WML CONSULTING
Civil, Structural and Geotechnical Engineers

Phase 2 Geo-Environmental Investigation and Assessment Report

For a site at

Trinity Street, Huddersfield

Undertaken for

Stainforth Construction

7913G-WML-XX-ZZ RP-G-0002
30th May 2023

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Reviewed By:	**S Seddon** Redacted
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WML Consulting Ltd
Third Floor South,
Metropolitan House,
Station Road,
Cheadle Hulme,
Cheshire,
SK8 7AZ

Tel: 0161 482 0600
Email:info@wmlconsulting.com
www.wmlconsulting.com

Executive Summary

Site Location	The site comprises the former Kirklees College campus to the west of Huddersfield Town Centre. It is centred on approximate Ordnance Survey National Grid Reference 414068E, 416825N with an indicative postcode of HD1 5NN.
Development Proposals	The proposed scheme involves the construction of a new retail structure in the eastern section of the site, with car parking to the west. A new access will be created to the south-west from Trinity Street.
Ground Conditions	Ground conditions encountered during the intrusive investigation generally confirm those identified in the published literature and previous reports and in summary comprise Made Ground locally underlain by Head Deposits and elsewhere or beneath the Made Ground by Pennine Lower Coal Measures strata (PLCM) which include worked coal seams.
Site Preparation	Demolition materials, including all asphalt/concrete hardstanding and below ground foundations removed as part of the clearance work, subject to appropriate sorting and crushing, would be suitable for re-use as bulk fill beneath hard cover areas. Although not considered to be significant any topsoil removed during site preparatory works and considered for re-use should be stockpiled separately from other materials and protected from inclement weather for future use in landscaped and garden areas subject to confirmatory laboratory testing.
Shallow Mine Workings	The risk of surface instability resulting from ground movement associated with collapse of abandoned shallow mine workings is considered to be low beneath the currently proposed building location with specific remedial measures required.
Mine Shafts	During the demolition of the former structures and removal of the slabs, a possible brick lined mine shaft was encountered close to the south-eastern site boundary. Groundwater was standing within the shaft at approximately 14.50mbgl, but the depth of the feature could not be accurately determined. The Client has employed a specialist driller and remediation specialist to investigate and remediate the potential mine shaft under the appropriate Coal Authority Licence. This is being undertaken independently to this report.
Foundations and Floor Slabs	It is anticipated that the made ground would be amenable to treatment by vibro-compaction to achieve a relatively consistent state of compaction throughout. Under such circumstances, a minimum net allowable bearing pressure of 150kN/m2 is anticipated. Although this should be confirmed by consultation with a reputable specialist contractor. The floor slab can be ground bearing where fully supported on engineered granular fill which has been compacted to an appropriate specification. Floor slabs would need to be reinforced.
Pavements and Hardstanding	Earthworks are to comprise the formation of a development plateau using either 6F2 or 6F5 where required to achieve a California Bearing Ratio (CBR) of 5% (when measured in accordance with BS 1377: Soils for civil engineering purposes: Part 4 at a formation level of 450mm below the proposed finished levels of external hardstanding.
Concrete Classification	The typical design sulphate (DS) class and "Aggressive Chemical Environment for Concrete" (ACEC) class for the site are DS-2 and AC-2z respectively.
Soakaways	In consideration of the thickness of Made Ground and cohesive nature of the natural soils beneath the site, soakaways are not considered a feasible drainage option.
Ground Gas	The site is indicated to classify as Characteristic Gas Situation (CS) 1 – Very Low Gas Risk' in accordance with BS8485:2015. Therefore, no specific gas protection measures are considered necessary.
Contamination Assessment	In consideration of the chemical test results, it is concluded that the site does not contain any significant and/or widespread contamination sources. Risks to controlled waters are also considered to be low with no remedial actions required.
Waste Disposal	On the basis of the current information it is likely that the majority of excavated soil would

	be classified as Non-hazardous or even Inert with natural deposits classified as Inert for landfill disposal. This would need to be confirmed by further analysis of bulk soils destined for disposal under consultation with the landfill operator.
Potable Water Supplies	The requirement for specific materials and measures to protect the water supply from ground contamination is not envisaged, but would need to be confirmed with the utilities provider.
Colliery Spoil	Although not anticipated in significant quantities, any colliery spoil encountered during inspection following the site strip should be removed where it will potentially interact with new building foundations and floor slabs.

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APPENDICES

1.0 INTRODUCTION

Appointment

1.1 WML Consulting was commissioned by Stainforth Construction to undertake a Phase 2 Geo-environmental Investigation and Assessment of a site referred to as Trinity Street, Huddersfield.

Proposed Development

1.2 The proposed scheme involves the construction of a new retail structure in the eastern section of the site, with car parking to the west. A new access will be created to the south-west from Trinity Street.

1.3 The structure and external hardstanding will be surrounded by soft amenity landscaping comprising grassed and planted areas.

1.4 The current proposed development and landscape drawing is presented in Appendix 01.

Objective

1.5 The objective of the ground investigation and assessment was to provide geotechnical recommendations for construction design purposes together with a geo-environmental risk assessment in terms of possible ground contamination.

1.6 To achieve the objective, the following tasks were undertaken:

- Review the existing desk study report for the site and design a Phase 2 Ground Investigation.
- Characterise the ground conditions in terms of geology, soil geotechnical parameters and ground contamination from information provided by the ground investigation.
- Provide recommendations regarding suitable foundations together with any other geotechnical considerations that could affect possible future development.
- Determine a ground conceptual model for the site so as to undertake a ground contamination Generic Quantitative Risk Assessment (GQRA).

Scope

1.7 A Phase 1 Desk Study for the site has been undertaken by WML and is presented in the following report:

- Phase 1 Desk Study and Preliminary Phase 2 Geoenvironmental Assessment, Reference 7344/G/01, dated January 2017.

1.8 It should be noted that the Phase 1 report was for the larger former college site, whereas this report provides information associated with the current phase of development in the southern half of the larger site only.

1.9 This report includes the findings of the pre and post demolition Phase 2 Ground Investigations designed on conclusions and recommendations within the Phase 1 Desk Study. For ease of reference, the findings of the Desk Study are summarised in the following sections. However, the two reports are not exclusive and should be read in conjunction.

1.10 The pre demolition investigations were undertaken by Ian Farmer Associates (on behalf of WML Consulting) and post demolition investigations by Groundtech Consulting and WML and are supplemented where required by an investigation undertaken by Soil Mechanics for WML in 2006.

1.11 The pre and post demolition rotary drilling to determine the presence of suspected abandoned mine workings was undertaken under relevant Coal Authority Permits in accordance with the HSE Guidance on Managing the Risk of Hazardous Gases when "Drilling or Piling Near Coal" and CIRIA Special

Publication 32:2002 "Construction Over Abandoned Mine Workings" (pre-demolition) and for the 2023 investigations C758D - 2019 "Abandoned mine workings manual" (post-demolition).

1.12 The ground investigation comprised the formation of window sample probeholes undertaken with reference to BS5930:2015 + A1:2020 Code of Practice for Ground Investigation and BS10175:2011 together with A2:2017, "Investigation of Potentially Contaminated Sites - Code of Practice" except where superseded by EN ISO 22475-1 "Geotechnical Investigation and Assessment – Sampling by Drilling and Excavation and Groundwater Measurements".

1.13 Geotechnical soil testing was undertaken in general accordance with guidelines provided in BS1377:1990 – Parts 1-9, "Method of Test for Soils for Civil Engineering Purposes". Samples for chemical analysis were obtained and handled generally in accordance with the current guidelines (BS10175: 2011 and A2:2017).

2.0 SITE LOCATION AND DESCRIPTION

Site Location

2.1 The site comprises the southern half of the former Kirklees College campus to the west of Huddersfield Town Centre. It is centred on approximate Ordnance Survey National Grid Reference 414068E, 416825N with an indicative postcode of HD1 5NN.

2.2 The site is bounded to the north by the larger former college site and a Grade II listed building, to the east by Castlegate. It is bounded to the south and west by Trinity Street.

2.3 A location plan, with the subject site as the black and white, unshaded area, presented in Appendix 01, on drawing referenced WIP280520 by Enjoy Design.

Site Description

2.4 The site is irregular in shape and is very approximately 1.15 hectares in plan area.

2.5 Until the recent demolition in late 2022/early 2023 the majority of the site was developed with structures of varying ages, heights and construction associated with their former use as Huddersfield Technical College.

2.6 Localised areas of landscaping were located within the eastern and southern sections of the site and comprise mainly grass and low-lying vegetation with localised trees of varying species.

2.7 During the post-demolition site investigations in 2023, the structures, floor slabs and foundations had all been demolished/cleared and the construction material was in the process of being crushed for re-use, under control of the earthwork's contractor. The northern section of the site appeared to be in use as a site compound.

2.8 During demolition a circular feature was encountered by the Contractor within the south-eastern section of the site, which was reported to be 2.00m in diameter and lined with brick/stone. Standing water was noted within the feature to be around 14.50mbgl. This is further discussed in Section 3.0 and has been considered likely to represent a potential mine shaft.

2.9 The surrounding land is predominantly occupied by mixed commercial and residential development. A pedestrian subway provide access beneath Castlegate immediately south-east of the site boundary.

2.10 Photographs of the site post demolition are provided in Appendix 02.

Topography

2.11 Prior to demolition activities the site sloped to the south-west with site elevations reducing from around 114.90m Above Ordnance Datum (AOD) in the north-western section of the larger former college site to around 104.70m AOD close to the south-eastern site boundary, adjacent to the access to the Castlegate pedestrian subway.

2.12 The changes in elevation were accommodated by a series of retaining walls of varying construction, concrete steps or gentle grassed and hardstanding slopes.

3.0 SUMMARY OF ENVIRONMENTAL AND HISTORICAL SETTING

3.1 The following paragraphs summarise the most relevant findings of the Phase 1 desk study report.

Geology

3.2 No Made Ground is recorded beneath the site although is likely to be present at least in part due to the previous development history.

3.3 The BGS plans indicated that drift deposits are absent beneath the majority of the site area with the exception of Head Deposits which are inferred to exist beneath the eastern and south-eastern sections. The Head Deposits are indicated to generally comprise interbedded silt, clay, sand and gravel.

3.4 Elsewhere and beneath the Head deposits the site is underlain by the Carboniferous Middle Bank Rock of the Lower Pennine Coal Measures (PLCM). This is indicated to comprise thinly bedded rubbly sandstone. This is underlain by undifferentiated PLCM strata mainly comprising interbedded grey mudstone, siltstone and pale grey sandstone with numerous coal seams.

3.5 The Soft Bed Coal is inferred to sub-crop to the north, east and south of the site approximately 500m west at its closest point. The BGS plans infer that the Soft Bed Coal is around 0.80m in thickness within the general site area. Therefore, as the solid strata are indicated to dip to the east at an angle of approximately 2°, the seam could occur at a relatively shallow depth beneath the subject site.

3.6 BGS archive borehole record SE11NW476 located some 10m south-west of the site encountered Made Ground to a depth of 1.45 metres below ground level (mbgl) underlain by 'stiff, brown clay' to a depth of 5.31mbgl and in turn by 'dark grey shale' with the borehole terminating at 7.00mbgl. In the wider area, records indicate potential mine workings / voids of approximately 0.95m in thickness at depths of around 19.00mbgl.

Radon

3.7 The property is not in a Radon Affected Area as defined by the UK Health Security Agency as less than 1% of properties are above the Action Level of exposure. Therefore, no radon protection measures are necessary for new structures as described in publication BR211 by the Building Research Establishment.

Mining and Subsidence

3.8 The Coal Authority report states that the property is not within the likely zone of influence from recorded past underground workings. However, the Authority also states that the property is in an area where coal is at or close to the surface and that this coal may have been worked at some time in the past.

3.9 Notwithstanding this, no notice of the risk of the land being affected by subsidence has been given under the Coal Mining Subsidence Act 1991 and the Authority has not received a damage notice or claim for the subject property, or other property within 50m, since records began in 1994.

3.10 The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out Procedure.

3.11 The Coal Authority Interactive viewer has indicated that the site is within a 'Development High Risk' area and in an area of 'probable shallow mine workings'.

3.12 The Coal Authority does not indicate that there are any mine shafts on site or within 20m of the site. However, during demolition a circular feature was encountered by the Contractor within the south-eastern section of the site, which was reported to be around 2.00m in diameter and lined with brick/stone. Groundwater was noted within the feature to be around 14.50mbgl. In order to ascertain

the nature and risk associated with this, the Client is currently employing a specialist driller and remediation specialist to investigate and remediate the potential mine shaft under the appropriate Coal Authority licence. This is being undertaken independently to this report.

Environmental Setting

3.13 The Head Deposits indicated to be present in the south-eastern section of the site are classified as a Secondary (formerly an Undifferentiated) Aquifer.

3.14 The underlying Middle Band Rock is classified as a Secondary (A) Aquifer (formerly Minor Aquifer). These include permeable layers capable of supporting water supplies at a local rather than at a strategic scale, and in some cases forming an important source of base flow to rivers.

3.15 There are no Environment Agency Source Protection Zones within 500m of the site.

3.16 There are no Detailed River Network Features within 500m of the site. The nearest surface water feature is a pond located some 227m to the north and therefore beyond the influence of the site.

3.17 There are no active Surface Water Abstraction Licences recorded within 500m of the site. Those at greater distance are not considered to be within influencing distance of the site.

3.18 There are no historical or active landfills within 500m of the site.

3.19 There are no licensed Waste Sites within 250m of the site. The nearest is located around 407m east and relates to household, commercial and industrial waste types.

Site History

3.20 In summary, the central section of the site had been developed as part of the larger Huddersfield Infirmary with a Timber Yard prior to the first available map of 1854. The southern sections of the site underwent residential development sometime prior to 1893. By 1959 the Timber Yard had been replaced with two unspecified Works. In the 1970's the site had been redeveloped as Huddersfield Training College, with the former Infirmary buildings retained and new structures constructed in the southern section of the site.

3.21 The historical use of the site as an Infirmary and a Timber Yard in the southern area is unlikely to have given rise to a significant degree of ground contamination although localised contamination sources are likely to be present as confirmed by previous ground investigations.

Preliminary Contamination Risk Assessment

3.22 Under the proposed development scenario, potential pollution linkages were on the whole considered unlikely with associated preliminary risks being assessed, on the whole, as low.

3.23 However, a moderate risk was assessed in relation to possible mine gas, particularly where potential lines of weakness in the solid strata such as unrecorded mine shafts may form a pathway for upward migration.

3.24 Uncertainties relating to the presence of ACM and asbestos fibres within the Made Ground as a result of previous unrecorded demolition and the potential, albeit for localised sources of ground contamination were also considered possible.

4.0 PREVIOUS GROUND INVESTIGATIONS

4.1 A review of both the WML records and Kirklees Council Planning Portal indicates that two ground investigation reports and a Coal Authority Risk Assessment have previously been undertaken on the site, namely:

- Report on Ground Investigation by Soil Mechanics on behalf of Huddersfield Technical College, reference A6111/1, dated October 2006.
- Phase 1 Geo-Environmental desk Study by Clancy Consulting Engineers on behalf of Wiggett Construction Limited, reference 10/0801/002, dated November 2015.
- Coal Mining Risk Assessment Report by Clancy Consulting Engineers on behalf of Wiggett Construction Limited, reference 10/0801/002, dated December 2015.
- Geo-Environmental Appraisal Report by Clancy Consulting Limited on behalf of Wiggett Construction, reference 10/0801/003, dated April 2016.

4.2 Information contained within the reports has been reviewed so as to supplement the findings of this current report. However, the information has not been reproduced within this report with the exception of relevant excerpts of the factual Soil Mechanics (2006) report undertaken for WML Consulting.

Soil Mechanics - 2006

4.3 The Soil Mechanics investigation comprised the formation of 10no window sample probeholes and 6no rotary cored boreholes together with chemical analysis, geotechnical testing and ground gas monitoring with BH3 to BH5 and WS6 to WS10 within the subject site.

4.4 In summary, the intrusive investigation indicated the majority of the wider site to be underlain by Made Ground extending to depths of between 0.35m and 4.25mbgl.

4.5 The Made Ground generally comprised asphalt hardstanding, concrete paving or stone cobbles underlain by a granular sub-base, or locally sandy, gravelly topsoil. These surface horizons of Made Ground were underlain by clayey gravelly sand and sandy gravel with cobbles of sandstone and brick. Gravel sized fragments generally comprised sandstone, brick, coal and locally concrete, bitumen, clinker, slag, glass, pottery, metal and wood.

4.6 The Made Ground was generally underlain by strata considered to represent Superficial Deposits extending to depths of between 1.00m and 4.80mbgl. The Superficial Deposits generally comprised variably sandy and gravelly clay, locally with cobbles.

4.7 The Made Ground or Superficial Deposits, where present, were in turn underlain by Pennine Lower Coal Measures (PLCM) at depths of between 0.20m and 4.80mbgl, extending to a maximum proven depth of 21.83mbgl. The PLCM strata comprised interbedded sandstone, siltstone and mudstone.

4.8 An intact coal seam of 0.40m in thickness was encountered beneath the subject site at a depth of 13.70mbgl. However, voids and loose ground were encountered within the larger former college site at depths of between 16.70m and 18.30mbgl. The voids were generally between 0.10m and 0.40m in thickness. Within BH1 and BH3 the voids were underlain by between 0.90m and 1.80m of 'loose ground' suggesting that possible collapse and upward migration of the workings had occurred.

4.9 Standing groundwater was recorded across the wider site area at depths of between 2.50m within the Superficial Deposits and between 13.00m and 20.00mbgl within the underlying PLCM.

4.10 Chemical analysis results indicated elevated concentrations of total Polyaromatic Hydrocarbons (PAH) and Total Petroleum Hydrocarbons (TPH) (500mg/kg of Mineral Oil) within a single sample of shallow Made Ground in the south-eastern section of the subject site.

4.11 During the wider site investigations, ground gas monitoring recorded slightly elevated concentrations of methane up to 1.1% by volume in air (v/v) and slightly elevated concentrations of carbon dioxide up to 3.8%v/v. No significant gas flow rates were recorded.

4.12 Relevant excerpts of the report are reproduced in Appendix 03.

Clancy Phase 1 Desk Study – November 2015

4.13 In 2015 Clancy undertook a desk study for the larger site area with the subject site to comprise a supermarket.

4.14 The report identified potential contamination sources, pathways and receptors and recommended that intrusive investigations be carried out to establish the ground profile and chemical constituents of the soil together with in situ testing to provide adequate recommendations for foundation design.

4.15 The report also recommended that a Coal Mining Risk Assessment be carried out in order to further assess the risk from shallow mine workings and to establish whether an intrusive mining investigation was required.

Clancy Coal Mining Risk Assessment Report – December 2015

4.16 Subsequently Clancy undertook a Coal Mining Risk Assessment which included a review of BGS maps and archive boreholes together with a Coal Authority Mining Report. The report also included a review of local archives together with information provided by a local mining historian.

4.17 The report makes no mention of the Soil Mechanics report suggesting that this was not available for their review at the time.

4.18 The anecdotal information referred to in the report indicated that much of Huddersfield Town Centre, including areas in close proximity to the site, are underlain by unrecorded shallow mine workings.

4.19 Unverified historical boreholes relating to nearby previous developments provided to Clancy indicated shallow bedrock with voids of up to 0.90m in thickness located at depths of approximately 19.00mbgl.

4.20 The report also referred to anecdotal information suggesting that coal/fireclay extraction may have occurred beneath the larger college site (i.e. north of the subject site) together with the possible presence of a '5 yard' (4.6m) deep shaft which was used for disposal of refuse/waste from the hospital. The presence or location of the shaft is, however unsubstantiated but inferred to be located to the north of the subject site.

Clancy Geo-environmental Appraisal Report April 2016

4.21 This report presented and assessed the results of a site investigation within the larger site area which comprised the formation of 18no window sample probeholes to a maximum depth of 5.45mbgl. No further mining investigations were undertaken as part of the investigation.

4.22 In summary, the intrusive investigation indicated the majority of the larger site to be underlain by Made Ground extending to depths of between 0.10m and 4.10mbgl. The Made Ground was locally underlain by Superficial Deposits to depths of up to 3.20mbgl, and in turn beneath the subject site area, by the weathered Pennine Lower Coal Measures mainly comprised weathered mudstone to a maximum proven depth of 5.45mbgl.

4.23 Limited ground gas monitoring recorded no methane and slightly elevated concentrations of carbon dioxide, up to 1.1%v/v. No significant flow rates were recorded.

5.0 SITE INVESTIGATION

Rationale

5.1 Phased intrusive investigations were undertaken to detail the presence of unrecorded shallow mine workings beneath the site and to verify the preliminary site conceptual model and clarify the low environmental risk.

5.2 The investigations comprised phased pre-demolition rotary boreholes and additional post-demolition rotary holes, targeting the building footprint, to intercept the coal seams and confirm the previous findings.

5.3 On the basis that solid strata were anticipated at shallow depth together with the restricted nature of the site, window sample probeholes were undertaken pre-demolition (2006 and also 2017) to provide general information on near surface deposits and to provide samples for chemical analysis. Due to the small diameter of the probing equipment, the depth of penetration achieved is dependent on favourable ground conditions. As such, ground penetration may be restricted in circumstances where the ground is particularly strong or contains relatively large obstructions such as cobbles and/or boulders.

5.4 Post-demolition trial pits were then undertaken at accessible locations across the site area to provide additional information and samples for chemical analyses.

5.5 The phased Investigations are listed in the table below for clarity:-

Site Investigation	Date	Rotary Boreholes	Window Samples	Trial Pits
Soil Mechanics (For WML)	2006	BH3 - BH5	WS6 – WS10	-
Ian Farmers (For WML)	2017	BH106 – BH108	WS106	-
**Groundtech Consulting (For Stainforth)	2023	RO1 – R03	-	-
**WML	2023	-	-	#TP01, TP02, TP05, TP06, TP07, TP08, TP12 & TP13 (and 3no spot samples from the proposed locations of TP09 and TP11).

Notes
**= Post-Demolition
#Numbering system was set out by the contractor and this resulted in the missing numbers being in working areas that could not be included in the trial pits.

5.6 Chemical analysis of a general suite of contaminants was undertaken on selected samples of soil with the inclusion of asbestos identification and hydrocarbon analysis on selected samples. This was to confirm the anticipated low contamination risk and to establish the chemical suitability of soils for possible re-use or disposal classification.

5.7 The investigation locations were chosen so as not to impact on the presence of known/suspected services beneath the site and also in view of the potential development options.

5.8 Monitoring standpipes were installed to the pre-demolition probeholes for the measurement of gas and groundwater.

Phased Intrusive Works

5.9 The original pre-demolition ground investigation work was undertaken in August 2006 by Soil Mechanics. Within the subject site area this comprised the formation of 5no window sample probeholes to a maximum depth of 5.00mbgl and 3no rotary open-hole and rotary cored boreholes to a maximum depth of 20.00mbgl in order to investigate the presence of shallow mine workings.

5.10 An additional phase of pre-demolition ground investigation work was undertaken between 6th and 19th January 2017 by Ian Farmer Associates (IFA). Within the subject site area this comprised the formation of 1no window sample probehole to a maximum depth of 3.45mbgl and 3no rotary open-hole boreholes to a maximum depth of 21.00mbgl in order to investigate the presence of shallow mine workings.

5.11 Post-demolition Groundtech Consulting undertook an additional 3no rotary open holes to a maximum depth of 40.00mbgl between 11th and 13th April 2023 in order to investigate the presence of shallow mine workings beneath the proposed building footprint.

5.12 Subsequently on 14th May WML undertook a series of trial pits to a maximum depth of 2.05mbgl across the general site area.

5.13 The exploratory hole records are presented in Appendix 03, 04 and 05 of this report whilst the exploratory hole locations are shown on a combined drawing referenced 7913G-SK01 in Appendix 01.

5.14 Drawing 7344G/SK-02 in Appendix 01 also includes the approximate locations of the rotary holes formed by Soil Mechanics during the 2006 investigations.

Monitoring Standpipes

5.15 Monitoring wells for groundwater and ground gas measurements were installed in 3no probeholes and 3no rotary holes within the subject site area during the 2006 and 2017 investigations. Those within the subject site are presented on the logs in Appendix 03 and 04.

Geotechnical and Chemical Testing

5.16 In-situ geotechnical testing was undertaken at regular intervals during the formation of the probeholes in the form of Standard Penetration Tests (SPTs). The results for the testing are presented on the descriptive logs.

5.17 Geotechnical testing was undertaken during the 2006 investigations for the following.

- Moisture Content
- Atterberg Limits
- Particle size distribution analyses
- Triaxial testing – Unconsolidated unconfined.

5.18 The results of the geotechnical testing are presented in Appendix 03.

5.19 Chemical analysis was undertaken on selected soil samples for the following contaminants of concern during the 2017 and 2023 investigations:

- Total Arsenic, Boron, Cadmium, Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc.
- Total Cyanide, Phenols, Sulphur, Sulphate.
- Speciated USEPA Polyaromatic Hydrocarbons (PAH).
- Total Petroleum Hydrocarbons, BTEX, MTBE.
- Asbestos Screen and Identification.
- 2:1 water/soil sulphate extract, pH.

- Organic Matter.

5.20 The results of the chemical analyses are presented in Appendix 03 and 06.

Gas and Groundwater Monitoring

5.21 Gas and groundwater monitoring has been carried out on 6no occasions in August 2006 by Soil Mechanics and a further 4no occasions between January and February 2017. The Soils Mechanics (2006) monitoring results are presented in Appendix 03, and the Ian Farmer Associates (2017) in Appendix 07.

6.0 GROUND CONDITIONS

General

6.1 Ground conditions encountered during the intrusive investigation generally confirm those identified in the published literature and previous reports and in summary comprise Made Ground underlain by Head Deposits and in turn by the Pennine Lower Coal Measures strata (PLCM) which include worked coal seams.

6.2 The current investigation data set comprised all phases of intrusive investigations between 2006 and 2023.

Made Ground

6.3 Made Ground was encountered in the majority of the exploratory holes from ground level to depths of between 0.30m and 4.00mbgl but more generally between 0.50m and 1.60mbgl. The deeper Made Ground was encountered in the south-east of the site.

6.4 The Made Ground generally comprised a surface horizon of asphalt over granular sub-base or more locally imported topsoil. However, by the 2023 investigations this and the majority of the former concrete floor slabs had been cleared.

6.5 Beneath this the Made Ground is very variable in nature and generally comprises both cohesive and granular strata with inclusions of gravel and cobble-sized brick, concrete, sandstone and ash together with lesser constituents of wood, glass and metal.

6.6 A Natural Moisture Content measured for the cohesive made ground was record at 23% with a liquid limit of 40% and a corresponding Plasticity Indices of 15% indicated clay of low volume change potential.

6.7 A single undrained shear strength results for the cohesive Made Ground recorded 42kN/m² confirming a variable strength ranging from soft to firm.

Head Deposits

6.8 The Made Ground is underlain by a thin layer of Superficial strata considered to represent Head Deposits which extend to depths generally between 1.00m and 3.50mbgl. However, this was absent within WS7, where the greatest thickness of Made Ground was encountered.

6.9 This is generally described as firm but locally soft or stiff, sandy gravelly clay with occasional cobbles and boulders. Gravel and cobbles are described as generally sub-angular of sandstone.

6.10 Standard Penetration Test (SPT) 'N' values undertaken in the Head Deposits ranged from 5 to 34 indicating a locally very soft but generally firm and stiff consistency.

6.11 Natural Moisture Contents for the cohesive superficial deposits were in the range of 16% to 21%. Liquid limits within the range of 32% to 44% with corresponding Plasticity Indices in the range of 12% to 21% (modified to 12% to 17%) indicated clay of low to intermediate plasticity and low volume change potential.

6.12 Undrained shear strength results for the superficial deposits ranges from around 61kN/m² to 73kN/m² confirming a firm consistency.

6.13 A PSD undertaken in the granular superficial deposits recorded the sample to comprise 26% gravle, 27% sand, 23% silt and 23% clay fractions.

Pennine Lower Coal Measures (PLCM)

6.14 The Made Ground and Head Deposits are underlain by solid strata of the PLCM from depths of between 3.00m and 4.50mbgl extending to a maximum proven depth of 40.00mbgl.

6.15 The PLCM generally comprised interbedded very weak to moderately strong mudstone, siltstones and sandstones and was generally thickly laminated to thinly bedded.

6.16 However, the upper horizons are highly to completely weathered and described as either a very stiff, laminated clay with fragments of mudstone or very weak to weak laminated mudstone. The rock strength increased with depth to become very weak to medium strong.

6.17 SPT 'N' values undertaken in the upper horizons of highly weathered rock ranged from 33 to greater than 50 confirming a generally weak strength.

Coal Seams/Shallow Mine Workings

6.18 Within all of the rotary holes, with the exception of R03 (Groundtech 2023), either intact coal seams or workings were recorded.

6.19 The depths to the coal/shallow mine workings together with appropriate levels to Ordnance Datum are summarised as follows.

BH	Ground Level (m AOD) prior to any earthworks activities	Depth of Coal/Workings		Level of Coal/Workings to Ordnance Datum		Details			
						Thickness (m)		Thickness of Loose / Collapsed Workings (m)	Total Thickness
		Depth to Top (mbgl)	Depth to Base (mbgl)	Depth to Top (mAOD)	Depth to Base (mAOD)	Void	Intact Coal		
Soil Mechanics 2006									
BH3	109.60	16.70	18.80	92.90	90.80	0.30	-	1.80	2.10
BH4	105.65	13.70	14.11	91.95	91.54	-	0.41	NA	0.41
BH5	*106.95	18.30	18.60	88.65	88.35	0.30	-	NA	0.30
WML 2017									
BH106	106.25	11.00	11.85	95.25	94.40	0.85	-	-	0.85
BH106	106.25	18.70	19.10	87.55	87.15	0.40	-	-	0.40
BH107	109.70	18.90	19.70	90.80	90.00	-	0.80	-	0.80
BH108	105.65	18.30	18.90	87.35	86.75	0.60	-	-	0.60
Groundtech 2023 (beneath building footprint)									
R01	**105.00	16.20	16.50	88.80	88.50	-	0.30	-	0.30
R02	**105.60	4.60	4.70	101.00	100.90	-	0.10	-	0.10

Notes
*Assumed incorrect on log and therefore estimated from topographical survey.
** Assumed from site data after clearance of floor slabs and basements.

6.20 The exploratory holes on the whole confirm a general shallow easterly to south-easterly dip of the strata by approximately 2° this being consistent with the geological information recorded on the published BGS maps. The strata dip is also generally consistent with the local surface gradient.

6.21 However, the Groundtech 2023 investigations did encounter a coal seam at fairly shallow depth within the central section of the proposed building footprint. That appears to be laterally impersistent, considering the very shallow angle of dip and dip direction, as it was not encountered within BH106.

Visual/Olfactory Evidence of Contamination

6.22 No visual and/or olfactory evidence of significant ground contamination were identified within the exploratory holes within the subject site during the investigations.

Groundwater

6.23 Groundwater was only encountered during formation of the BH107 and BH108 at depths of 6.00m and 3.90mbgl within the mudstone and top of mudstone respectively.

6.24 Standing groundwater levels were recorded as perched at depths as shallow as 2.11m but generally within in the solid strata to depths of around 20.00mbgl.

6.25 It should be appreciated that the groundwater monitoring described above was undertaken during a very short period of time. Significant variations in the long-term groundwater regime may occur at other times, particularly with prolonged, extreme weather conditions, and that no account can be taken of such in this report.

General

6.26 It should also be appreciated that ground conditions may vary between and away from the exploratory hole positions, and that no account can be taken in this report of such variations.

7.0 GEOTECHNICAL APPRAISAL

Site Preparation

7.1 It is understood that an appropriate asbestos survey was carried and all asbestos was removed by a specialist contractor prior to demolition commencing.

7.2 It would also appear that site-wide excavation to remove obstructions was underway during April 2023 subsequent groundworks. The stability of existing adjacent infrastructure will however need to be considered where excavations extend up to the site boundary and it may be necessary to retain existing foundations and/or basements as temporary support under such circumstances.

7.3 Demolition materials, including all asphalt/concrete hardstanding and below ground foundations removed as part of the clearance work, subject to appropriate sorting and crushing, would be suitable for re-use as bulk fill beneath hard cover areas.

7.4 Due to the potential for shallow cohesive soils to become softened if exposed to excess moisture, excavations should be undertaken in a controlled manner so as not to overly expose the soil during periods of inclement weather. Also, the site should, where possible be laid to fall and ideally incorporate a surface protective cover and a degree of temporary drainage to prevent surface ponding and thus enable a trafficable site for construction plant.

7.5 Although not considered to be significant any topsoil removed during site preparatory works and considered for re-use should be stockpiled separately from other materials and protected from inclement weather for future use in landscaped and garden areas subject to confirmatory laboratory testing.

Earthworks

7.6 All earthworks should be carried out in accordance with recommendations and guidance provided in BS6031:2009, Code of Practice for Earthworks. The platform construction works are being undertaken in accordance with the Manual of Contract Documents for Highway Works (MCHW) Volume 1, Series 600, Specification for Highway Works (SHW).

7.7 In summary, the works are to comprise the formation of a development plateau using either 6F2 or 6F5 where required to achieve a California Bearing Ratio (CBR) of 5% (when measured in accordance with BS 1377: Soils for civil engineering purposes: Part 4) at a formation level of 450mm below the proposed finished levels of external hardstanding which are anticipated to be 109.00m AOD. The proposed building FFL is 109.10m AOD.

7.8 Following demolition of any basement walls, slabs and foundations, the voids and basements were to infilled with 6F2 material, brought up to level of adjacent existing ground.

7.9 Fill beyond 3.0m of the building footprint will also be constructed by adopting method compaction in accordance with Table 6/4 of SHW Series 0600.

Coal Seams and Shallow Abandoned Mine Workings

7.10 Some of the rotary boreholes drilled during the Soil Mechanics and IFA investigations have record voided and or loose ground such as would indicate the presence of shallow abandoned mine workings possibly in the Soft Bed Coal seam at depths of between 16.70m and 18.30mbgl.

7.11 For situations where abandoned workings occur at relatively shallow depths, standard industry practice normally takes the maximum predicted height of collapse of such workings as being around 10 times the proven or anticipated seam thickness. In other words, where the solid rock cover is greater than 10 times the seam thickness, the risk of surface instability resulting from collapse of workings is reduced as the upward migration of the void is stalled by bulking of the collapsed strata.

7.12 Records indicate the Soft Bed Coal seam to be in the region of 0.80m thick regionally and this has been proven to some extent in one of the boreholes BH107.

7.13 On this basis, a solid rock cover of around 8.00m would be considered sufficient to maintain surface stability from upward migration of voids and current borehole information indicated that this condition is met. However, it may be prudent to assume that excavations for the extraction of coal could have extended beyond the vertical extent of the seam, particularly in view of the possibility that fireclay associated with the seam may also have also been extracted concurrently.

7.14 In view of this, the thickness of the disturbed ground as recorded in the boreholes is taken as a conservative indication of the worked seam thickness in the following table whilst also noting the location in the proposed development:

Hole	Geometry of Workings		Thickness of Workings (m)	10 Times Thickness (m)	Recorded Thickness of rock cover (m)	Proposed Development Location
	Depth to Top (mbgl)	Depth to Base (mbgl)				
Soil Mechanic 2006						
BH3	16.70	18.80	2.10	21.00	**13.90**	Soft landscaping
BH5	18.30	18.60	0.30	3.00	13.50	Soft landscaping
WML 2017						
BH106	18.70	19.10	0.40	4.00	13.90	Soft landscaping
BH107	18.90	19.70	0.80	8.00	15.10	Asphalt car Park
BH108	18.30	18.90	0.60	6.00	14.40	Soft landscaping

7.15 However, the rotary holes beneath the proposed building formed to a depth of 40.0mbgl encountered intact coal seams at depths of 16.20m and 4.60mbgl in R01 and R02 respectively, and were between 0.10m and 0.30m in thickness. No voids, broken ground or loss of flush such as would indicate the presence of workings beneath the new structure were encountered.

7.16 Therefore, the risk of surface instability resulting from ground movement associated with collapse of abandoned shallow mine workings is considered to be low beneath the currently proposed building location with no specific remedial measures required.

7.17 If additional structures were to be constructed in other areas of the site, this assessment would need to be updated accordingly.

Possible Mine Shafts

7.18 The Coal Authority reports procured as part of the Phase 1 Desk Study, did not identify the presence of any identified mine shafts within the site. However, based on site history it was indicated that unrecorded mine shafts could be encountered on the site.

7.19 Subsequently, during the demolition of the former structures and removal of the slabs a possible brick lined mine shaft was encountered close to the south-eastern site boundary. The standing water level was approximately 14.50mbgl, but the depth of the feature could not be accurately determined.

7.20 Subsequently the Client has employed a specialist drilling and remediation specialist to investigate and remediate the potential mine shaft under the appropriate Coal Authority Licence. This is being undertaken independently to this report.

7.21 On completion of any drilling and grouting the shaft will need to be capped and suitably marked on the surface with a permanent marker such as a fixed plate so that the shaft position may be readily located and identified in the future.

7.22 Current guidance indicates that new structures should be located in order to maintain a safety zone around the shaft. The new structure is not located over the position of the shaft.

Slopes and Retaining Walls

7.23 After completion of the cut and fill exercise, it is anticipated that changes in elevation across the site will be accommodated in the main by retaining walls with localised landscaped slopes.

7.24 Any slopes created as the result of the cut and fill activities will need to ensure their stability in both short and long-term situations, taking account of local ground and groundwater conditions. In this respect, slopes with angles of up to about 1 vertical in 3 horizontal (i.e. about 18 degrees) will be stable in both short and long term conditions.

7.25 Should steeper slopes be necessary, more detailed slope stability analysis is recommended to determine the stability in the long and short term.

7.26 New retaining walls are anticipated to be supported by spread foundations on natural soils where a net allowable bearing pressure of 150kN/m^2 is considered appropriate. This may need to be reduced to 100kN/m^2 where Cohesive Drift is encountered at formation level.

Foundations

7.27 Made Ground at the site is considered unsuitable for the direct support of structural loads as it is generally incompetent, loose and variable in nature, resulting in the potential for unacceptable total and differential settlements.

7.28 In consideration of the proposed earthworks it is considered that the use of traditional foundations would be impractical and uneconomical.

7.29 Therefore, it is anticipated that the made ground would be amenable to treatment by vibro-compaction to achieve a relatively consistent state of compaction throughout. Under such circumstances, a minimum net allowable bearing pressure of 150kN/m^2 is anticipated. Although this should be confirmed by consultation with a reputable specialist contractor.

7.30 Although not anticipated where foundations and floor slabs are to be constructed close to existing and/or removed trees, identification of the tree species will be required to determine its water demand as provided in Appendix 4.2-A of NHBC Standards 2010, Foundations, Chapter 4.2, Building Near Trees. Assessment of the soil heave or shrinkage potential will then need to be undertaken in consideration of a medium volume change potential for the clay with foundations designed to appropriate depths where such effects are envisaged.

Floor Slabs

7.31 The floor slab can be ground bearing where fully supported on engineered granular fill which has been compacted to an appropriate specification. Floor slabs would need to be suitably reinforced.

Excavations and Groundwater

7.32 Excavations beneath the majority of the site should be feasible using an appropriate scale of hydraulic plant but may very locally extend into mudstone, requiring the use of hydraulic breakers and ripping techniques.

7.33 No significant groundwater inflow is anticipated into excavations although shallow perched groundwater conditions may occur locally. Conventional 'sump and pump' dewatering measures are however considered adequate to keep excavations dry.

Pavement Design

7.34 Earthworks are to comprise the formation of a development plateau using either 6F2 or 6F5 where required to achieve a California Bearing Ratio (CBR) of 5% (when measured in accordance with BS 1377: Soils for civil engineering purposes: Part 4 at a formation level of 450mm below the proposed finished levels of external hardstanding.

7.35 The design value will need to be confirmed by suitable in-situ testing at formation levels following any earthwork operations and prior to pavement construction.

Concrete Design

7.36 Design/mix of buried concrete should be undertaken in accordance with the "Aggressive Chemical Environment for Concrete" (ACEC) classification, of BRE Special Digest 1:2005 (Concrete in Aggressive Ground). In consideration of the current development plan which includes the historically developed areas of the site, it is deemed necessary to classify the site as "Brownfield", with respect to BRE Special Digest.

7.37 Concentrations of 2:1 water/soil extract for sulphate do not exceed 0.06mg/l with values of pH ranging from 7.2 to 11.1 indicating near neutral to alkaline conditions. On the basis of these results, the typical design sulphate (DS) class and "Aggressive Chemical Environment for Concrete" (ACEC) class for the site would be DS-1 and AC-1 respectively.

7.38 However, in view of the potential for sulphate to be present in the PLCM strata, it may be prudent to increase the design class to DS-2 and the ACEC class to AC-2z.

Drainage and Soakaways

7.39 In consideration of the cohesive nature of the natural soils beneath the site, soakaways are not considered a feasible drainage option for the site. However, this may need to be confirmed by appropriate soakaway testing at drainage design stage.

Colliery Spoil

7.40 Although not encountered within any of the exploratory holes, the localised presence of colliery spoil cannot be wholly discounted at the site.

7.41 Such material can be problematic due to its potential to expand / heave on exposure to air and / or inundation with water and its inherently high sulphate content and low pH values, which can be aggressive to buried concrete.

7.42 Also, such material may have the potential to be combustible, particularly if it contains high percentages of coal or is high in carbon content.

7.43 Therefore, if encountered during consideration should be given to removing any such material where it will potentially interact with new building foundations and floor slabs.

8.0 GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA)

General

8.1 A review of the desk study and historical investigations has concluded that the potential for a significant pollution linkage to be present is low with more localised risks associated with the former timber yard and works in the southern section of the site.

8.2 This has been confirmed to a large degree by the physical ground investigation with no significant visual and/or olfactory evidence of significant ground contamination being encountered.

8.3 However, in view of the presence of Made Ground beneath the site, it has been considered prudent to adopt a precautionary principal and undertake chemical analysis of selected samples of sub-surface soils to provide further information on the conceptual model and hence confirm the low human health risk status of the site.

Human Health

8.4 Selected samples have been analysed for a general suite of contaminants of concern and compared against Screening Levels (SL's) for human health to determine the significance of the measured concentrations in relation to the site conceptual model. Thus, a Generic Quantitative Risk Assessment has been undertaken in line with guidelines provided in Land Contamination Risk Management, April 2021.

8.5 The criteria for a limited number of contaminants have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

8.6 Within the document, Category 4 Screening Levels (C4SL's) are described as being more pragmatic than previous screening criteria and represent concentrations in soil that present an 'acceptable' level of risk within the context of Part 2A.

8.7 The National Planning Policy Framework states that 'after development, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990'. Therefore, by inference, the C4SL's are appropriate for use in the planning context.

8.8 Although the SP1010 document states that C4SL only apply for a 'sandy loam soil with 6% soil organic matter', it is generally accepted that assessment criteria for metals are not sensitive to changes in soil organic content (SOM). The C4SL's have therefore been adopted as assessment criteria in this report for the listed metals within the SP1010.

8.9 Subsequent to SP1010, LQM/CIEH have published a document entitled 'The LQM/CIEH S4ULs for Human Health Risk Assessment' 2015. In brief, the document provides updated assessment criteria which have been derived in accordance with UK legislation, national as well as EA policy and using a modified version of the CLEA software and available guidance. The new screening criteria, or Suitable 4 Use Levels (S4ULs), are intended to provide a complete and updated replacement to the previous LQM/CIEH GAC of 2009. As such they are considered appropriate for use in this assessment for other contaminants not covered by C4SL's and/or for organic contaminants assuming a worst-case Soil Organic Matter (SOM) of 1% as an initial conservative assessment.

8.10 For each contaminant, S4UL's and C4SL's have been calculated for six land use scenarios, namely:

- Residential with homegrown produce.
- Residential without homegrown produce.
- Allotments.
- Commercial.
- Public Open Space, near residential housing.

- Public Parks, remote from residential housing.

8.11 In light of the proposed development, the SL's for a "Commercial" end-use are considered appropriate for the assessment at this stage. A table of relevant SL's are provided in Appendix 08.

Soil Test Results

8.12 A total of 22no samples (5no SM 2006, 1no WML 2017 and 16no 2023) generally of topsoil and Made Ground have been analysed as part of the three stages of investigations for suites of Metals, Semi-Metals and PAH's. The results indicate all of the samples contain concentrations below the screening levels for "Commercial" end use.

8.13 16no samples of shallow soils were also submitted for TPH analyses, with no concentrations exceeding the screening levels.

8.14 No asbestos was recorded within any of the soil samples analysed.

Discussion and Conclusions

Human Health

8.15 In consideration of the chemical test results, it is concluded that the site does not contain any significant and/or widespread contamination sources.

8.16 As the site is currently disused and unoccupied, the risk to human health from direct contact with any unrecorded contamination is considered low.

8.17 Following site development, where surfaced with buildings and hardstanding, there will be no mechanism for a direct contact pollution linkage with any unidentified contaminants. Therefore, the risk to end-users will be negligible in such areas.

8.18 However, in consideration of the potential for made ground to be encountered at formation levels within soft landscaped areas, a direct contact pollution linkage will exist and the soils would be unlikely to be considered as a suitable growing medium for plants and grasses. Therefore, it is anticipated that soft landscaping would need to be capped. This will normally comprise a 300mm clean cover, with a minimum 150mm thickness of topsoil and 150mm thickness of sub-soil, over the existing made ground.

Controlled Waters

8.19 In terms of sensitivity, the groundwater within the superficial 'Secondary (A) Aquifer' is considered to be of limited resource value and utilisation.

8.20 There are no Environment Agency Source Protection Zones (SPZ) within 500m of the site.

8.21 There are no rivers of water courses within proximity of the site.

8.22 Subsequently, due to the lack of visual and/or olfactory evidence of significant contamination, as confirmed to a large degree by the results of chemical analyses, the site is not considered to have been unduly impacted by its historical use.

8.23 Therefore, the risk to controlled waters from the site is considered low with no environmental remediation considered necessary.

9.0 GROUND GAS RISK ASSESSMENT

Methodology

9.1 Current guidance for the assessment of risk associated with the presence of hazardous ground gases (principally methane and carbon dioxide) is provided in two key documents, namely:

- Code of practice for the Characterisation and remediation from Ground Gas in Affected Developments. British Standard Institution (BS 8485:2015); and
- Assessing Risks posed by Hazardous Ground Gases to Buildings CIRIA (C665, 2007).

9.2 The assessment presented herein is primarily based on the BS8485 document.

9.3 Hazardous ground gas qualitative risk assessment is based on a conceptual model similar to that used for soil and groundwater contamination sources (i.e., source-pathway-receptor pollutant linkages). A semi-quantitative estimate of risk can be assessed based on knowledge of the conceptual model and a measure of hazardous gas concentration and gas flow at the site within monitoring standpipes.

9.4 Based on the measured flow rates and hazardous gas concentrations, individual "hazardous gas flow rates" (Qhg) can be derived for each monitoring point, from which the "site characteristic hazardous gas flow rate" (Qhgs), and then the "Characteristic Situation" (CS) can be determined.

9.5 BS8485 provides guidance on the level of gas protection requirements based upon the characteristic situation and the proposed development based on building type as outlined in Table 3.

Table 3 - Building Types

	Type A	Type B	Type C	Type D
Ownership	Private	Private or commercial/ Public, possible multiple	Commercial / Public	Commercial / Industrial
Control (Change of use)	None	Some but not all	Full	Full
Room Sizes	Small	Small/ medium	Small to Large	Large Industrial/ Retail Park

9.6 The proposed development therefore is indicated to comprise the construction of Type C which comprise commercial buildings with central building control to undertake building maintenance.

Ground Gas Conceptual Model

9.7 The property is not within an area where radon protection is required.

9.8 There are no active, non-operational or historic landfills within 500m of the site.

9.9 The underlying geology includes abandoned workings within relatively shallow coal seams which could have the potential to release hazardous ground gas through possible lines of weakness in the solid strata such as geological faults or mine entries. However, these are located outside the proposed building footprint.

9.10 No appreciable thickness of made ground with a high organic content or other soil with significant organic content have been encountered beneath the site.

9.11 During previous investigations (Soil Mechanics 2002), ground gas monitoring recorded slightly elevated concentrations of methane, ranging from below detectable limits to 0.40% by volume in air (v/v) and slightly elevated concentrations of carbon dioxide, ranging from below detectable limits to 3.8%v/v. No significant flow rates were recorded.

9.12 In consideration of the preliminary conceptual model, the preliminary risk to the development from ground gas has been assessed as medium. It was therefore considered prudent to undertake ground gas monitoring, primarily for methane and carbon dioxide, with associated flow rates, on a further 4no occasions between 13th January and 15th February 2017.

Monitoring Results and Recommendations

9.13 The results of the combined 10 no gas monitoring visits within the site area indicate concentrations of methane ranging from below detection limits to a maximum of 0.4% by volume in air (v/v in 2006) and a maximum steady state carbon dioxide concentration of 3.8% (v/v).

9.14 No positive ground gas flows were recorded during the monitoring visits.

9.15 The results give a maximum composite Qhg value of <0.004l/hr and indicate the site to classify as Characteristic Situation (CS) 1 – 'Very Low Gas Risk' in accordance with BS8485:2015, with no specific gas protection measures required.

10.0 OTHER POTENTIAL DEVELOPMENT CONSIDERATIONS

Waste Soils Characterisation

10.1 Excavation works undertaken during the development are likely to produce waste soils for which appropriate waste management will be required. In line with current sustainability principals, any waste soils should firstly be considered for re-use where possible by incorporation into the development.

10.2 The re-use of excavated topsoil in such areas should only be considered following further confirmatory chemical analysis.

10.3 It should be noted that the chemical analysis results for disposal classification are assessed against different assessment criteria to those relating to contamination risk assessment. Soils that are deemed suitable for use in terms of risk to human health and the environment may not necessary be un-contaminated and could be classified as Non-Hazardous or even Hazardous for disposal purposes.

10.4 For preliminary guidance based on the current information, it is likely that made ground, would be classified as 'Non-hazardous' with natural soils classified as 'Inert' for landfill disposal.

10.5 However, excavated soils which are contaminated with TPH compounds may classify as 'Hazardous' if disposed to landfill. Any soils containing ACM or significant asbestos fibres may also classify as 'Hazardous' following further quantification analysis.

10.6 In addition, for Inert and Hazardous waste disposal, allowance will need to be made for adequate Waste Acceptance Criteria (WAC) testing with appropriate consideration of the additional time and cost associated with this.

10.7 It will be the responsibility of the waste producer to undertake further testing and classification of any waste soils for disposal to an appropriately licenced landfill in accordance with current guidelines and Duty of Care requirements.

Imported Fill

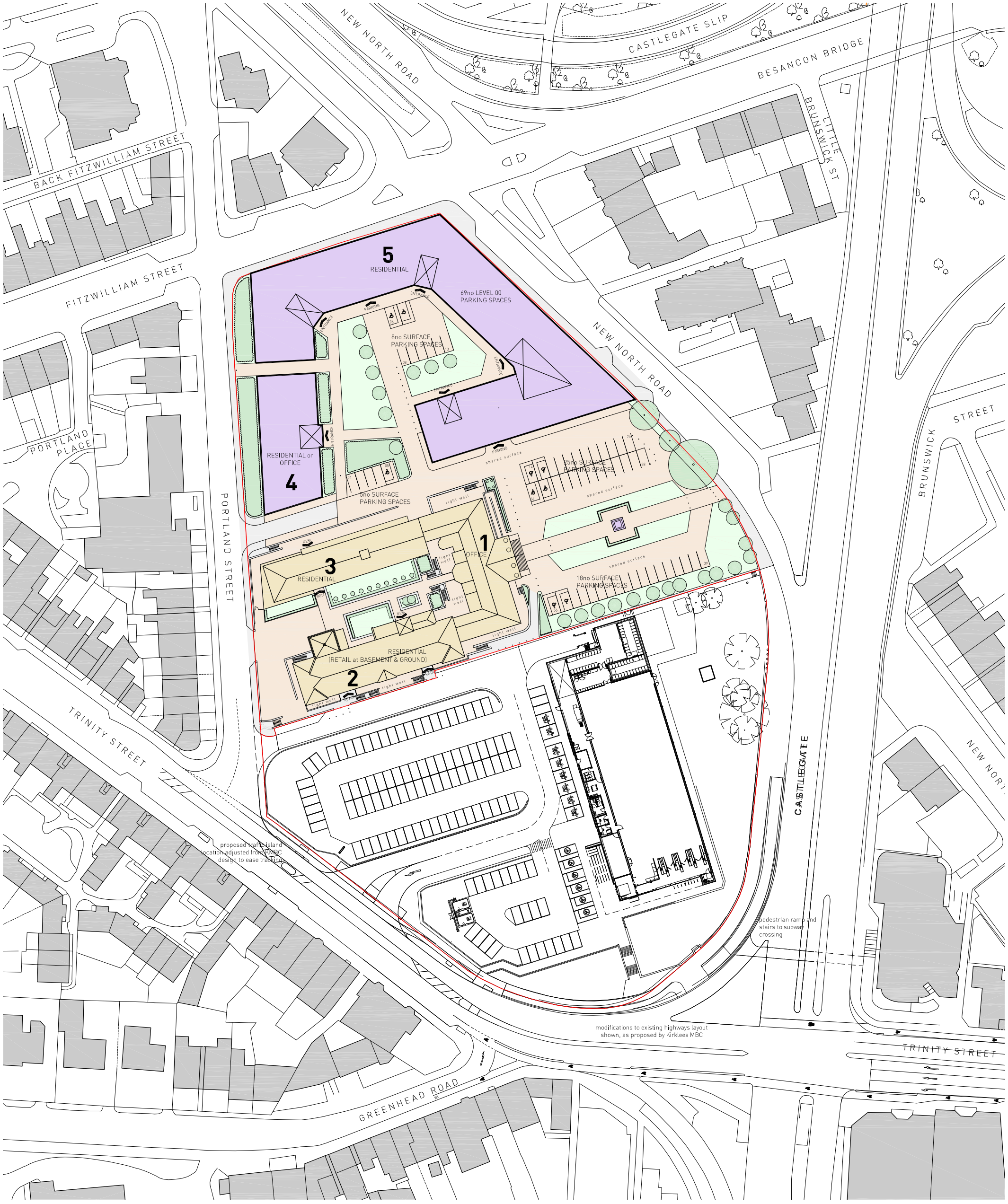
10.8 All imported fill, such as topsoil, will be subject to specific quality requirements. Allowance should be made for testing imported fill materials prior to emplacement to ensure suitability.

Water Supply Pipes

10.9 The utilities company will need to be consulted with regards to the selection of suitable water supply pipe materials for the development. However, in light of the ground conditions encountered, the requirement for specific materials and measures to protect the water supply from ground contamination is not envisaged.

APPENDIX 01

Drawings



WIP 280520

0 10 20 30 40 50m

Scale 1:1000

Rev.	Des.		By	Date	Ch.
T		walkway around SE corner of bldg 8 omitted	JNS	19Jul18	RG
S		minor updates to footprints of bldgs 2 and 8; digital marketing board shown	JNS	11Jul18	RG
R		route from eastern footpath improved as KMBC request; latest Bldg1 design shown.	JNS	02Jul18	RG
P		Bldgs 2+3 shown as new build; minor realignment of steps from highway to supermarket entrance	JNS	01Jun18	RG

APPROVAL

Status:

Client: Trinity One LLP

Job No. 16,047

Project: TRINITY ONE HUDDERSFIELD

Title: Proposed Site Plan

Date: Nov16

Scale: 1/1000@A3

Checked By: RG

Drawing No: 00 001

Drawn By: JNS

Revision: T

ENJOY DESIGN

The Old Brewery
High Court
Leeds
LS2 7ES
Tel: 0113 242 3622
www.enjoy-design.co.uk

PROTECTION OF EXISTING VEGETATION

Trees to be protected where necessary during works by a tree protective barrier, secured to a scaffold tubing framework with fluorescent tape to the top rail. Protective fencing shall be erected on the canopy drip line wherever possible. Laminated, waterproof A4 signs shall be fixed to the fence posts at 10m intervals bearing the words 'PROTECTED TREE ZONE - NO STORAGE OR OPERATIONS WITHIN FENCED AREA'.
Tracking of machinery, storage of chemicals and building materials shall not be permitted within the protected area. Leaks or spills should be removed immediately and the contaminated soil replaced. No bonfires shall be lit within 5m of the canopy spread. Any excavation work beneath the canopy spread shall be carried out by hand.
All works affecting trees within the development shall be subject to BS 5837:2012.

PLANTING SCHEDULES

SHRUB SCHEDULES

FDA_ORNAMENTAL PLANTING SCHEDULE				
Herbaceous				
Nr	Name	Ht in cm	Pot(L)	Density
294	Bergenia cordifolia 'Purpurea'		3L	5.00
360	Carex morrowii 'Evergold'		2L	10.00
Shrub				
Nr	Name	Ht in cm	Pot(L)	Density
133	Berberis thunbergii 'Atropurpurea Nana'	20-25cm	3L	5.00
150	Ceanothus thyrsiflorus repens	30-40cm(D)	3L	5.00
74	Cornus sanguinea 'Mid-Winter Fire'	40-60cm	3L	5.00
86	Cotoneaster 'Coral Beauty'	40-60cm(D)	3L	5.00
691	Euonymus fortunei 'Emerald Gaiety'	20-30cm(D)	3L	5.00
410	Hebe albicans 'Red Edge'	20-25cm	3L	5.00
488	Hebe pinguifolia 'Pagei'	20-30cm(D)	3L	5.00
407	Lavandula angustifolia 'Munstead'	30-40cm	3L	5.00
35	Lonicera nitida 'Baggesen's Gold'	30-40cm	3L	5.00
457	Lonicera nitida 'Maigreen'	30-40cm	3L	5.00
334	Skimmia japonica 'Rubella'	30-40cm	3L	5.00
386	Viburnum davidii	20-25cm	3L	5.00

All shrub material shall be first quality, sturdy, well rooted non-refridgerated stock with well branched heads and fibrous root systems. Shrubs shall be planted into 450mm good quality fibrous topsoil (To BS BS3882:2015) incorporating organic compost and slow release fertiliser in accordance with all good horticultural practice.

A proprietary geotextile membrane (colour: Black) is to be installed between the soil and mulch of the planted areas cut with T or X slits to fit around the plants as required. All plant material shall be a minimum of 3L pot size unless otherwise specified and conform to BS3936 Part 1 and BS 4428. Finished beds shall be dressed with a coarse amenity grade forest bark mulch (nominal particle size 5-75mm), to approved sample.

TREE SCHEDULE

SPECIES		NUMBERS REQUIRED
	Ht in m	4.5+
	Girth in cm	16-18
Acer platanoides 'Crimson King' (ApCK)		5
Betula utilis jacquemontii (Buj)		6
Platanus hispanica (Ph)		3
Prunus avium 'Plena' (PaP)		3
Sorbus aucuparia 'Sheerwater Seedling'(SaS)		9
Sorbus aria 'Majestica' (SaM)		5
Tilia cordata (Tc)		2

All trees to have clear stems to 2.0m above ground level with well developed branching heads with a single, central leader and healthy, fibrous root systems.
Trees shall be planted into pits of an appropriate size to accommodate the root system without restriction, backfilled with a 3:1 topsoil:compost mix and shall be secured to 2no. machine rounded stakes using 2 no. tree ties with rubber spacers.
Finished height of stake shall not exceed 1/3 height of staked tree above ground.

TURFED AREAS

The topsoiled area to be turfed, is to be grade and cross-graded to even running falls, to allow the finished levels of the turf to be 40mm above the adjoining paved areas.
The surface should be lightly and uniformly firmed by rolling or treading and reduced to a fine tiilth up to 25mm in depth. All rubbish, stones greater than 50mm in diameter etc, shall be removed from the surface. Apply an even application of approved fertiliser at a rate of 70g/m² and rake in. No turves shall be laid in exceptionally frosty weather or in other unsuitable weather conditions.
The turves shall be laid in a stretcher bond pattern, closely butted and firmed into position, to the correct levels. The turves should be laid off planks, working over turves previously laid. A dressing of fine, sifted topsoil (complying with BS 3882) should be applied to the laid turf and brushed well into the joints.
Turves shall be watered regularly to prevent them drying out before they establish.

BULB PLANTING

	Name	Grade (cm)	Planting density
12400	Narcissus pseudonarcissus lobularis ▨	10-11	40/m²

Bulbs to be scattered within the drifts indicated on the masterplan and planted where they fall to create a random and naturalised planting effect. Bulbs to be planted at the rate shown into ground which has been forked over to loosen it prior to planting. Bulbs shall be planted at the required depths for the particular species.

Rev.A: Removal of additional existing trees and replacement planting (SF) Oct 2020

Sue Farmer BA MALD MLI
Landscape Architect

fdalandscape

Westleigh Hall
Wakefield Road
Denby Dale
Huddersfield HD8 8QJ
telephone 01484 861611
fax 01484 861616
isdn 01484 866900
email info@fdalandscape.co.uk
www.fdalandscape.co.uk

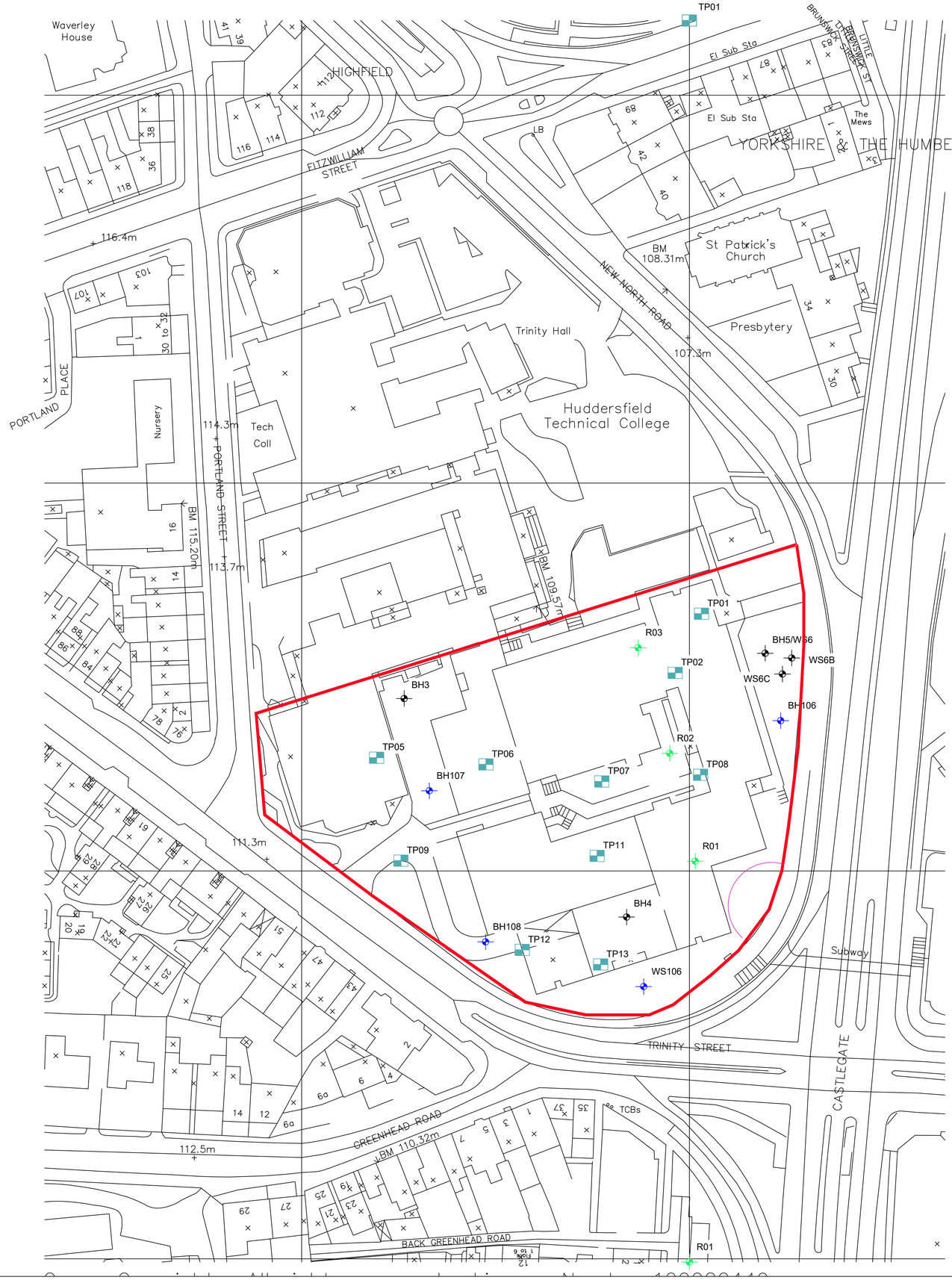
client
Lidl Great Britain Ltd

project
Proposed Store Extension

TRINITY STREET,
HUDDERSFIELD

drawing title
LANDSCAPE DETAILS

scale	date	drwn by	drawing no
1:250 @A1	Aug 20	SF	R/2377/1A



LEGEND

SOIL MECHANICS 2006

BH3 — ROTARY BOREHOLES

WS6 — WINDOW SAMPLE HOLES

IAN FARMER - 2017

BH106 — ROTARY BOREHOLES

WS106 — WINDOW SAMPLE HOLES

GROUNDTECH CONSULTING - 2023

R01 — ROTARY BOREHOLES

WNL CONSULTING - 2023

TP01 — TRIAL PITS

APPROXIMATE LOCATION OF SHAFT/WELL ENCOUNTERED DURING SITE STRIP - 2023

NOTES - TRIAL PIT NUMBERS (2023) TP03, TP04, TP10 NOT USED.

GENERAL NOTES

1. DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.
2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.
3. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
4. THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH & SAFETY PLAN.

Rev.	Amendment	Date	By	Chkd

Project
TRINITY STREET, HUDDERSFIELD

Client
STAINFORTH CONSTRUCTION

Title
EXPLORATORY HOLE LOCATION PLAN

Drawn	Checked	Date	Scale
SCS	TPB	11/04/2023	1:500@A1

WML CONSULTING
Chartered Civil and Structural Engineers
Third Floor South
Metropolitan House
Station Toad
Cheadle Hulme
Cheshire SK8 7AZ
Tel 0161 482 0600
Fax 0161 486 9210
e-mail info@wmlconsulting.com
www.wmlconsulting.com

Job No.	Drawing No.
7913G	SK-01 -

APPENDIX 02

Site Photographs

Photograph 1
View south-east across southern site area.

Photograph 2
View north-west across northern site area.

Photograph 3
View south from northern boundary.

Photograph 4
Red shoring depicts approximate location of encountered shaft on the south-eastern boundary.

APPENDIX 03

Soil Mechanics Report Excerpts - 2006

Borehole Log

Soil Mechanics

Drilled MB Logged BF Checked JH/RCG	Start 27/07/2006 End 28/07/2006	Equipment, Methods and Remarks Beretta T41 Rotary open hole drilling. Rotary core drilling (PWF size, 87mm diameter core).	Depth from 0.00m 6.00m	to 6.00m 20.00m	Diameter 121mm 121mm	Casing Depth 2.40m	Ground Level +109.56 mOD Coordinates E 414030.00 National Grid N 416845.00

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.20	ES 1	0.00-1.20 m Hand dug inspection pit		
0.40	ES 2			
0.60	ES 3			
1.20-1.65	SPT S	N=21 (3,5/5,4,5,7)		
1.20-1.65	D 4			
1.25-2.40	100 NR NR	NA		
2.40-2.90	100 NR NR			
2.90-3.70	100 98 31	NI 50 150		
3.70-5.20	100 73 63	NI 100 150		
5.20-6.00	100 43 19	NI NI 150		
			27/07/2006 2.40	1800
			28/07/2006 2.40	0800
		Flush: 1.25-16.70 Water, 100 %		

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
BITUMEN (HARDSTANDING)	0.00 +109.56 (0.30)		
Limestone HARDCORE (SUB-BASE)	0.30 +109.26		
Stiff orange mottled grey slightly sandy gravelly CLAY with occasional cobbles. Gravel and cobbles are of sandstone.	(0.95)		
Stiff orange brown sandy gravelly CLAY. Gravel is angular fine to coarse of sandstone and occasionally coal. Occasional very thin beds of moderately strong sandstone.	1.25 +108.31 (1.55)		
Very weak thinly laminated to very thinly bedded grey SILTSTONE with occasional very thin and thin beds of sandstone. Discontinuities: subhorizontal, very closely spaced, planar, smooth. 3.30-3.50 m 30 degree fractures	2.80 +106.76 (0.73)		
Weak thinly laminated dark grey MUDSTONE. Discontinuities: subhorizontal, closely spaced, planar, smooth, and with orange brown staining or clean.	3.53 +106.03 (2.47)		
Dark grey MUDSTONE (Foreman's description)	6.00 +103.56		
Stratum continues to 16.70 m			

Depth	RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From to (m)

Chiselling

Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	HUDDERSFIELD TECHNICAL COLLEGE
Project No.	A6111
Carried out for	Huddersfield Technical College

Borehole

BH3

Borehole Log

Soil Mechanics

Drilled MB Logged BF Checked JH/RCG	Start 27/07/2006 End 28/07/2006	Equipment, Methods and Remarks Beretta T41 Rotary open hole drilling. Rotary core drilling (PWF size, 87mm diameter core).	Depth from / to / Diameter / Casing Depth 0.00m 6.00m 121mm 2.40m 6.00m 20.00m 121mm	Ground Level +109.56 mOD Coordinates E 414030.00 National Grid N 416845.00

Samples and Tests / Strata

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Description (Continued from Sheet 1)	Depth, Level (Thickness)	Legend	Backfill/ Instruments
6.00-20.00	Rotary Open Hole Drilling					Dark grey MUDSTONE (Foreman's description)	(10.70)		
						VOID (Foreman's description)	16.70 +92.86 (0.30)		
			Flush: 16.70-20.00 Water, 0 %			LOOSE GROUND (Foreman's description) (Possibly collapsed workings)	17.00 +92.56 (1.80)		SP
				28/07/2006 2.40		Dark grey MUDSTONE (Foreman's description)	18.80 +90.76 (1.20)		
Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	EXPLORATORY HOLE ENDS AT 20.00 m			

Groundwater Entries

No. Struck (m) Post strike behaviour Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From to (m)

Chiselling

Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project HUDDERSFIELD TECHNICAL COLLEGE

Project No. A6111

Carried out for Huddersfield Technical College

Borehole BH3

Sheet 2 of 2

Borehole Log

Soil Mechanics

Drilled MB Logged BF Checked JH/RCG	Start 31/07/2006 End 31/07/2006	Equipment, Methods and Remarks Baretta T41 Rotary core drilling (PWF size, 87mm diameter core)	Depth from / to / Diameter / Casing Depth 0.00m / 18.90m / 121mm / 1.65m	Ground Level +105.65 mOD Coordinates E 414082.00 National Grid N 416785.00	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.20	ES 1	0.00-1.20 m Hand dug inspection pit		
0.40	ES 2			
0.90	ES 3			
1.20-1.65	SPT S	N=22 (3,4/4,5,6,7)		
1.20-1.65	D 4			
1.50	ES 5			
1.65-2.40	40 NR NR	NA		
2.65-2.80	ES 6			
2.40-3.90	87 87 23			
3.90-4.35	SPT S N=39 (3,5/7,9,11,12)			
3.90-4.35	D 7			
3.90-5.40	100 77 33	NI 75 150		
		Flush: 0.00-8.90 Water, 100 %		
5.40-6.90	89 44 27			
6.90-8.40	100 70 11			
8.40-9.90	100 77 50			
		NI 100 350	31/07/2006 1.65	1800 3.30

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
BITUMEN (HARDSTANDING)	0.10 +105.55		
Orange sandy angular GRAVEL of sandstone and limestone. (SUB-BASE)	0.30 +105.35		
Stiff grey and brown slightly sandy gravelly CLAY. Gravel is angular fine to coarse of sandstone, brick, limestone, clinker and occasional slag. Sand is ash. (MADE GROUND)	(1.35)		
Stiff brown sandy gravelly CLAY. Gravel is angular fine to coarse of mainly sandstone. 1.65-2.10 m AZCL	1.65 +104.00		
	(0.75)		
2.25-2.40 m Cobble-of-strong light grey sandstone			
Very weak thinly laminated dark grey MUDSTONE locally recovered as clay. 2.40-2.60 m AZCL Discontinuities: subhorizontal to 20 degrees, closely spaced, planar, smooth, stained orange brown.	2.40 +103.25		
3.90-4.25 m Carbonaceous, NI			
	(3.78)		
Weak becoming moderately weak thinly laminated to thinly bedded black carbonaceous MUDSTONE. 6.57-6.64 m 45 degree fracture Discontinuities: subhorizontal, closely spaced, planar, smooth with brown staining.	6.18 +99.47		
	(7.52)		
Stratum continues to 13.70 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From / to (m)

Chiselling

Depths (m) / Time / Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project: HUDDERSFIELD TECHNICAL COLLEGE

Project No.: A6111

Carried out for: Huddersfield Technical College

Borehole

BH4

Borehole Log

Soil Mechanics

Drilled MB Logged BF Checked JH/RDG	Start 31/07/2006 End 31/07/2006	Equipment, Methods and Remarks Beretta T41 Rotary core drilling (PWF size, 87mm diameter core)	Depth from 0.00m	to 18.90m	Diameter 121mm	Casing Depth 1.65m

Ground Level	+105.65 mOD
Coordinates	E 414082.00
National Grid	N 416786.00

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
				01/08/2006 1.65	0800 4.70
9.90-11.40	100 87 40				
11.40-12.90	100 95 0				
12.90-14.40	100 53 37	NI			
14.40-15.90	100 77 57		Flush: 9.90-18.90 Polymer mud, 100 %		
15.90-17.40	100 77 39	NI 100 450			
17.40-18.90	100 83 55				
				01/08/2006 1.65	2.40

Strata

Description (Continued from Sheet 1)		Depth, Level (Thickness)	Legend	Backfill/ Instruments
Weak becoming moderately weak thinly laminated to thinly bedded black carbonaceous MUDSTONE.				
Discontinuities: subhorizontal, closely spaced, planar, smooth with brown staining.	10.49-10.51 m 45 degree fracture			
	11.07-11.15 m 45 degree fracture			
	11.23-11.37 m 45 degree fracture			
Very weak and weak black bright COAL.	13.70-14.11 m Subvertical fracture	13.70 +91.95		
		(0.41)		
Weak and moderately weak, thinly bedded orange brown fine to medium grained SANDSTONE.		14.11 +91.54		
Discontinuities : subhorizontal, very closely to closely spaced, undulating, smooth and stained brown.		(0.84)		
Weak thinly laminated to medium bedded dark grey MUDSTONE.		14.95 +90.70		
Discontinuities: subhorizontal, closely spaced, planar, smooth, stained brown with occasional gravelly clay infill (up to 40 mm).	15.87-15.90 m 45 degree fracture	(2.22)		
Thinly interlaminated and thinly interbedded strong light grey SANDSTONE and moderately strong dark grey SILTSTONE.	17.40-17.65 m Mainly sandstone	17.17 +88.48		
Discontinuities: subhorizontal, closely to medium spaced, planar, smooth and clean.	17.90-18.10 m Subvertical fracture	(1.73)		
	18.60-18.90 m Mainly sandstone			
EXPLORATORY HOLE ENDS AT 18.90 m		18.90 +86.75		SP

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From to (m)

Chiselling

Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	HUDDERSFIELD TECHNICAL COLLEGE
Project No.	A6111
Carried out for	Huddersfield Technical College

Borehole

BH4

Borehole Log

Soil Mechanics

Drilled PS **Logged** BF **Checked** JH/RCG	**Start** 10/08/2006 **End** 11/08/2006	**Equipment, Methods and Remarks** Comacchio GEO 205 Rotary open hole drilling. Rotary core drilling (PWF size, 87mm diameter core)	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 3.20m / 121mm / 3.00m 3.20m / 9.20m / 121mm 9.20m / 21.83m / 121mm			**Ground Level** +106.25 mOD **Coordinates** E 414118.00 **National Grid** N 416858.00	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.00-0.80	ES 1	0.00-0.80 m Hand dug inspection pit		
0.00-3.20	Rotary Open Hole Drilling			
3.20-4.71	52 NR NR	NA		
4.71-6.15	100 69 29			
6.15-7.70	45 32 0	NI NI 150		
7.70-9.20	83 40 0			
		Flush: 0.80-18.28 Water, 100 %		

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Brown slightly clayey gravelly SAND with occasional cobbles of sandstone. Gravel is angular fine to coarse of sandstone and brick. (MADE GROUND)	(0.80)		
Firm to stiff brown sandy gravelly CLAY. Gravel is angular fine to coarse of sandstone and brick. Sand is occasionally ash. (MADE GROUND)	0.80 +105.45 (0.40) 1.20 +105.05		
OVERBURDEN (Foreman's description)	(2.00)		
Stiff yellow brown slightly gravelly CLAY 3.20 m Sandstone boulder (Foreman's record) 3.20-3.93 m AZCL	3.20 +103.05 (1.05)		
Very stiff thinly laminated, occasionally fissured, orange and grey slightly gravelly CLAY. Gravel is angular fine to coarse of sandstone.	4.25 +102.00 (0.55)		
Very weak and weak thinly laminated black carbonaceous MUDSTONE. Discontinuities:subhorizontal to 20 degrees, closely spaced, planar, smooth and stained orange. 6.15-7.00 m AZCL	4.80 +101.45 (2.20)		
Moderately weak black carbonaceous MUDSTONE. Discontinuities: subhorizontal, closely spaced, planar, smooth and stained orange. 7.70-7.95 m AZCL 8.00 m 45 degree fracture	7.00 +99.25 (2.20)		
Grey MUDSTONE (Foreman's description)	9.20 +97.05		
Stratum continues to 18.28 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From / to (m)

Chiselling

Depths (m) / Time / Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project HUDDERSFIELD TECHNICAL COLLEGE

Project No. A6111

Carried out for Huddersfield Technical College

Borehole BH5

Borehole Log

Soil Mechanics

Drilled PS Logged BF Checked JH/RCG	Start 10/08/2006 End 11/08/2006	Equipment, Methods and Remarks Comacchio GEO 205 Rotary open hole drilling. Rotary core drilling (PWF size, 87mm diameter core)	Depth from / to / Diameter / Casing Depth 0.00m – 3.20m / 121mm / 3.00m 3.20m – 9.20m / 121mm 9.20m – 21.83m / 121mm			Ground Level +106.25 mOD Coordinates E 414118.00 National Grid N 416856.00	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
9.20-21.83	Rotary Open Hole Drilling			10/08/2006 3.00	1800 0.50
				11/08/2006 3.00	0800 3.41

Strata

Description (Continued from Sheet 1)	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Grey MUDSTONE (Foreman's description)	(9.08)		
Possible VOID (Foreman's description)	18.28 +87.97 (0.32)		
Grey MUDSTONE (Foreman's description)	18.60 +87.65		
Stratum continues to 21.83 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From to (m)

Chiselling

Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	HUDDERSFIELD TECHNICAL COLLEGE
Project No.	A8111
Carried out for	Huddersfield Technical College

Borehole

BH5

Borehole Log

Soil Mechanics

Drilled	PS	Start	10/08/2006	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	+106.25 mOD
Logged	BF	End	11/08/2006	Comacchio GEO 205 Rotary open hole drilling. Rotary core drilling (PWF size, 87mm diameter core)	0.00m	3.20m	121mm	3.00m	Coordinates	E 414118.00
Checked	JH/RCG				3.20m	9.20m	121mm		National Grid	N 416856.00
					9.20m	21.83m	121mm			

Samples and Tests

Strata

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Description (Continued from Sheet 2)	Depth, Level (Thickness)	Legend	Backfill/ Instruments
			Flush: 18.28-21.83 Water, 0 %			Grey MUDSTONE (Foreman's description)	(3.23)		
				11/08/2006 3.00					
						EXPLORATORY HOLE ENDS AT 21.83 m	21.83 +84.42		SP
Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water				

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From to (m)

Chiselling

Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

AGS

Project	HUDDERSFIELD TECHNICAL COLLEGE
Project No.	A6111
Carried out for	Huddersfield Technical College

Borehole

BH5

Sheet 3 of 3

Dynamic Sampler Hole Log

Soil Mechanics

Drilled GH **Logged** BF **Checked** JHRCG	**Start** 26/07/2006 **End** 25/07/2006	**Equipment, Methods and Remarks** Competitor 130 Dynamic sampling	**Depth from** 0.00m **to** 0.80m **Diameter** 110mm **Casing Depth**	**Ground Level** +106.25 mOD **Coordinates** E 414118.00 **National Grid** N 416856.00

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
		0.00-0.80 m Hand dug inspection pit	26/07/2006	dry

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Concrete sets (HARDSTANDING)	0.08 *+105.18*		
Brown sandy TOPSOIL (Foreman's description)	(0.73)		
EXPLORATORY HOLE ENDS AT 0.80 m	0.80 *+105.45*		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.80		Obstruction.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

AGS

Project HUDDERSFIELD TECHNICAL COLLEGE

Project No. A6111

Carried out for Huddersfield Technical College

Borehole

WS6A

Sheet 1 of 1

Dynamic Sampler Hole Log

Soil Mechanics

Drilled GH Logged BF Checked JH/RCG	Start 26/07/2006 End 26/07/2006	Equipment, Methods and Remarks Competitor 130 Dynamic sampling	Depth from 0.00m	to 0.60m	Diameter 110mm	Casing Depth

Ground Level +105.75 mOD
Coordinates E 414126.00
National Grid N 416856.00

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
		0.00-0.60 m Hand dug inspection pit	26/07/2006	dry

Strata

Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Brown sandy TOPSOIL	(0.60)		
EXPLORATORY HOLE ENDS AT 0.60 m	0.60 +105.15		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.60		Obstruction.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project HUDDERSFIELD TECHNICAL COLLEGE
Project No. A8111
Carried out for Huddersfield Technical College

Borehole

WS6B

Sheet 1 of 1

Dynamic Sampler Hole Log

Soil Mechanics

Drilled GH Logged BF Checked JH/RCG	Start 26/07/2006 End 26/07/2006	Equipment, Methods and Remarks Competitor 130 Dynamic sampling	Depth from 0.00m to 0.60m Diameter 110mm Casing Depth	Ground Level +106.00 mOD Coordinates E 414124.00 National Grid N 416854.00

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
		0.00-0.60 m Hand dug inspection pit	26/07/2006	dry

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Brown sandy TOPSOIL	(0.60)		
EXPLORATORY HOLE ENDS AT 0.60 m	0.60 +105.40		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks *

From	to (m)	
0.60		Obstruction.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	HUDDERSFIELD TECHNICAL COLLEGE
Project No.	A6111
Carried out for	Huddersfield Technical College

Borehole

WS6C

Sheet 1 of 1

Dynamic Sampler Hole Log

Soil Mechanics

Drilled	GH	Start	25/07/2006	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	+105.42 mOD
Logged	BF	End	25/07/2006	Competitor 130 Dynamic sampling	0.00m	4.15m	110mm		Coordinates	E 414118.00
Checked	JH/RCG								National Grid	N 416801.00

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.10	ES 1	0.00-1.20 m Hand dug inspection pit.		
0.20	D 2			
0.50	ES 3			
0.50-1.00	B 4			
1.20-1.65	SPT S	N=7 (2,2/2,2,1,2)		
1.20-1.65	D 5			
1.20-2.10	B 6			
1.20	ES 7			
1.65-2.10	U NR	117 blows No recovery		
2.10-2.55	SPT S	N=23 (3,5/3,3,3,14)		
2.10-2.55	D 8			
2.10-2.75	B 9			
2.20	ES 10			
2.55-2.75	U NR	No recovery		
2.75-3.20	SPT S	N=11 (1,1/-,4,5,2)		
2.75-3.20	D 11			
2.75-3.70	B 12			
3.20-3.25	U NR	64 blows No recovery		
3.70-4.15	SPT S	N=21 (3,8/4,5,5,5)		
3.70-4.15	D 13			
			25/07/2006	dry

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Brown clayey slightly gravelly SAND. Gravel is angular fine to coarse of sandstone, glass and ceramic. Frequent roots (<20mm) and rootlets. Frequent cobbles of sandstone. (TOPSOIL)	0.20 +105.22		
Medium dense dark brown slightly clayey SAND and GRAVEL with occasional cobbles. Gravel is angular fine to coarse of glass, ceramic, bitumen, metal and brick. Cobbles are angular of sandstone, brick, ceramic and bitumen. Odorous. (MADE GROUND)	(3.80)		SP
Very stiff to hard thinly laminated dark brown grey CLAY with occasional staining on laminae planes.	4.00 +101.42		
EXPLORATORY HOLE ENDS AT 4.15 m	4.15 +101.27		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
4.15		Unable to advance sampler further.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	HUDDERSFIELD TECHNICAL COLLEGE
Project No.	A6111
Carried out for	Huddersfield Technical College

Borehole

WS7

Sheet 1 of 1

Dynamic Sampler Hole Log

Soil Mechanics

Drilled	GH	Start	24/07/2006	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	+106.33 mOD
Logged	BF	End	24/07/2006	Competitor 130 Dynamic sampling	0.00m	4.25m	110mm		Coordinates	E 414079.00
Checked	JH/RCG								National Grid	N 416822.00

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.10	ES 1	0.00-1.00 m Hand dug inspection pit		
0.30	D 2			
0.50	ES 3			
0.50-1.00	B 4			
1.00-1.45	SPT S	N=10 (1,1/2,1,3,4)		
1.00-1.45	D 5			
1.00-1.45	B 6			
1.10	ES 7			
1.45-1.90	U 8	8 blows		
1.90-2.00	D 9			
2.00-2.45	SPT S	N=21 (6,5/5,6,5,5)		
2.00-2.45	D 10			
2.00-2.80	B 11			
2.50	ES 12			
2.80-3.25	SPT S	N=26 (3,3/4,6,8,8)		
2.80-3.25	D 13			
2.80-3.80	B 14			
3.80-4.25	SPT S	N=47 (7,6/7,9,14,17)		
3.80-4.25	D 15		24/07/2006	dry

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Wood chippings over fabric membrane. (MADE GROUND)	0.05 +106.28		
Soft to firm black sandy slightly gravelly CLAY. Gravel is angular fine to coarse of sandstone and occasional plastic. Occasional rootlets (TOPSOIL)	0.30 +106.03 (0.60)		
Firm orange very sandy slightly gravelly CLAY. Gravel is angular fine to medium of sandstone, occasional coal and rare ceramic. Occasional cobbles of sandstone. (MADE GROUND)	0.90 +105.43 (1.60)		
Firm and stiff orange mottled grey sandy slightly gravelly CLAY. Gravel is subangular fine to medium of sandstone and rare coal. Occasional subangular cobbles of sandstone.	2.50 +103.83		
Very stiff and hard thinly laminated dark grey CLAY with orange brown staining along laminae planes. Occasional very thin beds of very weak mudstone and thin partings of coal. (Probably weathered MUDSTONE)	(1.75)		
EXPLORATORY HOLE ENDS AT 4.25 m	4.25 +102.08		

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
4.25		Unable to advance sampler further.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	HUDDERSFIELD TECHNICAL COLLEGE
Project No.	A8111
Carried out for	Huddersfield Technical College

Borehole

WS8

Sheet 1 of 1

Dynamic Sampler Hole Log

Soil Mechanics

Drilled	GH
Logged	BF
Checked	JH/RCG

Start	24/07/2006
End	24/07/2006

Equipment, Methods and Remarks
Competitor 130
Dynamic sampling

Depth from	to	Diameter	Casing Depth
0.00m	5.00m	110mm	

Ground Level	+109.71 mOD
Coordinates	E 414025.00
National Grid	N 416795.00

Samples and Tests

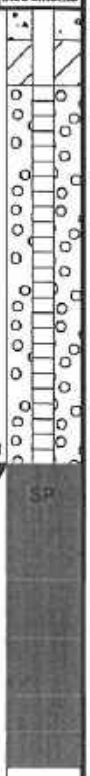
Depth	Type & No	Records	Date Casing	Time Water
0.10	ES 1	0.00-1.00 m Hand dug inspection pit		
0.20	D 2			
0.50	ES 3			
0.50-1.00	B 4			
1.00-1.45	SPT S	N=7 (1,1/2,1,2,2)		
1.00	ES 5			
1.00-1.45	B 6			
1.45-1.90	U 7	123 blows		
1.90-2.00	D 8			
2.00-2.10	ES 9			
2.10-2.65	SPT S	N=8 (1,2/2,1,1,4)		
2.10-2.55	D 10			
2.10-2.55	B 11			
2.50	W 21			
2.55-3.00	U 12	98 blows		
3.00-3.45	SPT S	N=9 (1,1/2,2,3,2)		
3.00-3.10	ES 13			
3.10-3.55	D 14			
3.10-3.55	B 15			
3.55-4.00	U 16	117 blows		
4.00-4.10	ES 17			
4.10-4.55	SPT S	N=11 (2,1/2,3,5,1)		
4.10-4.55	D 18			
4.10-4.55	B 19			
4.55-5.00	SPT S	N=69 (5,8/7,19,18,25)		
4.55-5.00	D 20			
			24/07/2006	dry

Strata

Description	Depth, Level (Thickness)
Firm brown sandy slightly gravelly CLAY. Gravel is subangular fine to coarse of sandstone and occasional cobbles of sandstone. Frequent rootlets (<6mm) and rootlets. (TOPSOIL)	0.20 +109.51
	(0.80)
Very stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular fine to coarse of sandstone. Frequent cobbles of sandstone. (MADE GROUND)	1.00 +108.71
Firm and stiff, locally very stiff, dark grey mottled orange brown sandy slightly gravelly CLAY. Gravel is subangular fine to coarse of sandstone and coal. Occasional subangular cobbles of sandstone between 1.00 and 2.00m. Below 2.50m, mica crystals.	(2.50)
Very stiff locally firm thickly laminated dark grey micaceous CLAY (Probably weathered MUDSTONE)	3.50 +106.21
	(1.50)
EXPLORATORY HOLE ENDS AT 5.00 m	5.00 +104.71

Legend

Backfill/ Instruments



Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.00	-	-

Depth Related Remarks *

From	to (m)	
5.00		Unable to advance sampler further.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

AGS

Project	HUDDERSFIELD TECHNICAL COLLEGE
Project No.	A8111
Carried out for	Huddersfield Technical College

Borehole

WS9

Sheet 1 of 1

Dynamic Sampler Hole Log

Soil Mechanics

Drilled GH **Logged** BF **Checked** JH/RCG	**Start** 25/07/2006 **End** 25/07/2006	**Equipment, Methods and Remarks** Competitor 130 Dynamic sampling	**Depth from** 0.00m **to** 2.55m **Diameter** 110mm **Casing Depth**	**Ground Level** +105.78 mOD **Coordinates** E 414074.00 **National Grid** N 416770.00	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.10	ES 1	0.00-1.20 m Hand dug inspection pit		
0.30	D 2			
0.50	ES 3			
0.50-1.00	B 4			
1.00	ES 5			
1.20-1.65	SPT S	N=12 (3,2/3,3,3,3)		
1.20-1.65	D 6			
1.20-1.65	B 7			
1.30	ES 8			
1.65-2.10	U 9	240 blows		
2.10-2.55	SPT S	N=42 (4,6/8,10,12,12)		
2.10-2.55	D 10		25/07/2006	dry

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Stiff dark brown sandy gravelly CLAY. Gravel is angular fine to coarse of sandstone, brick and occasional ceramic, glass, wood and plastic. Occasional angular cobbles of sandstone and brick and frequent rootlets. (TOPSOIL)	(0.30) 0.30 +105.48		
Hard, becoming very stiff with depth, orange brown mottled dark grey slightly sandy slightly gravelly CLAY. Gravel is angular fine to coarse of sandstone, rare brick and 1 No. nail. (MADE GROUND)	(0.90) 1.20 +104.58		
Very stiff, locally firm, brown slightly gravelly CLAY. Gravel is angular fine to medium of sandstone and coal.	(0.80) 2.00 +103.78		
Very weak thinly laminated dark grey MUDSTONE with occasional orange staining along laminae planes. Occasional laminae of hard clay.	(0.55) 2.55 +103.23		
EXPLORATORY HOLE ENDS AT 2.55 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks *

From	to (m)	
2.55	.	Unable to advance sampler further.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project HUDDERSFIELD TECHNICAL COLLEGE

Project No. A6111

Carried out for Huddersfield Technical College

Borehole

WS10

Sheet 1 of 1

Installation Details

Soil Mechanics

Hole No	Instrument ID	Installation Type	Date of Installation	Tip depth, (m)	Piezometer Diameter (mm)	Top of response zone, (m)	Base of response zone, (m)	Tubing Completion Details	Headworks	Remarks
BH1		SP	7 Aug 2006	2.50	50	0.50	2.50	Gas tap	Stop cock cover	
BH1		SP	7 Aug 2006	20.00	50	5.00	20.00	Gas tap	Stop cock cover	
BH2		SP	3 Aug 2006	17.80	50	5.00	17.80	Gas tap	Stop cock cover	
BH3		SP	28 Jul 2006	18.00	50	9.00	18.00	Gas tap	Stop cock cover	
BH4		SP	31 Jul 2006	18.90	50	3.00	18.90	Gas tap	Stop cock cover	
BH5		SP	11 Aug 2006	21.83	50	4.25	21.83	Gas tap	Stop cock cover	
WS7		SP	25 Jul 2006	1.00	50	0.30	1.00	Gas tap	Stop cock cover	
WS9		SP	24 Jul 2006	3.00	50	0.50	3.00	Gas tap	Stop cock cover	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well Prepared: 04/11/2006 09:36

AGS

Project: HUDDERSFIELD TECHNICAL COLLEGE
Project No.: A6111
Carried out for: Huddersfield Technical College

Table B1

Groundwater Monitoring

Soil Mechanics

Hole No	Instrument ID	Instrument Type	Tip Depth (mBGL)	Reading				
				Date	Time (hhmmss)	Water Level (mBGL) * calculated	Head (m above Tip) * calculated	Comments
BH1		SP	2.50	8 Aug 2006	083000			dry
BH1		SP	2.50	10 Aug 2006	161000			dry
BH1		SP	2.50	16 Aug 2006	124500			dry
BH1		SP	2.50	29 Aug 2006	142000			dry
BH1		SP	20.00	8 Aug 2006	081500	19.16	0.84 *	
BH1		SP	20.00	10 Aug 2006	161500	19.16	0.84 *	
BH1		SP	20.00	16 Aug 2006	125200	19.17	0.83 *	
BH1		SP	20.00	29 Aug 2006	144000	19.20	0.80 *	
BH2		SP	17.80	7 Aug 2006	084500	13.24	4.56 *	
BH2		SP	17.80	10 Aug 2006	121000	13.18	4.62 *	
BH2		SP	17.80	16 Aug 2006	135000	13.41	4.39 *	
BH2		SP	17.80	29 Aug 2006	080000	13.37	4.43 *	
BH3		SP	18.00	2 Aug 2006	082000			dry
BH3		SP	18.00	10 Aug 2006	115200	17.99	0.01 *	
BH3		SP	18.00	16 Aug 2006	134000			dry
BH3		SP	18.00	29 Aug 2006	151000			dry
BH4		SP	18.90	3 Aug 2006	090000	16.20	2.70 *	
BH4		SP	18.90	10 Aug 2006	115200	16.56	2.34 *	
BH4		SP	18.90	16 Aug 2006	133000	15.56	3.34 *	
BH4		SP	18.90	29 Aug 2006	163000	16.79	2.11 *	
BH5		SP	21.83	16 Aug 2006	130500	20.33	1.50 *	
BH5		SP	21.83	29 Aug 2006	161000	20.34	1.49 *	
WS7		SP	1.00	3 Aug 2006	093000			dry
WS7		SP	1.00	10 Aug 2006	114500	0.99	0.01 *	
WS7		SP	1.00	16 Aug 2006	131000	0.98	0.02 *	
WS7		SP	1.00	29 Aug 2006	155000			dry
WS9		SP	3.00	2 Aug 2006	085000	2.40	0.60 *	
WS9		SP	3.00	10 Aug 2006	115500	2.48	0.52 *	
WS9		SP	3.00	16 Aug 2006	132000	2.38	0.62 *	
WS9		SP	3.00	29 Aug 2006	153000	2.25	0.75 *	

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

AGS

Project: HUDDERSFIELD TECHNICAL COLLEGE

Project No.: A6111

Carried out for: Huddersfield Technical College

Table B2

Gas Monitoring

Soil Mechanics

								Detection Limit						
								Unit	%vol	%LEL	%vol	%vol	ppm	ppm
Hole No	Date	Reading Depth, mBGL	Air Temperature, oC	Barometric Pressure, mbar	Groundwater Level, mBGL	Gas Differential Pressure, Pa	Gas Flow Rate, l/hr	Gas	Methane	Methane	Oxygen	Carbon dioxide	Carbon monoxide	Hydrogen sulphide
BH1	8 Aug 2006	2.50	19	1006	dry	0.0	0.1		ND	ND	19.8	0.2	5.9	ND
BH1	16 Aug 2006	2.50			dry				ND	ND	20.4	0.2	ND	ND
BH1	29 Aug 2006	2.50		995	dry		0.0		ND	ND	20.7	ND	ND	ND
BH1	8 Aug 2006	20.00	19	1006	19.16	0.0	0.1		1.1	22.8	20.8	ND	6.1	ND
BH1	16 Aug 2006	20.00			19.17				ND	ND	18.2	1.2	1.9	ND
BH1	29 Aug 2006	20.00		997	19.20		0.0		ND	ND	20.9	ND	ND	ND
BH2	7 Aug 2006	17.80	20	1004	13.24	0.0	0.1		ND	ND	21.0	ND	14.4	ND
BH2	16 Aug 2006	17.80			13.41				ND	ND	14.5	0.5	1.4	ND
BH2	29 Aug 2006	17.80		997	13.37		0.0		ND	ND	18.3	0.3	ND	ND
BH3	2 Aug 2006	18.00	24	1006	dry	0.0	-0.4		ND	ND	16.6	2.7	2.3	ND
BH3	16 Aug 2006	18.00			dry				ND	ND	20.2	ND	3.6	ND
BH3	29 Aug 2006	18.00		997	dry		0.0		ND	ND	8.0	2.9	ND	ND
BH4	3 Aug 2006	18.90	22	1005	16.20	0.0	0.1		0.4	8.3	19.3	ND	33.9	ND
BH4	16 Aug 2006	18.90			15.56				ND	ND	7.7	3.5		1.6
BH4	29 Aug 2006	18.90		997	16.79		-0.6		ND	ND	6.2	3.8	1.7	ND
BH5	16 Aug 2006	21.83			20.33				ND	ND	20.4	0.4	2.0	ND
BH5	29 Aug 2006	21.83		997	20.34		0.0		ND	ND	21.1	ND	ND	ND
WS7	3 Aug 2006	1.00	22	1005	dry				ND	ND	19.1	1.4	ND	ND
WS7	16 Aug 2006	1.00			0.98				ND	ND	19.9	1.1	ND	ND
WS7	29 Aug 2006	1.00		997	dry		0.0		ND	ND	20.8	ND	ND	ND
WS9	2 Aug 2006	3.00	24	1006	2.40	0.0	0.1		ND	ND	20.2	1.0	ND	ND
WS9	16 Aug 2006	3.00			2.38				ND	ND	19.8	0.7	ND	ND
WS9	29 Aug 2006	3.00		997	2.25		0.0		ND	ND	16.0	0.7	ND	ND

Notes: ND - not detected

Project: HUDDERSFIELD TECHNICAL COLLEGE

Project No.: A6111

Carried out for: Huddersfield Technical College

Table B3

INDEX PROPERTIES - SUMMARY OF RESULTS

Project No	Project Name
A6111	HUDDERSFIELD TECHNICAL COLLEGE - PHASE 1 GROUND INVESTIGATION

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	ρ Mg/m³	ρ_d Mg/m³	w %	< 425 µm sieve %	W_L %	W_P %	I_P	ρ_s Mg/m³	Remarks
WS1	7	1.65	2.10	U	Stiff yellowish brown sandy slightly gravelly CLAY. Gravel is weak sandstone.			15	69	36	16	20		
WS1	9	2.16	2.60	D	Brown slightly clayey slightly gravelly SAND with rare sandstone.			12						
WS10	8	1.65	2.10	U	Firm dark brown slightly sandy friable CLAY.			23	100	40	25	15		
WS2	10	1.20	1.65	B	Dark brownish grey mottled yellowish brown slightly sandy slightly gravelly CLAY.			20	72	42	20	22		
WS2	9	1.20	1.65	D	Brown and light brown slightly sandy slightly gravelly CLAY.			20						
WS4	10	1.65	2.00	U	Firm yellowish brown sandy slightly gravelly CLAY. Gravel is sandstone.			19	94	47	22	25		
WS5	5	1.00	1.45	B	Yellowish brown sandy gravelly CLAY.			12	39	38	20	18		
WS5	4	1.00	1.45	D	Yellowish brown sandy slightly gravelly CLAY.			16						
WS8	8	1.45	1.90	U	Firm yellowish brown sandy gravelly CLAY with occasional cobbles.			16	65	34	20	14		
WS8	14	2.80	3.80	B	Dark brown laminated CLAY.			16	100	44	27	17		
WS8	15	3.80	4.25	D	Dark grey laminated CLAY.			11						
WS9	7	1.45	1.90	U	Firm to stiff greyish brown slightly sandy slightly gravelly CLAY.			21	81	44	23	21		
WS9	12	2.55	3.00	U	Firm to stiff dark brownish grey slightly sandy slightly gravelly CLAY with silt pockets.			16	100	32	20	12		
WS9	16	3.55	4.00	U	Firm to stiff greyish brown slightly sandy CLAY.			25	100	48	27	21		

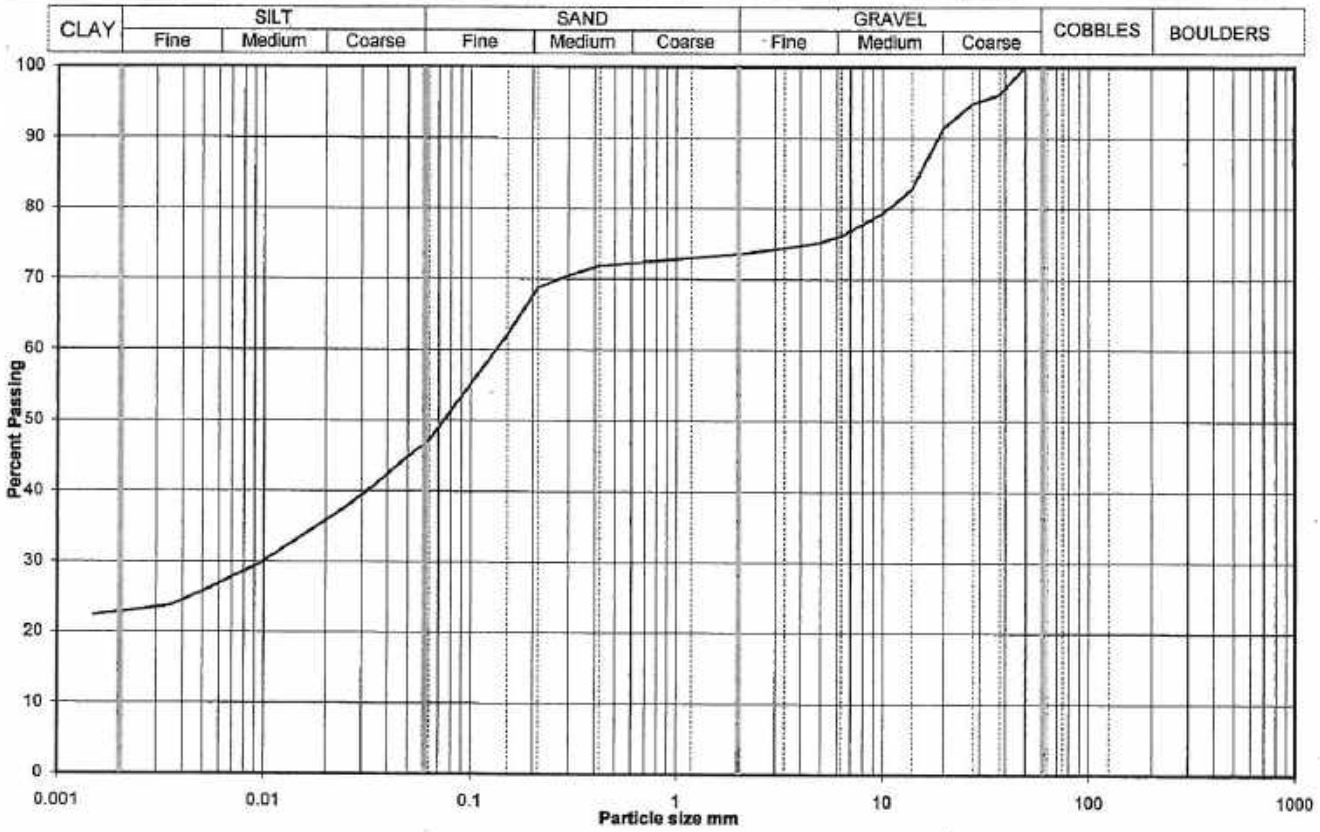
General notes: Definitive method used in all cases unless annotated otherwise. See individual test reports for further details.

Key:

- ρ bulk density, linear
- ρ_d dry density
- w moisture content
- W_L Liquid limit
- W_P Plastic limit
- NP non - plastic
- I_P Plasticity Index
- ρ_s particle density
- -g = gas jar
- -p = small pyknometer

Particle Size Distribution Analysis

Project No	A6111	Sample Details:	Hole No	WS8		
Project Name	HUDDERSFIELD TECHNICAL COLLEGE - PHASE 1 GROUND INVESTIGATION		Depth (m BGL)	1.00		
			Samp No	6	Type	B
			ID	ESGA611120060731000022		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	47
90	100	0.0482	44
75	100	0.0348	41
63	100	0.0251	38
50	100	0.0180	35
37.5	96	0.0095	30
28	95	0.0049	26
20	91	0.0035	24
14	83	0.0015	22
10	79		
6.3	76		
5.0	75		
3.35	74		
2.00	74		
1.18	73	Particle density, Mg/m3	
0.600	72		
0.425	72	2.65 assumed	
0.300	70	Dry mass of sample, kg	
0.212	69		
0.150	62	1.9	
0.063	47		

Soil description	Brown mottled brownish grey slightly sandy slightly gravelly CLAY.	
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377	
Remarks		
Sample Proportions	Cobbles / boulders	0
	Gravel	26
	Sand	27
	Silt	24
	Clay	23

Uniformity Coefficient	D_{60} / D_{10}	#N/A

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

QA Ref SLR 2.9 Rev 0 Nov 04	Soil Mechanics	UKAS 1167	Approved	Redacted
			Date	24.8.06
			Figure	**PSD**

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

Project No	Project Name
A6111	HUDDERSFIELD TECHNICAL COLLEGE - PHASE 1 GROUND INVESTIGATION

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Density bulk Mg/m³	Density dry Mg/m³	w %	Test type	Dia. mm	δ_3 kPa	At failure / end of stage: Axial strain %	$\delta_1 - \delta_3$ kPa	C_u kPa	MODE	Remarks
WS1	7	1.65	2.10	U	Stiff yellowish brown sandy slightly gravelly CLAY. Gravel is weak sandstone.	2.12	1.83	15	UU	101.4	40	19.6	221	111	P	
WS10	9	1.65	2.10	U	Firm dark brown slightly sandy friable CLAY.	1.67	1.36	23	UU	103.7	40	20.1	84	42	P	
WS4	10	1.65	2.00	U	Firm yellowish brown sandy slightly gravelly CLAY. Gravel is sandstone.	1.97	1.66	19	UU	100.6	40	10.3	108	54	C	
WS8	8	1.45	1.90	U	Firm yellowish brown sandy gravelly CLAY with occasional cobbles.	2.12	1.83	16	UU	103.1	35	19.7	123	61	B	
WS9	7	1.45	1.90	U	Firm to stiff greyish brown slightly sandy slightly gravelly CLAY.	1.97	1.63	21	UU	102.0	35	10.8	154	77	B	
WS9	16	3.55	4.00	U	Firm to stiff greyish brown slightly sandy CLAY.	1.93	1.54	25	UU	102.5	75	6.9	146	73	B	

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)
- UUM - multistage test on a single specimen
- suffix R - remoulded or recompacted
- δ_3 cell pressure
- $\delta_1 - \delta_3$ deviator stress
- C_u undrained shear strength
- Mode of failure: P plastic; B brittle; C compound

CHEMICAL TESTS - SUMMARY OF RESULTS

Project No	Project Name
A6111	HUDDERSFIELD TECHNICAL COLLEGE - PHASE 1 GROUND INVESTIGATION

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	pH	Org %	LOI %	Sulphate as SO_4 soil %	Sulphate as SO_4 2:1 g/L	Sulphate as SO_4 water g/L	CO_2 %	Chloride, Cl water sol. %	Chloride, Cl acid sol. %	<2 mm %	Remarks
WS1	5	1.20	1.65	D	Dark brown slightly sandy slightly gravelly CLAY.	7.0				0.06					85	
WS2	6	0.70	0.70	D	Brown and yellowish brown sandy slightly gravelly CLAY.	6.0				0.14					78	
WS3	5	1.65	1.65	D	Light brown and brown sandy gravelly CLAY.	3.6				0.08					40	
WS4	11	2.00	2.45	D	Yellowish brown sandy slightly gravelly CLAY.	5.1				0.04					51	
WS5	6	1.45	1.45	D	Yellowish brown sandy gravelly CLAY.	4.5				0.10					42	
WS8	5	1.00	1.45	D	Yellowish brown sandy slightly gravelly CLAY.	5.3				0.08					58	
WS9	8	1.90	2.00	D	Brownish grey sandy CLAY.	5.0				0.14					78	
WS9	21	2.50	2.50	W		6.2					0.10					

General notes: BS 1377:Part 3:1990 definitive method used in all cases unless annotated otherwise. See individual test reports for further details

Key : 2:1 2:1 water:soil extract from soil; Org Organic matter content; CO_2 Carbonate content (rapid titration)

< 2 mm material passing 2mm sieve; LOI Mass loss on ignition

Units :		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			
Method Codes :		ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICTSCN28	PAHSCUV	WSLM3	WSLM4			
Method Reporting Limits :		0.5	0.1	0.5	0.5	0.5	0.10	0.5	0.5	3.0	1	10		0.5			
UKAS Accredited :		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes			
TES ID Number CU	Client Sample Description	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	CN- (total)	PAH (screening)	pH units	Phenol Index			
0615791	WS 1 ES 2 0.4	30.9	0.47	24	78.2	367.5	2.27	19.6	1.29	140.9	<1	190	7.7	2.1			
0615792	WS 2 ES 4 0.5	15.9	0.21	16.6	32.6	104.5	0.47	13.7	0.52	70.1	<1	152	8.4	2.0			
0615793	WS 2 ES 7 0.8	6.3	<0.1	16.8	16.3	12.7	<0.1	10.6	0.59	29.8	<1	<10	7.9	2.6			
0615794	WS 3 ES 1 0.2	25.7	0.44	18.4	395.3	253.1	0.4	46.2	0.98	236.3	<1	100	7.9	2.7			
0615795	WS 4 ES 1 0.1	28	0.24	19.5	60.9	216.3	0.56	14.0	1.25	64.3	<1	160	5.5	2.2			
0615796	WS 4 ES 3 0.5	10.6	0.17	15.2	23.8	59	0.52	11.8	0.65	44.9	<1	11	5.2	1.0			
0615797	WS 4 ES 6 1	11.8	0.2	16.5	39.1	60.8	1.73	14.2	0.63	55.2	<1	10	5.2	1.2			
0615798	WS 5 ES 2 0.4	5.3	<0.1	12.3	15.3	27.9	0.1	9.8	<0.5	28.6	<1	36	8.0	1.4			
0615787	WS 7 ES 3 0.5	23.4	0.34	21.3	53.4	237.5	1.55	18.3	0.95	124.7	<1	3160	9.5	20.5			
0615788	WS 7 ES 7 1.2	29.1	0.89	25.6	137.4	309.5	0.89	24.8	1.35	284	<1	4680	9.6	5.0			
0615789	WS 8 ES 3 0.5	6.8	0.19	22.3	23.2	29.1	<0.1	21.5	<0.5	71.3	<1	<10	7.6	1.5			
0615790	WS 9 ES 3 0.5	7.3	<0.1	19.8	20.9	50.2	<0.1	17.8	0.57	57.8	<1	38	8.1	1.7			
0615799	WS 10 ES 3 0.5	6.7	<0.1	21.7	24.6	30.1	<0.1	20.6	1.07	66	<1	15	5.7	1.2			

TES Bretby

PO Box 100, Bretby Business Park,

Burton-on-Trent, Staffordshire, DE15 0XD

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name	Soil Mechanics
Contact	Mr J Huntington

Huddersfield-Phase 1

Soils Sample Analysis

Date Printed	23-Aug-06
Report Number	EFS/062723
Table Number	1

TES Bretby

Units :		mg/kg	mg/kg																
Method Codes :		FTIRSWPER	PAHMSUS	SEN9															
Method Reporting Limits :		50	0.08																
UKAS Accredited :		no	no	no															
TES ID Number CL/	Client Sample Description	TPH FTIRPER (AR)	PAH by MS.16(0.08)	Asbestos (screening)															
0615791	WS 1 ES 2 0.4	414	Req	NBFO															
0615792	WS 2 ES 4 0.5	<50	Req	NBFO															
0615793	WS 2 ES 7 0.8	<50		NBFO															
0615794	WS 3 ES 1 0.2	<50	Req	NBFO															
0615795	WS 4 ES 1 0.1	227	Req	NBFO															
0615796	WS 4 ES 3 0.5	<50		NBFO															
0615797	WS 4 ES 6 1	<50		NBFO															
0615798	WS 5 ES 2 0.4	51		NBFO															
0615787	WS 7 ES 3 0.5	1320	Req	NBFO															
0615788	WS 7 ES 7 1.2	4830	Req	NBFO															
0615789	WS 8 ES 3 0.5	<50		NBFO															
0615790	WS 9 ES 3 0.5	<50		NBFO															
0615799	WS 10 ES 3 0.5	<50		NBFO															

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Fax +44 (0) 1283 554422

Client Name	Soil Mechanics
Contact	Mr J Huntington

Huddersfield-Phase 1

Soils Sample Analysis

Date Printed	23-Aug-06
Report Number	EFS/062723
Table Number	1

TES Bretby

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Soil Mechanics: Huddersfield-Phase 1		
Sample Details:	WS 7 ES 3 0.5	**Job Number:**	S06_2723
LIMS ID Number:	CL0615787	**Date Booked in:**	03-Aug-06
QC Batch Number:	1964	**Date Extracted:**	15-Aug-06
Quantitation File:	0818CCC13.D	**Date Analysed:**	21-Aug-06
Directory:	0818ABN.MS5\	**Matrix:**	Soil
Dilution:	20.0	**Ext Method:**	Ultrasonic

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	1.64	182.29	89
Acenaphthylene	208-96-8	3.33	29.91	59
Acenaphthene	83-32-9	3.47	11.33	83
Fluorene	86-73-7	3.88	70.92	96
Phenanthrene	85-01-8	5.04	502.34	97
Anthracene	120-12-7	5.11	143.01	98
Fluoranthene	206-44-0	6.75	440.01	84
Pyrene	129-00-0	7.07	403.20	66
Benzo[a]anthracene	56-55-3	9.01	162.45	69
Chrysene	218-01-9	9.06	167.96	M
Benzo[b]fluoranthene	205-99-2	10.64	163.40	87
Benzo[k]fluoranthene	207-08-9	10.67	62.28	89
Benzo[a]pyrene	50-32-8	11.07	124.31	92
Indeno[1,2,3-cd]pyrene	193-39-5	12.51	73.84	62
Dibenzo[a,h]anthracene	53-70-3	12.56	5.07	64
Benzo[g,h,i]perylene	191-24-2	12.80	75.95	63
Total (USEPA16) PAHs	-	-	2618.27	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	106
Acenaphthene-d10	106
Phenanthrene-d10	119
Chrysene-d12	122
Perylene-d12	122

Surrogates	% Rec
Nitrobenzene-d5	N.D
2-Fluorobiphenyl	121
Terphenyl-d14	81

Concentrations are reported on a wet 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:	Soil Mechanics: Huddersfield-Phase 1		
Sample Details:	WS 7 ES 7 1.2	**Job Number:**	S06_2723
LIMS ID Number:	CL0615788	**Date Booked in:**	03-Aug-06
QC Batch Number:	1964	**Date Extracted:**	15-Aug-06
Quantitation File:	0818CCC11.D	**Date Analysed:**	20-Aug-06
Directory:	0818ABN.MS5\	**Matrix:**	Soil
Dilution:	10.0	**Ext Method:**	Ultrasonic

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	1.64	11.70	74
Acenaphthylene	208-96-8	3.16	2.09	78
Acenaphthene	83-32-9	3.33	21.46	63
Fluorene	86-73-7	3.88	20.44	M
Phenanthrene	85-01-8	5.04	132.16	92
Anthracene	120-12-7	5.11	48.34	93
Fluoranthene	206-44-0	6.75	194.80	82
Pyrene	129-00-0	7.07	186.79	83
Benzo[a]anthracene	56-55-3	9.01	85.17	52
Chrysene	218-01-9	9.05	92.37	85
Benzo[b]fluoranthene	205-99-2	10.63	98.59	88
Benzo[k]fluoranthene	207-08-9	10.67	29.98	89
Benzo[a]pyrene	50-32-8	11.07	83.49	60
Indeno[1,2,3-cd]pyrene	193-39-5	12.50	57.24	M
Dibenzo[a,h]anthracene	53-70-3	12.56	2.59	65
Benzo[g,h,i]perylene	191-24-2	12.79	49.20	M
Total (USEPA16) PAHs	-	-	1116.41	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	112
Acenaphthene-d10	97
Phenanthrene-d10	112
Chrysene-d12	119
Perylene-d12	111

Surrogates	% Rec
Nitrobenzene-d5	N.D
2-Fluorobiphenyl	128
Terphenyl-d14	93

Concentrations are reported on a wet 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.

APPENDIX 04

Exploratory Hole Records 2017

Core Photographs
BH106

Run 1+2: 10.00m-12.50m

Core Photographs
BH106

Run 3+4: 12.50m-15.50m

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			WS106
Contract Number:	Date Started:	Logged By:	Checked By:	Status:	Sheet 1 of 1
42009	06/01/2017	JM	MHW	DRAFT	
Dynamic Sample Borehole Log	Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 12/01/2017	Scale: 1:50

Weather: | Termination: Terminated due to refusal. | SPT Hammer: N/R, Energy Ratio: N/R

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
0.30	D2			(0.40)		MADE GROUND: Dark grey, silty, slightly gravelly, fine and medium SAND with rootlets. Gravel is angular to subrounded, fine to coarse including sandstone, occasional brick and ash.		
0.30	ES1			0.40		Stiff, light brown, mottled grey, slightly sandy, slightly gravelly CLAY. Gravel is subangular to rounded, fine to coarse including sandstone.		
0.40 - 1.20	B3							
0.70	D5							
0.70	ES4							
1.20 - 1.65	D6							
1.20		SPT(S) N=21 (2,4/5,5,5,6)		(2.20)				
1.70	D7							
1.70	D8							
2.00 - 2.45	D9							
2.00		SPT(S) N=27 (4,6/6,6,7,8)		2.60		Dark grey MUDSTONE recovered as very stiff, slightly sandy, slightly gravelly clay. Gravel is subangular to rounded, fine to coarse of mudstone.		
2.80	D10							
3.00 - 3.45	D11			(0.85)				
3.00		SPT(S) N=49 (6,7/49 for 285mm)		3.45		End of Borehole at 3.45m		

Borehole Diameter		Installation			
Depth (m)	Dia (m)	Depth Top	Base (m)	Diameter	Pipe Type
		0.00	1.00		PLAIN
		1.00	3.00		SLOTTED

Water Strikes					
Depth Strike	Depth Casing	Depth Sealed	Time (mins)	Rose to (m)	Remarks

Remarks:

Service inspection pit hand excavated from GL to 1.20m.

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			BH106
Contract Number:	Date Started:	Loggged By:	Checked By:	Status:	Sheet 1 of 3
42009	06/01/2017	JM	MHW	DRAFT	
Rotary Core Drilling Log	Easting: 414119.8	Northing: 416855.4	Ground Level: 106.26mOD	Plant Used: Comacchio 205	Print Date: 25/01/2017	Scale: 1:50
Weather:		Termination:			

Coring Details					Strata Details				Groundwater	
Depth	TCR	SCR	RQD	Fracture Spacing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
						(0.30)		MADE GROUND: Grass over, dark brown, slightly gravelly, fine and medium SAND with rootlets.		
					105.96	0.30		MADE GROUND: Dark brown, sandy, angular to subrounded, fine to coarse GRAVEL including concrete and brick.		
						(0.50)				
					105.46	0.80		Light, yellow brown, very clayey, gravelly, fine to coarse SAND with low cobble content. Gravel is subangular to subrounded, fine to coarse including sandstone.		
						(0.40)				
					105.06	1.20		Yellow brown, clayey SAND with sandstone cobble (driller's description).		
						(3.60)				
					101.46	4.80		Dark grey weathered MUDSTONE (driller's description).		
						(5.20)				
					96.26	10.00				

1 2 3 4 5 6 7 8 9 10

Start & End of Shift Observations				
Date	Time	Depth (m)	Casing (m)	Water (m)

Borehole Diameter		Casing Diameter	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)
20.00	92	12.50	121

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole from 1.20m to 10.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Flush Information					Installation			
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)
11.00	10.00	Water	40%					
12.50	11.00	Water	60%					
14.00	12.50	Water	50%					

Fracture spacing as FI or Min, Average and Max in mm. TCR, SCR and RQD reported in %

IAN FARMER ASSOCIATES	Contract Name: Trinity Street, Huddersfield			Client: WML Consulting		Borehole ID: BH106
	Contract Number: 42009	Date Started: 06/01/2017	Loggged By: JM	Checked By: MHW	Status: DRAFT	Sheet 2 of 3
Rotary Core Drilling Log	Easting: 414119.8	Northing: 416855.4	Ground Level: 106.26mOD	Plant Used: Comacchio 205	Print Date: 25/01/2017	Scale: 1:50
Weather:		Termination:				

Coring Details					Strata Details				Groundwater	
Depth	TCR	SCR	RQD	Fracture Spacing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
10.00 - 11.00	13	0	0	AZCL NI		(0.87)		Assumed zone of core loss, driller notes yellow sandstone cobbles.		
					95.39 95.26	10.87 11.00		Brown, slightly sandy, clayey, subangular, fine to coarse GRAVEL of sandstone and mudstone.		
11.00 - 12.50	43	9	0	AZCL NI 40+ 40	94.41	(0.85) 11.85		Assumed zone of core loss, driller notes dark grey weathered mudstone.		
12.50 - 14.00	43	4	0	AZCL NI 29				Weak to moderately strong, blackish grey MUDSTONE. Discontinuities are 1) 0- 25 degrees, extremely closely spaced to very closely spaced, planar and undulating, smooth, clean and unstained. 2) 80-90 degrees, rare, spacing not discernable, planar, smooth, clean and stained brown. 3) Random, closely to medium spaced, planar and undulating, smooth, clean and unstained.		
14.00 - 15.50	67	16	0	AZCL NI 33 NI		(6.85)				
15.50 - 17.00	86	29	0	AZCL NI 21 40+ 33 NI 30						
17.00 - 18.50	33	0	0	AZCL NI 33 40	87.56	18.70		Assumed zone of core loss, driller notes void/seam.		
18.50 - 20.00	73	25	0	AZCL 40+ 27 NI 33 NI 14 29	87.16 86.89 86.40 86.26	(0.40) 19.10 19.37 (0.49) 19.86 20.00		Weak to moderately strong, blackish grey MUDSTONE (Probably from above void/coal seam). Discontinuities are 1) 0-10 degrees, extremely to very closely spaced, planar, smooth, clean and unstained. 2) 90 degrees, spacing not discernable, planar, smooth, clean and unstained. Extremely weak to medium strong, grey SILTSTONE with		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)
					20.00	92	12.50	121

Flush Information					Installation			
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)
11.00	10.00	Water	40%					
12.50	11.00	Water	60%					
14.00	12.50	Water	50%					

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole from 1.20m to 10.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Fracture spacing as FI or Min, Average and Max in mm. TCR, SCR and RQD reported in %

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			BH106
Contract Number:	Date Started:	Loggged By:	Checked By:	Status:	Sheet 3 of 3
42009	06/01/2017	JM	MHW	DRAFT	
Rotary Core Drilling Log	Easting: 414119.8	Northing: 416855.4	Ground Level: 106.26mOD	Plant Used: Comacchio 205	Print Date: 25/01/2017	Scale: 1:50
Weather:		Termination:			

Coring Details					Strata Details				Groundwater	
Depth	TCR	SCR	RQD	Fracture Spacing	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
								frequent plant fossils and weathered clayey bands <25mm. Discontinuities are 1) 0-20 degrees, extremely to closely spaced, planar, rough, clean and unstained. 2) 70-90 degrees, very closely spaced, planar, rough, clean and unstained.		
								Strong, blackish grey MUDSTONE. Discontinuities are 1) 0-20 degrees, very closely spaced, undulating, smooth, clean and stained brown.		
								End of Borehole at 20.00m		

21 22 23 24 25 26 27 28 29 30

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)
					20.00	92	12.50	121

Flush Information					Installation			
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)
11.00	10.00	Water	40%					
12.50	11.00	Water	60%					
14.00	12.50	Water	50%					

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole from 1.20m to 10.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Fracture spacing as FI or Min, Average and Max in mm. TCR, SCR and RQD reported in %

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			BH107
Contract Number:	Date Started:	Logged By:	Checked By:	Status:	Sheet 1 of 3
42009	18/01/2017	JM		DRAFT	
Rotary Drilling Log	Easting:	Northing:	Ground Level:	Plant Used: Comacchio 205	Print Date: 23/01/2017	Scale: 1:50
Weather:		Termination:			

Samples & In Situ Testing						Strata Details				Groundwater	
Depth	TCR	SCR	RQD	FI	Samples / Tests	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
					D2 0.30 ES1 0.30 B3 0.40		0.10 0.20 0.40		MADE GROUND: Tarmacadam. MADE GROUND: Yellow brown, sandy, angular to subrounded, fine to coarse GRAVEL of sandstone. MADE GROUND: Dark grey, yellow brown, sandy, angular to subrounded, fine to coarse GRAVEL including ash, clinker and sandstone.		
					D5 1.00 ES4 1.00		(1.40)		Firm, brown mottled grey, slightly sandy, slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse sandstone.		
							1.80		Brown, sandy CLAY (driller's description).		
							(1.10)				
							2.90		Dark brown, sandy CLAY (driller's description).		
							(0.90)				
							3.80		Dark grey, weathered MUDSTONE (driller's description).		
							(7.00)				

1 2 3 4 5 6 7 8 9 10

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Flush Information					Installation			
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole drilling from 1.20m to 21.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
6.00	6.00		20	5.80	Slow

Fracture Index reported as number per metre. TCR, SCR and RQD reported in %

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			BH107
Contract Number:	Date Started:	Logged By:	Checked By:	Status:	Sheet 2 of 3
42009	18/01/2017	JM		DRAFT	
Rotary Drilling Log	Easting:	Northing:	Ground Level:	Plant Used: Comacchio 205	Print Date: 23/01/2017	Scale: 1:50
Weather:		Termination:			

Samples & In Situ Testing						Strata Details				Groundwater	
Depth	TCR	SCR	RQD	FI	Samples / Tests	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
									Dark grey, weathered MUDSTONE (driller's description).		
							10.80		Dark grey MUDSTONE (driller's description).		
							(3.40)				
							14.20		Grey MUDSTONE (driller's description).		
							(1.90)				
							16.10		Dark grey MUDSTONE (driller's description).		
							(2.80)				
							18.90		COAL seam (driller's description).		
							(0.80)				
							19.70		Light grey MUDSTONE (driller's description).		

Start & End of Shift Observations				
Date	Time	Depth (m)	Casing (m)	Water (m)

Borehole Diameter		Casing Diameter	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Flush Information				
Top (m)	Base (m)	Flush Type	Return	Flush Colour

Installation			
Top (m)	Base (m)	Type	Dia (mm)

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole drilling from 1.20m to 21.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
6.00	6.00		20	5.80	Slow

Fracture Index reported as number per metre. TCR, SCR and RQD reported in %

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			BH107
Contract Number:	Date Started:	Logged By:	Checked By:	Status:	Sheet 3 of 3
42009	18/01/2017	JM		DRAFT	
Rotary Drilling Log	Easting:	Northing:	Ground Level:	Plant Used: Comacchio 205	Print Date: 23/01/2017	Scale: 1:50
Weather:		Termination:			

Samples & In Situ Testing						Strata Details				Groundwater	
Depth	TCR	SCR	RQD	FI	Samples / Tests	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
							(1.30)		Light grey MUDSTONE (driller's description).		
							21.00		End of Borehole at 21.00m		

Start & End of Shift Observations				
Date	Time	Depth (m)	Casing (m)	Water (m)
18-01-2017	15:00	21.00	10.50	5.10

Borehole Diameter		Casing Diameter	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Flush Information				
Top (m)	Base (m)	Flush Type	Return	Flush Colour

Installation			
Top (m)	Base (m)	Type	Dia (mm)

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole drilling from 1.20m to 21.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
6.00	6.00		20	5.80	Slow

Fracture Index reported as number per metre. TCR, SCR and RQD reported in %

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			BH108
Contract Number:	Date Started:	Logged By:	Checked By:	Status:	Sheet 1 of 3
42009	19/01/2017	JM		DRAFT	
Rotary Drilling Log	Easting:	Northing:	Ground Level:	Plant Used: Comacchio 205	Print Date: 23/01/2017	Scale: 1:50
Weather:		Termination:			

Samples & In Situ Testing						Strata Details				Groundwater	
Depth	TCR	SCR	RQD	FI	Samples / Tests	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
					B1 0.10		0.10		MADE GROUND: Tarmacadam.		
							(0.50)		MADE GROUND: Yellow brown, sandy, angular to subangular, fine to coarse GRAVEL of sandstone		
					D3 0.50 ES2 0.50		0.60		Firm, grey brown, slightly sandy, slightly gravelly, silty CLAY. Gravel is subangular to subrounded, fine and medium including sandstone.		
					D5 1.00 ES4 1.00		(0.60)				
							1.20		Brown, sandy CLAY (driller's description).		
							(0.50)				
							1.70		Dark brown, sandy CLAY (driller's description).		
							(2.20)				
							3.90		Dark grey, weathered MUDSTONE (driller's description).		
							(5.70)				
							9.60		Dark grey MUDSTONE (driller's description).		

Start & End of Shift Observations				
Date	Time	Depth (m)	Casing (m)	Water (m)

Borehole Diameter		Casing Diameter	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)

Flush Information				
Top (m)	Base (m)	Flush Type	Return	Flush Colour

Installation			
Top (m)	Base (m)	Type	Dia (mm)

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole drilling from 1.20m to 21.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
3.90	0.00		20	3.40	Medium

Fracture Index reported as number per metre. TCR, SCR and RQD reported in %

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			BH108
Contract Number:	Date Started:	Logged By:	Checked By:	Status:	Sheet 2 of 3
42009	19/01/2017	JM		DRAFT	
Rotary Drilling Log	Easting:	Northing:	Ground Level:	Plant Used: Comacchio 205	Print Date: 23/01/2017	Scale: 1:50
Weather:		Termination:			

Samples & In Situ Testing						Strata Details				Groundwater	
Depth	TCR	SCR	RQD	FI	Samples / Tests	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
									Dark grey MUDSTONE (driller's description).		
							(3.70)				
							13.30		Grey MUDSTONE (driller's description).		
							(1.30)				
							14.60		Dark grey MUDSTONE (driller's description).		
							(2.00)				
							16.60		Grey MUDSTONE (driller's description).		
							(0.50)				
							17.10		Dark grey MUDSTONE (driller's description).		
							(1.20)				
							18.30		Void/coal seam (driller's description).		
							(0.60)				
							18.90		Light grey MUDSTONE (driller's description).		
							(2.10)				

11 12 13 14 15 16 17 18 19 20

Start & End of Shift Observations				
Date	Time	Depth (m)	Casing (m)	Water (m)

Borehole Diameter	
Depth (m)	Dia (mm)

Casing Diameter	
Depth (m)	Dia (mm)

Flush Information				
Top (m)	Base (m)	Flush Type	Return	Flush Colour

Installation			
Top (m)	Base (m)	Type	Dia (mm)

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole drilling from 1.20m to 21.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
3.90	0.00		20	3.40	Medium

Fracture Index reported as number per metre. TCR, SCR and RQD reported in %

IAN FARMER ASSOCIATES

Contract Name:		Client:			Borehole ID:
Trinity Street, Huddersfield		WML Consulting			BH108
Contract Number:	Date Started:	Logged By:	Checked By:	Status:	Sheet 3 of 3
42009	19/01/2017	JM		DRAFT	
Rotary Drilling Log	Easting:	Northing:	Ground Level:	Plant Used: Comacchio 205	Print Date: 23/01/2017	Scale: 1:50
Weather:		Termination:			

Samples & In Situ Testing						Strata Details				Groundwater	
Depth	TCR	SCR	RQD	FI	Samples / Tests	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation
							21.00		Light grey MUDSTONE (driller's description). End of Borehole at 21.00m		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)
19-01-2017	15:00	21.00	10.50	6.20				

Flush Information					Installation			
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)

Remarks:

Service inspection pit hand excavated from GL to 1.20m. Rotary open hole drilling from 1.20m to 21.00m.

Water Strikes

Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
3.90	0.00		20	3.40	Medium

Fracture Index reported as number per metre. TCR, SCR and RQD reported in %

Core Photographs
BH106

Run 5+6: 15.50m-18.50m

Core Photographs
BH106

Run 7: 18.50m-20.00m

APPENDIX 05

Exploratory Hole Records 2023

WML CONSULTING	Project Title: Trinity West, Lidl Enabling Works		TP01
	Project Number: 7913G	Client: Stainforth Construction	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 14/04/2023	Method: Tracked Excavator	Logged By: TJS	Scale: 1:40

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.10 - 0.30	ES	V=56, 90, 80			0.40	Brown and orangish brown clayey gravelly sand with occasional cobbles. Gravel sized fragments comprise brick, glass and ash. (MADE GROUND)	
					1.00	Firm friable grey mottled orange gravelly CLAY with occasional cobbles and boulders. Gravel, comprises subangular sandstone. (SUPERFICIAL DEPOSITS)	
					1.60	End Of Trial Pit At 1.60 m	
					2.00		
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

WML CONSULTING	Project Title: Trinity West, Lidl Enabling Works		TP02
	Project Number: 7913G	Client: Stainforth Construction	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 14/04/2023	Method: Tracked Excavator	Logged By: TJS	Scale: 1:40

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.20 - 0.40	ES	V=82, 84, 74			0.65	Brown and orangish brown clayey gravelly sand with occasional cobbles. Gravel sized fragments comprise brick, glass and ash. (MADE GROUND)	
					1.00	Stiff orangish brown mottled grey very sandy gravelly CLAY. (SUPERFICIAL DEPOSITS)	
					1.50	End Of Trial Pit At 1.50 m	
					2.00		
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

WML CONSULTING	Project Title: Trinity West, Lidl Enabling Works		TP05
	Project Number: 7913G	Client: Stainforth Construction	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 14/04/2023	Method: Tracked Excavator	Logged By: TJS	Scale: 1:40

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
					0.25	brown and orangish brown clayey gravelly sand with occasional cobbles. Gravel sized fragments comprise brick, glass and ash. (MADE GROUND)	
					0.30	Greyish brown sandstone flagstones. (MADE GROUND)	
					1.00	Orange gravelly sand with occasional cobbles of concrete. Gravel sized fragments comprise sandstone, concrete, metal and brick. (MADE GROUND)	
					1.10	Stiff orangish brown slightly sandy gravelly CLAY. Gravel is fine to coarse of mixed lithologies. (SUPERFICIAL DEPOSITS)	
					2.00	Pale orangish brown very sandy COBBLES of sandstone . (SUPERFICIAL DEPOSITS)	
						End Of Trial Pit At 2.05 m	
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

WML CONSULTING	Project Title: Trinity West, Lidl Enabling Works		TP06
	Project Number: 7913G	Client: Stainforth Construction	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 14/04/2023	Method: Tracked Excavator	Logged By: TJS	Scale: 1:40

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
					0.50	brown and orangish brown clayey gravelly sand with occasional cobbles. Gravel sized fragments comprise brick, glass, plastic and ash. (MADE GROUND)	
					1.00	End Of Trial Pit At 0.50 m	
					2.00		
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
Pit terminated due to presence of temporary utility.

WML CONSULTING	Project Title: Trinity West, Lidl Enabling Works		TP07
	Project Number: 7913G	Client: Stainforth Construction	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 14/04/2023	Method: Tracked Excavator	Logged By: TJS	Scale: 1:40

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.20 - 0.30	ES	V=70, 76, 66			0.40	Pale grey sand and gravel of crushed concrete with fragments of plastic sheeting. (MADE GROUND)	
					1.00	Stiff orangish brown mottled yellow sandy very gravelly CLAY. Gravel is fine to coarse of subangular sandstone. (SUPERFICIAL DEPOSITS)	
					1.50		
					1.55	Pale orangish brown very sandy COBBLES and BOULDERS of sandstone . (SUPERFICIAL DEPOSITS)	
					2.00	End Of Trial Pit At 1.55 m	
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

WML CONSULTING	Project Title: Trinity West, Lidl Enabling Works		TP08
	Project Number: 7913G	Client: Stainforth Construction	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 14/04/2023	Method: Tracked Excavator	Logged By: TJS	Scale: 1:40

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.20 - 0.40	ES				0.40	Brown and orangish brown clayey gravelly sand with occasional cobbles. Gravel sized fragments comprise brick, glass and ash. (MADE GROUND)	
0.70 - 0.90	ES				1.00	Stiff orangish brown mottled grey sandy slightly gravelly CLAY with rare cobbles. (SUPERFICIAL DEPOSITS)	
					1.70		
					1.75	Pale orangish brown very sandy COBBLES of sandstone . (SUPERFICIAL DEPOSITS)	
					2.00	End Of Trial Pit At 1.75 m	
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

WML CONSULTING	Project Title: Trinity West, Lidl Enabling Works		TP12
	Project Number: 7913G	Client: Stainforth Construction	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 14/04/2023	Method: Tracked Excavator	Logged By: TJS	Scale: 1:40

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
0.30 - 0.40	ES	V=68, 52, 60			0.10	Asphalt (MADE GROUND)	
0.70 - 0.90	ES				0.25	Firm yellowish brown slightly clayey sandy gravel. Gravel sized fragments are fine to coarse of mixed lithologies. (MADE GROUND)	
					0.70	Yellowish brown slightly silty sandy gravelly CLAY. (SUPERFICIAL DEPOSITS)	
					1.00	Stiff mid brown slightly sandy gravelly CLAY. Gravel is fine to coarse of mudstone and sandstone. (SUPERFICIAL DEPOSITS)	
					1.90		
					2.00	End Of Trial Pit At 1.90 m	
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

WML CONSULTING	Project Title: Trinity West, Lidl Enabling Works		TP13
	Project Number: 7913G	Client: Stainforth Construction	Sheet 1 Of 1
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 14/04/2023	Method: Tracked Excavator	Logged By: TJS	Scale: 1:40

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water
		V=40, 56, 60			0.70	Mid brown very clayey slightly gravelly slightly cobbly sand. Low content of red brick, concrete and black ash. (MADE GROUND)	
					1.00	Stiff brown sandy gravelly clay with occasional cobbles of concrete. Gravel sized fragments are fine to coarse of brick and concrete. (MADE GROUND)	
					1.30	Stiff friable mid-brown slightly sandy gravelly CLAY. (SUPERFICIAL DEPOSITS)	
					1.90	End Of Trial Pit At 1.90 m	
					2.00		
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered

GROUNDTECH CONSULTING

Rotary Core Log

Borehole No. **RO1**

Sheet 1 of 4

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 11/04/2023 - 12/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										MADE GROUND: Grey clayey sandy angular to sub angular fine to coarse gravel of mixed lithology including bricks and concrete.
							1.20			Brown silty boulder CLAY.
							3.00			Grey sandy MUDSTONE.
							4.00			Dark grey MUDSTONE.
										Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks

1. Hand dug pit to 1.2m bgl. 2. Ground water strike at 36m bgl. 3. No voids, broken ground or loss of flush recorded.

Rotary Core Log

GROUNDTECH CONSULTING

Borehole No. **RO1**

Sheet 2 of 4

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 11/04/2023 - 12/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
							16.20			COAL.
							16.50			Dark grey MUDSTONE.
							17.90			Light grey MUDSTONE.
										Continued on next sheet

11 12 13 14 15 16 17 18 19 20

Remarks

1. Hand dug pit to 1.2m bgl. 2. Ground water strike at 36m bgl. 3. No voids, broken ground or loss of flush recorded.

GROUNDTECH CONSULTING

Rotary Core Log

Borehole No. **RO1**

Sheet 3 of 4

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 11/04/2023 - 12/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							20.50			Brown SANDSTONE.
							24.00			Grey SANDSTONE.
							28.50			Grey sandy MUDSTONE.
										Continued on next sheet

21 22 23 24 25 26 27 28 29 30

Remarks

1. Hand dug pit to 1.2m bgl. 2. Ground water strike at 36m bgl. 3. No voids, broken ground or loss of flush recorded.

Rotary Core Log

GROUNDTECH CONSULTING

Borehole No. **RO1**

Sheet 4 of 4

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 11/04/2023 - 12/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
	▼						34.00			Dark grey SILTSTONE.
							37.50			Light grey SANDSTONE.
							40.00			End of borehole at 40.00 m

31 32 33 34 35 36 37 38 39 40

Remarks

1. Hand dug pit to 1.2m bgl. 2. Ground water strike at 36m bgl. 3. No voids, broken ground or loss of flush recorded.

Rotary Core Log

GROUNDTECH CONSULTING

Borehole No. **RO2**

Sheet 1 of 3

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 12/04/2023 - 13/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										MADE GROUND: Grey clayey sandy angular to sub angular fine to coarse gravel of mixed lithology including bricks and concrete.
							2.60			Grey MUDSTONE.
							3.00			Grey SANDSTONE.
							3.70			Grey MUDSTONE.
							4.60			COAL.
							4.70			Dark grey MUDSTONE.
										Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks

1. Hand dug pit to 1.2m bgl. 2. Ground water strike at 26m bgl. 3. No voids, broken ground or loss of flush recorded.

GROUNDTECH CONSULTING

Rotary Core Log

Borehole No. **RO2**

Sheet 2 of 3

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 12/04/2023 - 13/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							16.00			Light grey SANDSTONE.
							17.00			Brown SANDSTONE.
							18.50			Grey sandy MUDSTONE.
							19.00			Brown SANDSTONE.
							20.00			Continued on next sheet

11 12 13 14 15 16 17 18 19 20

Remarks

1. Hand dug pit to 1.2m bgl. 2. Ground water strike at 26m bgl. 3. No voids, broken ground or loss of flush recorded.

Rotary Core Log

GROUNDTECH CONSULTING

Borehole No. **RO2**

Sheet 3 of 3

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 12/04/2023 - 13/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Grey sandy MUDSTONE.
							24.00			Grey SILTSTONE.
	▼						30.00			End of borehole at 30.00 m

21 22 23 24 25 26 27 28 29 30

Remarks

1. Hand dug pit to 1.2m bgl. 2. Ground water strike at 26m bgl. 3. No voids, broken ground or loss of flush recorded.

GROUNDTECH CONSULTING

Rotary Core Log

Borehole No. **RO3**

Sheet 1 of 3

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 13/04/2023 - 13/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										MADE GROUND: Grey clayey sandy angular to sub angular fine to coarse gravel of mixed lithology including bricks and concrete.
							2.80			Brown SANDSTONE.
							5.50			Grey sandy MUDSTONE.
										Continued on next sheet

Remarks

1. Hand dug pit to 1.2m bgl. 2. No voids, broken ground or loss of flush recorded.

GROUNDTECH CONSULTING

Rotary Core Log

Borehole No.
RO3
Sheet 2 of 3

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 13/04/2023 - 13/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
										18.00 Grey SILTSTONE.
										19.50 Grey sandy MUDSTONE.
										Continued on next sheet

11 12 13 14 15 16 17 18 19 20

Remarks
1. Hand dug pit to 1.2m bgl. 2. No voids, broken ground or loss of flush recorded.

Rotary Core Log

GROUNDTECH CONSULTING

Borehole No. **RO3**

Sheet 3 of 3

Project Name: HUDDERSFIELD TRINITY	Project No. GRO-22410	Co-ords: -	Hole Type RO
Location: HUDDERSFIELD		Level:	Scale 1:50
Client: STAINFORTH CONSTRUCTION		Dates: 13/04/2023 - 13/04/2023	Logged By AJ

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							22.00			Light grey sandy MUDSTONE.
							23.00			Grey brown SANDSTONE.
							25.50			Grey sandy MUDSTONE.
							29.50			Grey SILTSTONE.
							30.00			End of borehole at 30.00 m

21 22 23 24 25 26 27 28 29 30

Remarks

1. Hand dug pit to 1.2m bgl. 2. No voids, broken ground or loss of flush recorded.

APPENDIX 06

Chemical Analyses

2531

ANALYTICAL TEST REPORT

Contract no: 121685

Contract name: Stainforth LLP

Client reference: Trinity Project at Huddersfield - WML Trial Pit Samples

Clients name: Black Rock Environmental Associates

Clients address: 16 Buckingham Crescent
Clayton, Bradford
West Yorkshire
BD14 6EJ

Samples received: 18 April 2023

Analysis started: 18 April 2023

Analysis completed: 25 April 2023

Report issued: 25 April 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Redacted

Approved by:

Samantha Rogerson
Reporting Manager

Unit 6 Parkhead, Greencroft Industrial Park, Stanley, County Durham, DH9 7YB
Tel 01207 528578 Email customerservices@chemtech-env.co.uk
Vat Reg No. 772 5703 18 Registered in England number 4284013

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SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
121685-1	WML TP1 ES1	0.10-0.30	Gravel	-	-	0.5
121685-2	WML TP2 ES1	0.20-0.40	Gravel	-	-	0.5
121685-3	WML TP5 ES1	0.10-0.20	Gravel	-	-	1.4
121685-4	WML TP5 ES2	0.40-0.50	Gravel	-	-	5.2
121685-5	WML TP6 ES1	0.10-0.20	Clay with Gravel	-	-	7.7
121685-6	WML TP7 ES1	0.70-0.90	Gravel	-	-	0.4
121685-7	WML TP8 ES1	0.20-0.40	Clay with Gravel	-	-	2.6
121685-8	WML TP8 ES2	0.70-0.90	Gravel	-	-	2.3
121685-9	WML TP12 ES1	0.20-0.40	Gravel	-	-	2.6
121685-10	WML TP12 ES2	0.70-0.90	Clay with Gravel	-	-	7.7
121685-11	WML TP13 ES1	0.20-0.40	Clay with Gravel	-	-	3.9
121685-12	WML TP13 ES2	0.90-1.10	Gravel	-	-	0.3
121685-13	WML TP13 ES3	1.70-1.90	Gravel	-	-	2.1

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SOILS

Lab number			121685-1	121685-2	121685-3	121685-4	121685-5	121685-6
Sample id			WML TP1 ES1	WML TP2 ES1	WML TP5 ES1	WML TP5 ES2	WML TP6 ES1	WML TP7 ES1
Depth (m)			0.10-0.30	0.20-0.40	0.10-0.20	0.40-0.50	0.10-0.20	0.70-0.90
Date sampled			14/04/2023	14/04/2023	14/04/2023	14/04/2023	14/04/2023	14/04/2023
Test	**Method**	**Units**						
Chromium (III)	CE208	mg/kg CrIII	26	23	23	21	71	45
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Arsenic	$ [M]	mg/kg	11	12	9.1	4.7	6.5	6.4
Cadmium	$ [M]	mg/kg	0.2	0.2	0.4	0.3	0.4	0.4
Chromium	$ [M]	mg/kg	26	23	23	21	71	45
Copper	$ [M]	mg/kg	31	34	19	16	19	17
Lead	$ [M]	mg/kg	42	85	34	30	27	27
Mercury	$ [M]	mg/kg	0.1	0.2	0.3	0.2	< 0.1	< 0.1
Nickel	$ [M]	mg/kg	18	15	14	11	24	13
Selenium	$ [M]	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	$ [M]	mg/kg	74	61	71	72	82	114
pH	CE004 [M]	units	8.5	7.7	10.2	8.7	12.2	12.1
Cyanide (free)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 [M]	mg/kg	0.05	<0.02	0.09	<0.02	1.85	<0.02
Acenaphthylene	CE087 [M]	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	CE087 [M]	mg/kg	0.14	<0.02	0.08	<0.02	0.58	<0.02
Fluorene	CE087 [U]	mg/kg	0.08	<0.02	0.06	<0.02	0.40	<0.02
Phenanthrene	CE087 [M]	mg/kg	0.92	0.06	0.56	0.10	2.78	0.04
Anthracene	CE087 [U]	mg/kg	0.29	<0.02	0.14	0.03	0.71	<0.02
Fluoranthene	CE087 [M]	mg/kg	1.97	<0.02	0.71	0.21	2.93	0.04
Pyrene	CE087 [M]	mg/kg	1.75	<0.02	0.63	0.19	2.58	0.04
Benzo(a)anthracene	CE087 [U]	mg/kg	0.91	<0.02	0.31	0.13	1.32	0.03
Chrysene	CE087 [M]	mg/kg	0.99	0.03	0.34	0.13	1.33	<0.03
Benzo(b)fluoranthene	CE087 [M]	mg/kg	1.16	<0.02	0.34	0.16	1.42	0.02
Benzo(k)fluoranthene	CE087 [M]	mg/kg	0.55	<0.03	0.13	0.06	0.55	<0.03
Benzo(a)pyrene	CE087 [U]	mg/kg	1.09	<0.02	0.32	0.14	1.32	<0.02
Indeno(123cd)pyrene	CE087 [M]	mg/kg	0.69	<0.02	0.17	0.08	0.71	<0.02
Dibenz(ah)anthracene	CE087 [M]	mg/kg	0.17	<0.02	0.05	<0.02	0.18	<0.02
Benzo(ghi)perylene	CE087 [M]	mg/kg	0.78	<0.02	0.21	0.09	0.80	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	11.5	<0.34	4.15	1.31	19.5	<0.34
BTEX & TPH								
MTBE	CE192 [U]	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m & p-Xylene	CE192 [U]	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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SOILS

Lab number			121685-1	121685-2	121685-3	121685-4	121685-5	121685-6
Sample id			WML TP1 ES1	WML TP2 ES1	WML TP5 ES1	WML TP5 ES2	WML TP6 ES1	WML TP7 ES1
Depth (m)			0.10-0.30	0.20-0.40	0.10-0.20	0.40-0.50	0.10-0.20	0.70-0.90
Date sampled			14/04/2023	14/04/2023	14/04/2023	14/04/2023	14/04/2023	14/04/2023
Test	**Method**	**Units**						
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<10	<10	<10	<10	<10	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<10	<10	<10	<10	<10	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	<1	<1	15	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<1	<1	18	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	3.19	2.83	1.70	2.20	2.07	1.73
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	0.12	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	0.12	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6	<6	<6	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	<6	<6	<6	<6	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<15	<15	90	<15	<15	<15
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	<10	35	<10	<10	<10
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

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SOILS

Lab number			121685-7	121685-8	121685-9	121685-10	121685-11	121685-12
Sample id			WML TP8 ES1	WML TP8 ES2	WML TP12 ES1	WML TP12 ES2	WML TP13 ES1	WML TP13 ES2
Depth (m)			0.20-0.40	0.70-0.90	0.20-0.40	0.70-0.90	0.20-0.40	0.90-1.10
Date sampled			14/04/2023	14/04/2023	14/04/2023	14/04/2023	14/04/2023	14/04/2023
Test	**Method**	**Units**						
Chromium (III)	CE208	mg/kg CrIII	25	26	16	19	32	28
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Arsenic	$ [M]	mg/kg	13	9.4	4.0	11	4.5	9.8
Cadmium	$ [M]	mg/kg	0.2	< 0.2	< 0.2	0.3	0.3	0.4
Chromium	$ [M]	mg/kg	25	26	16	19	32	28
Copper	$ [M]	mg/kg	35	36	31	41	20	39
Lead	$ [M]	mg/kg	72	22	23	19	26	40
Mercury	$ [M]	mg/kg	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	$ [M]	mg/kg	22	22	46	87	24	55
Selenium	$ [M]	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	$ [M]	mg/kg	74	66	89	161	74	125
pH	CE004 [M]	units	10.3	7.6	7.0	7.1	9.4	5.8
Cyanide (free)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAH								
Naphthalene	CE087 [M]	mg/kg	1.81	0.07	0.03	<0.02	<0.02	<0.02
Acenaphthylene	CE087 [M]	mg/kg	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	CE087 [M]	mg/kg	2.76	0.19	0.04	<0.02	<0.02	<0.02
Fluorene	CE087 [U]	mg/kg	1.80	0.13	0.03	<0.02	<0.02	<0.02
Phenanthrene	CE087 [M]	mg/kg	16.83	1.01	0.21	<0.02	0.07	<0.02
Anthracene	CE087 [U]	mg/kg	3.96	0.29	0.06	<0.02	<0.02	<0.02
Fluoranthene	CE087 [M]	mg/kg	19.59	0.96	0.18	<0.02	0.11	<0.02
Pyrene	CE087 [M]	mg/kg	16.93	0.78	0.15	<0.02	0.10	<0.02
Benzo(a)anthracene	CE087 [U]	mg/kg	7.23	0.43	0.06	<0.02	0.04	<0.02
Chrysene	CE087 [M]	mg/kg	7.84	0.40	0.07	<0.03	0.05	<0.03
Benzo(b)fluoranthene	CE087 [M]	mg/kg	7.22	0.40	0.06	<0.02	0.05	<0.02
Benzo(k)fluoranthene	CE087 [M]	mg/kg	2.97	0.17	<0.03	<0.03	<0.03	<0.03
Benzo(a)pyrene	CE087 [U]	mg/kg	7.33	0.33	0.05	<0.02	0.04	<0.02
Indeno(123cd)pyrene	CE087 [M]	mg/kg	5.38	0.20	0.03	<0.02	0.02	<0.02
Dibenz(ah)anthracene	CE087 [M]	mg/kg	0.90	0.05	<0.02	<0.02	<0.02	<0.02
Benzo(ghi)perylene	CE087 [M]	mg/kg	4.29	0.20	0.03	<0.02	0.02	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	107	5.62	1.00	<0.34	0.50	<0.34
BTEX & TPH								
MTBE	CE192 [U]	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m & p-Xylene	CE192 [U]	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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SOILS

Lab number			121685-7	121685-8	121685-9	121685-10	121685-11	121685-12
Sample id			WML TP8 ES1	WML TP8 ES2	WML TP12 ES1	WML TP12 ES2	WML TP13 ES1	WML TP13 ES2
Depth (m)			0.20-0.40	0.70-0.90	0.20-0.40	0.70-0.90	0.20-0.40	0.90-1.10
Date sampled			14/04/2023	14/04/2023	14/04/2023	14/04/2023	14/04/2023	14/04/2023
Test	**Method**	**Units**						
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<10	<10	<10	<10	<10	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	86	<10	<10	<10	<10	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	1300	37	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	2265	68	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	523	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	1.63	2.02	1.62	1.56	1.19	1.10
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	0.19	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6	<6	<6	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	<6	<6	<6	<6	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	88	<15	20	<15	<15	<15
EPH Aliphatic (>C35-C44)	CE250	mg/kg	48	<10	<10	<10	<10	<10
Subcontracted analysis								
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD

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SOILS

Lab number			121685-13
Sample id			WML TP13 ES3
Depth (m)			1.70-1.90
Date sampled			14/04/2023
Test	**Method**	**Units**	
Chromium (III)	CE208	mg/kg CrIII	30
Chromium (VI)	CE146	mg/kg CrVI	<1
Arsenic	$ [M]	mg/kg	8.7
Cadmium	$ [M]	mg/kg	0.7
Chromium	$ [M]	mg/kg	30
Copper	$ [M]	mg/kg	46
Lead	$ [M]	mg/kg	20
Mercury	$ [M]	mg/kg	< 0.1
Nickel	$ [M]	mg/kg	93
Selenium	$ [M]	mg/kg	< 1.0
Zinc	$ [M]	mg/kg	137
pH	CE004 [M]	units	7.2
Cyanide (free)	CE077	mg/kg CN	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5
PAH			
Naphthalene	CE087 [M]	mg/kg	<0.02
Acenaphthylene	CE087 [M]	mg/kg	<0.02
Acenaphthene	CE087 [M]	mg/kg	<0.02
Fluorene	CE087 [U]	mg/kg	<0.02
Phenanthrene	CE087 [M]	mg/kg	<0.02
Anthracene	CE087 [U]	mg/kg	<0.02
Fluoranthene	CE087 [M]	mg/kg	<0.02
Pyrene	CE087 [M]	mg/kg	<0.02
Benzo(a)anthracene	CE087 [U]	mg/kg	<0.02
Chrysene	CE087 [M]	mg/kg	<0.03
Benzo(b)fluoranthene	CE087 [M]	mg/kg	<0.02
Benzo(k)fluoranthene	CE087 [M]	mg/kg	<0.03
Benzo(a)pyrene	CE087 [U]	mg/kg	<0.02
Indeno(123cd)pyrene	CE087 [M]	mg/kg	<0.02
Dibenz(ah)anthracene	CE087 [M]	mg/kg	<0.02
Benzo(ghi)perylene	CE087 [M]	mg/kg	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	<0.34
BTEX & TPH			
MTBE	CE192 [U]	mg/kg	<0.02
Benzene	CE192 [U]	mg/kg	<0.01
Toluene	CE192 [U]	mg/kg	<0.01
Ethylbenzene	CE192 [U]	mg/kg	<0.01
m & p-Xylene	CE192 [U]	mg/kg	<0.02
o-Xylene	CE192 [U]	mg/kg	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01

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SOILS

Lab number			121685-13
Sample id			WML TP13 ES3
Depth (m)			1.70-1.90
Date sampled			14/04/2023
Test	**Method**	**Units**	
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	<1
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	1.15
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<15
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10
Subcontracted analysis			
Asbestos (qualitative)	$	-	NAD

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE208	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
$^{M}	Arsenic	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg
$^{M}	Cadmium	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg
$^{M}	Chromium	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Copper	Aqua regia digest, ICP-MS	Dry	M	4	mg/kg
$^{M}	Lead	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Mercury	Aqua regia digest, ICP-MS	Dry	M	0.1	mg/kg
$^{M}	Nickel	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Selenium	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Zinc	Aqua regia digest, ICP-MS	Dry	M	4.5	mg/kg
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE192	MTBE	Headspace GC-FID	As received	U	0.02	mg/kg
CE192	Benzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Toluene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Ethylbenzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	m & p-Xylene	Headspace GC-FID	As received	U	0.02	mg/kg
CE192	o-Xylene	Headspace GC-FID	As received	U	0.01	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		1	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		15	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		10	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

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

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
121685-1	WML TP1 ES1	0.10-0.30	N	
121685-2	WML TP2 ES1	0.20-0.40	N	
121685-3	WML TP5 ES1	0.10-0.20	N	
121685-4	WML TP5 ES2	0.40-0.50	N	
121685-5	WML TP6 ES1	0.10-0.20	N	
121685-6	WML TP7 ES1	0.70-0.90	N	
121685-7	WML TP8 ES1	0.20-0.40	N	
121685-8	WML TP8 ES2	0.70-0.90	N	
121685-9	WML TP12 ES1	0.20-0.40	N	
121685-10	WML TP12 ES2	0.70-0.90	N	
121685-11	WML TP13 ES1	0.20-0.40	N	
121685-12	WML TP13 ES2	0.90-1.10	N	
121685-13	WML TP13 ES3	1.70-1.90	N	

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ADDITIONAL INFORMATION

Notes

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

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

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

Methods, procedures and performance data are available on request.

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

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

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

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

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

For soils and solids, analytical results are inclusive of stones, where applicable.

Moisture Content Calculated on a Wet Weight basis

Chemtech Environmental Limited

TEST REPORT REVISIONS

The table below identifies ammendments that have been made to this test report for each revision.

Test Report Reference	Details of amendments to test report	Issue Date
	Original report issued	

ANALYTICAL TEST REPORT

Contract no: 121982

Contract name: Stainforth Construction Trinity Project Huddersfield

Client reference: -

Clients name: Black Rock Environmental Associates

Clients address: 16 Buckingham Crescent
Clayton, Bradford
West Yorkshire
BD14 6EJ

Samples received: 24 April 2023

Analysis started: 24 April 2023

Analysis completed: 03 May 2023

Report issued: 03 May 2023

Key

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

Redacted

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
121982-1	TP9 Topsoil	-	Loamy Clay with Roots	-	-	29.8
121982-2	TP11 Made Ground	-	Sand with Gravel & Roots	-	-	9.8
121982-3	TP11 Natural Ground	-	Sand with Gravel	-	-	8.7

Chemtech Environmental Limited

SOILS

Lab number			121982-1	121982-2	121982-3
Sample id			TP9 Topsoil	TP11 Made Ground	TP11 Natural Ground
Depth (m)			-	-	-
Date sampled			18/04/2023	18/04/2023	18/04/2023
Test	**Method**	**Units**			
Chromium (III)	CE208	mg/kg CrIII	76	29	29
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1
Arsenic	$ [M]	mg/kg	24	12	2.5
Cadmium	$ [M]	mg/kg	0.4	0.5	0.4
Chromium	$ [M]	mg/kg	76	29	29
Copper	$ [M]	mg/kg	79	24	41
Lead	$ [M]	mg/kg	114	30	12
Mercury	$ [M]	mg/kg	0.3	< 0.1	< 0.1
Nickel	$ [M]	mg/kg	21	17	14
Selenium	$ [M]	mg/kg	< 1.0	< 1.0	< 1.0
Vanadium	$ [M]	mg/kg	34	22	19
Zinc	$ [M]	mg/kg	141	124	73
pH	CE004 [M]	units	7.4	11.9	8.8
Sulphate (2:1 water soluble)	CE061 [U]	mg/l SO_4	56	29	246
Sulphate (acid extractable)	CE062 [M]	mg/kg SO_4	840	8434	1469
Cyanide (free)	CE077	mg/kg CN	<1	<1	<1
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5
PAH					
Naphthalene	CE087 [M]	mg/kg	0.07	0.06	<0.02
Acenaphthylene	CE087 [M]	mg/kg	<0.02	<0.02	<0.02
Acenaphthene	CE087 [M]	mg/kg	0.07	0.08	<0.02
Fluorene	CE087 [U]	mg/kg	0.05	0.04	<0.02
Phenanthrene	CE087 [M]	mg/kg	0.67	0.53	<0.02
Anthracene	CE087 [U]	mg/kg	0.16	0.10	<0.02
Fluoranthene	CE087 [M]	mg/kg	1.02	0.61	0.04
Pyrene	CE087 [M]	mg/kg	0.95	0.58	0.03
Benzo(a)anthracene	CE087 [U]	mg/kg	0.46	0.27	<0.02
Chrysene	CE087 [M]	mg/kg	0.53	0.36	<0.03
Benzo(b)fluoranthene	CE087 [M]	mg/kg	0.55	0.32	0.02
Benzo(k)fluoranthene	CE087 [M]	mg/kg	0.22	0.11	<0.03
Benzo(a)pyrene	CE087 [U]	mg/kg	0.47	0.25	<0.02
Indeno(123cd)pyrene	CE087 [M]	mg/kg	0.33	0.17	<0.02
Dibenz(ah)anthracene	CE087 [M]	mg/kg	0.06	0.04	<0.02
Benzo(ghi)perylene	CE087 [M]	mg/kg	0.32	0.19	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	5.93	3.71	<0.34
BTEX & TPH					
MTBE	CE192 [U]	mg/kg	<0.02	0.21	<0.02
Benzene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01
Toluene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01

Chemtech Environmental Limited

SOILS

Lab number			121982-1	121982-2	121982-3
Sample id			TP9 Topsoil	TP11 Made Ground	TP11 Natural Ground
Depth (m)			-	-	-
Date sampled			18/04/2023	18/04/2023	18/04/2023
Test	**Method**	**Units**			
Ethylbenzene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01
m & p-Xylene	CE192 [U]	mg/kg	<0.02	0.02	<0.02
o-Xylene	CE192 [U]	mg/kg	<0.01	<0.01	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	0.02	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<10	<10	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<10	<10	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	109	206	23
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	71	178	18
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	0.22	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	<6	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	44	477	<15
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	221	<10
Subcontracted analysis					
Asbestos (qualitative)	$	-	NAD	NAD	NAD

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE208	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
$^{M}	Arsenic	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg
$^{M}	Cadmium	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg
$^{M}	Chromium	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Copper	Aqua regia digest, ICP-MS	Dry	M	4	mg/kg
$^{M}	Lead	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Mercury	Aqua regia digest, ICP-MS	Dry	M	0.1	mg/kg
$^{M}	Nickel	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Selenium	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg
$^{M}	Vanadium	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg
$^{M}	Zinc	Aqua regia digest, ICP-MS	Dry	M	4.5	mg/kg
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO_4
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	M	100	mg/kg SO_4
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE192	MTBE	Headspace GC-FID	As received	U	0.02	mg/kg
CE192	Benzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Toluene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Ethylbenzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	m & p-Xylene	Headspace GC-FID	As received	U	0.02	mg/kg
CE192	o-Xylene	Headspace GC-FID	As received	U	0.01	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		15	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		10	mg/kg

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

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

Key

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

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
121982-1	TP9 Topsoil	-	N	
121982-2	TP11 Made Ground	-	N	
121982-3	TP11 Natural Ground	-	N	

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

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

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

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

Methods, procedures and performance data are available on request.

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

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

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

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

For soils and solids, analytical results are inclusive of stones, where applicable.

Moisture Content Calculated on a Wet Weight basis

SCIENTIFIC ANALYSIS LABORATORIES
DELIVERING SCIENCE

Scientific Analysis Laboratories is a limited company registered in England and Wales (No 2514788) whose address is at Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 626869-1

Date of Report: 23-Jan-2017

Customer: Ian Farmer Associates
14-15 Rufford Court
Hardwick Grange
Warrington
Cheshire
WA1 4RF

Customer Contact: Ms Michelle Hirst-Watson

Customer Job Reference: 42009
Customer Site Reference: Trinity Lane, Huddersfield
Date Job Received at SAL: 12-Jan-2017
Date Analysis Started: 17-Jan-2017
Date Analysis Completed: 23-Jan-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with Section 25 of the SAL Quality Manual

UKAS TESTING 1549

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked and authorised by :
Stefan Kondziela
Project Manager

Issued by :
Stefan Kondziela
Project Manager

Redacted

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	**626869 001**	**626869 002**	**626869 003**	**626869 004**	**626869 005**
				Customer Sample Reference	**WS101**	**WS101**	**WS101**	**WS102**	**WS103**
				Bottom Depth	**0.3**	**0.8**	**1.8**	**0.5**	**0.5**
				Date Sampled	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**
				Type	**Sandy Soil**	**Sandy Soil**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Moisture @105C	T162	AR	0.1	%	**13**	**15**	**13**	**22**	**21**
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	**626869 006**	**626869 007**
				Customer Sample Reference	**WS104**	**WS106**
				Bottom Depth	**0.5**	**0.3**
				Date Sampled	**06-JAN-2017**	**06-JAN-2017**
				Type	**Sandy Soil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Moisture @105C	T162	AR	0.1	%	**13**	**15**
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
Miscellaneous

				SAL Reference	**626869 001**	**626869 002**	**626869 003**	**626869 004**	**626869 005**
				Customer Sample Reference	**WS101**	**WS101**	**WS101**	**WS102**	**WS103**
				Bottom Depth	**0.3**	**0.8**	**1.8**	**0.5**	**0.5**
				Date Sampled	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**
				Type	**Sandy Soil**	**Sandy Soil**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Vanadium	T6	A40	1	mg/kg	**14**	**28**	**18**	**19**	**24**
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1
Phenol	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	<0.01	**0.01**	**0.01**	<0.01	<0.01
Sulphur (total)	T21	AR	0.05	%	**0.06**	**0.06**	<0.05	<0.05	<0.05
Total Organic Carbon	T21	M40	0.1	%	**0.4**	**4.6**	**0.3**	**1.6**	**2.2**
Asbestos ID	T27	AR			N.D.	N.D.	N.D.	N.D.	N.D.
pH	T7	AR			**11.1**	**8.4**	**7.5**	**8.0**	**7.9**

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
Miscellaneous

SAL Reference	**626869 006**	**626869 007**
Customer Sample Reference	**WS104**	**WS106**
Bottom Depth	**0.5**	**0.3**
Date Sampled	**06-JAN-2017**	**06-JAN-2017**
Type	**Sandy Soil**	**Topsoil**

Determinand	Method	Test Sample	LOD	Units		
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1
Chromium VI	T6	AR	1	mg/kg	<1	<1
Vanadium	T6	A40	1	mg/kg	**45**	**38**
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1
Phenol	T207	M105	0.1	mg/kg	(9) <1.0	<0.1
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	**0.05**	**0.06**
Sulphur (total)	T21	AR	0.05	%	**0.11**	**0.05**
Total Organic Carbon	T21	M40	0.1	%	**6.0**	**7.3**
Asbestos ID	T27	AR			N.D.	N.D.
pH	T7	AR			**7.8**	**7.2**

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
Heavy Metals(9)

SAL Reference					**626869 001**	**626869 002**	**626869 003**	**626869 004**	**626869 005**
Customer Sample Reference					**WS101**	**WS101**	**WS101**	**WS102**	**WS103**
Bottom Depth					**0.3**	**0.8**	**1.8**	**0.5**	**0.5**
Date Sampled					**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**
Type					**Sandy Soil**	**Sandy Soil**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Arsenic	T6	M40	2	mg/kg	**2**	**26**	**7**	**9**	**8**
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	**15**	**20**	**16**	**16**	**17**
Copper	T6	M40	1	mg/kg	**9**	**120**	**25**	**29**	**25**
Lead	T6	M40	1	mg/kg	**16**	**340**	**38**	**74**	**37**
Mercury	T6	M40	1	mg/kg	<1	**4**	<1	<1	<1
Nickel	T6	M40	1	mg/kg	**10**	**20**	**10**	**12**	**12**
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T6	M40	1	mg/kg	**43**	**160**	**37**	**61**	**46**

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
Heavy Metals(9)

SAL Reference	**626869 006**	**626869 007**
Customer Sample Reference	**WS104**	**WS106**
Bottom Depth	**0.5**	**0.3**
Date Sampled	**06-JAN-2017**	**06-JAN-2017**
Type	**Sandy Soil**	**Topsoil**

Determinand	Method	Test Sample	LOD	Units		
Arsenic	T6	M40	2	mg/kg	**29**	**40**
Cadmium	T6	M40	1	mg/kg	<1	<1
Chromium	T6	M40	1	mg/kg	**81**	**26**
Copper	T6	M40	1	mg/kg	**76**	**86**
Lead	T6	M40	1	mg/kg	**190**	**230**
Mercury	T6	M40	1	mg/kg	<1	<1
Nickel	T6	M40	1	mg/kg	**21**	**24**
Selenium	T6	M40	3	mg/kg	<3	<3
Zinc	T6	M40	1	mg/kg	**140**	**110**

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

SAL Reference	**626869 001**	**626869 002**	**626869 003**	**626869 004**	**626869 005**
Customer Sample Reference	**WS101**	**WS101**	**WS101**	**WS102**	**WS103**
Bottom Depth	**0.3**	**0.8**	**1.8**	**0.5**	**0.5**
Date Sampled	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**	**06-JAN-2017**
Type	**Sandy Soil**	**Sandy Soil**	**Clay**	**Clay**	**Clay**

Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	**0.4**	**0.6**	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	**0.2**	**2.5**	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	**0.1**	**1.6**	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	**1.0**	**11**	<0.1	**0.3**	**0.2**
Anthracene	T207	M105	0.1	mg/kg	**0.3**	**3.7**	<0.1	<0.1	<0.1
Fluoranthene	T207	M105	0.1	mg/kg	**0.4**	**10**	<0.1	**1.3**	**0.3**
Pyrene	T207	M105	0.1	mg/kg	**0.5**	**8.2**	<0.1	**1.3**	**0.3**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**0.2**	**7.0**	<0.1	**0.8**	**0.1**
Chrysene	T207	M105	0.1	mg/kg	**0.3**	**7.3**	<0.1	**0.8**	**0.2**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**0.1**	**7.5**	<0.1	**0.9**	**0.1**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	<0.1	**2.8**	<0.1	**0.5**	<0.1
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**0.1**	**6.2**	<0.1	**0.8**	**0.2**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	**4.1**	<0.1	**0.5**	<0.1
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<0.1	**1.2**	<0.1	**0.1**	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	**4.6**	<0.1	**0.5**	<0.1
PAH(total)	T207	M105	0.1	mg/kg	**3.6**	**79**	<0.1	**7.9**	**1.4**

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

				SAL Reference	**626869 006**	**626869 007**
				Customer Sample Reference	**WS104**	**WS106**
				Bottom Depth	**0.5**	**0.3**
				Date Sampled	**06-JAN-2017**	**06-JAN-2017**
				Type	**Sandy Soil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Naphthalene	T207	M105	0.1	mg/kg	(9) <1.0	**0.2**
Acenaphthylene	T207	M105	0.1	mg/kg	(9) <1.0	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	(9) <1.0	**0.3**
Fluorene	T207	M105	0.1	mg/kg	(9) <1.0	**0.2**
Phenanthrene	T207	M105	0.1	mg/kg	**2.5**	**2.1**
Anthracene	T207	M105	0.1	mg/kg	**1.0**	**0.5**
Fluoranthene	T207	M105	0.1	mg/kg	**5.5**	**2.4**
Pyrene	T207	M105	0.1	mg/kg	**6.2**	**2.2**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**2.0**	**1.2**
Chrysene	T207	M105	0.1	mg/kg	**2.8**	**1.4**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**2.3**	**1.2**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	**1.0**	**0.6**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**2.1**	**1.1**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	**1.4**	**0.6**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	(9) <1.0	**0.2**
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	**1.7**	**0.7**
PAH(total)	T207	M105	0.1	mg/kg	**29**	**15**

SAL Reference: 626869
Project Site: Trinity Lane, Huddersfield
Customer Reference: 42009

Soil Analysed as Soil
TPH UKCWG

				SAL Reference	**626869 002**	**626869 003**
				Customer Sample Reference	**WS101**	**WS101**
				Bottom Depth	**0.8**	**1.8**
				Date Sampled	**06-JAN-2017**	**06-JAN-2017**
				Type	**Sandy Soil**	**Clay**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Benzene	T54	AR	0.001	mg/kg	(13) <0.001	(13) <0.001
Toluene	T54	AR	0.001	mg/kg	<0.001	<0.001
EthylBenzene	T54	AR	0.001	mg/kg	<0.001	<0.001
M/P Xylene	T54	AR	0.001	mg/kg	<0.001	<0.001
O Xylene	T54	AR	0.001	mg/kg	<0.001	<0.001
Methyl tert-Butyl Ether	T54	AR	0.001	mg/kg	<0.001	<0.001
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C10-C12 aliphatic)	T8	M105	1	mg/kg	(9,13) <10	(13) <1
TPH (C12-C16 aliphatic)	T8	M105	1	mg/kg	**(13) 14**	(13) <1
TPH (C16-C21 aliphatic)	T8	M105	1	mg/kg	(13,9) <10	(13) <1
TPH (C21-C35 aliphatic)	T8	M105	1	mg/kg	**(13) 37**	**(13) 2**
TPH (C35-C44 aliphatic)	T8	M105	1	mg/kg	(13,9) <10	(13) <1
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010
TPH (C10-C12 aromatic)	T8	M105	1	mg/kg	**(13) 220**	(13) <1
TPH (C12-C16 aromatic)	T8	M105	1	mg/kg	**(13) 420**	(13) <1
TPH (C16-C21 aromatic)	T8	M105	1	mg/kg	**(13) 2000**	**(13) 2**
TPH (C21-C35 aromatic)	T8	M105	1	mg/kg	**(13) 3100**	**(13) 5**
TPH (C35-C44 aromatic)	T8	M105	1	mg/kg	(13,9) <10	(13) <1

Index to symbols used in 626869-1

Value	Description
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
A40	Assisted dried < 40C
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
AR	As Received
N.D.	Not Detected
9	LOD raised due to dilution of sample
13	Results have been blank corrected.
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos was subcontracted to REC Asbestos.

Method Index

Value	Description
T162	Grav (1 Dec) (105 C)
T7	Probe
T8	GC/FID
T21	OX/IR
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T546	Colorimetry (CF)
T27	PLM
T2	Grav
T6	ICP/OES
T54	GC/MS (Headspace)
T207	GC/MS (MCERTS)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-007
Chromium VI	T6	AR	1	mg/kg	N	001-007
Vanadium	T6	A40	1	mg/kg	U	001-007
Cyanide(Total)	T546	AR	1	mg/kg	M	001-007
Phenol	T207	M105	0.1	mg/kg	M	001-007
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	N	001-007
Sulphur (total)	T21	AR	0.05	%	N	001-007
Total Organic Carbon	T21	M40	0.1	%	N	001-007
Asbestos ID	T27	AR			SU	001-007
pH	T7	AR			M	001-007
Arsenic	T6	M40	2	mg/kg	M	001-007
Cadmium	T6	M40	1	mg/kg	M	001-007
Chromium	T6	M40	1	mg/kg	M	001-007
Copper	T6	M40	1	mg/kg	M	001-007
Lead	T6	M40	1	mg/kg	M	001-007
Mercury	T6	M40	1	mg/kg	M	001-007
Nickel	T6	M40	1	mg/kg	M	001-007
Selenium	T6	M40	3	mg/kg	M	001-007
Zinc	T6	M40	1	mg/kg	M	001-007
Moisture @105C	T162	AR	0.1	%	N	001-007
Retained on 10mm sieve	T2	M40	0.1	%	N	001-007
Naphthalene	T207	M105	0.1	mg/kg	M	001-007
Acenaphthylene	T207	M105	0.1	mg/kg	U	001-007
Acenaphthene	T207	M105	0.1	mg/kg	M	001-007
Fluorene	T207	M105	0.1	mg/kg	M	001-007
Phenanthrene	T207	M105	0.1	mg/kg	M	001-007
Anthracene	T207	M105	0.1	mg/kg	U	001-007

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Fluoranthene	T207	M105	0.1	mg/kg	M	001-007
Pyrene	T207	M105	0.1	mg/kg	M	001-007
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001-007
Chrysene	T207	M105	0.1	mg/kg	M	001-007
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	M	001-007
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	M	001-007
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001-007
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001-007
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001-007
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001-007
PAH(total)	T207	M105	0.1	mg/kg	U	001-007
Benzene	T54	AR	0.001	mg/kg	U	002-003
Toluene	T54	AR	0.001	mg/kg	U	002-003
EthylBenzene	T54	AR	0.001	mg/kg	U	002-003
M/P Xylene	T54	AR	0.001	mg/kg	U	002-003
O Xylene	T54	AR	0.001	mg/kg	U	002-003
Methyl tert-Butyl Ether	T54	AR	0.001	mg/kg	U	002-003
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	002-003
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	N	002-003
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	N	002-003
TPH (C10-C12 aliphatic)	T8	M105	1	mg/kg	N	002-003
TPH (C12-C16 aliphatic)	T8	M105	1	mg/kg	N	002-003
TPH (C16-C21 aliphatic)	T8	M105	1	mg/kg	N	002-003
TPH (C21-C35 aliphatic)	T8	M105	1	mg/kg	N	002-003
TPH (C35-C44 aliphatic)	T8	M105	1	mg/kg	N	002-003
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	002-003
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	N	002-003
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	N	002-003
TPH (C10-C12 aromatic)	T8	M105	1	mg/kg	N	002-003
TPH (C12-C16 aromatic)	T8	M105	1	mg/kg	N	002-003
TPH (C16-C21 aromatic)	T8	M105	1	mg/kg	N	002-003
TPH (C21-C35 aromatic)	T8	M105	1	mg/kg	N	002-003
TPH (C35-C44 aromatic)	T8	M105	1	mg/kg	N	002-003

APPENDIX 07

Ground Gas Monitoring 2017

IAN FARMER ASSOCIATES
Geotechnical & Environmental Specialists

Gas and Groundwater Monitoring Results

Contract Number:	*42009*	**Gas Monitor:**	*GA5000*
Contract Name:	*Trinity Street*	**Readings Taken By:**	*JM*
Date:	*13th January 2017*	**Checked By:**	*MHW*

Background Readings:			O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm
	Weather Conditions:	*Dry, approx. 2 °C*					
	Ground Conditions (dry / wet etc):	*Frozen, snow*					
	Atmospheric Pressure (Start):	*999mb*	*20.9*	*0.1*	*0.0*	*0.0*	*0.0*
	Atmospheric Pressure (Finish):	*1000mb*					
	Time (Start): 10:00 Time (Finish):	11:05					

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
WS101	*NR*	*20.7*	*0.3*	*0.0*	*0.0*	*0*	*0*	*0.42*	*0.0*	*1.42*	*DRY*	*NA*
WS102	*NR*	*20.9*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.42*	*0.0*	*3.06*	*2.99*	*NR*
WS103	*NR*	*19.4*	*0.6*	*0.0*	*0.0*	*0*	*0*	*0.42*	*0.0*	*2.13*	*2.11*	*NR*
WS104	*NR*	*17.0*	*2.3*	*0.0*	*0.0*	*0*	*0*	*0.42*	*0.0*	*1.73*	*DRY*	*NA*
WS106	*NR*	*19.4*	*1.6*	*0.0*	*0.0*	*0*	*0*	*0.42*	*0.0*	*3.14*	*DRY*	*NA*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: WS102 - unable to monitor as borehole covered by a car.

IAN FARMER ASSOCIATES
Geotechnical & Environmental Specialists

Gas and Groundwater Monitoring Results

Contract Number:	*42009*	**Gas Monitor:**	*GA5000*
Contract Name:	*Trinity Street*	**Readings Taken By:**	*JM*
Date:	*20th January 2017*	**Checked By:**	*MHW*

Background Readings:			O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm
	Weather Conditions:	*Cloudy Dry*					
	Ground Conditions (dry / wet etc):	*Damp*					
	Atmospheric Pressure (Start):	*1026mb*	*20.9*	*0.0*	*0.0*	*0.0*	*0.0*
	Atmospheric Pressure (Finish):	*1026mb*					
	Time (Start): 10:00 Time (Finish):	11:00					

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
WS101	*NR*	*20.2*	*0.5*	*0.0*	*0.0*	*0*	*0*	*0.23*	*0.0*	*1.43*	*DRY*	*NA*
WS103	*NR*	*19.6*	*0.4*	*0.0*	*0.0*	*0*	*0*	*0.23*	*0.0*	*2.14*	*2.10*	*ND*
WS104	*NR*	*19.5*	*1.5*	*0.0*	*0.0*	*0*	*0*	*0.23*	*0.0*	*1.74*	*DRY*	*NA*
WS106	*NR*	*20.2*	*0.8*	*0.0*	*0.0*	*0*	*0*	*0.23*	*0.0*	*3.15*	*DRY*	*NA*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: WS102 - unable to monitor as borehole covered by a car.

IAN FARMER ASSOCIATES
Geotechnical & Environmental Specialists

Gas and Groundwater Monitoring Results

Contract Number:	*42009*	**Gas Monitor:**	*GA5000*
Contract Name:	*Trinity Street, Huddersfield*	**Readings Taken By:**	*NM*
Date:	*3rd February 2017*	**Checked By:**	*MHW*

Background Readings:										
	Weather Conditions:	*Dry, bright, 6.1 °C*	O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm
	Ground Conditions (dry / wet etc):	*Dry*					
	Atmospheric Pressure (Start):	*980mb*	*21.4*	*0.0*	*0.0*	*0.0*	*0.0*
	Atmospheric Pressure (Finish):	*980mb*					
	Time (Start):11:05 Time (Finish):	12:10					

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH102	*0.0*	*17.4*	*3.2*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*1.85*	*DRY*	*NA*
BH103	*0.0*	*20.7*	*0.2*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*16.28*	*13.87*	*NR*
BH106	*0.0*	*19.0*	*1.7*	*0.0*	*0.0*	*1*	*0*	*0.00*	*0.0*	*2.97*	*2.80*	*NR*
WS101	*0.0*	*20.5*	*0.6*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*1.43*	*DRY*	*NA*
WS102	*0.0*	*21.1*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*2.77*	*2.54*	*NR*
WS103	*0.0*	*20.5*	*0.4*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*2.12*	*DRY*	*NA*
WS106	*0.0*	*21.1*	*0.2*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*3.14*	*DRY*	*NA*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks:

IAN FARMER ASSOCIATES
Geotechnical & Environmental Specialists

Gas and Groundwater Monitoring Results

Contract Number:	*42009*	**Gas Monitor:**	*GA5000*
Contract Name:	*Trinity Street, Huddersfield*	**Readings Taken By:**	*NM*
Date:	*15th February 2017*	**Checked By:**	*MHW*

Background Readings:			O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm
	Weather Conditions:	*Bright mild dry 6ºC*					
	Ground Conditions (dry / wet etc):	*Damp*					
	Atmospheric Pressure (Start):	*1011mb*	*21.5*	*0.0*	*0.0*	*0.0*	*0.0*
	Atmospheric Pressure (Finish):	*1013mb*					
	Time (Start): 08:45 Time (Finish):	10:15					

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
WS101	*0.0*	*21.3*	*0.3*	*0.0*	*0.0*	*0*	*0*	*0.05*	*0.0*	*1.42*	*DRY*	*NA*
WS102	*0.0*	*21.4*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.05*	*0.0*	*3.08*	*3.05*	*ND*
WS103	*0.0*	*21.4*	*0.2*	*0.0*	*0.0*	*0*	*0*	*0.07*	*0.0*	*2.10*	*2.08*	*ND*
WS104	*0.0*	*21.1*	*0.7*	*0.0*	*0.0*	*0*	*0*	*0.09*	*0.0*	*1.75*	*1.57*	*ND*
WS106	*0.0*	*21.5*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.05*	*0.0*	*3.14*	*DRY*	*NA*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks:

APPENDIX 08

Site Specific Assessment Criteria

Screening Levels for "Commercial" end use assuming a 1% SOM for Hydrocarbons.

Contaminant	Screening Levels for Commercial End Use (mg/kg)
Metals	
Arsenic	640
Boron	240,000
Cadmium	190
Chromium III	8,600
Chromium VI	33
Copper	68,000
Lead*	2300
Mercury	58
Nickel	980
Selenium	12,000
Vanadium	9,000
Zinc	730,000
Non Metals	
Phenol	440
Polyaromatic Hydrocarbons (PAHs)	
Benz[a]anthracene	170
Benzo[a]pyrene	35
Benzo[b]fluoranthene	44
Benzo[ghi]perylene	3,900
Benzo[k]fluoranthene	1,200
Chrysene	350
Dibenz[ah]anthracene	3.5
Fluoranthene	23,000
Indeno[123-cd]pyrene	500
Naphthalene	190
Pyrene	54,000

* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

Contaminant	Screening Levels for Commercial End Use (mg/kg)
Volatile Organic Compounds	
Benzene	27
Ethylbenzene	5,700
Toluene	56,000
M - Xylene	6,200
O - Xylene	6,600
P - Xylene	5,900
Total Petroleum Hydrocarbons	
Aliphatic C5-6	3,200
Aliphatic C6-8	7,800
Aliphatic C8-10	2,000
Aliphatic C10-12	9,700
Aliphatic C12-16	59,000
Aliphatic C16-35	1,600,000
Aliphatic C35 - 44	1,600,000
Aromatic C5 - 7	26,000
Aromatic C7 - 8	56,000
Aromatic C8-10	3,500
Aromatic C10-12	16,000
Aromatic C12-16	36,000
Aromatic C16-21	28,000
Aromatic C21-35	28,000
Aromatic C35 - 44	28,000

* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.