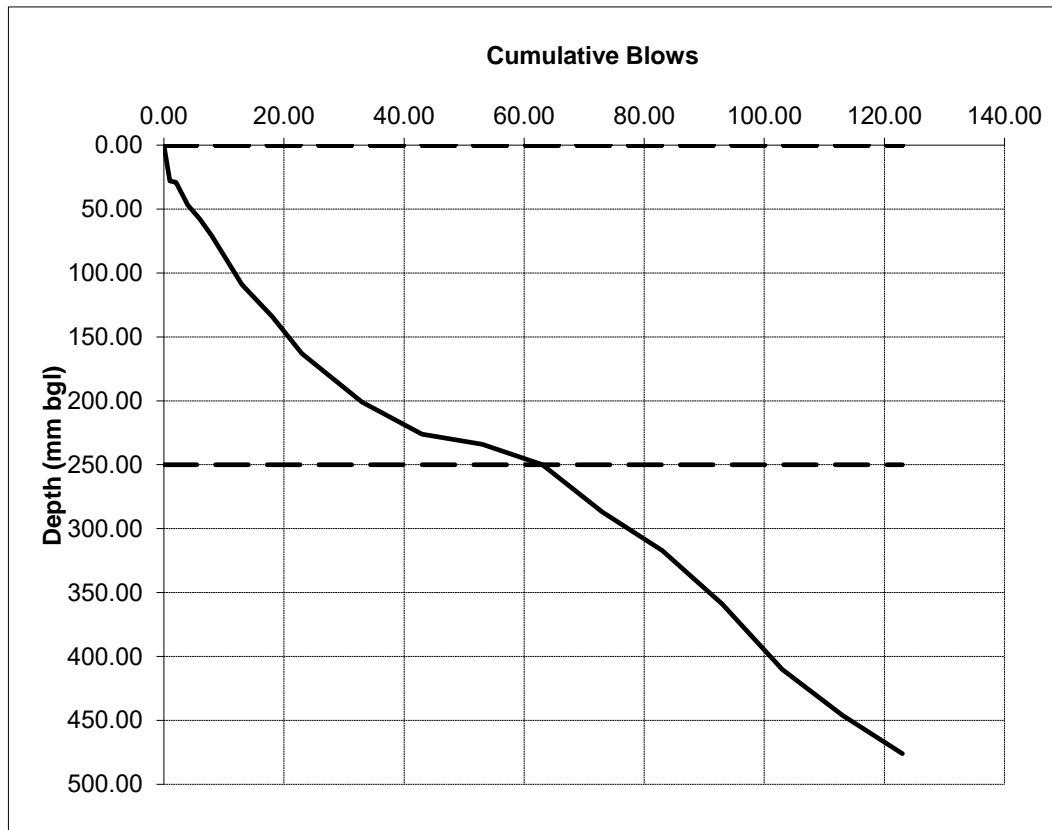


CBR Interpretation based on the TRL Equation: $\text{Log}_{10}(\text{CBR}) = 2.480 - [1.057 \times \text{Log}_{10}(\text{DCP Strength})]$

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109	 BWB CONSULTANCY ENVIRONMENT INFRASTRUCTURE BUILDINGS
PROJECT TITLE	Trowbridge WRC	
TEST REFERENCE	DCP06	
DATE	10-Nov-20	
MATERIAL/ STRATA TYPE	Made Ground	
START DEPTH (mm bgl)	0	
WEATHER/ GROUND CONDITION	Dry	

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	63	63	250	250	70.4
2	60	123	226	476	74.3



CBR Interpretation based on the TRL Equation: $\text{Log}_{10}(\text{CBR}) = 2.480 - [1.057 \times \text{Log}_{10}(\text{DCP Strength})]$

Appendix 7: Soil Chemical Testing Results



Imogen Wort
BWB Consulting Limited
5th Floor
Waterfront House
Nottingham
NG2 3DQ

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

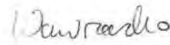
t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

e: imogen.wort@bwbconsulting.com

Analytical Report Number : 20-42335

Replaces Analytical Report Number: 20-42335, issue no. 1
Additional analysis undertaken.

Project / Site name:	Towbridge WRC	Samples received on:	13/11/2020
Your job number:	BMG2109	Samples instructed on/ Analysis started on:	19/11/2020
Your order number:	POR032908	Analysis completed by:	18/12/2020
Report Issue Number:	2	Report issued on:	18/12/2020
Samples Analysed:	1 leachate sample - 4 soil samples		

Signed: 

Joanna Wawrzeczek
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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: 20-42335
 Project / Site name: Towbridge WRC
 Your Order No: POR032908

Lab Sample Number	1689562	1689563	1689564	1689565			
Sample Reference	BH02	BH02	BH03	BH03			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	1.00-1.00	4.00-4.00	3.50-3.50	7.50-7.50			
Date Sampled	11/11/2020	11/11/2020	12/11/2020	12/11/2020			
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	7	20	24	19
Total mass of sample received	kg	0.001	NONE	2	2	2	2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.6	7.9	8	8.4
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.1	0.6	2.3	1.4

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.5	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.58	< 0.05	0.69	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.6	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	5.6	< 0.05	8.5	0.28
Anthracene	mg/kg	0.05	MCERTS	1.3	< 0.05	3.7	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	9.3	< 0.05	20	0.61
Pyrene	mg/kg	0.05	MCERTS	8.2	< 0.05	16	0.52
Benzo(a)anthracene	mg/kg	0.05	MCERTS	6.9	< 0.05	13	0.4
Chrysene	mg/kg	0.05	MCERTS	4.5	< 0.05	8.2	0.28
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	5.6	< 0.05	11	0.4
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.8	< 0.05	6	0.22
Benzo(a)pyrene	mg/kg	0.05	MCERTS	5.4	< 0.05	10	0.37
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.8	< 0.05	5	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.85	< 0.05	1.4	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.1	< 0.05	5.2	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	57.9	< 0.80	115	3.08
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	12	4.5	27	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	23	21	32	12
Barium (aqua regia extractable)	mg/kg	1	MCERTS	400	74	940	66
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	3	< 0.2	2.1	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	200	36	140	38
Copper (aqua regia extractable)	mg/kg	1	MCERTS	270	30	91	22
Lead (aqua regia extractable)	mg/kg	1	MCERTS	350	44	770	46
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	0.9	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	5.1	1.7	1.5	0.91
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	87	40	28	32
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	87	59	38	36
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	710	160	1900	180

Monoaromatics & Oxygenates

Analytical Report Number: 20-42335
 Project / Site name: Towbridge WRC
 Your Order No: POR032908

Lab Sample Number				1689562	1689563	1689564	1689565
Sample Reference				BH02	BH02	BH03	BH03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00-1.00	4.00-4.00	3.50-3.50	7.50-7.50
Date Sampled				11/11/2020	11/11/2020	12/11/2020	12/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	1.8	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	15	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	30	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	24	< 8.0	130	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	32	< 10	170	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	9.4	< 2.0	6	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	37	< 10	59	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	73	< 10	110	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	120	< 10	170	< 10

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



Analytical Report Number: 20-42335
Project / Site name: Towbridge WRC
Your Order No: POR032908

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1689562	BH02	1.00-1.00	133	Loose Fibres	Chrysotile	< 0.001	< 0.001
1689564	BH03	3.50-3.50	118	Loose Fibres & Bitumen	Chrysotile	< 0.001	< 0.001

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



Analytical Report Number: 20-42335
Project / Site name: Towbridge WRC

Your Order No: POR032908

Lab Sample Number				1689566
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				4.00-4.00
Date Sampled				11/11/2020
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status	

General Inorganics

pH	pH Units	N/A	ISO 17025	7.7
Total Cyanide	µg/l	10	ISO 17025	< 10
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1
Sulphate as SO4	mg/l	0.1	ISO 17025	170
Ammoniacal Nitrogen as N	µg/l	15	NONE	990

Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10
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Speciated PAHs

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

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0
Boron (dissolved)	µg/l	10	ISO 17025	630
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Chromium (III)	µg/l	1	NONE	< 1.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.6
Copper (dissolved)	µg/l	0.7	ISO 17025	9.2
Lead (dissolved)	µg/l	1	ISO 17025	5.7
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	4
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	16



Analytical Report Number: 20-42335
Project / Site name: Towbridge WRC

Your Order No: POR032908

Lab Sample Number				1689566
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				4.00-4.00
Date Sampled				11/11/2020
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status	

Monoaromatics & Oxygenates

Analytical Parameter	Units	Limit of detection	Accreditation Status	Result
Benzene	µg/l	1	ISO 17025	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10

Petroleum Hydrocarbons

Analytical Parameter	Units	Limit of detection	Accreditation Status	Result
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10

Analytical Parameter	Units	Limit of detection	Accreditation Status	Result
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10

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

Analytical Report Number : 20-42335
Project / Site name: Towbridge WRC

* 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 *
1689562	BH02	None Supplied	1.00-1.00	Brown loam and sand with gravel.
1689563	BH02	None Supplied	4.00-4.00	Brown clay with gravel.
1689564	BH03	None Supplied	3.50-3.50	Brown clay with gravel.
1689565	BH03	None Supplied	7.50-7.50	Grey clay.

Analytical Report Number : 20-42335
Project / Site name: Towbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

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
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperin staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free 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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
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
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
Total cyanide in leachate	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	ISO 17025

Analytical Report Number : 20-42335
Project / Site name: Towbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Cr (III) in leachate	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Free cyanide in leachate	Determination of free 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	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025

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

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

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

Sample Deviation Report



Analytical Report Number : 20-42335
Project / Site name: Towbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH02	None Supplied	S	1689562	c	Free cyanide in soil	L080-PL	c
BH02	None Supplied	S	1689563	c	Free cyanide in soil	L080-PL	c
BH03	None Supplied	S	1689564	c	Free cyanide in soil	L080-PL	c
BH03	None Supplied	S	1689565	c	Free cyanide in soil	L080-PL	c



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Analytical Report Number : 20-42481

Replaces Analytical Report Number: 20-42481, issue no. 1
Additional analysis undertaken.

Project / Site name:	Trowbridge WRC	Samples received on:	12/11/2020
Your job number:	BMG2109	Samples instructed on/ Analysis started on:	19/11/2020
Your order number:	PORO32913	Analysis completed by:	18/12/2020
Report Issue Number:	2	Report issued on:	18/12/2020
Samples Analysed:	10 leachate samples - 16 soil samples		

Signed:

Joanna Wawrzeczek
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 20-42481
 Project / Site name: Trowbridge WRC
 Your Order No: PORO32913

Lab Sample Number	1690323	1690324	1690325	1690326	1690327			
Sample Reference	BH01	BH01	HP01	HP01	HP01			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	0.70-0.70	3.00-3.00	0.10-0.10	0.30-0.30	0.60-0.60			
Date Sampled	10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020			
Time Taken	None Supplied	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	< 0.1
Moisture Content	%	0.01	NONE	14	18	21	18	17
Total mass of sample received	kg	0.001	NONE	1.7	1.2	1.2	1.2	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	7.8	7.9	7.8	8.1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.8	0.5	3.1	1.7	0.7

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.47	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.96	< 0.05	0.66	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.88	< 0.05	0.56	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.74	< 0.05	0.4	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.56	< 0.05	0.25	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.98	< 0.05	0.38	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.29	< 0.05	0.16	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.57	< 0.05	0.26	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.47	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.57	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	6.49	< 0.80	2.67	< 0.80	< 0.80
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	23	2.6	< 1.0	2.5	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	64	14	11	9.3	9.1
Barium (aqua regia extractable)	mg/kg	1	MCERTS	840	63	94	54	39
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	4.3	< 0.2	0.5	0.3	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	53	28	27	19	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	1100	31	29	13	13
Lead (aqua regia extractable)	mg/kg	1	MCERTS	910	33	63	33	19
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	5	0.4	< 0.3	0.4	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	9.7	1.4	1.4	1.2	1.2
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	83	25	13	10	12
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	72	43	34	31	31
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	1300	84	160	63	57

Analytical Report Number: 20-42481
 Project / Site name: Trowbridge WRC
 Your Order No: PORO32913

Lab Sample Number	1690323			1690324			1690325			1690326			1690327		
Sample Reference	BH01			BH01			HP01			HP01			HP01		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.70-0.70			3.00-3.00			0.10-0.10			0.30-0.30			0.60-0.60		
Date Sampled	10/11/2020			10/11/2020			10/11/2020			10/11/2020			10/11/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status												

Monoaromatics & Oxygenates

Parameter	Units	Limit of detection	Accreditation Status	1690323	1690324	1690325	1690326	1690327
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	1690323	1690324	1690325	1690326	1690327
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	6.5	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	9.8	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	16	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	100	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	140	< 10	< 10	< 10	< 10

Parameter	Units	Limit of detection	Accreditation Status	1690323	1690324	1690325	1690326	1690327
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	14	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	32	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	47	< 10	< 10

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

Analytical Report Number: 20-42481
 Project / Site name: Trowbridge WRC
 Your Order No: PORO32913

Lab Sample Number				1690328	1690329	1690330	1690331	1690332
Sample Reference				HP03	HP03	HP04	HP04	HP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.10	0.50-0.50	0.10-0.10	0.50-0.50	0.10-0.10
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	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	< 0.1
Moisture Content	%	0.01	NONE	18	16	10	17	15
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.7

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.1	8	8.1	7.9	8
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.2	0.5	2	0.4	1.9

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.26
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.47
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	3.7
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.3
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.48	< 0.05	7.8
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.49	< 0.05	6.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	< 0.05	1.9
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28	< 0.05	3.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.47	< 0.05	3
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.21	< 0.05	1.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.31	< 0.05	2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.24	< 0.05	1.2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.29	< 0.05	1.6

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	3.19	< 0.80	35
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	2.8	< 1.0	< 1.0	3.3	6.1
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	9	12	14	19
Barium (aqua regia extractable)	mg/kg	1	MCERTS	81	36	360	43	250
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	0.6	< 0.2	1.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	22	42	29	42
Copper (aqua regia extractable)	mg/kg	1	MCERTS	79	18	56	16	95
Lead (aqua regia extractable)	mg/kg	1	MCERTS	67	20	63	17	130
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	0.7
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	1.1	0.55	1.3	0.95	1.8
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	15	26	16	37
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	32	29	43	43	37
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	65	200	64	250

Analytical Report Number: 20-42481
 Project / Site name: Trowbridge WRC
 Your Order No: PORO32913

Lab Sample Number	1690328			1690329			1690330			1690331			1690332		
Sample Reference	HP03			HP03			HP04			HP04			HP05		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.10-0.10			0.50-0.50			0.10-0.10			0.50-0.50			0.10-0.10		
Date Sampled	10/11/2020			10/11/2020			10/11/2020			10/11/2020			10/11/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status												
Monoaromatics & Oxygenates															
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	13	< 10	13	< 10	13	< 10	13	< 10	22
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	30	< 10	30	< 10	30	< 10	30	< 10	50
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	43	< 10	43	< 10	43	< 10	43	< 10	71

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

Analytical Report Number: 20-42481
 Project / Site name: Trowbridge WRC
 Your Order No: PORO32913

Lab Sample Number	1690333	1690334	1690335	1690336	1690337			
Sample Reference	HP05	HP05	HP06	HP06	HP07			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	0.20-0.20	0.50-0.50	0.10-0.10	0.60-0.60	0.20-0.20			
Date Sampled	10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020			
Time Taken	None Supplied	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	< 0.1
Moisture Content	%	0.01	NONE	8.9	16	7.9	21	10
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.7	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	7.4	8	8	8.2
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.3	0.8	2	3.6	1.7

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.3	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.6	< 0.05	0.98	2.2	3.6
Anthracene	mg/kg	0.05	MCERTS	0.56	< 0.05	0.41	0.92	1.2
Fluoranthene	mg/kg	0.05	MCERTS	4.1	< 0.05	3	5.1	5.8
Pyrene	mg/kg	0.05	MCERTS	3.8	< 0.05	2.6	5.9	4.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.9	< 0.05	1.5	3.3	1.7
Chrysene	mg/kg	0.05	MCERTS	1.5	< 0.05	1.2	2.4	2.5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.1	< 0.05	1.6	3.7	1.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	< 0.05	0.83	2	1.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.7	< 0.05	1	4.3	1.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.4	< 0.05	0.91	2.8	1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.6	< 0.05	0.97	3.3	1.2

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	21.4	< 0.80	15.1	37.4	26.1
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	7.6	3.1	2.8	11	6.4
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	25	14	17	28	27
Barium (aqua regia extractable)	mg/kg	1	MCERTS	450	81	300	420	400
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.7	< 0.2	0.9	2.5	2.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	55	37	39	130	62
Copper (aqua regia extractable)	mg/kg	1	MCERTS	150	24	63	260	150
Lead (aqua regia extractable)	mg/kg	1	MCERTS	260	32	110	450	260
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	1.7	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	3.1	1.7	2.5	3.8	2.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	39	24	21	40	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	38	42	22	41	28
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	420	77	200	760	470

Analytical Report Number: 20-42481
 Project / Site name: Trowbridge WRC
 Your Order No: PORO32913

Lab Sample Number				1690333	1690334	1690335	1690336	1690337
Sample Reference				HP05	HP05	HP06	HP06	HP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.20	0.50-0.50	0.10-0.10	0.60-0.60	0.20-0.20
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	13	5
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	84	18
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	600	83
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	700	110

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	4.2	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	12	< 10	13	46	19
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	34	< 10	42	380	52
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	46	< 10	55	430	71

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

Analytical Report Number: 20-42481
 Project / Site name: Trowbridge WRC
 Your Order No: PORO32913

Lab Sample Number				1690338
Sample Reference				HP07
Sample Number				None Supplied
Depth (m)				0.40-0.40
Date Sampled				10/11/2020
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	18
Total mass of sample received	kg	0.001	NONE	1.7

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.6
Free Cyanide	mg/kg	1	MCERTS	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.4

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.5
Anthracene	mg/kg	0.05	MCERTS	0.8
Fluoranthene	mg/kg	0.05	MCERTS	4.4
Pyrene	mg/kg	0.05	MCERTS	4.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.4
Chrysene	mg/kg	0.05	MCERTS	2.4
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.1
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.7
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.53
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	26.8
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Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	17
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	41
Barium (aqua regia extractable)	mg/kg	1	MCERTS	540
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	2.7
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	130
Copper (aqua regia extractable)	mg/kg	1	MCERTS	340
Lead (aqua regia extractable)	mg/kg	1	MCERTS	490
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	2
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	5.9
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	57
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	51
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	860

Analytical Report Number: 20-42481
 Project / Site name: Trowbridge WRC
 Your Order No: PORO32913

Lab Sample Number				1690338
Sample Reference				HP07
Sample Number				None Supplied
Depth (m)				0.40-0.40
Date Sampled				10/11/2020
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Monoaromatics & Oxygenates				
Benzene	µg/kg	1	MCERTS	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	27
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	72
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	260
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	360

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	6.7
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	40
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	120
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	170

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



Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: POR032913

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1690337	HP07	0.20-0.20	162	Loose Fibres	Chrysotile	< 0.001	< 0.001
1690338	HP07	0.40-0.40	145	Loose Fibres	Chrysotile	< 0.001	< 0.001

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



Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC

Your Order No: PORO32913

Lab Sample Number	1690339				1690340	1690341	1690342	1690343
Sample Reference	BH01				BH01	HP01	HP03	HP04
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.70-0.70				3.00-3.00	0.60-0.60	0.10-0.10	0.50-0.50
Date Sampled	10/11/2020				10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

	pH Units	N/A	ISO 17025	1690339	1690340	1690341	1690342	1690343
pH				8.1	8	7.8	8	7.9
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1	< 1	< 1	< 1	< 1
Sulphate as SO4	mg/l	0.1	ISO 17025	50.7	109	12.2	2.6	11.7
Ammoniacal Nitrogen as N	µg/l	15	NONE	300	3100	< 15	16	35

Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	1690339	1690340	1690341	1690342	1690343
				< 10	< 10	< 10	< 10	< 10

Speciated PAHs

	µg/l	0.01	ISO 17025	1690339	1690340	1690341	1690342	1690343
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	1690339	1690340	1690341	1690342	1690343
				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

Heavy Metals / Metalloids

	µg/l	1	ISO 17025	1690339	1690340	1690341	1690342	1690343
Arsenic (dissolved)	µg/l	1	ISO 17025	2.1	2.9	3.9	< 1.0	< 1.0
Boron (dissolved)	µg/l	10	ISO 17025	120	710	52	29	40
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	U/S*	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	5.1	< 1.0	U/S*	1.3	< 1.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	5.1	< 0.4	1.1	1.3	0.9
Copper (dissolved)	µg/l	0.7	ISO 17025	16	7.8	12	13	6.8
Lead (dissolved)	µg/l	1	ISO 17025	8.8	7.3	< 1.0	3.4	2.5
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.4	2.2	1.9	1	0.9
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	38	8.4	33	18	13



Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC

Your Order No: POR032913

Lab Sample Number	1690339				1690340	1690341	1690342	1690343
Sample Reference	BH01				BH01	HP01	HP03	HP04
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.70-0.70				3.00-3.00	0.60-0.60	0.10-0.10	0.50-0.50
Date Sampled	10/11/2020				10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Parameter	Units	Limit of detection	Accreditation Status	1690339	1690340	1690341	1690342	1690343
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	1690339	1690340	1690341	1690342	1690343
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

Parameter	Units	Limit of detection	Accreditation Status	1690339	1690340	1690341	1690342	1690343
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

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

*U/S due to high variances between chromium (hexavalent) and chromium (dissolved) caused by method differences.



Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC

Your Order No: PORO32913

Lab Sample Number	1690344				1690345	1690346	1690347	1690348
Sample Reference	HP05				HP05	HP06	HP06	HP07
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.10-0.10				0.50-0.50	0.10-0.10	0.60-0.60	0.40-0.40
Date Sampled	10/11/2020				10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

	pH Units	N/A	ISO 17025	8	7.9	8	7.8	7.6
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1	< 1	< 1	< 1	< 1
Sulphate as SO4	mg/l	0.1	ISO 17025	15.4	33.1	3.9	41.1	426
Ammoniacal Nitrogen as N	µg/l	15	NONE	38	38	29	34	43

Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	19	16
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Speciated PAHs

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

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
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Heavy Metals / Metalloids

	µg/l	1	ISO 17025	< 1.0	< 1.0	6	9.7	< 1.0
Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0	< 1.0	6	9.7	< 1.0
Boron (dissolved)	µg/l	10	ISO 17025	120	64	20	63	590
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	0.09
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	1.7	1.9	3.5	4.6	1.7
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.7	1.9	3.5	4.6	1.7
Copper (dissolved)	µg/l	0.7	ISO 17025	17	8.3	17	14	14
Lead (dissolved)	µg/l	1	ISO 17025	5.7	4.2	5.2	9.7	6
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.3	1.2	0.8	1.4	2.6
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	14	19	26	47	70



Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC

Your Order No: POR032913

Lab Sample Number	1690344				1690345	1690346	1690347	1690348
Sample Reference	HP05				HP05	HP06	HP06	HP07
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.10-0.10				0.50-0.50	0.10-0.10	0.60-0.60	0.40-0.40
Date Sampled	10/11/2020				10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Parameter	Units	Limit of detection	Accreditation Status	1690344	1690345	1690346	1690347	1690348
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	1690344	1690345	1690346	1690347	1690348
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

Parameter	Units	Limit of detection	Accreditation Status	1690344	1690345	1690346	1690347	1690348
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

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

*U/S due to high variances between chromium (hexavalent) and chromium (dissolved) caused by method differences.



Analytical Report Number : 20-42481
Project / Site name: Trowbridge WRC

* 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 *
1690323	BH01	None Supplied	0.70-0.70	Brown loam and sand with gravel.
1690324	BH01	None Supplied	3.00-3.00	Light brown sandy clay.
1690325	HP01	None Supplied	0.10-0.10	Brown loam and clay with vegetation.
1690326	HP01	None Supplied	0.30-0.30	Light brown sandy clay.
1690327	HP01	None Supplied	0.60-0.60	Light brown clay.
1690328	HP03	None Supplied	0.10-0.10	Brown loam and clay with vegetation.
1690329	HP03	None Supplied	0.50-0.50	Light brown clay with vegetation.
1690330	HP04	None Supplied	0.10-0.10	Light brown loam and clay with gravel and vegetation.
1690331	HP04	None Supplied	0.50-0.50	Light brown clay.
1690332	HP05	None Supplied	0.10-0.10	Grey loam and clay.
1690333	HP05	None Supplied	0.20-0.20	Grey loam and clay with gravel.
1690334	HP05	None Supplied	0.50-0.50	Light brown loam and clay with gravel.
1690335	HP06	None Supplied	0.10-0.10	Light brown loam and clay with gravel.
1690336	HP06	None Supplied	0.60-0.60	Brown loam and clay with gravel and vegetation.
1690337	HP07	None Supplied	0.20-0.20	Light brown loam and clay with gravel.
1690338	HP07	None Supplied	0.40-0.40	Light brown loam and clay with gravel.

Analytical Report Number : 20-42481
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

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
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperin staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free 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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
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
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
Total cyanide in leachate	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	ISO 17025

Analytical Report Number : 20-42481
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Cr (III) in leachate	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Free cyanide in leachate	Determination of free 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	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025

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

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

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

Sample Deviation Report



Analytical Report Number : 20-42481

Project / Site name: Trowbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01	None Supplied	S	1690323	c	Free cyanide in soil	L080-PL	c
BH01	None Supplied	S	1690324	c	Free cyanide in soil	L080-PL	c
HP01	None Supplied	S	1690325	c	Free cyanide in soil	L080-PL	c
HP01	None Supplied	S	1690326	c	Free cyanide in soil	L080-PL	c
HP01	None Supplied	S	1690327	c	Free cyanide in soil	L080-PL	c
HP03	None Supplied	S	1690328	c	Free cyanide in soil	L080-PL	c
HP03	None Supplied	S	1690329	c	Free cyanide in soil	L080-PL	c
HP04	None Supplied	S	1690330	c	Free cyanide in soil	L080-PL	c
HP04	None Supplied	S	1690331	c	Free cyanide in soil	L080-PL	c
HP05	None Supplied	S	1690332	c	Free cyanide in soil	L080-PL	c
HP05	None Supplied	S	1690333	c	Free cyanide in soil	L080-PL	c
HP05	None Supplied	S	1690334	c	Free cyanide in soil	L080-PL	c
HP06	None Supplied	S	1690335	c	Free cyanide in soil	L080-PL	c
HP06	None Supplied	S	1690336	c	Free cyanide in soil	L080-PL	c
HP07	None Supplied	S	1690337	c	Free cyanide in soil	L080-PL	c
HP07	None Supplied	S	1690338	c	Free cyanide in soil	L080-PL	c

Appendix 8: Geotechnical Testing Results



TEST CERTIFICATE

Liquid and Plastic Limits

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



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

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

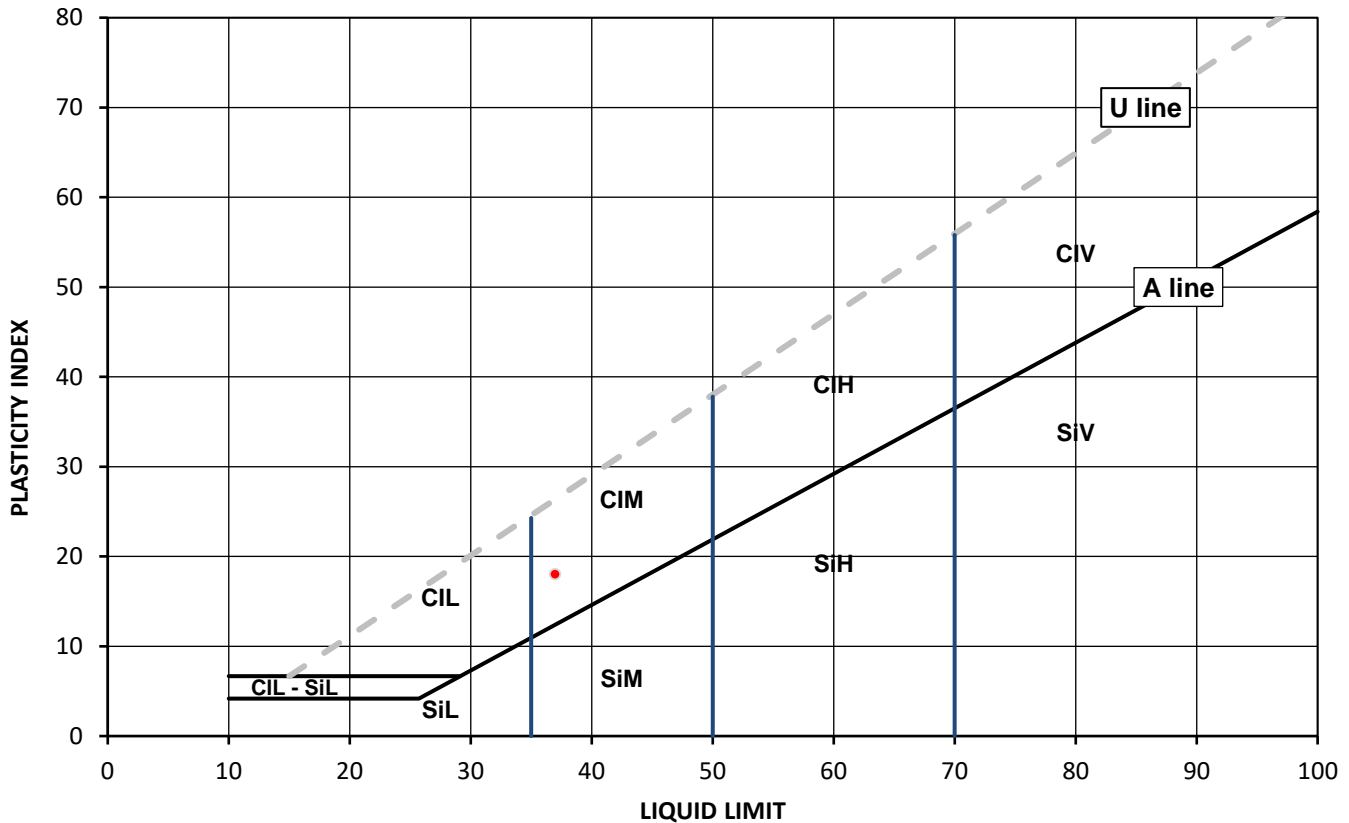
Test Results:

Laboratory Reference: 1699727
Hole No.: BH01
Sample Reference: Not Given
Soil Description: Brown slightly gravelly sandy CLAY

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

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	37	19	18	95



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

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

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

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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



TEST CERTIFICATE

Liquid and Plastic Limits

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



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

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
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Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

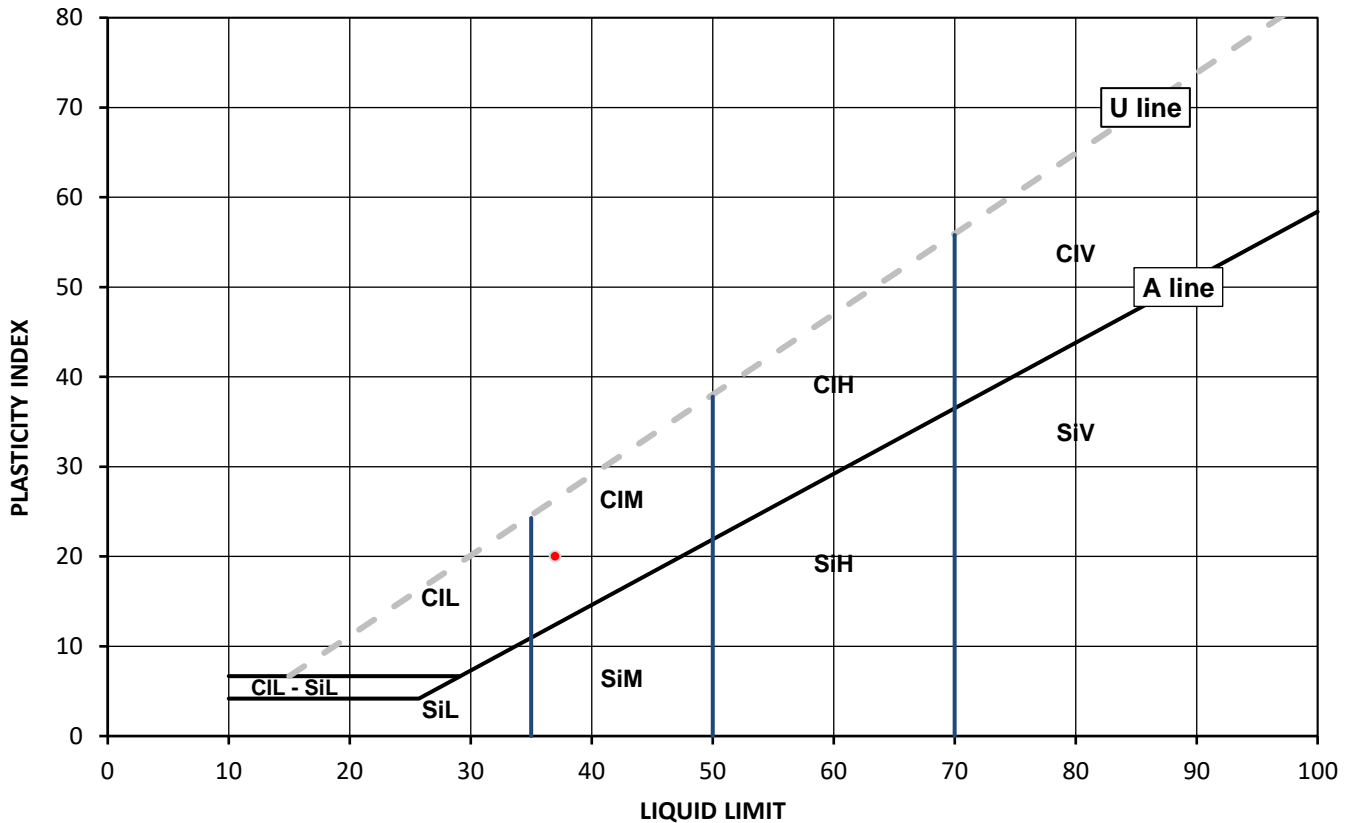
Test Results:

Laboratory Reference: 1699733
Hole No.: BH01
Sample Reference: Not Given
Soil Description: Dark grey slightly gravelly sandy CLAY

Depth Top [m]: 7.00
Depth Base [m]: 7.00
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	37	17	20	90



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

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

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

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Liquid and Plastic Limits

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



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

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

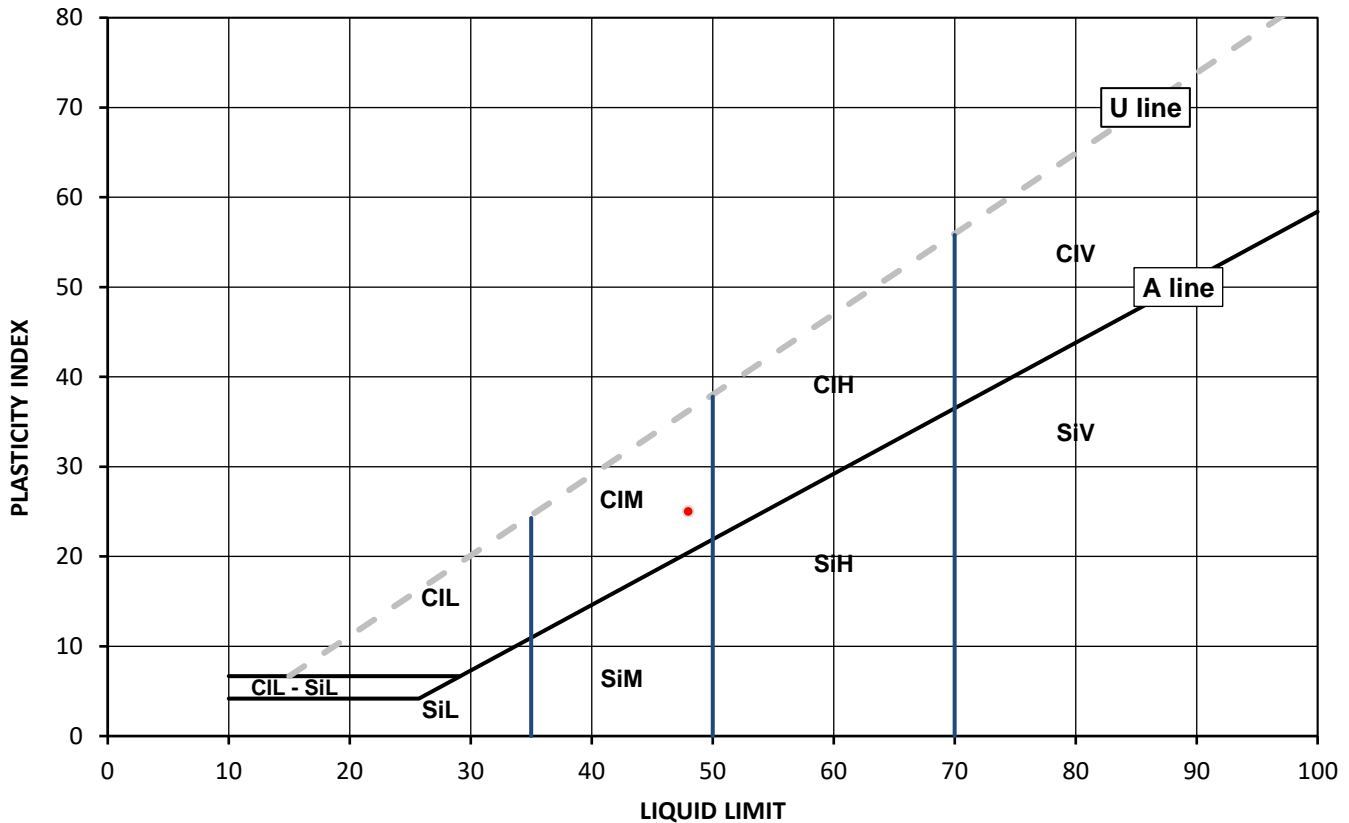
Test Results:

Laboratory Reference: 1699737
Hole No.: BH01
Sample Reference: Not Given
Soil Description: Dark brown slightly sandy CLAY

Depth Top [m]: 14.00
Depth Base [m]: 14.00
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	48	23	25	100



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

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

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

Remarks:

Signed:

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PL Deputy Head of Geotechnical Section
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TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
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Northampton NN4 7EB



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

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
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Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
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Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

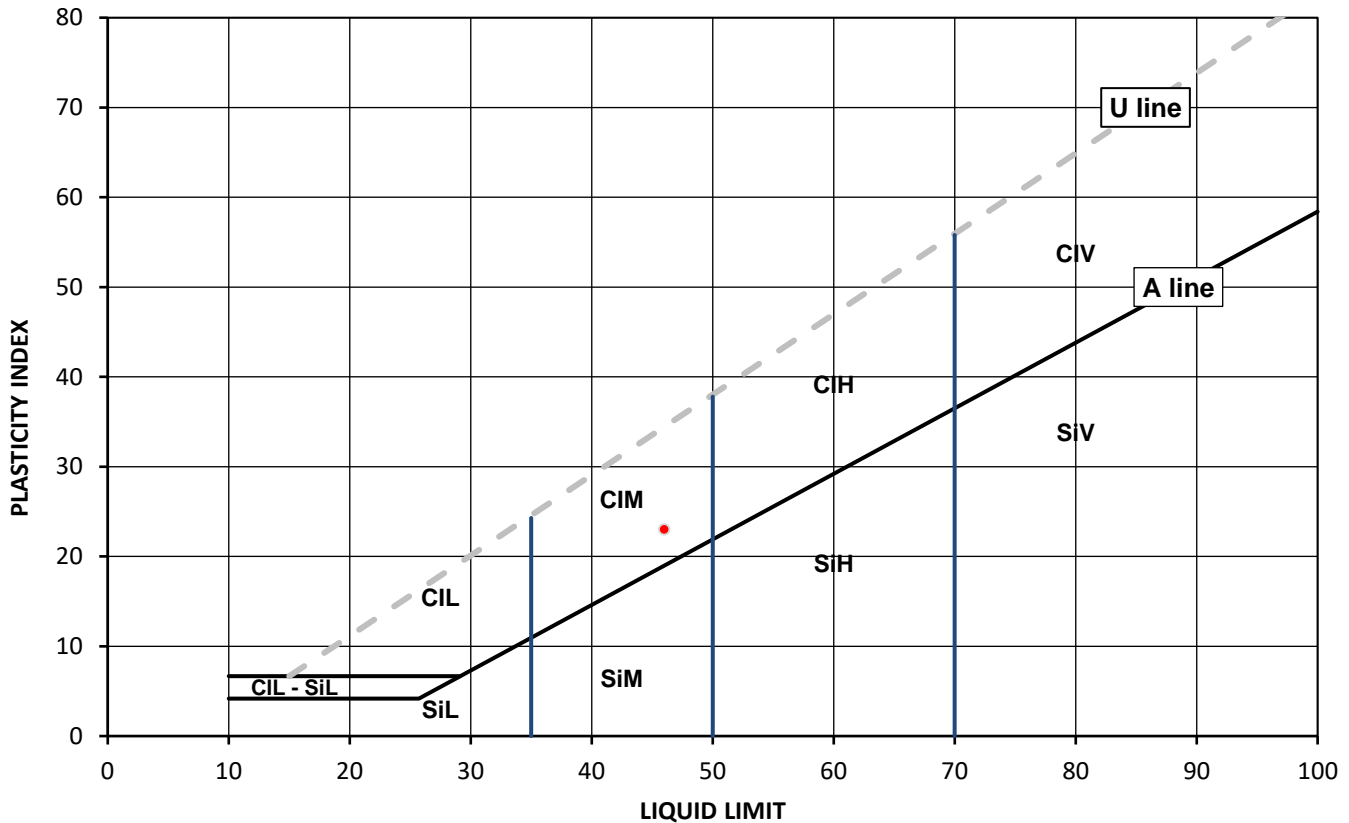
Test Results:

Laboratory Reference: 1699755
Hole No.: BH02
Sample Reference: Not Given
Soil Description: Dark brown slightly gravelly slightly sandy CLAY

Depth Top [m]: 4.00
Depth Base [m]: 4.45
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
28	46	23	23	87



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

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

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

Remarks:

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Client: BWB Consulting Limited
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Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

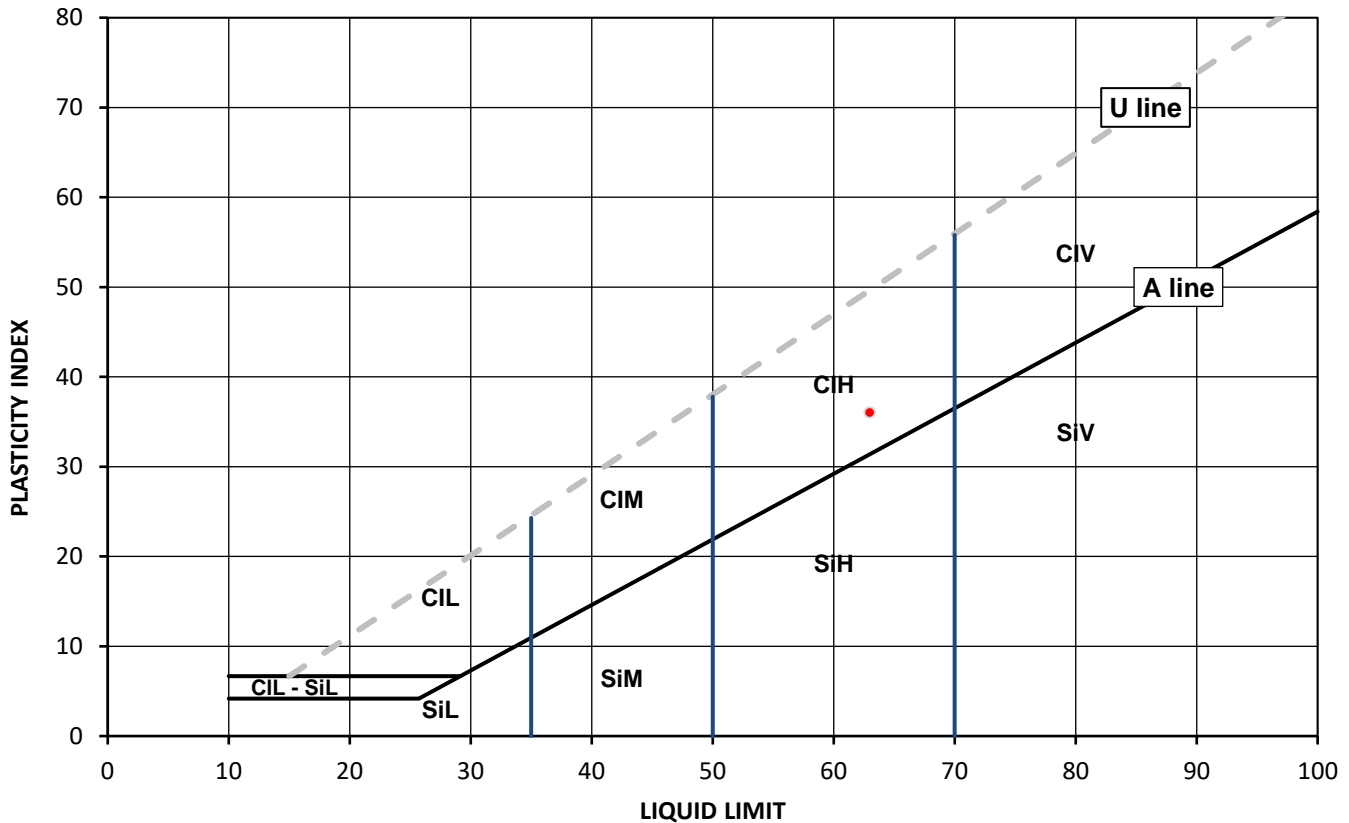
Test Results:

Laboratory Reference: 1699758
Hole No.: BH02
Sample Reference: Not Given
Soil Description: Brown CLAY

Depth Top [m]: 5.50
Depth Base [m]: 5.50
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
33	63	27	36	100



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

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

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

Remarks:

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TEST CERTIFICATE

Liquid and Plastic Limits

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Northampton NN4 7EB



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

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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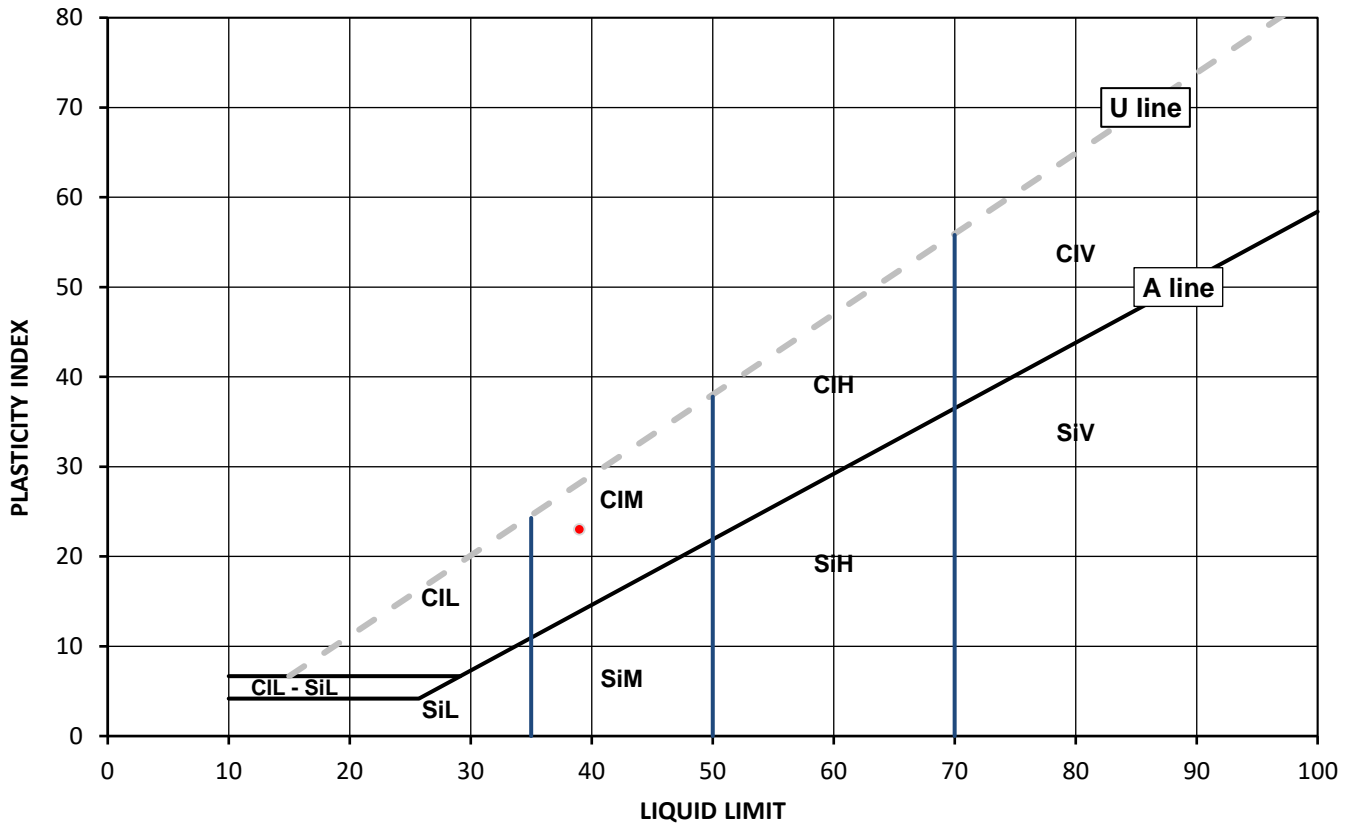
Test Results:

Laboratory Reference: 1699762
Hole No.: BH02
Sample Reference: Not Given
Soil Description: Dark brown slightly gravelly sandy CLAY

Depth Top [m]: 8.00
Depth Base [m]: 8.00
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	39	16	23	80



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

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

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

Remarks:

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

Client: BWB Consulting Limited
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Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

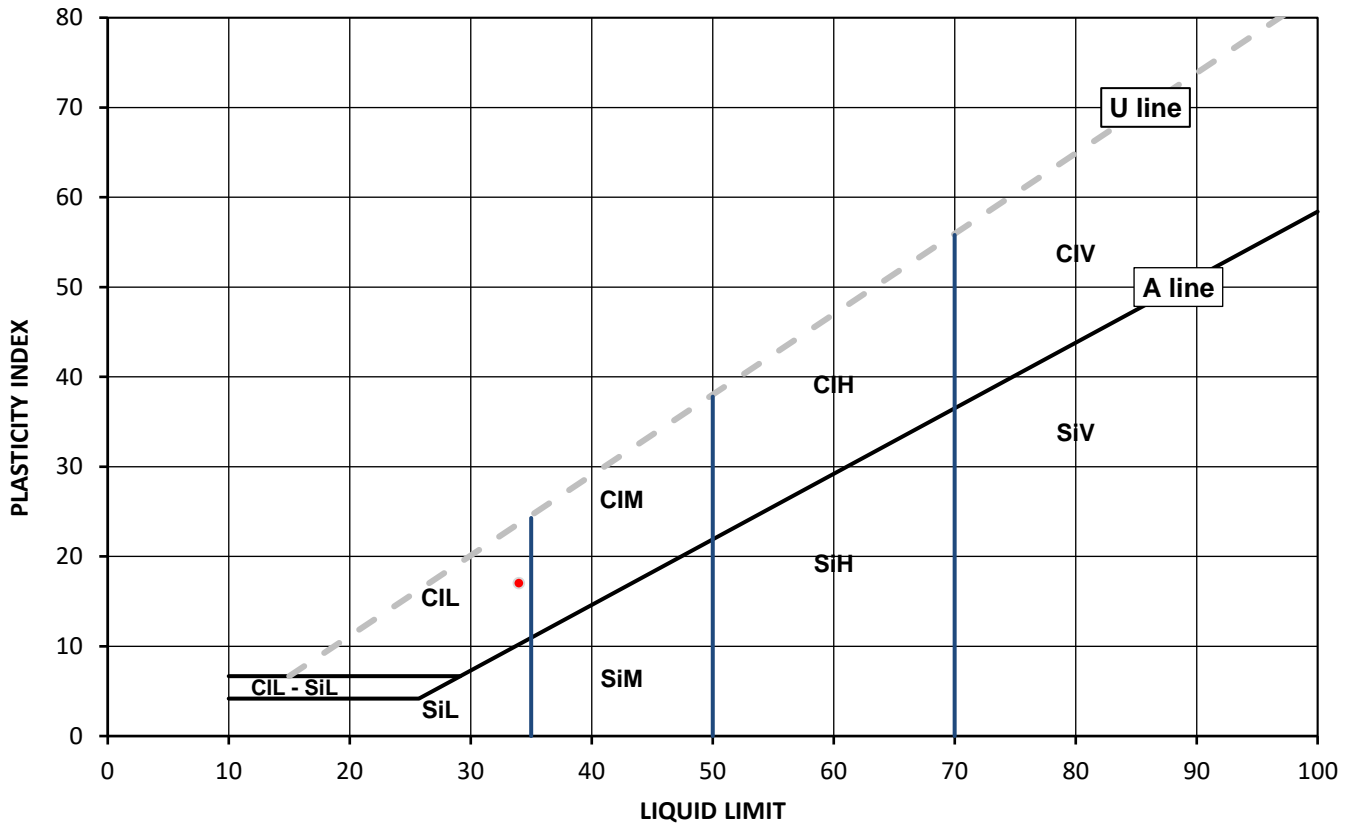
Test Results:

Laboratory Reference: 1699766
Hole No.: BH02
Sample Reference: Not Given
Soil Description: Dark brown slightly gravelly very sandy CLAY

Depth Top [m]: 12.00
Depth Base [m]: 12.45
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	34	17	17	99



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

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

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

Remarks:

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TEST CERTIFICATE

Liquid and Plastic Limits

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

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Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
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Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

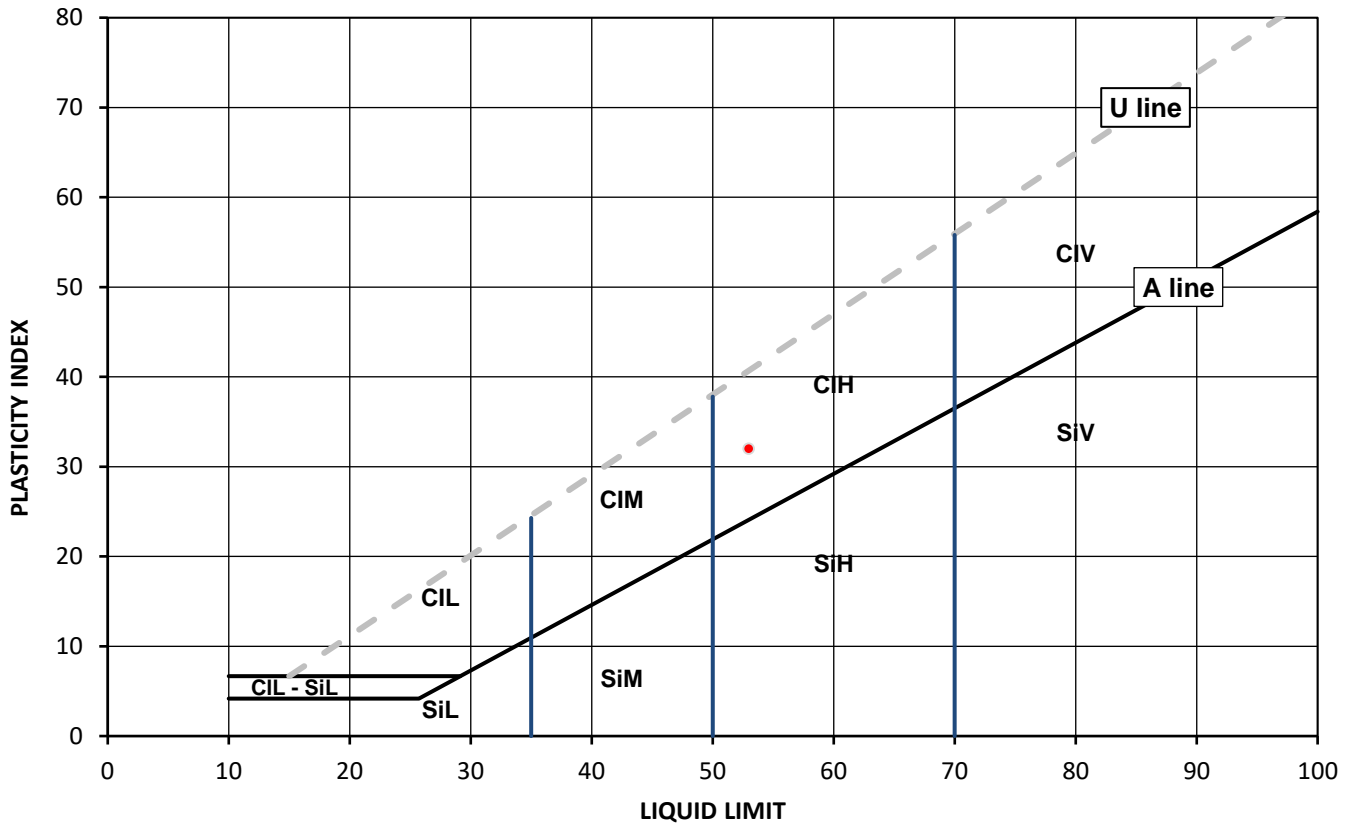
Test Results:

Laboratory Reference: 1699769
Hole No.: BH03
Sample Reference: Not Given
Soil Description: Brown slightly gravelly slightly sandy CLAY

Depth Top [m]: 6.00
Depth Base [m]: 6.45
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
36	53	21	32	91



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

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

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

Remarks:

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Northampton NN4 7EB



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

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Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

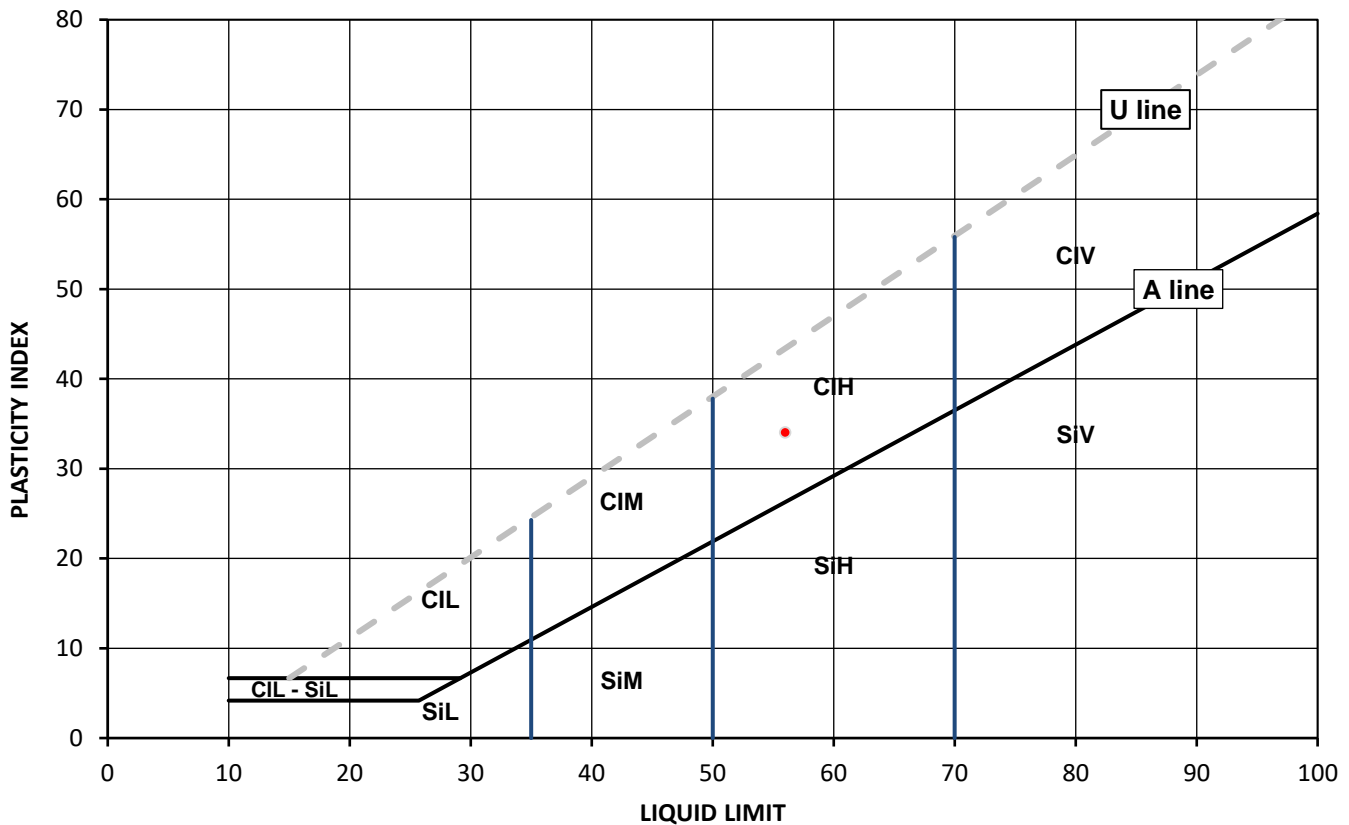
Test Results:

Laboratory Reference: 1699770
Hole No.: BH03
Sample Reference: Not Given
Soil Description: Dark grey slightly gravelly slightly sandy CLAY

Depth Top [m]: 6.80
Depth Base [m]: 6.80
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
25	56	22	34	98



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

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

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

Remarks:

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TEST CERTIFICATE

Liquid and Plastic Limits

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Brackmills Industrial Estate
Northampton NN4 7EB



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

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

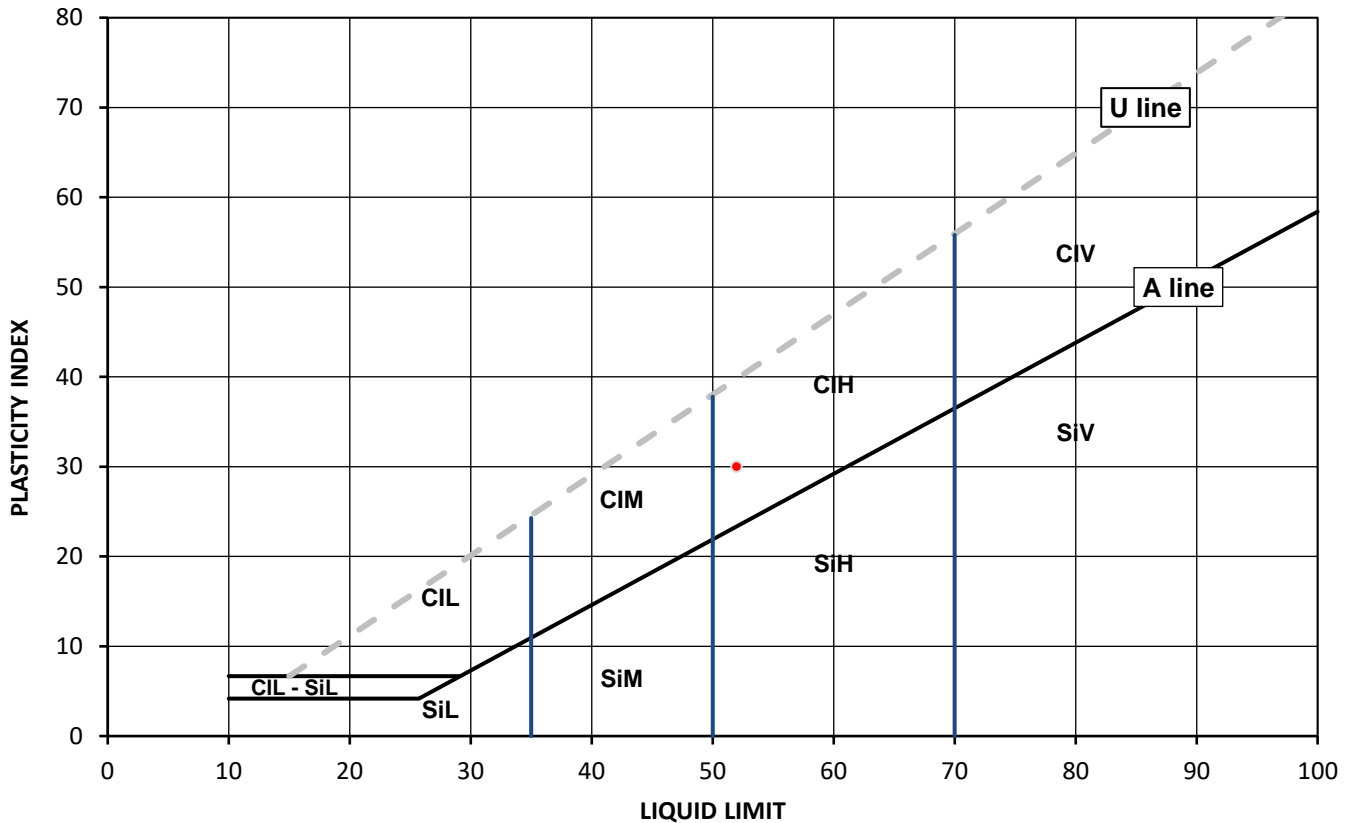
Test Results:

Laboratory Reference: 1699772
Hole No.: BH03
Sample Reference: Not Given
Soil Description: Brown slightly gravelly slightly sandy CLAY

Depth Top [m]: 8.50
Depth Base [m]: 8.50
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
29	52	22	30	98



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

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

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

Remarks:

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SUMMARY REPORT

Summary of Classification Test Results

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



Environmental Science

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: BMG2109

Job Number: 20-44142

Date Sampled: 10/11 - 11/11/2020

Date Received: 18/11/2020

Date Tested: 04/12/2020

Sampled By: Not Given

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W] %	Water Content [W] %	Atterberg				Density			Total Porosity# %	
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3		
1699725	BH01	Not Given	2.00	2.45	D	Dark brown slightly gravelly CLAY		38										
1699727	BH01	Not Given	3.00	3.45	D	Brown slightly gravelly sandy CLAY	Atterberg 4 Point	27		95	37	19	18					
1699729	BH01	Not Given	4.50	4.50	D	Brown to grey CLAY		24										
1699731	BH01	Not Given	6.50	6.50	D	Dark brown CLAY		18										
1699733	BH01	Not Given	7.00	7.00	D	Dark grey slightly gravelly sandy CLAY	Atterberg 4 Point	16		90	37	17	20					
1699735	BH01	Not Given	9.50	9.50	D	Dark grey CLAY		21										
1699736	BH01	Not Given	13.50	13.95	D	Dark grey CLAY		19										
1699737	BH01	Not Given	14.00	14.00	D	Dark brown slightly sandy CLAY	Atterberg 4 Point	22		100	48	23	25					
1699743	BH01	Not Given	19.20	19.46	C	Dark grey LIMESTONE		6.6										
1699745	BH01	Not Given	19.85	20.10	C	Grey LIMESTONE with fragments of shell		4.8										

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

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SUMMARY REPORT

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Environmental Science

Tested in Accordance with:

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Client Reference: BMG2109

Job Number: 20-44142

Date Sampled: 11/11/2020

Date Received: 18/11/2020

Date Tested: 04/12/2020

Sampled By: Not Given

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Contact: Imogen Wort
Site Address: Trowbridge WRC

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Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W] %	Water Content [W] %	Atterberg				Density			Total Porosity# %	
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3		
1699748	BH01	Not Given	22.23	22.63	C	Dark brown LIMESTONE		10										
1699750	BH01	Not Given	24.16	24.39	C	Grey LIMESTONE		1.1										
1699752	BH01	Not Given	24.52	24.56	C	Greenish grey LIMESTONE		8.7										
1699754	BH02	Not Given	2.00	2.45	D	Dark brown slightly gravelly CLAY		24										
1699755	BH02	Not Given	4.00	4.45	D	Dark brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	28		87	46	23	23					
1699758	BH02	Not Given	5.50	5.50	D	Brown CLAY	Atterberg 4 Point	33		100	63	27	36					
1699759	BH02	Not Given	5.70	5.70	D	Dark brown CLAY		28										
1699762	BH02	Not Given	8.00	8.00	D	Dark brown slightly gravelly sandy CLAY	Atterberg 4 Point	18		80	39	16	23					
1699763	BH02	Not Given	9.00	9.45	D	Brown CLAY		22										
1699765	BH02	Not Given	11.50	11.50	D	Brown to grey CLAY		24										

Note: # Non accredited; NP - Non plastic

Comments:

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Environmental Science

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Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Client: BWB Consulting Limited
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Contact: Imogen Wort
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Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W] %	Water Content [W] %	Atterberg				Density			Total Porosity# %	
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3		
1699766	BH02	Not Given	12.00	12.45	D	Dark brown slightly gravelly very sandy CLAY	Atterberg 4 Point	18		99	34	17	17					
1699767	BH02	Not Given	15.00	15.45	D	Brown CLAY		23										
1699769	BH03	Not Given	6.00	6.45	D	Brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	36		91	53	21	32					
1699770	BH03	Not Given	6.80	6.80	D	Dark grey slightly gravelly slightly sandy CLAY	Atterberg 4 Point	25		98	56	22	34					
1699772	BH03	Not Given	8.50	8.50	D	Brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	29		98	52	22	30					
1699773	BH03	Not Given	10.00	10.00	D	Brown slightly gravelly CLAY		22										
1699775	BH03	Not Given	12.00	12.45	D	Brown CLAY		23										

Note: # Non accredited; NP - Non plastic

Comments:

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TEST CERTIFICATE

Particle Size Distribution

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



Tested in Accordance with: BS 1377-2: 1990

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

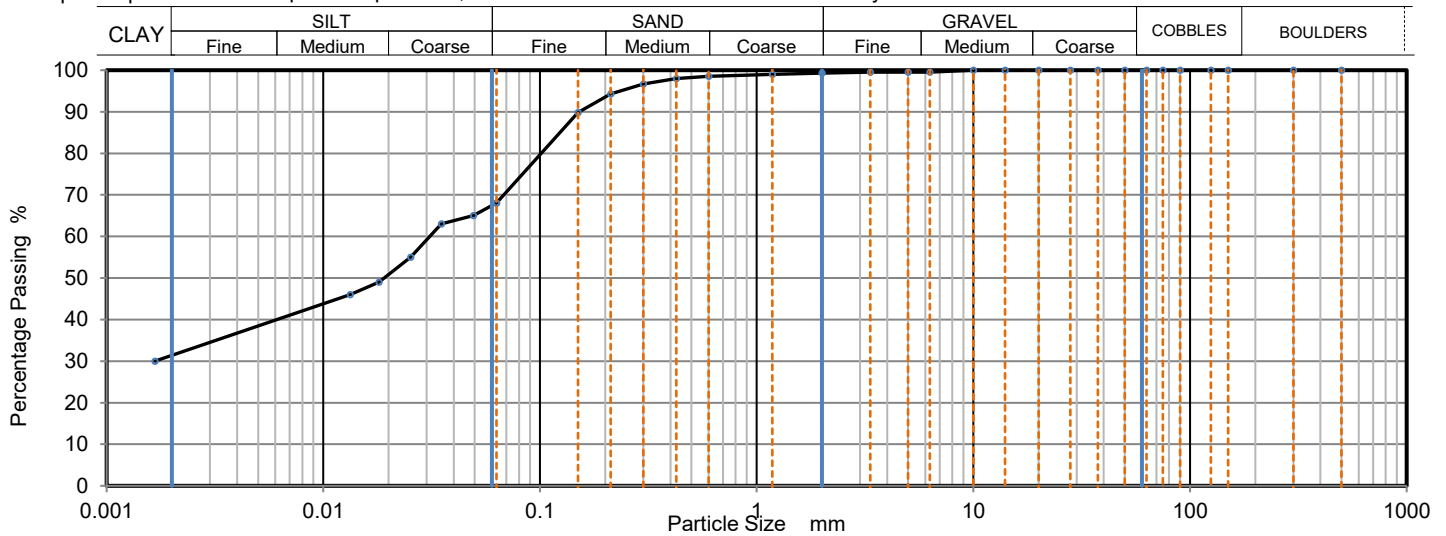
Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699726
Hole No.: BH01
Sample Reference: Not Given
Sample Description: Brown very clayey very sandy SILT
Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 3.00
Depth Base [m]: 3.50
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	68
300	100	0.0492	65
150	100	0.0350	63
125	100	0.0253	55
90	100	0.0181	49
75	100	0.0133	46
63	100	0.0017	30
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100	Particle density (assumed)	
2	99	2.65	Mg/m ³
1.18	99		
0.6	99		
0.425	98		
0.3	97		
0.212	94		
0.15	90		
0.063	68		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.70
Sand	31.10
Silt	36.80
Clay	31.40

Grading Analysis		
D100	mm	10
D60	mm	0.0314
D30	mm	
D10	mm	
Uniformity Coefficient		> 19
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Particle Size Distribution

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



Tested in Accordance with: BS 1377-2: 1990

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699732

Hole No.: BH01

Sample Reference: Not Given

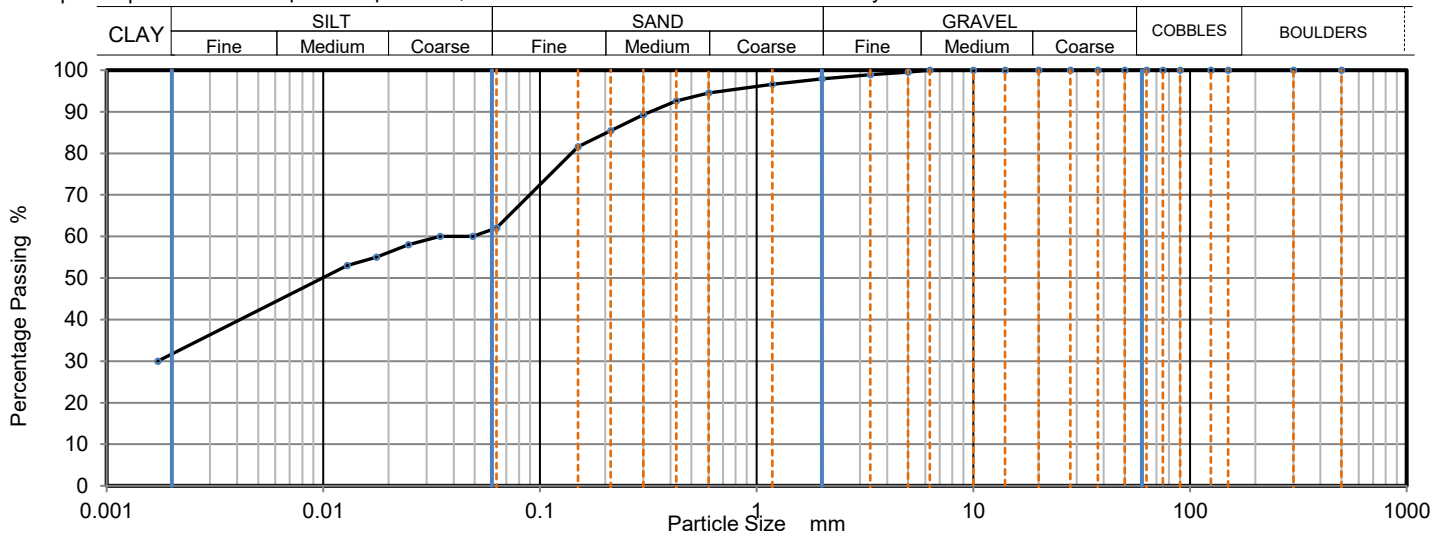
Sample Description: Brown slightly gravelly very sandy silty CLAY

Sample Preparation: Sample was quartered, oven dried at 107.7 °C and broken down by hand.

Depth Top [m]: 7.00

Depth Base [m]: 7.50

Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	62
300	100	0.0490	60
150	100	0.0346	60
125	100	0.0247	58
90	100	0.0176	55
75	100	0.0129	53
63	100	0.0017	30
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99	Particle density (assumed) 2.65 Mg/m ³	
2	98		
1.18	97		
0.6	95		
0.425	93		
0.3	89		
0.212	85		
0.15	82		
0.063	62		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	2.10
Sand	35.80
Silt	30.50
Clay	31.60

Grading Analysis		
D100	mm	6.3
D60	mm	0.0501
D30	mm	0.00174
D10	mm	
Uniformity Coefficient		> 29
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Particle Size Distribution

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



Tested in Accordance with: BS 1377-2: 1990

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

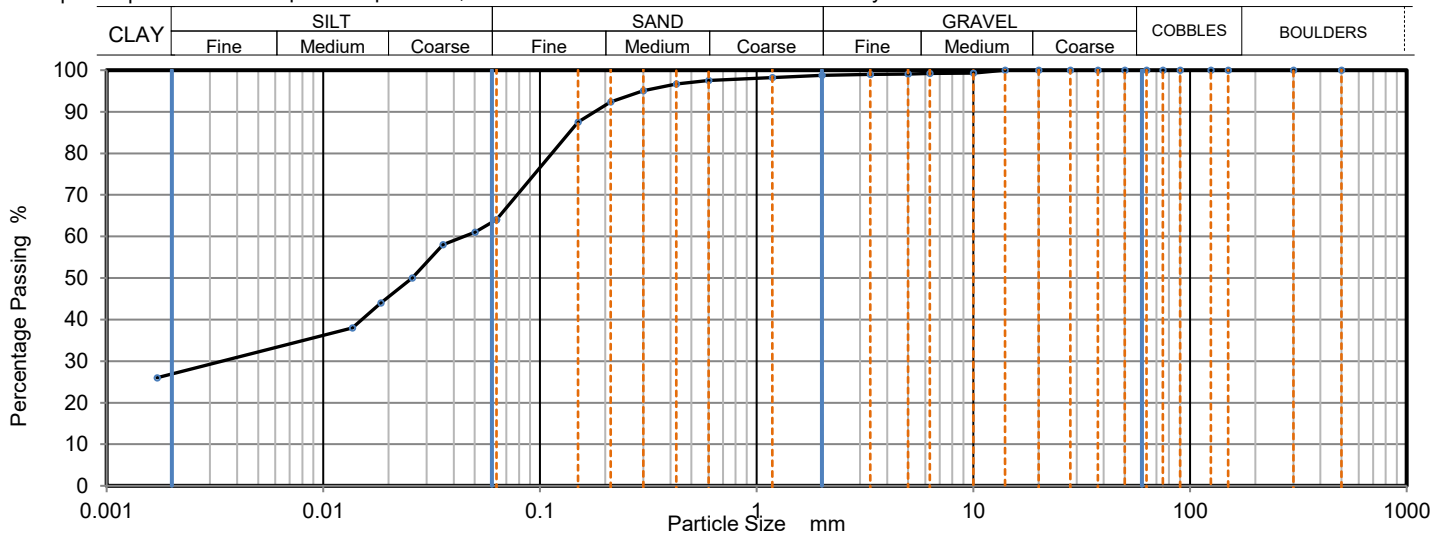
Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699756
Hole No.: BH02
Sample Reference: Not Given
Sample Description: Brown very clayey very sandy SILT
Sample Preparation: Sample was quartered, oven dried at 107.7 °C and broken down by hand.

Depth Top [m]: 4.00
Depth Base [m]: 4.45
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	64
300	100	0.0502	61
150	100	0.0357	58
125	100	0.0257	50
90	100	0.0184	44
75	100	0.0136	38
63	100	0.0017	26
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	99		
3.35	99	Particle density (assumed) 2.65 Mg/m ³	
2	99		
1.18	98		
0.6	98		
0.425	97		
0.3	95		
0.212	92		
0.15	88		
0.063	64		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	1.20
Sand	34.50
Silt	37.10
Clay	27.20

Grading Analysis		
D100	mm	14
D60	mm	0.0432
D30	mm	0.00332
D10	mm	
Uniformity Coefficient		> 25
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Particle Size Distribution

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



Tested in Accordance with: BS 1377-2: 1990

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699760

Depth Top [m]: 7.00

Hole No.: BH02

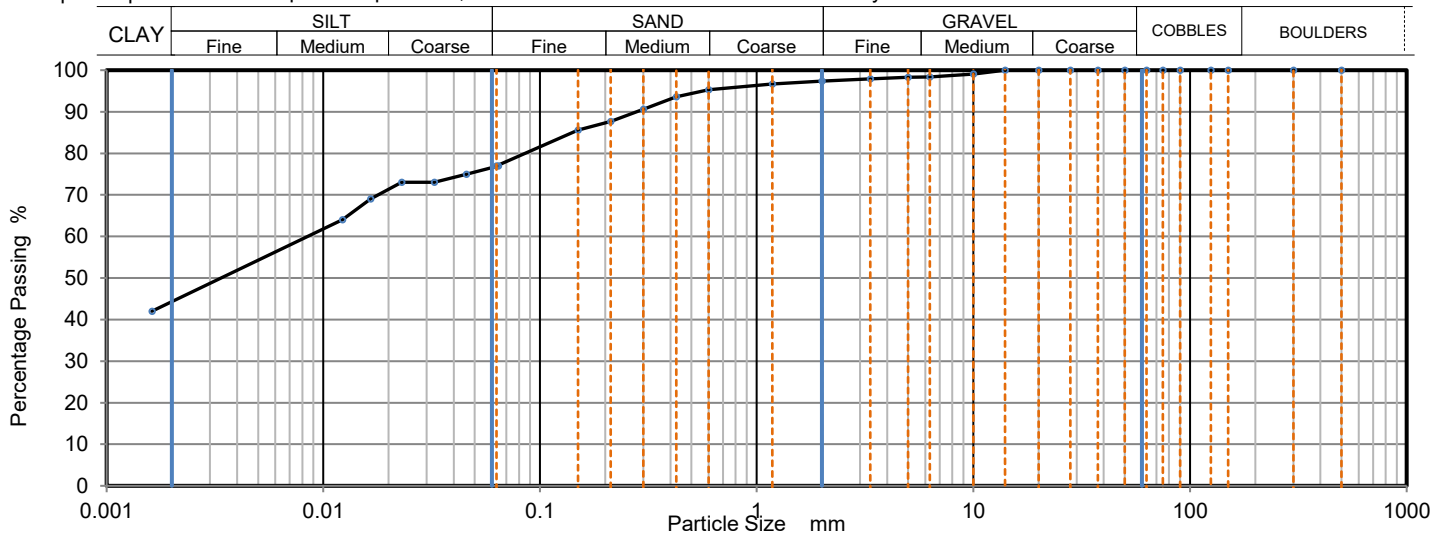
Depth Base [m]: 7.50

Sample Reference: Not Given

Sample Type: B

Sample Description: Brown slightly gravelly sandy very silty CLAY

Sample Preparation: Sample was quartered, oven dried at 106.3 °C and broken down by hand.



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0641	77
300	100	0.0457	75
150	100	0.0326	73
125	100	0.0230	73
90	100	0.0165	69
75	100	0.0122	64
63	100	0.0016	42
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	98	Particle density (assumed) 2.65 Mg/m ³	
2	97		
1.18	97		
0.6	95		
0.425	94		
0.3	91		
0.212	88		
0.15	86		
0.063	77		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	2.60
Sand	20.50
Silt	32.90
Clay	44.00

Grading Analysis		
D100	mm	14
D60	mm	0.00827
D30	mm	
D10	mm	
Uniformity Coefficient		> 5.1
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Particle Size Distribution

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



Tested in Accordance with: BS 1377-2: 1990

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

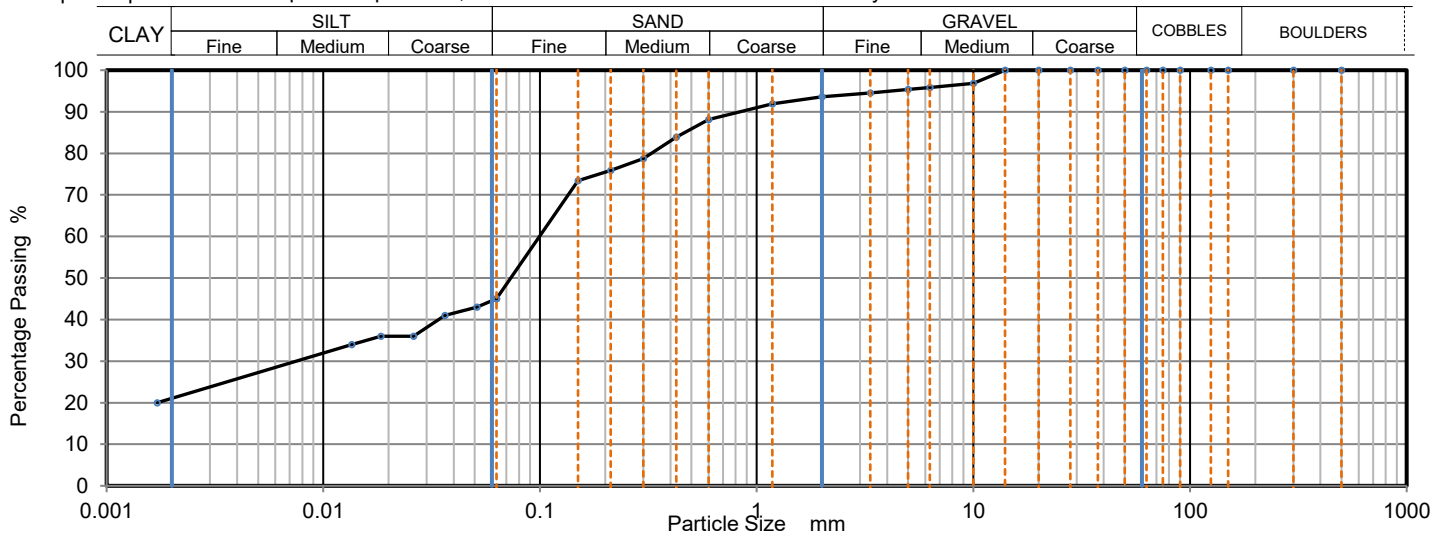
Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699768
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Brown slightly gravelly clayey silty SAND
Sample Preparation: Sample was quartered, oven dried at 107.7 °C and broken down by hand.

Depth Top [m]: 5.50
Depth Base [m]: 6.00
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	45
300	100	0.0512	43
150	100	0.0364	41
125	100	0.0261	36
90	100	0.0184	36
75	100	0.0135	34
63	100	0.0017	20
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	97		
6.3	96		
5	95		
3.35	95	Particle density (assumed) 2.65 Mg/m ³	
2	94		
1.18	92		
0.6	88		
0.425	84		
0.3	79		
0.212	76		
0.15	73		
0.063	45		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	6.40
Sand	48.20
Silt	23.90
Clay	21.50

Grading Analysis		
D100	mm	14
D60	mm	0.099
D30	mm	0.00732
D10	mm	
Uniformity Coefficient		> 58
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Particle Size Distribution

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



Tested in Accordance with: BS 1377-2: 1990

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

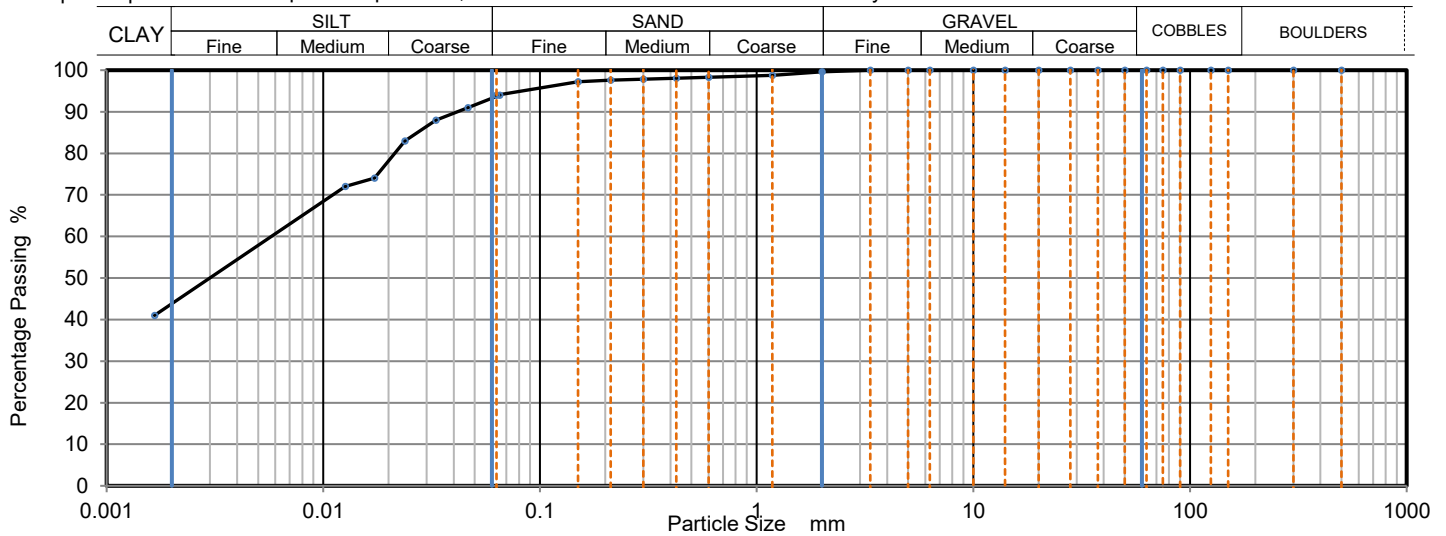
Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699771
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Brownish grey slightly sandy very clayey SILT
Sample Preparation: Sample was quartered, oven dried at 106.3 °C and broken down by hand.

Depth Top [m]: 7.50
Depth Base [m]: 8.00
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0652	94
300	100	0.0465	91
150	100	0.0331	88
125	100	0.0238	83
90	100	0.0172	74
75	100	0.0126	72
63	100	0.0017	41
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100	Particle density (assumed)	
2	100	2.65	Mg/m ³
1.18	99		
0.6	98		
0.425	98		
0.3	98		
0.212	98		
0.15	97		
0.063	94		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.40
Sand	5.70
Silt	49.80
Clay	44.10

Grading Analysis		
D100	mm	5
D60	mm	0.00577
D30	mm	
D10	mm	
Uniformity Coefficient		> 3.5
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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



Determination of California Bearing Ratio

Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client: BWB Consulting Limited
 Client Address: 5th Floor, Waterfront House,
 Nottingham, NG2 3DQ

Client Reference: BMG2109
 Job Number: 20-44142
 Date Sampled: 10/11/2020
 Date Received: 18/11/2020
 Date Tested: 08/12/2020
 Sampled By: Not Given

Contact: Imogen Wort
 Site Address: Trowbridge WRC

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

Test Results:

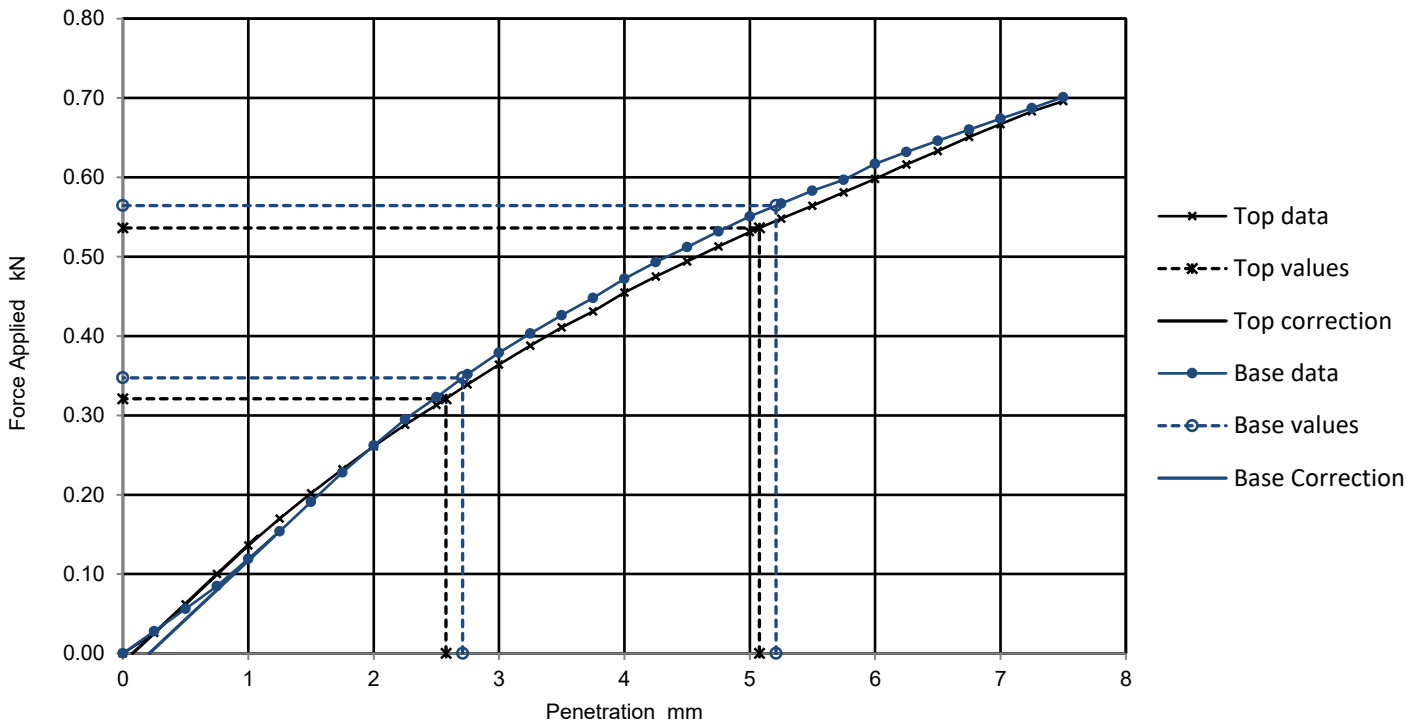
Laboratory Reference: 1699724
 Hole No.: BH01
 Sample Reference: Not Given
 Sample Description: Brownish grey gravelly CLAY

Depth Top [m]: 0.20
 Depth Base [m]: 0.50
 Sample Type: D

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
Material retained on 20mm sieve removed	15 %	Dry density after soaking	Mg/m ³
Initial Specimen details	Bulk density 2.06 Mg/m ³	Surcharge applied	8 kg
	Dry density 1.75 Mg/m ³		4.8 kPa
	Moisture content 18 %		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	Yes	2.4	2.7	2.7	2.8	19
BASE	Yes	2.6	2.8	2.8		18

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Janoszek
 PL Deputy Head of Geotechnical Section
 for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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



Determination of California Bearing Ratio

Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 08/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

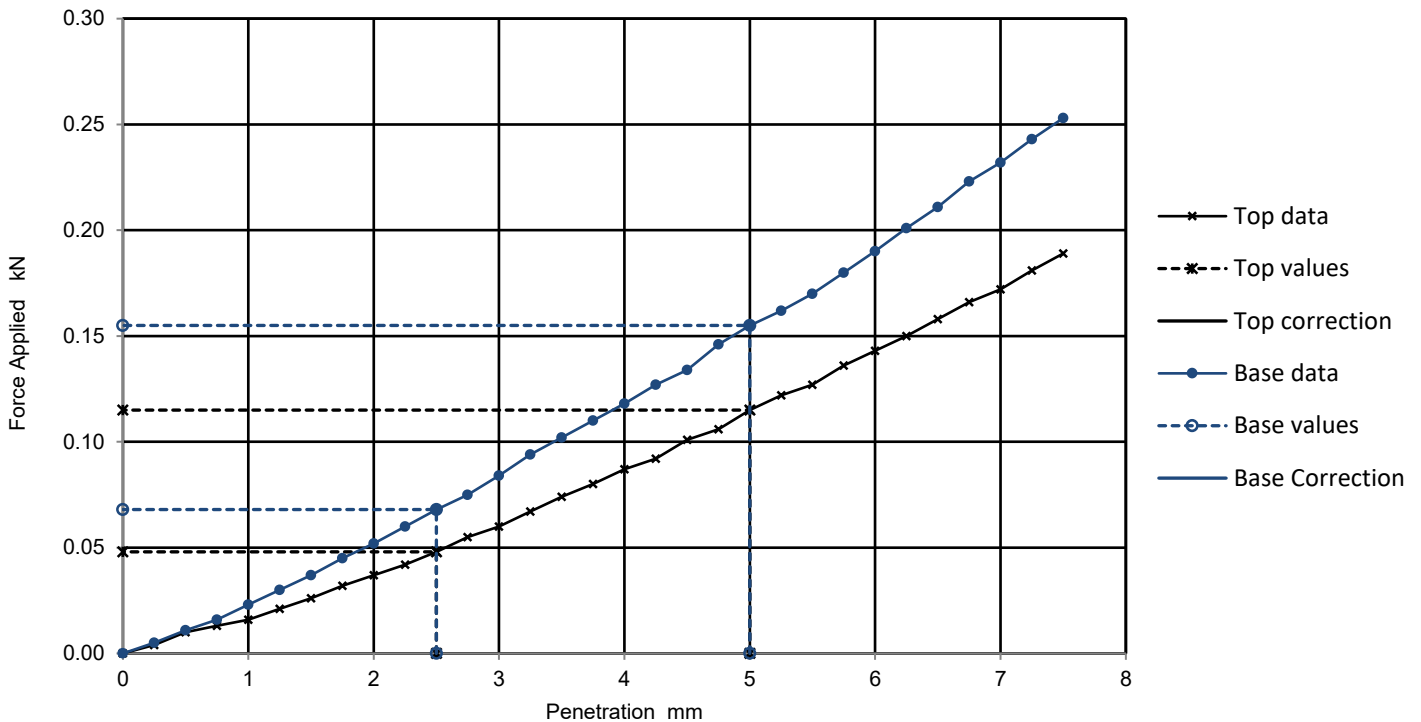
Laboratory Reference: 1699753
Hole No.: BH02
Sample Reference: Not Given
Sample Description: Dark brown slightly gravelly sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: 3.00
Sample Type: B

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
Material retained on 20mm sieve removed	12 %	Dry density after soaking	Mg/m ³
Initial Specimen details	Bulk density 1.87 Mg/m ³	Surcharge applied	8 kg
	Dry density 1.45 Mg/m ³		4.9 kPa
	Moisture content 29 %		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	0.4	0.6	0.6	28	
BASE	No	0.5	0.8	0.8		

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

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



Summary of Point Load Strength Index Tests Results

Tested in Accordance with: ISRM: 2007, pages 125-132

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11 - 11/11/2020
Date Received: 18/11/2020
Date Tested: 07/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa
1699738	BH01	Not Given	16.50	16.95	D	Dark grey CLAY	WC = 13.5%	1	D	U	YES	37.4	40.2	40.0	29.0	0.3	34.1	0.26	0.22
1699739	BH01	Not Given	16.57	17.20	C	Dark grey silty sandy CLAY	WC = 11.5%	1	D	U	YES	51.5	88.5	88.0	70.0	0.8	78.7	0.13	0.16
1699740	BH01	Not Given	17.20	17.61	C	Dark grey LIMESTONE	WC = 2.5%	1	D	U	YES	59.3	87.0	86.0	81.0	3.4	83.9	0.48	0.60
1699741	BH01	Not Given	18.45	18.61	C	Dark grey silty CLAY	WC = 11.9%	1	D	U	YES	84.3	87.4	87.0	72.0	0.5	79.3	0.07	0.09
1699742	BH01	Not Given	18.88	19.20	C	Dark grey LIMESTONE	WC = 0.7%	1	D	U	YES	67.4	87.0	87.0	76.0	28.1	81.3	4.25	5.29
1699744	BH01	Not Given	19.58	19.72	C	Dark grey LIMESTONE	WC = 5.3%	1	D	U	YES	62.5	87.6	88.0	82.0	3.8	84.8	0.53	0.67
1699746	BH01	Not Given	20.27	20.39	C	Dark grey LIMESTONE	WC = 5.3%	1	D	U	YES	60.4	87.4	87.0	80.0	9.2	83.6	1.31	1.65
1699749	BH01	Not Given	22.70	22.82	C	Dark grey LIMESTONE	WC = 6.1%	1	A	U	YES	-	86.7	54.0	39.0	2.7	65.6	0.62	0.70
1699751	BH01	Not Given	24.40	24.45	C	Dark grey LIMESTONE	WC = 10.8%	1	A	U	YES	-	86.4	51.0	46.0	2.4	71.1	0.46	0.54
1699777	BH02	Not Given	18.00	18.26	C	Dark grey LIMESTONE	WC = 0.8%	1	D	U	YES	75.3	88.4	88.0	81.0	25.1	84.6	3.51	4.44

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Comments:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

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



Environmental Science

Summary of Point Load Strength Index Tests Results

Tested in Accordance with: ISRM: 2007, pages 125-132

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 07/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa
1699778	BH02	Not Given	19.20	19.45	C	Dark grey LIMESTONE	WC = 6.0%	1	D	U	YES	115.3	88.3	88.0	78.0	2.7	83.0	0.39	0.49
1699779	BH02	Not Given	24.00	24.33	C	Dark grey LIMESTONE	WC = 11.2%	1	A	U	YES	-	85.3	63.0	57.0	0.6	78.7	0.10	0.12
1699780	BH02	Not Given	24.57	24.70	C	Dark grey LIMESTONE	WC = 7.2%	1	D	U	YES	70.0	86.5	86.0	80.0	1.3	83.2	0.18	0.23
1699781	BH02	Not Given	24.84	24.93	C	Dark grey LIMESTONE	WC = 5.5%	1	D	U	YES	50.3	84.6	83.0	81.0	0.3	82.8	0.04	0.05

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Comments:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

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



Environmental Science

Summary of Uniaxial Compression Test on Rock Test Results

Tested in Accordance with: ISRM, 2007, p153, part 1

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Contact: Imogen Wort
Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 11/11/2020
Date Received: 18/11/2020
Date Tested: 07/12/2020
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Specimen Dimensions (2)				Bulk density (2) Mg/m3	Water Content (1) %	Uniaxial Compression (3)			
		Reference	Depth Top m	Depth Base m	Type			Diameter mm	Length mm	H/D	Orientation of sample			Condition	Stress Rate Mpa/s	Mode of failure	UCS Mpa
1699747	BH01	Not Given	21.50	22.22	C	Grey LIMESTONE	Sample is below recommended length to diameter ratio.*	86.3	143.3	1.7	Vertical	2.27	11.6	oven dried	0.0513	MS + AC	14.9
1699776	BH02	Not Given	16.81	17.14	C	Dark grey LIMESTONE	Sample is below recommended length to diameter ratio.*	86.5	204.6	2.4	Vertical	2.31	11.0	as received	0.0340	MS + AC	13.8

Note: 1 - ISRM p87 test 1, water content at 105 ± 3 oC, specimen as tested for UCS, 2 - ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density, 3 - ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials, above notes apply unless annotated otherwise in the remarks. Compaction machine: VJ Tech AUTOCON - VJT 51-3011; Mode of failure legend: S - Single shear, MS - multiple shear, AC - Axial cleavage, F - Fragmented

Comments: *Duration of test, fell below time specified in ISRM method, 2007, p153, part1

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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



Unconsolidated Undrained Triaxial Compression

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 1699728
Hole No.: BH01
Sample Reference: Not Given
Sample Description: Brown mottled grey slightly silty CLAY

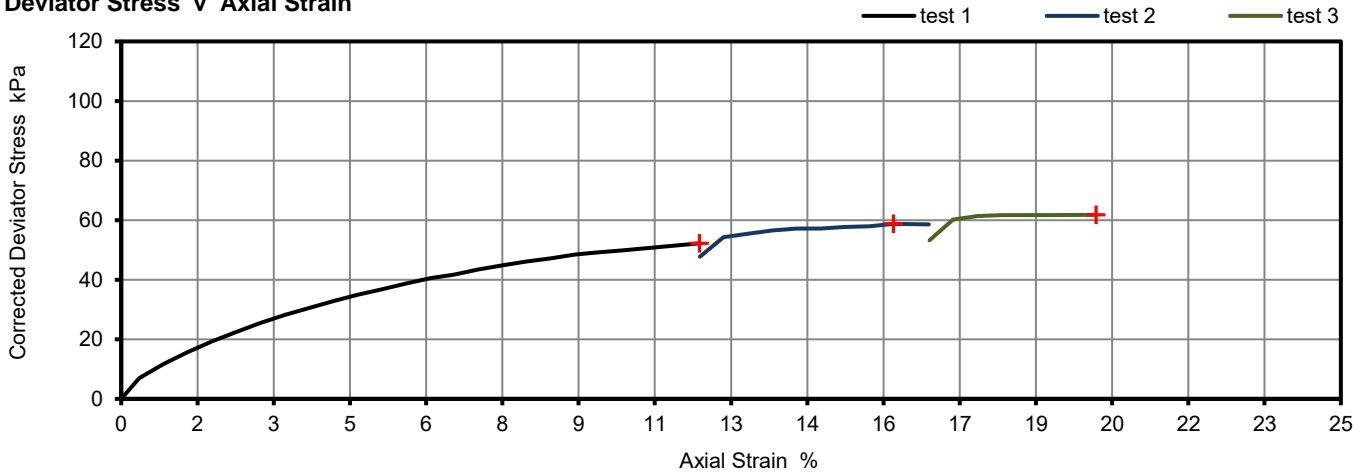
Depth Top [m]: 4.00
Depth Base [m]: 4.45
Sample Type: U

Length	201.64	mm
Diameter	101.42	mm
Bulk Density	2.13	Mg/m ³
Moisture Content	25	%
Dry Density	1.71	Mg/m ³
Membrane thickness	0.24	mm

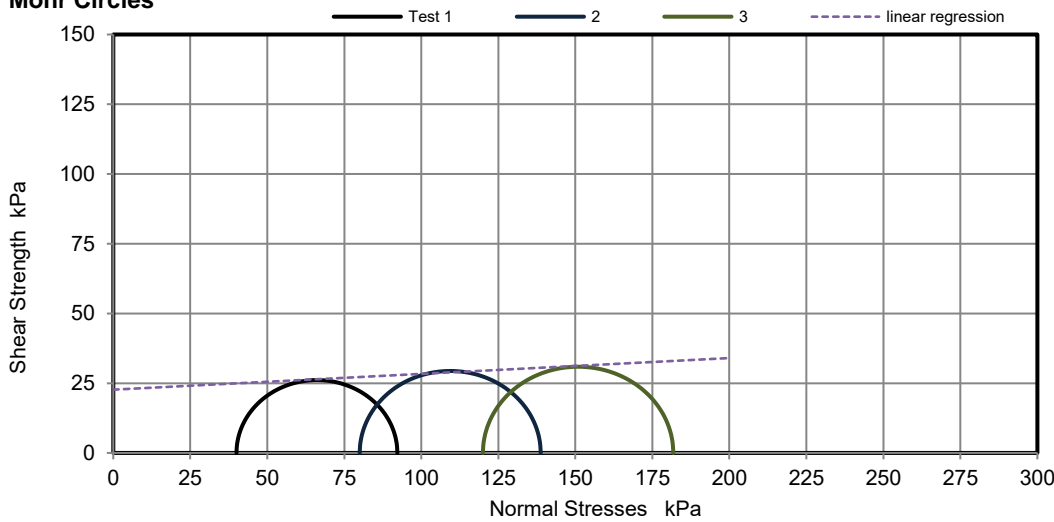
Rate of Strain
Stage Number
Cell Pressure
Axial Strain at failure
Deviator Stress, ($\sigma_1 - \sigma_3$)f
Shear strength, cu
Mode of failure
Membrane Correction

1.98			%/min
1	2	3	
40	80	120	kPa
11.9	15.8	20.0	%
52	59	62	kPa
26	29	31	kPa
Compound			
0.60	0.75	0.91	kPa

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression
 ϕ_u 3.2 °
cu 23 kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 40kPa=18N, 80kPa=35N, 120kPa=54N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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



Unconsolidated Undrained Triaxial Compression

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699730
Hole No.: BH01
Sample Reference: Not Given
Sample Description: Brownish grey CLAY

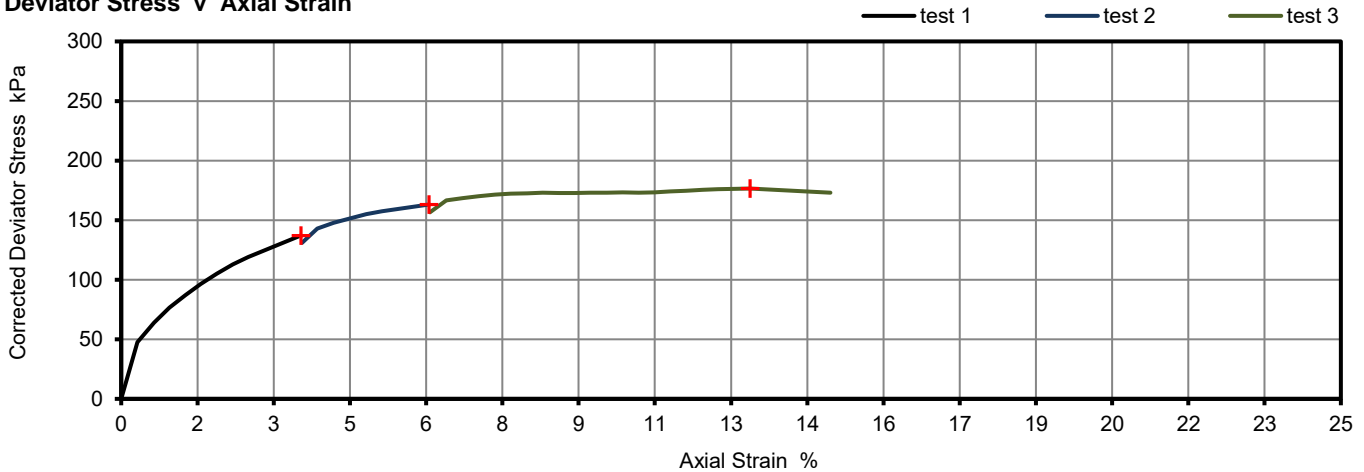
Depth Top [m]: 6.00
Depth Base [m]: 6.45
Sample Type: U

Length	201.62	mm
Diameter	101.36	mm
Bulk Density	2.09	Mg/m ³
Moisture Content	24	%
Dry Density	1.68	Mg/m ³
Membrane thickness	0.24	mm

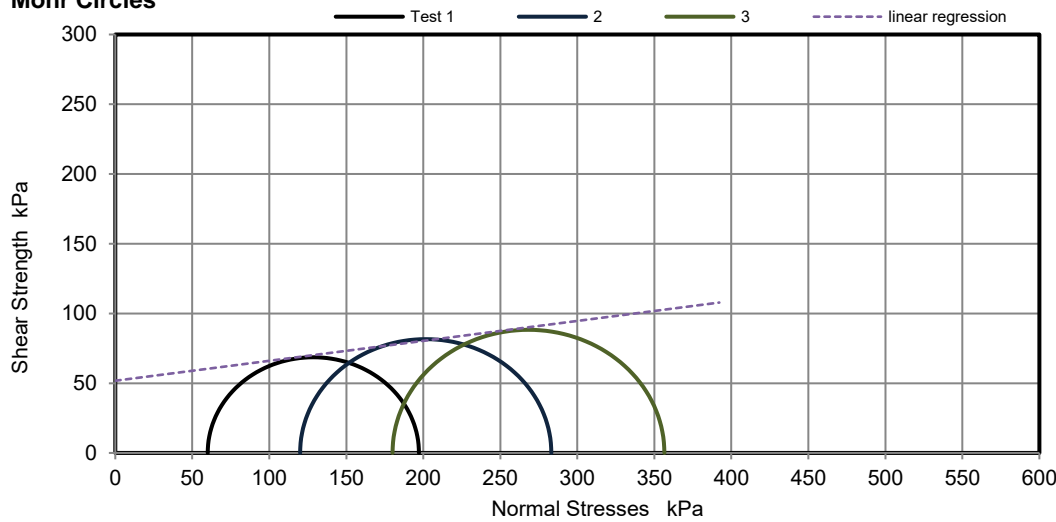
Rate of Strain
Stage Number
Cell Pressure
Axial Strain at failure
Deviator Stress, ($\sigma_1 - \sigma_3$) f
Shear strength, cu
Mode of failure
Membrane Correction

1.98			%/min
1	2	3	
60	120	180	kPa
3.7	6.3	12.9	%
137	163	177	kPa
69	82	88	kPa
Compound			
0.24	0.39	0.64	kPa

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression
 ϕ_u 8.1 °
cu 52 kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 60kPa=30N, 120kPa=62N, 180kPa=94N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Unconsolidated Undrained Triaxial Compression

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699734
Hole No.: BH01
Sample Reference: Not Given
Sample Description: Grey CLAY

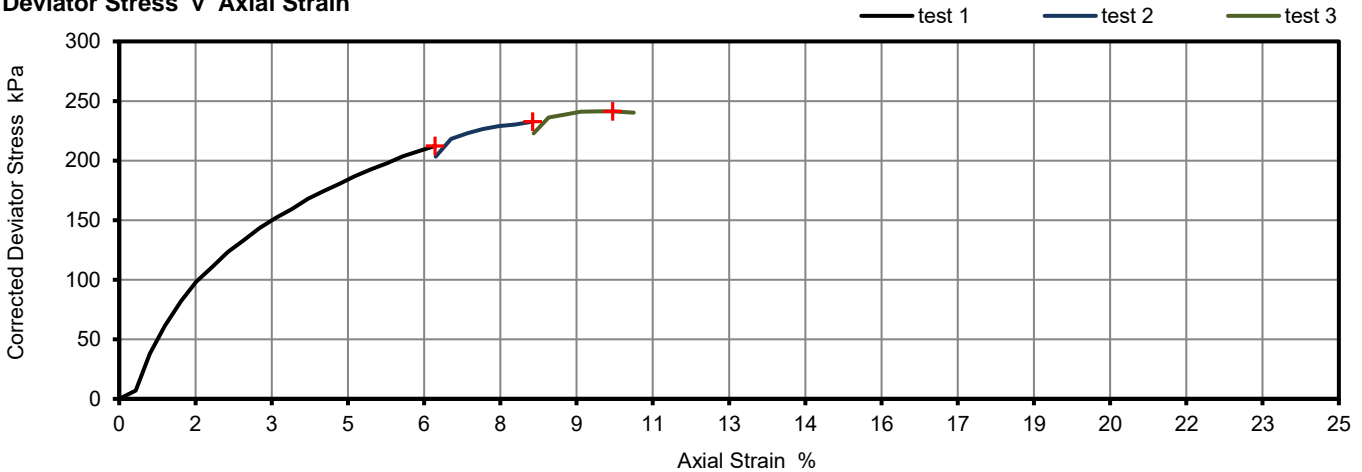
Depth Top [m]: 9.00
Depth Base [m]: 9.45
Sample Type: U

Length	201.78	mm
Diameter	103.43	mm
Bulk Density	2.16	Mg/m ³
Moisture Content	23	%
Dry Density	1.76	Mg/m ³
Membrane thickness	0.22	mm

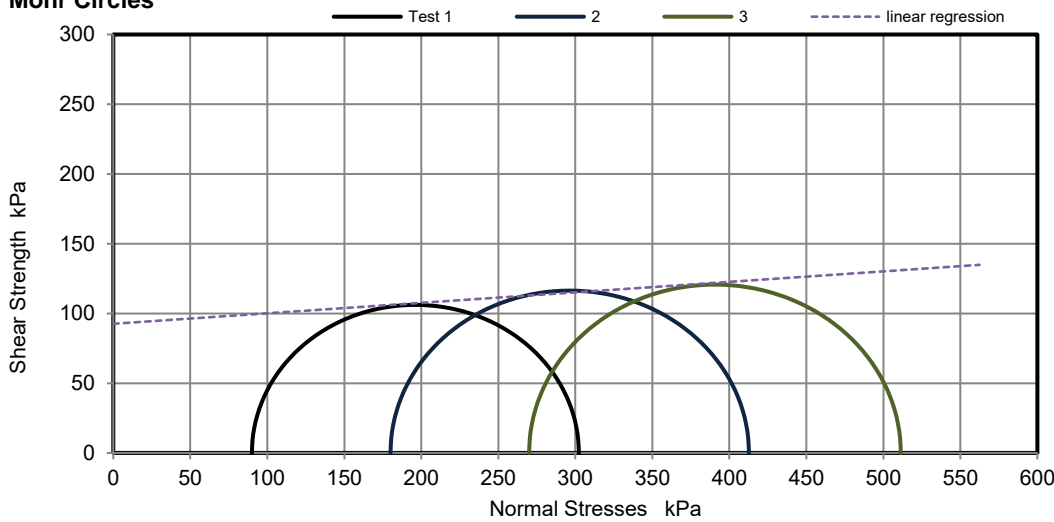
Rate of Strain
Stage Number
Cell Pressure
Axial Strain at failure
Deviator Stress, ($\sigma_1 - \sigma_3$)
Shear strength, c_u
Mode of failure
Membrane Correction

1.98			%/min
1	2	3	
90	180	270	kPa
6.5	8.5	10.1	%
212	233	241	kPa
106	116	121	kPa
Compound			
0.35	0.42	0.48	kPa

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression
 ϕ_u 4.3 °
 c_u 93 kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 90kPa=44N, 180kPa=96N, 270kPa=140N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Unconsolidated Undrained Triaxial Compression

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699761
Hole No.: BH02
Sample Reference: Not Given
Sample Description: Grey mottled brown CLAY

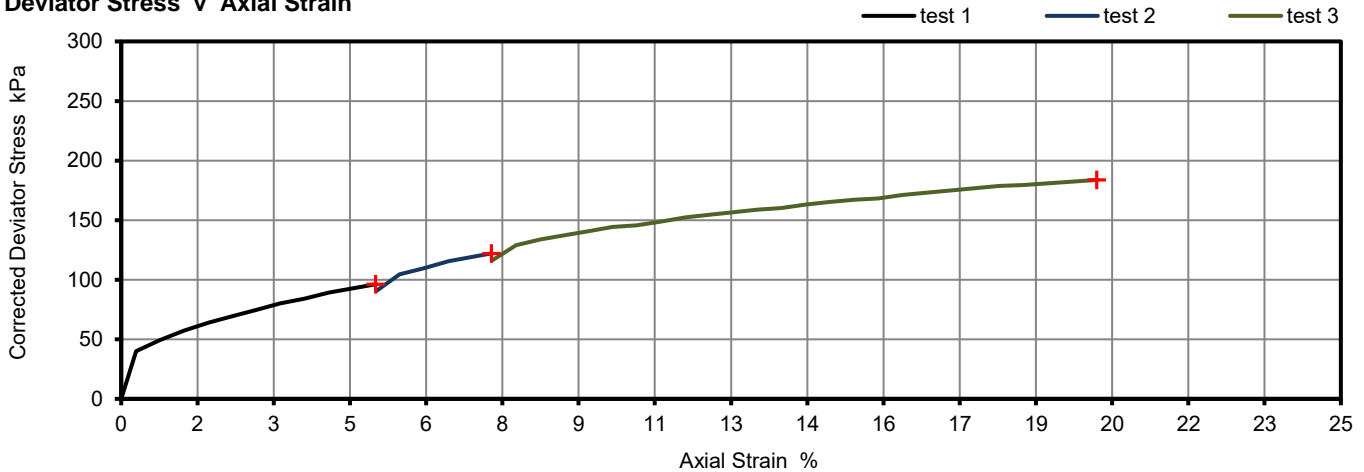
Depth Top [m]: 7.50
Depth Base [m]: 7.95
Sample Type: U

Length	200.09	mm
Diameter	103.71	mm
Bulk Density	2.13	Mg/m ³
Moisture Content	15	%
Dry Density	1.85	Mg/m ³
Membrane thickness	0.25	mm

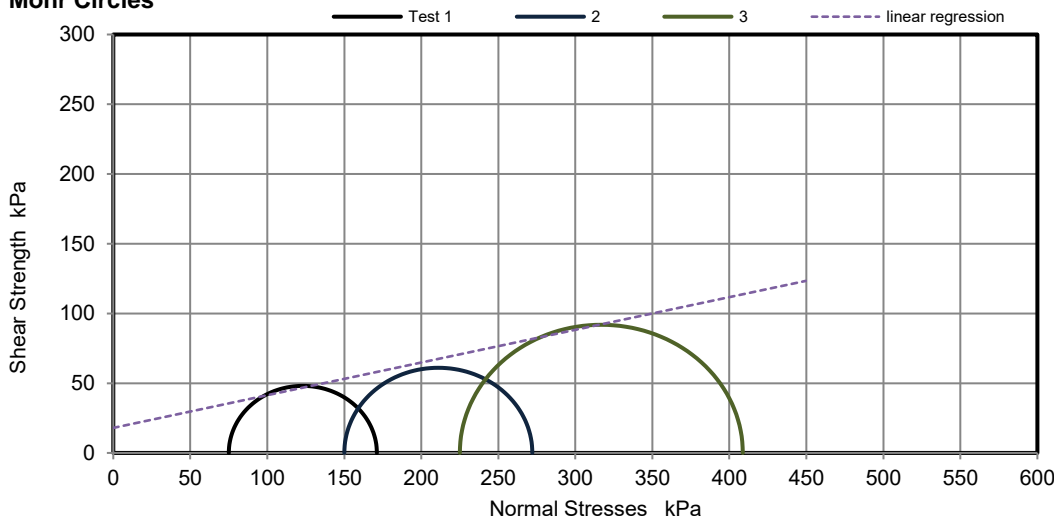
Rate of Strain
Stage Number
Cell Pressure
Axial Strain at failure
Deviator Stress, ($\sigma_1 - \sigma_3$) f
Shear strength, cu
Mode of failure
Membrane Correction

2.00			%/min
1	2	3	
75	150	225	kPa
5.2	7.6	20.0	%
96	122	184	kPa
48	61	92	kPa
Compound			
0.35	0.44	0.93	kPa

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression
 ϕ_u 13.2 °
cu 18 kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 75kPa=37N, 150kPa=74N, 225kPa=113N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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



Unconsolidated Undrained Triaxial Compression

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699764
Hole No.: BH02
Sample Reference: Not Given
Sample Description: Grey CLAY

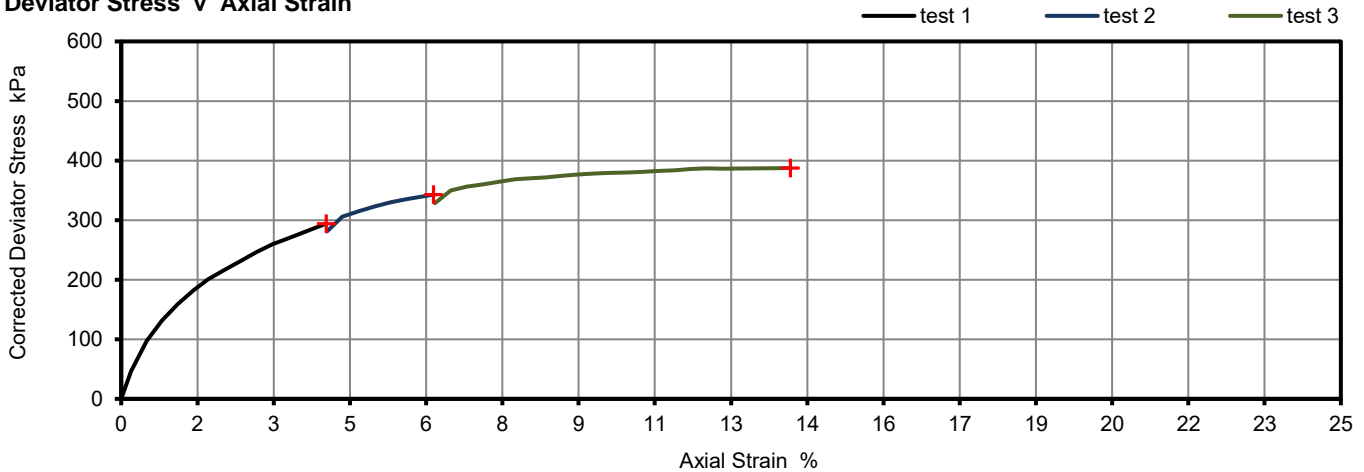
Depth Top [m]: 10.50
Depth Base [m]: 10.95
Sample Type: U

Length	201.83	mm
Diameter	103.75	mm
Bulk Density	2.14	Mg/m ³
Moisture Content	20	%
Dry Density	1.78	Mg/m ³
Membrane thickness	0.27	mm

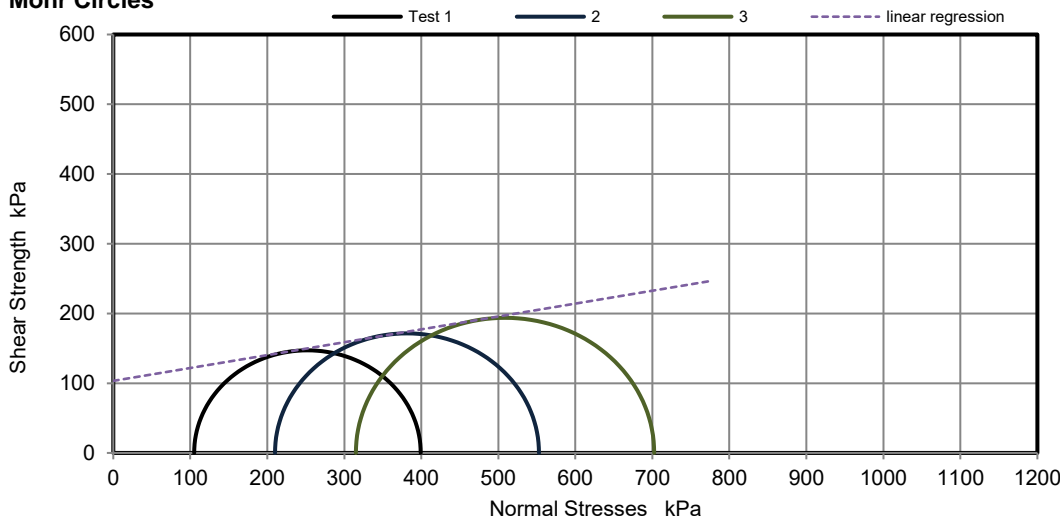
Rate of Strain
Stage Number
Cell Pressure
Axial Strain at failure
Deviator Stress, ($\sigma_1 - \sigma_3$)
Shear strength, cu
Mode of failure
Membrane Correction

1.98			%/min
1	2	3	
105	210	315	kPa
4.2	6.4	13.7	%
294	343	387	kPa
147	171	194	kPa
Compound			
0.30	0.43	0.74	kPa

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression
 ϕ_u 10.5 °
cu 103 kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 75kPa=37N, 150kPa=74N, 225kPa=113N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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



Unconsolidated Undrained Triaxial Compression

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699774
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Grey CLAY

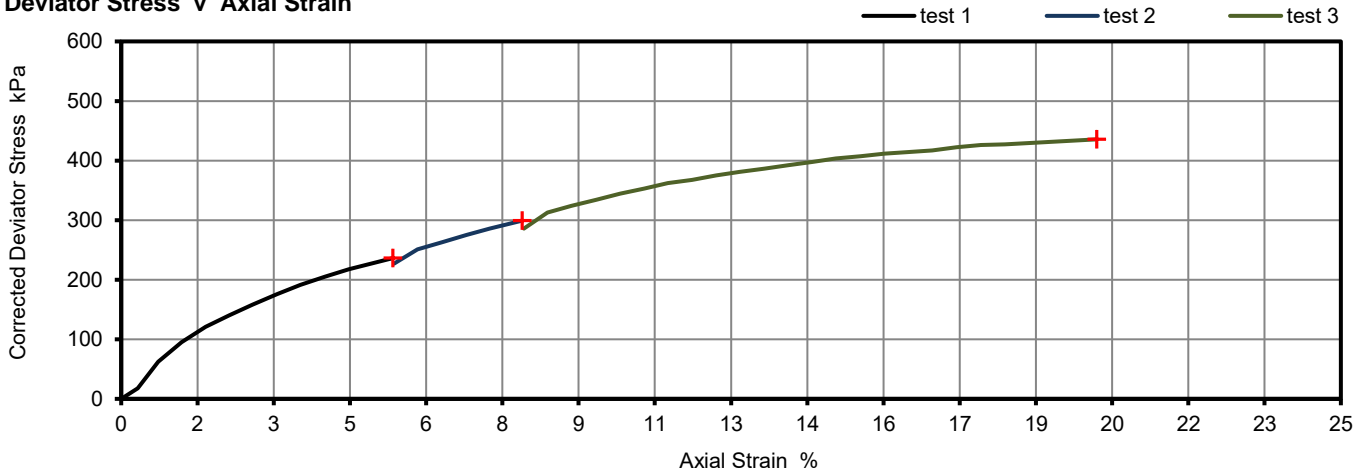
Depth Top [m]: 10.50
Depth Base [m]: 10.95
Sample Type: U

Length	200.76	mm
Diameter	102.79	mm
Bulk Density	2.16	Mg/m ³
Moisture Content	20	%
Dry Density	1.81	Mg/m ³
Membrane thickness	0.28	mm

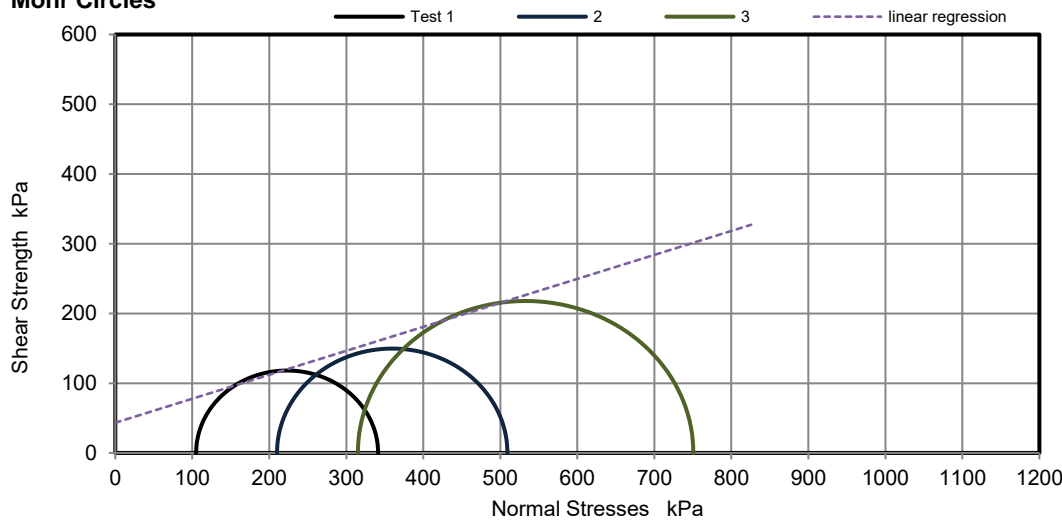
Rate of Strain
Stage Number
Cell Pressure
Axial Strain at failure
Deviator Stress, $(\sigma_1 - \sigma_3)$
Shear strength, c_u
Mode of failure
Membrane Correction

1.99			%/min
1	2	3	
105	210	315	kPa
5.6	8.2	20.0	%
236	299	436	kPa
118	150	218	kPa
Compound			
0.41	0.53	1.05	kPa

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression
 ϕ_u 19.0 °
 c_u 43 kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 105kPa=53N, 210kPa=105N, 315kPa=159N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

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



One Dimensional Consolidation Test

Tested in Accordance with: BS 1377-5: 1990: Clause 3

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 07/12/2020
Sampled By: Not Given

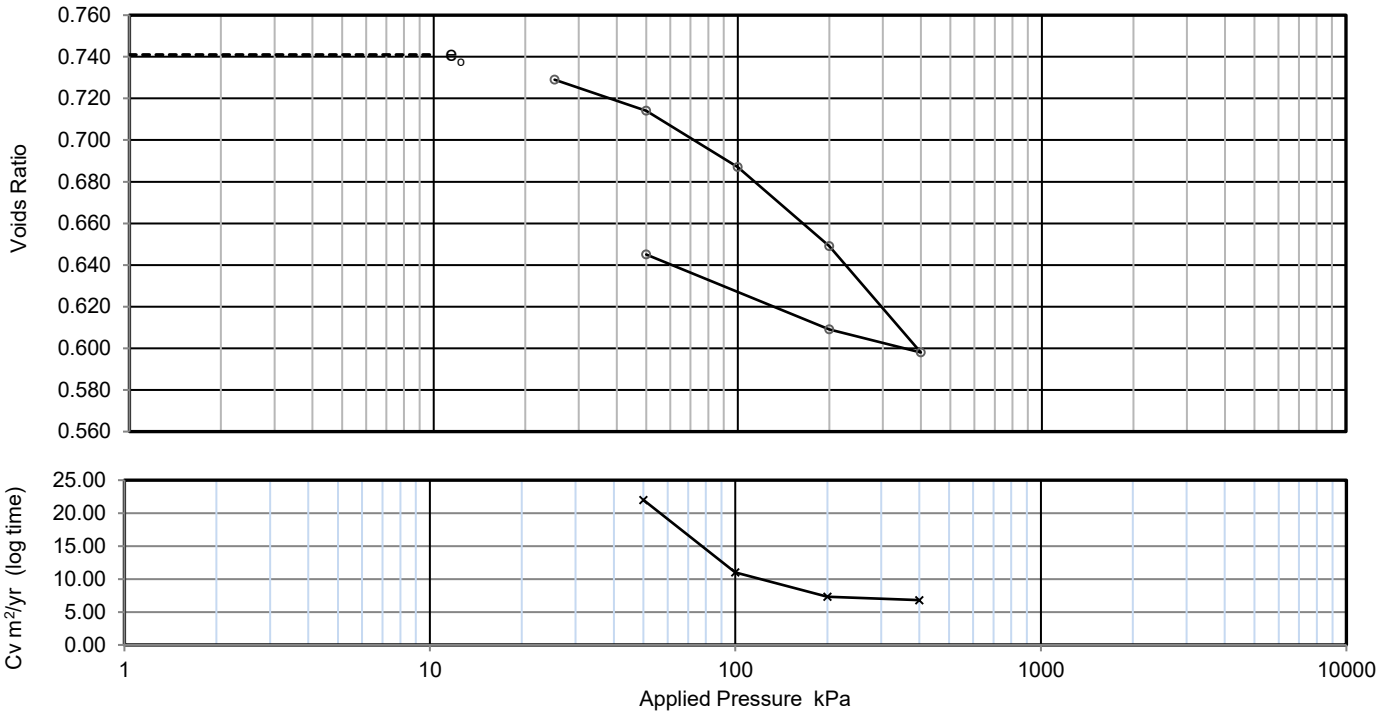
Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test Results:

Laboratory Reference: 1699757
Hole No.: BH02
Sample Reference: Not Given
Sample Description: Mottled brown CLAY

Depth Top [m]: 5.00
Depth Base [m]: 5.45
Sample Type: U



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0	0.741	-	-	-	-
25	0.729	0.28	N/A	N/A	N/A
50	0.714	0.34	22	51	0.00043
100	0.687	0.32	11	21	0.0013
200	0.649	0.23	7.3	18	0.0013
400	0.598	0.15	6.8	20	0.0019
200	0.609	0.034			
50	0.645	0.15			

Preparation

Index tests

Orientation of the sample

Particle density

Liquid limit

Plastic limit

Vertical		
assumed	2.65	Mg/m3
N/A		%
N/A		%

Specimen details

Diameter

Height

Moisture Content

Bulk density

Dry density

Voids Ratio

Saturation

Avg. temperature for test

Swelling Pressure

Settlement on saturation

Initial	Final	
50.07	-	mm
20.02	18.92	mm
27	26	%
1.93	2.03	Mg/m3
1.52	1.61	Mg/m3
0.741	0.645	
95	107	%
22.0		°C
Not measured		kPa
		%

Note: Cv corrected to 20°C

Remarks: Stage 1 - swelling

Signed:

Monika Janoszek

PL Deputy Head of Geotechnical Section

for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

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



Environmental Science

Summary of Point Load Strength Index Tests Results

Tested in Accordance with: ISRM: 2007, pages 125-132

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Client Reference: BMG2109
Job Number: 20-46686
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 21/12/2020
Sampled By: Client

Contact: Imogen Wort
Site Address: Trowbridge WRC

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa
1713318	BH02	Not Given	18.29	18.53	C	Grey LIMESTONE	WC = 1.5%	1	D	U	YES	57.4	89.0	88.0	82.0	22.2	85.4	3.04	3.87

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Comments: Re-issue 1: Hole number amendment as per client request

Signed:

Szczepan Bielatowicz
PL Deputy of Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

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



Environmental Science

Summary of Uniaxial Compression Test on Rock Test Results

Tested in Accordance with: ISRM, 2007, p153, part 1

Client: BWB Consulting Limited
Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Contact: Imogen Wort
Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-46686
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 21/12/2020
Sampled By: Client

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Specimen Dimensions (2)				Bulk density (2) Mg/m3	Water Content (1) %	Uniaxial Compression (3)			
		Reference	Depth Top m	Depth Base m	Type			Diameter mm	Length mm	H/D	Orientation of sample			Condition	Stress Rate Mpa/s	Mode of failure	UCS Mpa
1713319	BH02	Not Given	18.72	18.96	C	Grey LIMESTONE	Sample is below recommended length:diameter ratio.*	88.8	126.2	1.4	Vertical	2.18	7.6	as received	0.0323	MS + AC	4.23

Note: 1 - ISRM p87 test 1, water content at 105 ± 3 oC, specimen as tested for UCS, 2 - ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density, 3 - ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials, above notes apply unless annotated otherwise in the remarks. Compaction machine: VJ Tech AUTOCON - VJT 51-3011; Mode of failure legend: S - Single shear, MS - multiple shear, AC - Axial cleavage, F - Fragmented

Comments: *Testing completed above time specified in ISRM method, 2007, p153, part1. Re-issue 1: Hole number amendment as per client request

Signed:

Szczepan Bielatowicz
PL Deputy of Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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



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Analytical Report Number : 20-44149

Project / Site name:	Trowbridge WRC	Samples received on:	18/11/2020
Your job number:	BMG2109	Samples instructed on/ Analysis started on:	26/11/2020
Your order number:	POR032992	Analysis completed by:	09/12/2020
Report Issue Number:	1	Report issued on:	09/12/2020
Samples Analysed:	10 soil samples		

Signed:

Rachel Bradley
Deputy Quality Manager
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: 20-44149
 Project / Site name: Trowbridge WRC
 Your Order No: POR032992

Lab Sample Number				1699830	1699831	1699832	1699833
Sample Reference				BH01	BH01	BH01	BH01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.70-1.70	3.50-3.50	7.50-7.95	15.00-15.45
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020
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	18	17	15	14
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5	0.5

General Inorganics

Parameter	Units	Limit of detection	Accreditation Status				
pH - Automated	pH Units	N/A	MCERTS	-	-	8.4	9.1
Total Sulphate as SO ₄	%	0.005	MCERTS	-	-	0.199	0.151
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	0.83	0.52
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	834	521
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	54	160
Total Sulphur	%	0.005	MCERTS	-	-	1.77	2.11
Organic Matter	%	0.1	MCERTS	12	0.2	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	< 2.0	< 2.0

Heavy Metals / Metalloids

Parameter	Units	Limit of detection	Accreditation Status				
Magnesium (water soluble)	mg/kg	5	NONE	-	-	65	45
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	32	22

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

Analytical Report Number: 20-44149
 Project / Site name: Trowbridge WRC
 Your Order No: POR032992

Lab Sample Number	1699834	1699835	1699836	1699837			
Sample Reference	BH02	BH02	BH02	BH03			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	3.50-3.50	4.50-4.50	8.50-8.50	5.50-5.50			
Date Sampled	Deviating	Deviating	Deviating	Deviating			
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	20	16	12	21
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5	0.5

General Inorganics

	pH Units	N/A	MCERTS				
pH - Automated				-	8.2	-	8.3
Total Sulphate as SO ₄	%	0.005	MCERTS	-	0.096	-	0.053
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.35	-	0.11
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	352	-	112
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	13	-	13
Total Sulphur	%	0.005	MCERTS	-	0.045	-	0.038
Organic Matter	%	0.1	MCERTS	6.4	-	1.4	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	< 2.0	-	< 2.0

Heavy Metals / Metalloids

	mg/kg	5	NONE				
Magnesium (water soluble)	mg/kg	5	NONE	-	37	-	12
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	19	-	5.8

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

Analytical Report Number: 20-44149
 Project / Site name: Trowbridge WRC
 Your Order No: POR032992

Lab Sample Number				1699838	1699839
Sample Reference				BH03	BH03
Sample Number				None Supplied	None Supplied
Depth (m)				6.50-6.50	9.00-9.45
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	13
Total mass of sample received	kg	0.001	NONE	0.3	0.3

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-
Total Sulphate as SO4	%	0.005	MCERTS	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-
Total Sulphur	%	0.005	MCERTS	-	-
Organic Matter	%	0.1	MCERTS	3.4	1.9
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	-	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-

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

Analytical Report Number : 20-44149
Project / Site name: Trowbridge WRC

* 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 *
1699830	BH01	None Supplied	1.70-1.70	Brown loam and clay with gravel and vegetation.
1699831	BH01	None Supplied	3.50-3.50	Brown clay and sand.
1699832	BH01	None Supplied	7.50-7.95	Brown clay.
1699833	BH01	None Supplied	15.00-15.45	Brown clay.
1699834	BH02	None Supplied	3.50-3.50	Brown clay and sand with gravel.
1699835	BH02	None Supplied	4.50-4.50	Brown clay and sand.
1699836	BH02	None Supplied	8.50-8.50	Brown clay and sand.
1699837	BH03	None Supplied	5.50-5.50	Brown clay and sand.
1699838	BH03	None Supplied	6.50-6.50	Brown clay and sand.
1699839	BH03	None Supplied	9.00-9.45	Brown clay and sand.

Analytical Report Number : 20-44149
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

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

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

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

Sample Deviation Report



Analytical Report Number : 20-44149

Project / Site name: Trowbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH02	None Supplied	S	1699834	a	None Supplied	None Supplied	None Supplied
BH02	None Supplied	S	1699835	a	None Supplied	None Supplied	None Supplied
BH02	None Supplied	S	1699836	a	None Supplied	None Supplied	None Supplied
BH03	None Supplied	S	1699837	a	None Supplied	None Supplied	None Supplied
BH03	None Supplied	S	1699838	a	None Supplied	None Supplied	None Supplied
BH03	None Supplied	S	1699839	a	None Supplied	None Supplied	None Supplied

Appendix 9: Water Chemical Testing Results



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Analytical Report Number : 20-43438

Project / Site name:	Trowbridge WRC	Samples received on:	24/11/2020
Your job number:	BMG2109	Samples instructed on/ Analysis started on:	26/11/2020
Your order number:	POR032916	Analysis completed by:	02/12/2020
Report Issue Number:	1	Report issued on:	02/12/2020
Samples Analysed:	1 water sample		

Signed: _____

Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

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

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

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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: 20-43438
Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

General Inorganics

pH	pH Units	N/A	ISO 17025	7.3
Total Cyanide	µg/l	10	ISO 17025	< 10
Complex Cyanide	µg/l	10	ISO 17025	< 10
Free Cyanide	µg/l	10	ISO 17025	< 10
Thiocyanate as SCN	µg/l	200	ISO 17025	270
Sulphate as SO4	µg/l	45	ISO 17025	104000
Sulphate as SO4	mg/l	0.045	ISO 17025	104
Elemental Sulphur	mg/l	0.02	NONE	< 0.02
Sulphide	µg/l	5	NONE	120
Chloride	mg/l	0.15	ISO 17025	22
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	4800
Total Nitrogen (Kjeldahl)	mg/l	0.1	NONE	6.6
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	11.3
Nitrate as N	mg/l	0.01	ISO 17025	0.09
Nitrate as NO3	mg/l	0.05	ISO 17025	0.41
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	1900
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	7.1

Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	9.07
Acenaphthylene	µg/l	0.01	ISO 17025	4.83
Acenaphthene	µg/l	0.01	ISO 17025	6.53
Fluorene	µg/l	0.01	ISO 17025	5.93
Phenanthrene	µg/l	0.01	ISO 17025	25.9
Anthracene	µg/l	0.01	ISO 17025	9.81
Fluoranthene	µg/l	0.01	ISO 17025	52.6
Pyrene	µg/l	0.01	ISO 17025	40.1
Benzo(a)anthracene	µg/l	0.01	ISO 17025	28.7
Chrysene	µg/l	0.01	ISO 17025	22.7
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	30.1
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	14.2
Benzo(a)pyrene	µg/l	0.01	ISO 17025	29.3
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	15.8
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	5.69
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	16.4

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	318
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Analytical Report Number: 20-43438
 Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

Heavy Metals / Metalloids

Boron (dissolved)	µg/l	10	ISO 17025	420
Calcium (dissolved)	mg/l	0.012	ISO 17025	110
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.038
Magnesium (dissolved)	mg/l	0.005	ISO 17025	7.3
Potassium (dissolved)	mg/l	0.025	ISO 17025	12
Sodium (dissolved)	mg/l	0.01	ISO 17025	100

Chromium (total)	µg/l	0.2	ISO 17025	6.8
Lead (total)	µg/l	0.2	ISO 17025	7
Mercury (total)	µg/l	0.05	ISO 17025	< 0.05
Nickel (total)	µg/l	0.5	ISO 17025	80
Selenium (total)	µg/l	0.6	ISO 17025	4
Zinc (total)	µg/l	0.5	ISO 17025	6800

Antimony (dissolved)	µg/l	0.4	ISO 17025	4
Arsenic (dissolved)	µg/l	0.15	ISO 17025	2.98
Barium (dissolved)	µg/l	0.06	ISO 17025	68
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02
Manganese (dissolved)	µg/l	0.05	ISO 17025	1800
Vanadium (dissolved)	µg/l	0.2	ISO 17025	1.9

Copper (total)	µg/l	0.5	ISO 17025	11
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Analytical Report Number: 20-43438
Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	16
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	45
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	330
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	390

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	31
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	79
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	330
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	960
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	1400

Volatile free fatty acids

Formic Acid	mg/l	10	NONE	< 10
Acetic Acid	mg/l	10	NONE	< 10
Propanoic Acid	mg/l	10	NONE	< 10
Isobutyric Acid	mg/l	10	NONE	< 10
Butyric Acid	mg/l	10	NONE	< 10
Isovaleric Acid	mg/l	10	NONE	< 10
Valeric Acid	mg/l	10	NONE	< 10
Hexanoic Acid	mg/l	10	NONE	< 10
Heptanoic Acid	mg/l	10	NONE	< 10
4-methylvaleric Acid	mg/l	10	NONE	< 10

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

Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (total)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Complex cyanide in water	Determination of complex cyanide by calculation. Accredited matrices SW, PW, GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Thiocyanate in water	Determination of thiocyanate in water by discreet analyser (colorimetry). Accredited matrices SW, GW, PW.	In house method based on SMWW 4500-CN-M. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025

Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Kjeldahl nitrogen in water	Determination of total nitrogen using the Kjeldahl-digestion method and colorimetric determination.	In house method based on BS 7755-3.7:1995 & ISO 11261:1995.	L087-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Volatile free fatty acids in Water	Determination of volatile free fatty acids in water by HPLC.	In-house method	L105B-PL		NONE
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Elemental sulphur in water	Determination of elemental sulphur in water by extraction in dichloromethane followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	W	NONE
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

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

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

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

Sample Deviation Report



Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH03 (S)	None Supplied	W	1695692	a	None Supplied	None Supplied	None Supplied



Imogen Wort

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Analytical Report Number : 20-44136

Project / Site name:	Trwbridge WRC	Samples received on:	30/11/2020
Your job number:	BMG2109	Samples instructed on/ Analysis started on:	30/11/2020
Your order number:	POR033029	Analysis completed by:	07/12/2020
Report Issue Number:	1	Report issued on:	07/12/2020
Samples Analysed:	2 water samples		

Signed: 

Zina Abdul Razzak
Senior Quality 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: 20-44136
Project / Site name: Trwbridge WRC

Your Order No: POR033029

Lab Sample Number				1699714	1699715
Sample Reference				BH03 (D)	BH02 (D)
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

	pH Units	N/A	ISO 17025	7.5	7.7
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Complex Cyanide	µg/l	10	ISO 17025	< 10	< 10
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10
Thiocyanate as SCN	µg/l	200	ISO 17025	330	240
Sulphate as SO4	µg/l	45	ISO 17025	497000	803000
Sulphate as SO4	mg/l	0.045	ISO 17025	497	803
Elemental Sulphur	mg/l	0.02	NONE	< 0.02	< 0.02
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	99	840
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	190	2600
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	33.7	13.5
Nitrate as N	mg/l	0.01	ISO 17025	0.07	0.05
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	350	120
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	34	56

Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16
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Analytical Report Number: 20-44136
Project / Site name: Trwbridge WRC

Your Order No: POR033029

Lab Sample Number				1699714	1699715
Sample Reference				BH03 (D)	BH02 (D)
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Boron (dissolved)	µg/l	10	ISO 17025	1800	3900
Calcium (dissolved)	mg/l	0.012	ISO 17025	130	78
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.11	0.17
Magnesium (dissolved)	mg/l	0.005	ISO 17025	8.8	21
Potassium (dissolved)	mg/l	0.025	ISO 17025	13	23
Sodium (dissolved)	mg/l	0.01	ISO 17025	380	920

Chromium (total)	µg/l	0.2	ISO 17025	8.4	6.8
Lead (total)	µg/l	0.2	ISO 17025	37	43
Mercury (total)	µg/l	0.05	ISO 17025	< 0.05	0.15
Nickel (total)	µg/l	0.5	ISO 17025	46	27
Selenium (total)	µg/l	0.6	ISO 17025	7.8	8.7
Zinc (total)	µg/l	0.5	ISO 17025	380	220

Antimony (dissolved)	µg/l	0.4	ISO 17025	3	1.3
Arsenic (dissolved)	µg/l	0.15	ISO 17025	3.98	5.56
Barium (dissolved)	µg/l	0.06	ISO 17025	46	37
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02
Manganese (dissolved)	µg/l	0.05	ISO 17025	220	120
Vanadium (dissolved)	µg/l	0.2	ISO 17025	1.2	5.5

Copper (total)	µg/l	0.5	ISO 17025	28	63
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Volatile free fatty acids

Formic Acid	mg/l	10	NONE	< 10	210
Acetic Acid	mg/l	10	NONE	< 10	< 10
Propanoic Acid	mg/l	10	NONE	< 10	< 10
Isobutyric Acid	mg/l	10	NONE	< 10	< 10
Butyric Acid	mg/l	10	NONE	< 10	< 10
Isovaleric Acid	mg/l	10	NONE	< 10	< 10
Valeric Acid	mg/l	10	NONE	< 10	< 10
Hexanoic Acid	mg/l	10	NONE	< 10	< 10
Heptanoic Acid	mg/l	10	NONE	< 10	< 10
4-methylvaleric Acid	mg/l	10	NONE	< 10	< 10

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



Analytical Report Number : 20-44136
Project / Site name: Trwbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (total)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Complex cyanide in water	Determination of complex cyanide by calculation. Accredited matrices SW, PW, GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Thiocyanate in water	Determination of thiocyanate in water by discrete analyser (colorimetry). Accredited matrices SW, GW, PW.	In house method based on SMWW 4500-CN-M. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025



Analytical Report Number : 20-44136
 Project / Site name: Trwbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Volatile free fatty acids in Water	Determination of volatile free fatty acids in water by HPLC.	In-house method	L105B-PL		NONE
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Elemental sulphur in water	Determination of elemental sulphur in water by extraction in dichloromethane followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	W	NONE
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

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

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

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

Sample Deviation Report



Analytical Report Number : 20-44136
Project / Site name: Trwbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH02 (D)	None Supplied	W	1699715	a	None Supplied	None Supplied	None Supplied
BH03 (D)	None Supplied	W	1699714	a	None Supplied	None Supplied	None Supplied