



Lamb Lane, Monk Bretton, Barnsley
Phase 2 Site Investigation Report
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PHASE 2 SITE INVESTIGATION REPORT

LAMB LANE, MONK BRETTON, BARNSELEY

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Revision	Date	Prepared By	Checked By
Final	October 2013	P Finnimore Geotechnical Engineer	D. Simpson Principal Geotechnical Engineer
			



1 EXECUTIVE SUMMARY

Site Address	Lamb Lane, Monk Bretton, Barnsley, S71 2PU
Site Description	The desk study area comprises a parcel of land containing a brick library building to the west and brick enclosure to the east. The site has a maintained grass covering with gravel car parking area and road through the site.
Proposed Development	The site is outlined for the development of residential housing incorporating a new access, parking area and utilising existing garden areas as soft landscaping.
Fieldwork	• 6no small percussive boreholes to max. 2.4mbgl. • 8no trail pits to max. 2.1mbgl including in-situ CBR testing within 4 • 3no percolation trials.
Ground Conditions	• The made ground generally consisted of topsoil, sand and gravel fill, and road formation consisting of tarmac underlain by colliery spoil to a maximum depth of 0.60mbgl. Within TP5 a former basement was encountered, this was infilled with rubble with the basement floor present at 2.10mbgl • Natural deposits immediately beneath the made ground consisted of medium dense to dense sand and gravels within the majority of the positions to a maximum depth of 1.60mbgl. Firm to stiff sandy gravelly clay was encountered within BH4 and TP1 to a maximum depth of 1.10mbgl. • Rockhead was proven between 0.60 and 2.00mbgl. • No groundwater recorded.
Contamination Testing Results	• 5no samples were subject to a suite of metals, semi-metals, non-metals and inorganic, two samples showed raised levels on inorganic chemicals. • 3no were subject to Speciated Poly Aromatic Hydrocarbons (PAH), Total Petroleum Hydrocarbons (TPH) Aromatic, Aliphatic Splits, one sample from BH4 showed levels on organics. • 4no samples were subject to asbestos screening, no asbestos was detected.
Contamination Analysis	• No remediation required beneath the new building. • Made ground can generally be classed as slightly Contaminated, locally the made ground can be classed as Unusually Heavy Contaminated in BH4 and Heavy Contaminated (TP5). PPE required for workers. Damping down of site during dry windy conditions. • Clean cover system for soft landscaping/gardens comprising 200mm imported clean topsoil over 300mm screened ashy fill or natural sub soil. • Ground and surface water are not considered to be at risk. • Consultation with the utility company is required. As a minimum all services should be laid in clean trenches. • Sub surface concrete should be designed to DS-1 ACEC (Class AC-1). Static water conditions.
Contamination Risk Assessment	Based on the information contained in this report, it is the opinion of Solmek that the site represents a Low environmental risk.
Ground Gas Analysis	Ground gas monitoring is ongoing and an addendum report will be issued when complete.
Geotechnical Testing Results	• Sub surface concrete should be designed to DS-1 ACEC (Class AC-1). Static water conditions • Insitu SPT's N-Values ranged from 20 (medium dense) and 50+ (very dense) within the granular deposits and rockhead. • Triaxial testing of the natural clay returned shear strengths of 67kPa and 127kPa indicating firm and stiff conditions. • CBRs at approximate formation depth of 300mm and 600mm ranged from 5 % and over 10%. • The cohesive material can be assessed as having a low to medium shrinkage potential in relation to NHBC Guidance Chapter 4.2. • Moisture levels were between 5.4% and 20%. • Particle Size Distribution testing and the results indicated that the samples from BH1, 2 and 3 were slightly clayey, sandy gravel. (Slightly sandy within BH1), BH6 was classified as clayey sand and gravel with BH5 classified as clayey, gravelly sand. • pH levels indicating acidic to alkaline conditions with low Soluble sulphates levels. • Percolation testing was carried out within the natural ground and the results indicate Moderately Poor to Acceptable conditions.
Geotechnical Analysis & Foundation Recommendations	• Two different strata's are present on the site, where founding on both strata's, reinforcement should be incorporated to reduce the risk of differential settlement. • Where clay is encountered, strips foundation should be adopted. Using the lowest shear strengths of 67kPa an allowable bearing capacity of 160kN/m² has been calculated. This assumes that strip foundations 0.60m wide will be placed at a depth of 0.90mbgl. • A strip footing should be placed on the natural sand at a minimum depth of 0.75mbgl. Based on the lowest insitu SPT N Value of 20 using a 0.60m wide strip and assuming a load of 160kN/m², a predicted settlement of less than 25mm has been calculated if the loads are not exceeded. • Made ground in some areas of the site exceeds 2.00mbgl and footings should therefore be deepened to natural strata below. • Additionally foundation near existing or proposed trees should also be deepened. • Use of ground slabs for development.

2 INTRODUCTION

2.1 Authorisation

Solmek were instructed by Acanthus WSM Architects Ltd to undertake a desk study on a parcel of land at Lamb Lane, Monk Bretton, Barnsley.

2.2 Scope of Works

The site is outlined for the development of residential housing incorporating a new access, parking area and garden areas as soft landscaping. A drawing showing site is included in Appendix A (Figure 1).

A geotechnical and environmental investigation was requested. The fieldwork and testing was generally carried out according to the recommendations of BS5930: 1999 "Code of Practice for Site Investigations" and all stratum descriptions are as recommended in that publication. The information provided in this report is based on the investigation fieldwork, and is subject to the comments and approval of the various regulatory authorities.

There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Solmek reserve the right to alter conclusions and recommendations should further information be available or provided. Any schematic representation or opinion of the possible configuration of ground conditions between exploratory positions is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

3 SITE DESCRIPTION AND FIELDWORK

The site currently comprises a parcel of land to the north east of Barnsley. Situated to the west of the site is a library building of brick and tile construction. To the east of the site is a brick walled enclosure and a number of brick structures. The majority of the site is made up of maintained grassland with areas of gravel which appear to be used as a car park for the library and road through the site.

A variety of mature and semi mature trees are present across the site including mature sycamore trees south east of the library building.

The southern area of the site including the library appears to be relatively level with the site sloping away towards the north. A stone retaining wall was present along the western boundary above Lamb Lane at an approximate height of 1.5m.

3.1 Fieldwork

The fieldwork was carried out on 30th August 2013 comprising:

- Six small percussive boreholes (BH1 to BH6) drilled to depths of up to 2.5m below ground level (bgl).
- Eight trial pits (TP1 to TP8) excavated to depths of up to 2.1m below ground level (bgl) including CBR testing.
- Three percolation trials within TP1, 2 and 3.

Standard penetration tests (SPT) were undertaken at various depths within the small percussive boreholes and disturbed samples were retrieved for laboratory testing.

Descriptions of the strata encountered in the boreholes and trial pits together with details of testing, sampling and groundwater are presented in Appendix B of this report. A plan showing the location of the boreholes and trial pits can be found in Appendix A, Figure 1.

4 GROUND CONDITIONS

A summary of the ground conditions encountered is given below.

4.1 Made Ground

Made ground was encountered in the majority of the trial pits and the boreholes and generally consisted of brown sandy topsoil to depths of between 0.10 and 0.40mbgl, brick and concrete fragments were also noted.

Made ground recorded in BH4 consisted of ashy clayey gravel fill of brick and sandstone onto a clayey sand fill to a depth of 0.60mbgl.

In TP6 the made ground consisted of 100mm gravel fill of dolomite and tarmac with the made ground in TP8 consisted of 200mm of topsoil, both trial pits were underlain by a gravel fill of siltstone/shale (colliery waste) to a maximum depth of 0.45mbgl. Within TP4 the made ground consisted of 50mm of tarmac.

The deepest made ground was encountered in TP5 and consisted of sandy topsoil to 0.20mbgl and this was underlain by a gravel fill of sandstone, brick and glass. Basement walls were also noted to the south of the pit which was based into the natural sandstone.

4.2 Natural Deposits

Natural deposits immediately beneath the made ground consisted of medium dense sandy gravel of sandstone was proven within BH1, 2, 3, 5, 6 and TP4, 7 and 8 to depths of between 0.60 and 1.60mbgl. Medium dense sand within TP2 and TP3 to a maximum depth of 0.75mbgl. Firm to stiff sandy gravelly clay was encountered within BH4 and TP1 to a maximum depth of 1.10mbgl.

4.3 Rockhead

Weathered rockhead was proven within all of the boreholes and trial pits at depths of between 0.60 (TP7) and 2.20mbgl (BH3), which generally consisted of sandstone and siltstone.

4.4 Groundwater

Groundwater was not encountered within any of the boreholes and trial pits.

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities.

5 CONTAMINATION TESTING RESULTS

The site is outlined for the development of a new residential housing incorporating a new access, parking area and utilising existing garden areas as soft landscaping.

5.1 Contamination Testing

To provide information upon the possibility of ground contamination five samples of made ground from the boreholes and trial pit (TP5) between 0.20 and 0.50mbgl were subject to chemical contamination analysis. A suite of metals, semi-metals, non-metals and inorganic determinands was carried out on all of the samples. Three of the samples were also tested for Speciated Poly Aromatic Hydrocarbons (PAH), Total Petroleum Hydrocarbons (TPH) Aromatic and Aliphatic Splits. Four samples were screened for asbestos.

5.2 Test Results

Given the sites end use, the test results have been compared to a series of Solmek Generic Assessment Criteria (GAC) thresholds based on a residential with homegrown produce land use. Solmek GAC were derived using the EA CLEA Software Version 1.06 (May 2011) which produce Model Output Reports to compare the contamination concentrations against. In the absence of Solmek GAC values, WS Atkins Soil Screening Values (SSV) for residential with homegrown produce have been used (which have been

derived using EA CLEA Version 1.06, May 2011).

Solmek used the following input parameters within the CLEA Model to generate the GAC values:

- **Land use:** Residential With Homegrown Produce
- **Receptor:** Female (Res)
- **Building Type:** Semi-Detached House
- **Soil Type:** Sandy Loam
- **Soil pH:** 6.7 (recorded value)
- **Soil Organic Matter:** 2.3% (recorded value)

The test results are presented in Appendix C, and a summary is provided below in Table 1.

The CLEA UK Model Output Reports have been included in Appendix C. The CLEA Model output reports show three assessment criteria (Oral, Inhalation and Combined). Where all three boxes are shaded red the threshold values have been assumed to be the soil saturation limit.

TABLE 1: SUMMARY OF INORGANIC CONTAMINATION TESTING RESULTS

Determinant	Units	Number of Samples above Level of Detection	Minimum Level	Maximum Level	Threshold Value	Number of Results Exceeding Threshold Value
Metals						
Cadmium	mg/kg	5	0.3	1.0	5.17	0
Chromium	mg/kg	5	14	66	3000	0
Chromium (VI)	mg/kg	0	<1	-	4.25	0
Copper	mg/kg	5	16	41	2360	0
Lead	mg/kg	5	8.1	140	276*	0
Mercury	mg/kg	3	<0.05	0.29	169	0
Nickel	mg/kg	5	14	26	127	0
Zinc	mg/kg	5	10	160	2860	0
Semi metals and non metals						
Arsenic	mg/kg	5	7.6	18	32.4	0
Boron	mg/kg	5	1.8	5.4	10.3	0
Selenium	mg/kg	1	<0.5	1.8	350	0
Inorganic chemicals						
Cyanide (total)	mg/kg	4	<0.1	0.4	1.37	0
W.S. Sulphate	mg/l	5	12	2200	500**	1
Sulphide	mg/kg	5	20	2500	250**	2
Other						
pH	pH	5	6.7	11.7	<5.5**	0
Phenols	mg/kg	2	<0.3	1.2	328	0
* Atkins SSV (GAC), CLEA Software Version 1.06 ** EA Upper Tier Threshold Values *** BRE Special Digest 1: 2005						

5.3 Metals, Semi Metals and Non Metals

From the five samples tested, there were no raised levels of metals or metalloids exceeding the thresholds values for long term risk to human health.

5.4 Inorganic Chemicals

Soluble sulphates (potentially aggressive to foundation concrete) were recorded between 12 and 2200mg/l. Two samples from BH4, 0.20m and TP5, 0.50m showed sulphide levels above the thresholds.

The results of the pH testing were 6.7 and 11.7 which are consistent with slightly acidic to highly alkaline conditions.

TABLE 2: SUMMARY OF ORGANIC CONTAMINATION TESTING RESULTS

Determinant	Units	Number of Samples Determinant Detected in	Minimum Level	Maximum Level	Threshold Value	Number of Results Exceeding Threshold Value
TPH Aliphatic Fractions						
C5-6	mg/kg	0	<0.01	-	58.8	0
C6-8	mg/kg	0	<0.01	-	172	0
C8-10	mg/kg	0	<0.01	-	48.3	0
C10-12	mg/kg	0	<1.5	-	109**	0
C12-16	mg/kg	1	<1.2	1.6	5.44**	0
C16-21	mg/kg	1	<1.5	5.5	19.5**	0
C21-35	mg/kg	1	<3.4	33	19.5**	1
TPH Aromatic Fractions						
C5-7	mg/kg	0	<0.01	-	0.152	0
C7-8	mg/kg	0	<0.01	-	255	0
C8-10	mg/kg	0	<0.01	-	66.3	0
C10-12	mg/kg	0	<0.9	-	114	0
C12-16	mg/kg	2	<0.5	4.9	288	0
C16-21	mg/kg	3	1.4	140	457	0
C21-35	mg/kg	3	3.5	290	1090	0
Speciated PAH						
Acenaphthene	mg/kg	0	<0.1	-	448	0
Acenaphthylene	mg/kg	0	<0.1	-	370	0
Anthracene	mg/kg	1	<0.1	10	4630	0
Benz' (a)anthracene	mg/kg	1	<0.1	24	4.91	0
Benz' (a)pyrene	mg/kg	1	<0.1	26	0.94	1
Benz' (b)fluor' ene	mg/kg	1	<0.1	19	6.52	1
Benz' (k)fluor' ene	mg/kg	1	<0.1	12	9.53	1
Benz (ghi)per' ene	mg/kg	1	<0.1	15	45.9	0
Chrysene	mg/kg	0	<0.1	26	8.04	1
Dibenz(ah)anth'ene	mg/kg	1	<0.1	2.3	0.862	1
Fluoranthene	mg/kg	1	<0.1	58	443	0
Fluorene	mg/kg	0	<0.1	-	352	0
Id' (123cd)pyrene	mg/kg	1	<0.1	17	3.84	1
Napthalene	mg/kg	0	<0.1	-	3.77	0
Phenanthrene	mg/kg	1	<0.1	33	189	0
Pyrene	mg/kg	1	<0.1	51	994	0
Other						
PAH Total	mg/kg	1	<1.6	290	1000*	0
* EA Upper Tier Threshold Value						
** Soil Saturation Limit						

5.5 Organic Chemicals

From the three samples tested, only one of the samples (BH4, 0.20m) recorded raised levels of speciated PAH's which exceeding the thresholds values for long term risk to human health, the other two samples were below the thresholds. This sample comprised ashy granular fill.

5.6 Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation, is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to "identify and remove unacceptable risks to human health and the environment" and to "seek to ensure that contaminated land is made suitable for its current use". Part 2A uses a risk based approach to defining contaminated land whereby the "risk" is interpreted as "the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land" and by "the scale and seriousness of such harm or pollution if it did occur".

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that "for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters."

A conceptual model is used to develop and communicate the risks associated with a particular site.

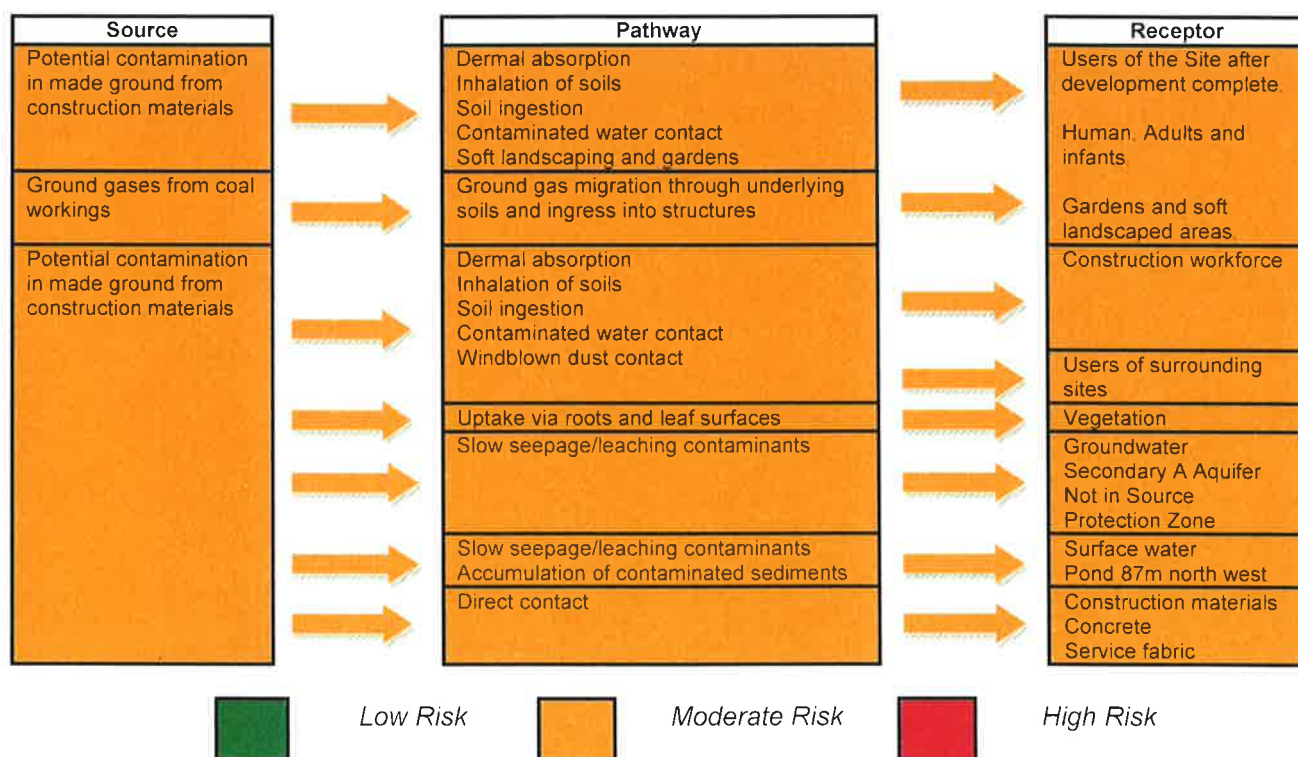
To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include "land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health." Categories 3 and 4 "encompass land which is not capable of being determined on such grounds".

See Appendix E for additional notes on contamination guidelines.

6 CONTAMINATION ANALYSIS

The contamination conceptual model in Table 2 identifies the potential pollution linkages present on site based on source – pathway – receptor relationships.

TABLE 3: CONCEPTUAL MODEL



In general terms all receptors are considered to be at **potentially less** of a risk.

Each receptor is discussed in the following sections.

6.1 Users of the Site Once Development is Complete

To establish if the levels of contaminants present on site may pose a risk to the health of the future users of the site the results of the contamination testing have been compared to a series of Solmek GAC thresholds based on a residential with homegrown produce land use. The results indicate that the concentrations of contamination within the samples tested are generally below the threshold values for long term risk to human health.

It is therefore considered that remediation is not required for areas beneath the proposed building footprints and the proposed access or parking areas.

If any zones of odorous, brightly coloured or suspected contaminated ground are encountered then work should cease in that area until the material has been tested. The results of the tests will determine whether or not remediation will be required.

The current legislation on waste involves the categorization of materials into inert waste, non reactive hazardous wastes and hazardous wastes. The determination of the category depends on DEFRA landfill directive waste acceptance criteria (WAC) testing. Material taken off site may be subject to WAC by the appropriate waste disposal company.

6.2 Construction Workers and Users of Surrounding Sites

Short term human exposure to contaminants present in soils can occur via several pathways during the construction and ground works phase of the development. These include dermal absorption after contact with contaminated ground, inhalation of soil or dust (including windblown dust), inhalation of volatilised compounds, inadvertent soil ingestion and contact with contaminated groundwater.

Using guidance in the HSE publication *"Protection of Workers and the General Public during the Development of Contaminated Land"*, the made ground can generally be classed as slightly contaminated due to raised levels of boron and sulphide, locally the made ground can be classed as unusually heavy contaminated in the vicinity of BH4 and heavy contaminated (TP5) due to raised boron and sulphide levels within both samples. It is recommended that appropriate PPE in accordance with HSE and Environment Agency guidance is adopted for the duration of the contractor works and good practice is adopted to minimise the release of potential contaminants during ground works.

During dry weather, any excavations may require clean water to be sprinkled at shallow depth to prevent excess dust escaping to off-site receptors.

6.3 Vegetation

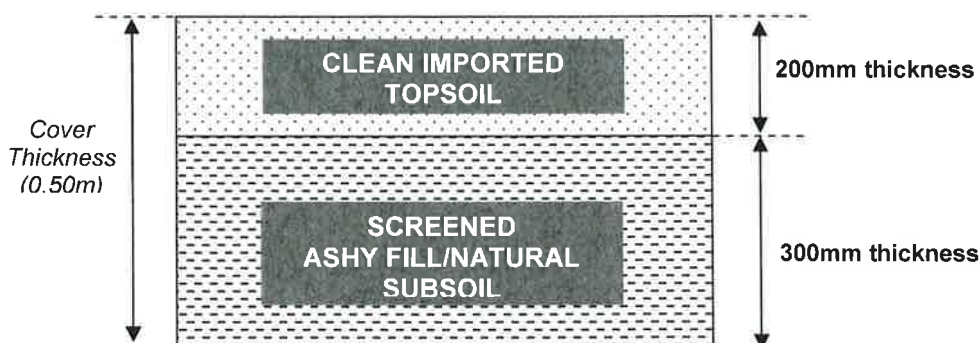
Plants can be affected by soil contamination in a number of ways resulting in growth inhibition, nutrient deficiencies and yellowing of leaves. Contaminants are taken up by plants through the roots and through foliage. Contaminants identified as being highly phytotoxic include boron, cadmium, copper, nickel, and zinc.

To establish if the levels of contaminants present on site may pose a risk to vegetation the results of the contamination testing have been compared to a series of threshold values published in *"Code of Good Agricultural Practice for the Protection of Soil"*. No concentrations of the phytotoxic determinants are shown as elevated within the topsoil tested.

The cover system should be at least 500mm in thickness. Therefore we suggest that the cover system should include clean topsoil to a depth of 200mm over either natural ground or screened clean fill where encountered. Where the fill is to be used as sub soil this should be at least 300mm in thickness.

During the initial site strip, soft landscaped areas and gardens should be excavated to 0.50mbgl or natural ground (whichever is the shallowest) and the ashy granular fill within the vicinity of BH4 should be screened for deleterious materials such as ash and brick rubble. Any deleterious materials encountered (i.e. ash and brick rubble) should be placed beneath areas of permanent hardcover to prevent contamination migration. The remaining screened fill can then be separately stockpiled and validated prior to use within soft landscaped areas. Should the test results show elevated PAH contaminants then the materials will have to be removed from site and the natural clay should therefore be used as sub soil.

The diagram below gives an overview of the minimum thicknesses of clean cover that should be placed by the site operatives in soft landscaped or garden areas:



6.4 Ground and Surface Water

The principal pathway by which soil contamination may reach the water environment is through a slow seepage or leaching to groundwater or surface water. The potential for contaminants to migrate along such pathways is dependent on the chemical and physical characteristics of the contaminants and the local hydrogeology.

Given the generally low contamination results, Secondary A Aquifer, lack of groundwater encountered and no surface water features within 80m of the site; ground and surface water are not considered to be at risk of contamination from the site.

6.5 Construction Materials

Materials at risk from potential soil contamination include inorganic matrices such as cement and concrete and also organic material; e.g. plastics and rubbers. Acid ground conditions and elevated levels of sulphates can accelerate the corrosion of building materials. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

BRE Special Digest One: *"Concrete in Aggressive Ground"*: 2005 3rd Edition has been used to assess the risks posed to underground concrete and to establish the design measures required to mitigate the risks.

The results of the pH and sulphate tests fall into Class DS-1, ACEC (Class AC-1s) requirements for concrete protection assuming static groundwater conditions.

The levels of potential contaminants detected have been compared to thresholds supplied in the Water Regulations Advisory Scheme Guidance Note 9-04-03 *"The Selection of materials for Water Supply Pipes to be laid in Contaminated Land"*. Based on the contamination test results the levels of Sulphate, Sulphide and pH were raised above the thresholds and consultant with the utility provider is recommended, as a minimum services should be placed within clean service trenches.

7 GROUND GAS ASSESSMENT

Ground gas monitoring is ongoing and an addendum report will be issued when complete.

8 GEOTECHNICAL TESTING AND ANALYSIS

Samples taken from the boreholes underwent a series of geotechnical tests (BS 1377:1990) to aid foundation design and soil description. In addition, insitu Standard Penetration Tests (SPTs) and in situ hand vanes were undertaken at regular intervals during drilling. The geotechnical results are presented in Appendix D.

8.1 Strength and Density

Insitu SPT's were undertaken within the natural granular deposits and rockhead at depths of between 1.2 and 2.50mbgl during drilling and the N-Values ranged from 20 (medium dense) and 50+ (very dense).

Triaxial soil strength testing was undertaken on two samples of the natural clay at depths between 0.70-0.80mbgl. The tests results returned shear strengths of 67kPa and 127kPa indicating firm and stiff conditions.

8.2 Insitu CBR Testing

Insitu Farnel Probes were undertaken within the natural and made ground at approximate formation depth of 300mm and 600mm within TP4, TP5, TP6 and TP7. The CBR values ranged from 5 % and over 10%. An equilibrium CBR value of 6% should be adopted for formation material.

8.3 Atterberg Limit Determinations

Two Atterberg Limit Determination tests were out carried on samples of cohesive material to classify the fine grained soils. The results were compared to the Casagrande Chart published in BS 5930 and showed the samples to be low and intermediate plasticity.

The Plasticity Indices were 11 and 23 with moisture contents recorded above and below the corresponding plastic limits. The cohesive material can be assessed as having a **medium** shrinkage potential in relation to NHBC Guidance Chapter 4.2.

8.4 Moisture Contents

Eight samples recovered from the boreholes have been subject to moisture content tests at depths of 0.7 and 1.5mbgl. Moisture levels were between 5.4% and 20%.

8.5 Particle Size Distribution Testing

Six samples from between 0.80 and 1.00mbgl was subject to Particle Size Distribution testing and the results indicated that the samples from BH1, 2 and 3 were slightly clayey, sandy gravel. (Slightly sandy within BH1), BH6 was classified as clayey sand and gravel with BH5 classified as clayey, gravelly sand.

8.6 pH and Sulphate Results

Three samples of natural ground from the boreholes were tested for acidity and soluble sulphate content to assess whether the material may be potentially aggressive to building fabric. The results of the testing for pH were between 5.1 and 8.4 indicating acidic to alkaline conditions. Soluble sulphates were recorded at levels were between less than 10mg/l and 52mg/l.

8.7 Percolation Testing

Percolation testing was carried out within the natural ground encountered and the infiltration rates were calculated as $49.00\text{m/sec} \times 10^{-6}$ within TP1, $15.90\text{m/sec} \times 10^{-6}$ within TP2 and $82.70\text{m/sec} \times 10^{-6}$ within TP3 which is classified as Moderately Poor to Acceptable, the results are shown in Appendix D.

8.8 Foundations

The site investigation proved two different strata on the site at approximate foundation level. Therefore two different bearing capacities have been calculated for each stratum and where founding on both strata's, reinforcement should be incorporated to reduce the risk of differential settlement.

Clays

Based on plasticity index results, the cohesive soils on the site were classified as medium volume change potential. Foundations should therefore be placed at a minimum depth of 0.90m below original or finished ground level, whichever is the lower.

For strips using the lowest shear strengths of 67kPa an allowable bearing capacity of 160kN/m^2 has been calculated. This assumes that strip foundations 0.60m wide will be placed at a depth of 0.90mbgl. Assuming that any new structures are founded in the natural clays and will impart a load of less than 160kN/m^2 , total settlements should be less than 25mm.

Sands

A strip footing should be placed on the natural sand at a minimum depth of 0.75mbgl, any made ground should be removed and replaced with compact inert granular material. The formation level should first be proof rolled prior to placing the foundation. Based on the lowest insitu SPT N Value of 20 using a 0.60m wide strip and assuming a load of 160kN/m^2 , a predicted settlement of less than 25mm has been calculated.

Prior to placing foundation concrete, obvious soft or loose spots should be removed and replaced with suitably compacted hardcore or lean mix concrete. In addition, all excavations should be inspected to ensure that they fully penetrate areas of disturbed ground.

Further advice should be sought from Solmek if unexpected ground conditions are encountered during redevelopment

Made ground in some areas of the site exceeds 2.00mbgl and footings should therefore be deepened to natural strata below. Overdeepened foundations should be stepped in accordance with NHBC Standards, Chapter 4.4. Additionally, trees are present on the north, south and west boundaries of the site. Foundations near existing or proposed trees should also be deepened and provided with appropriate heave precautions in accordance with NHBC Standards Chapter 4.2 current guidance.

Sub-surface concrete should be Design Sulphate Class DS-1, with the site allocated an ACEC Classification of AC-1, assuming static ground water conditions.

Further advice should be sought from Solmek if unexpected ground conditions are encountered during redevelopment.

8.9 Floor Slabs

In accordance with NHBC guidelines, ground slabs should be adopted for the extension where made ground is less than 0.6m in thickness.

8.10 Excavation

Based on the nature of the ground conditions encountered, excavations should be within the capacity of normal earthworks plant. Stability of excavations will be moderate in the made ground was present but should improve within the natural clay and medium dense sand. Sides should be designed, constructed and supported in accordance with the recommendations given in CIRIA Report No. 97: "Trenching Practice".

Obstructions maybe present to the centre of the site where a former basement was encountered within TP5, where the basement wall was present.

8.11 Groundwater

Groundwater was not recorded during the fieldwork. Therefore, no significant volume of groundwater is expected at shallow depth.

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Due to the cohesive nature of the underlying strata encountered dewatering may be necessary if excavations are left open for prolonged periods during inclement weather conditions.

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APPENDIX A:

Figures

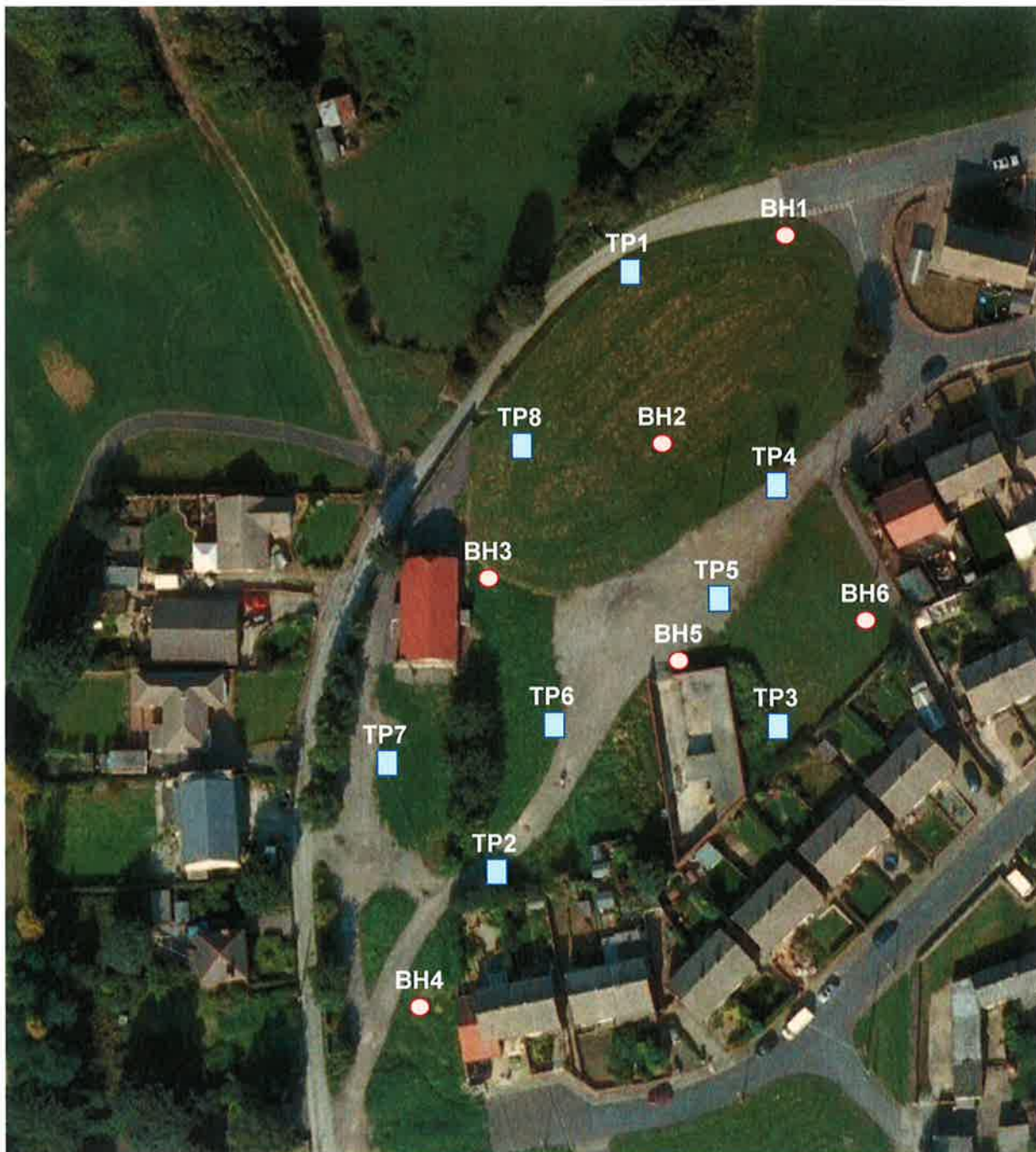


Figure 1: Borehole and Trial Pit Location Plan

Client:	Acanthus WSM Architects	
Project:	Lamb Lane, Barnsley	
Title:	Borehole and Trial Pit Location Plan	
Drawing No:	Figure 1	Scale: NTS
Date	October 2013	

APPENDIX B:
Borehole Logs & Trial Pit Logs

BOREHOLE LOG

Project Lamb Lane, Barnsley				BOREHOLE No BH1	
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()		Sheet 1 of 1
Contractor					

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		
0.20	B					(0.30) 0.30	MADE GROUND: Brown sandy topsoil.	
0.80	B					(0.90) 1.20	Medium dense light brown clayey sandy fine to coarse GRAVEL of angular to sub rounded sandstone.	
1.20-1.65	SPT	N=23				(0.60) 1.80	Medium dense becoming dense light brown weathered SANDSTONE.	
1.50	B							
1.80	SPT	N=50+						

GRD BOREHOLE LOG TEST S130818 GPJ AGS3 ALL GDT 24/10/13

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
All dimensions in metres Scale 1:18.75						Client Acanthus WSM			Method/ Plant Used		Logged By PF

Tel 01642607083
Fax 01642612355

Project Lamb Lane, Barnsley				BOREHOLE No BH2
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.20	B					(0.30) 0.30	MADE GROUND: Brown sandy topsil with brick fragments.		
0.80	B					(1.00)	Medium dense to dense (drillers description) light brown clayey sandy fine to coarse GRAVEL od angular to sub rounded sandstone.		
1.20-1.65	SPT	N=43				1.30 (0.40)	Dense dark brown weathered SANDSTONE/SILTSTONE.		
1.50	B					1.70			
1.70	SPT	N=50+							

[illegible]

All dimensions in metres Scale 1:18.75	Client Acanthus WSM	Method/ Plant Used	Logged By PF
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SRD_BOREHOLE_LOG TEST S130818 GPJ AGS3 ALL GDT 24/10/13

BOREHOLE LOG

Project Lamb Lane, Barnsley				BOREHOLE No BH3	
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
0.20	B					(0.40) 0.40	MADE GROUND: Dark brown sandy topsoil with brick and concrete.	
0.50	B					(1.20) 1.60	Medium dense to dense light brown clayey sandy fine to coarse GRAVEL of angular to sub rounded sandstone.	
1.00	B							
1.20-1.65	SPT	N=36						
1.50	B							
2.00-2.45	SPT	N=40				(0.60) 2.20	Stiff grey to orangeish brownish sandy gravelly CLAY with bands of coal (weathered siltstone).	
2.30	B					(0.30) 2.50	Dense grey weathered SILTSTONE.	
2.50	SPT	N=50+						

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
All dimensions in metres Scale 1:18.75			Client Acanthus WSM			Method/ Plant Used			Logged By PF		

GRD BOREHOLE LOG TEST S130818 GPJ AGS3 ALL GDT 24/10/13

BOREHOLE LOG

Project Lamb Lane, Barnsley				BOREHOLE No BH4	
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)		
0.20	B				(0.30)	MADE GROUND: Brown ashy clayey fine to coarse gravel fill of brick and sandstone.		
0.50	B				(0.30)	MADE GROUND: Dark brown clayey fine to coarse sand fill.		
0.80	B				(0.50)	Firm (drillers description) light brown sandy, gravelly CLAY. Gravel is rounded to sub rounded fine to coarse of sandstone.		
1.20-1.65	SPT	N=20			(0.60)	Medium dense to dense orangey brown to grey weathered SANDSTONE.		
1.50	B							
1.70	SPT	N=50+			1.70			

GRD_BOREHOLE_LOG TEST S130818.GPJ AGS3, ALL GDT 24/10/13

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
All dimensions in metres Scale 1:18.75						Client Acanthus WSM			Method/ Plant Used		Logged By PF

BOREHOLE LOG

Project Lamb Lane, Barnsley				BOREHOLE No BH5	
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.20	B					(0.40) 0.40	MADE GROUND: Brown slightly gravelly sandy topsoil. Gravel is angular to sub rounded fine to coarse of sandstone and brick.		
0.50	B					(0.80) 1.20	Medium dense (drillers description) light brown gravelly fine to coarse SAND. Gravel is angular to sub rounded of fine to coarse sandstone.		
1.20-1.65	SPT	N=27				(0.60) 1.80	Medium dense becoming dense weathered SANDSTONE.		
1.50	B								
1.80	SPT	N=50+							

GRD_BOREHOLE_LOG TEST S130818 GPJ AGS3 ALL GDT 24/10/13

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
All dimensions in metres Scale 1:18.75		Client Acanthus WSM				Method/ Plant Used				Logged By PF	

BOREHOLE LOG

Project Lamb Lane, Barnsley				BOREHOLE No BH6	
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 1 of 1	

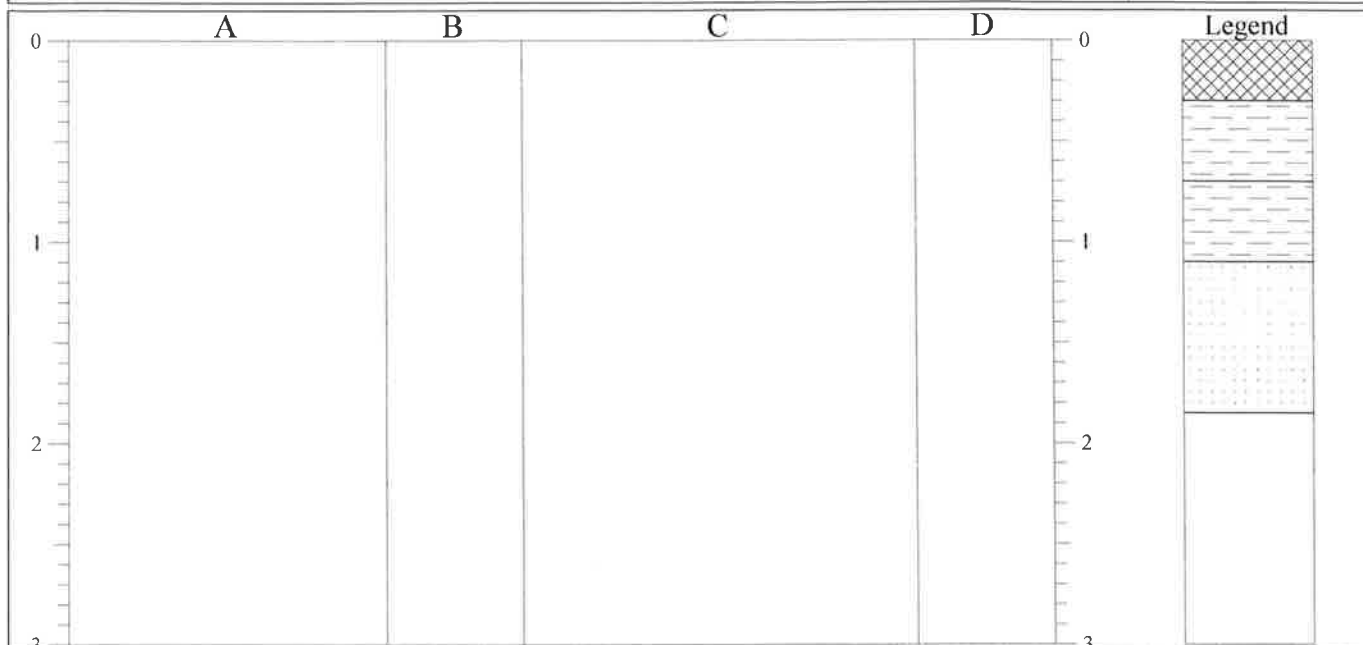
SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.20	B					(0.40) 0.40	MADE GROUND: Brown slightly sandy gravelly topsoil. Gravel is rounded to sub rounded fine to coarse of sandstone and brick.		
0.80	B					(0.80) 1.20	Medium dense (drillers description) light brown clayey SAND and GRAVEL. Gravel is fine to coarse, angular to sub rounded of sandstone.		
1.20	SPT	N=36				(0.50) 1.70	Dense orangey brown weathered SANDSTONE.		
1.50	B								
1.70	SPT	N=50+							

GRD BOREHOLE LOG TEST S130818 GPJ AGSS ALL GDT 24/10/13

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
All dimensions in metres Scale 1:18.75			Client Acanthus WSM			Method/ Plant Used			Logged By PF		

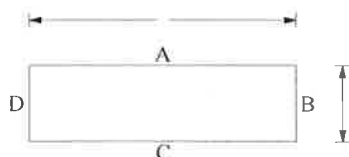
TRIAL PIT LOG

Project Lamb Lane, Barnsley				TRIAL PIT No TP1
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 1 of 1



STRATA				SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests	
0.00-0.30		MADE GROUND: Brown sandy topsoil.				
0.30-0.70		Stiff (engineers description) light brown sandy CLAY.				
0.70-1.10		Stiff (engineers description) grey to orangey brown silty CLAY.				
1.10-1.85		Light brown SANDSTONE.				

Shoring/Support:
Stability:



GENERAL REMARKS

No groundwater encountered.
Pit walls stable.

All dimensions in metres
Scale 1:37.5

Client **Acanthus WSM**

Method/
Plant Used

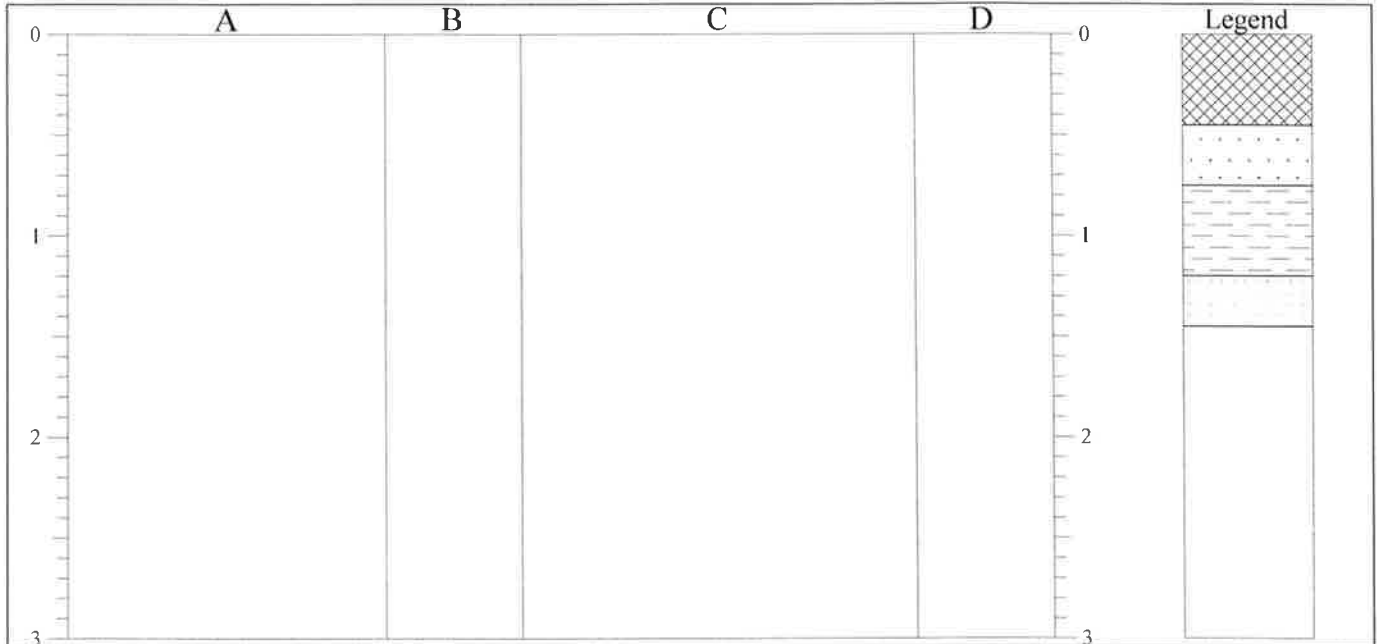
JCB 3CX

Logged By

PF

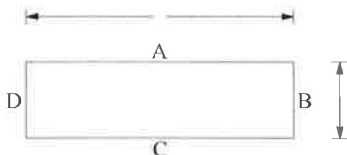
TRIAL PIT LOG

Project Lamb Lane, Barnsley				TRIAL PIT No TP2
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests
0.00-0.45		MADE GROUND: Brown sandy topsoil with brick.			
0.45-0.75		Medium dense (engineers description) light brown fine to coarse SAND.			
0.75-1.20		Stiff (engineers description) grey to orangey brown silty CLAY (weathered sandstone).			
1.20-1.45		Light brown SANDSTONE.			

Shoring/Support:
Stability:



GENERAL
REMARKS

No groundwater
encountered.

All dimensions in metres
Scale 1:37.5

Client **Acanthus WSM**

Method/
Plant Used

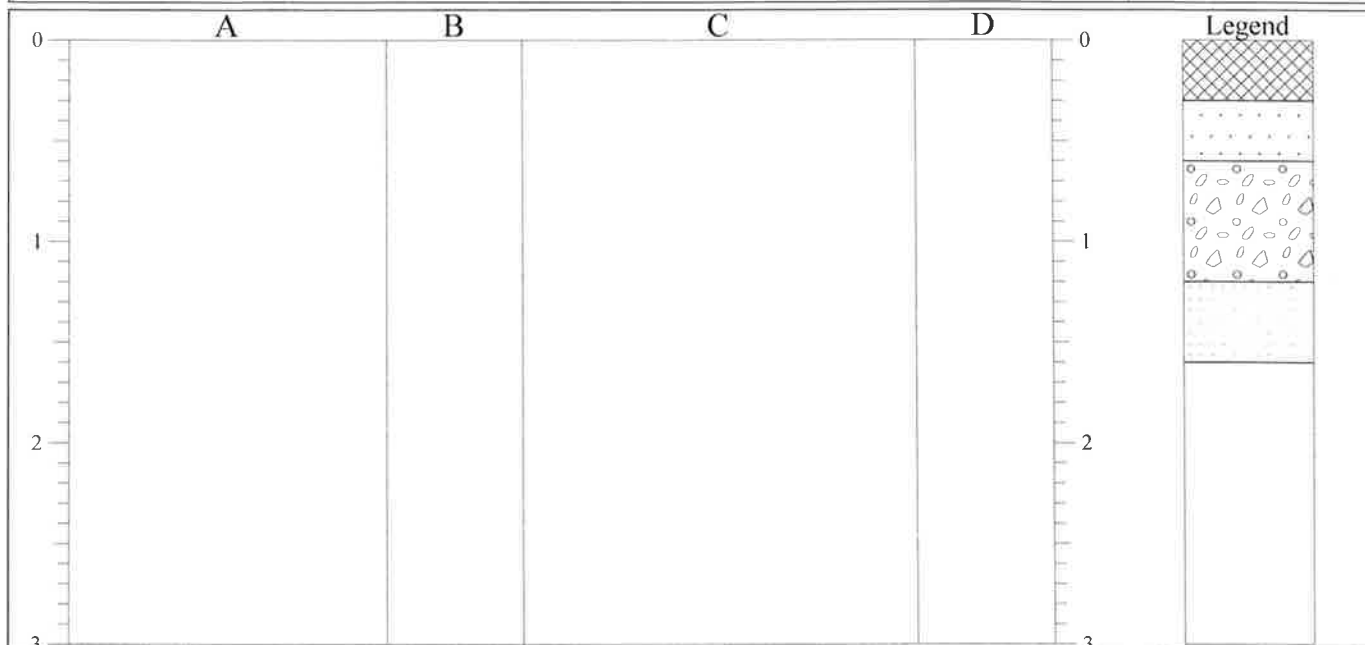
JCB 3CX

Logged By

PF

TRIAL PIT LOG

Project Lamb Lane, Barnsley				TRIAL PIT No TP3
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests
0.00-0.30		MADE GROUND: Brown sandy topsoil.			
0.30-0.60		Medium dense (engineers description) light brown fine to coarse SAND.			
0.60-1.20		Medium dense becoming dense (engineers description) light brown sandy fine to coarse GRAVEL of angular to sub angular sandstone.			
1.20-1.60		Light brown SANDSTONE.			

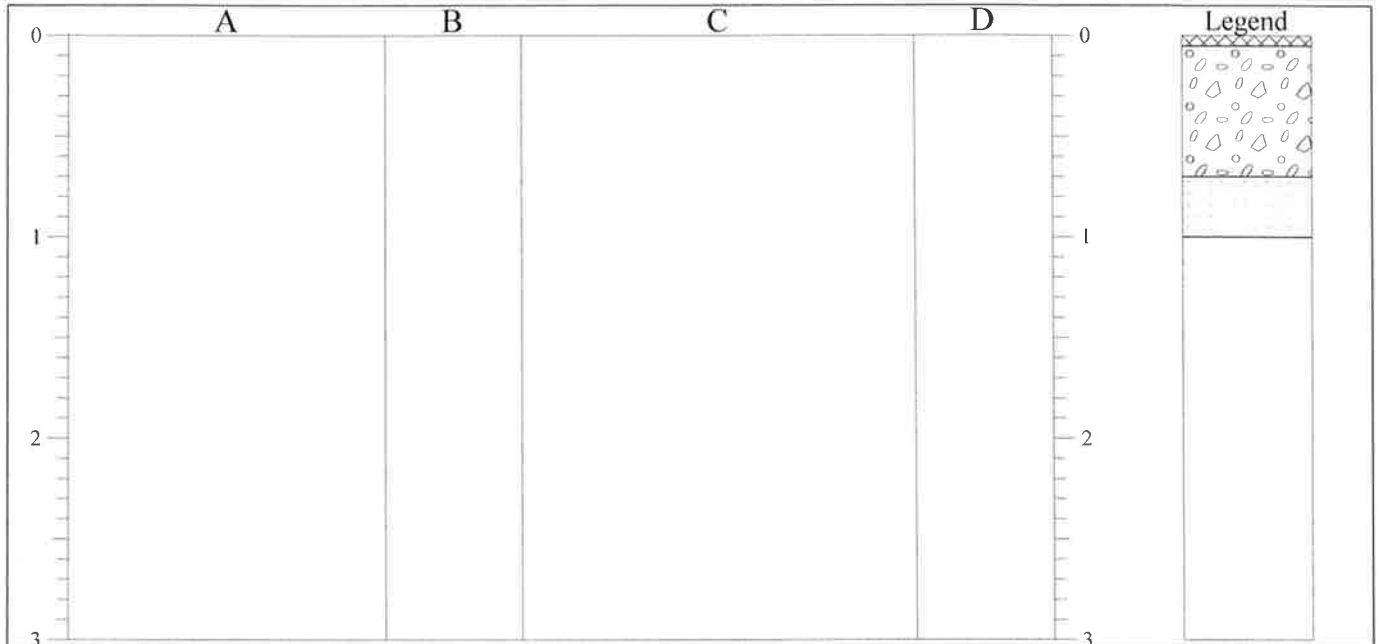
Shoring/Support: Stability:			GENERAL REMARKS No groundwater encountered.	
All dimensions in metres Scale 1:37.5		Client Acanthus WSM	Method/ Plant Used JCB 3CX	
			Logged By PF	

GRD TRIAL PIT LOG S130818 GPJ AGS3 ALL GDT 24/10/13

TRIAL PIT LOG

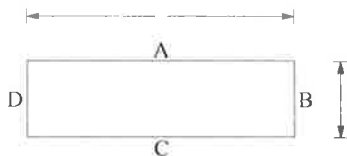
Tel 01642607083
Fax 01642612355

Project Lamb Lane, Barnsley				TRIAL PIT No TP4
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 1 of 1



STRATA				SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests	
0.00-0.05		MADE GROUND: Black tarmac.				
0.05-0.70		Medium dense to dense (engineers description) light brown sandy fine to coarse GRAVEL of angular to sub rounded sandstone.	0.30	CBR	=8%	
			0.60	CBR	=10%	
0.70-1.00		Light brown SANDSTONE.				

Shoring/Support:
Stability:



GENERAL REMARKS

No groundwater encountered.

All dimensions in metres
Scale 1:37.5

Client **Acanthus WSM**

Method/
Plant Used

JCB 3CX

Logged By

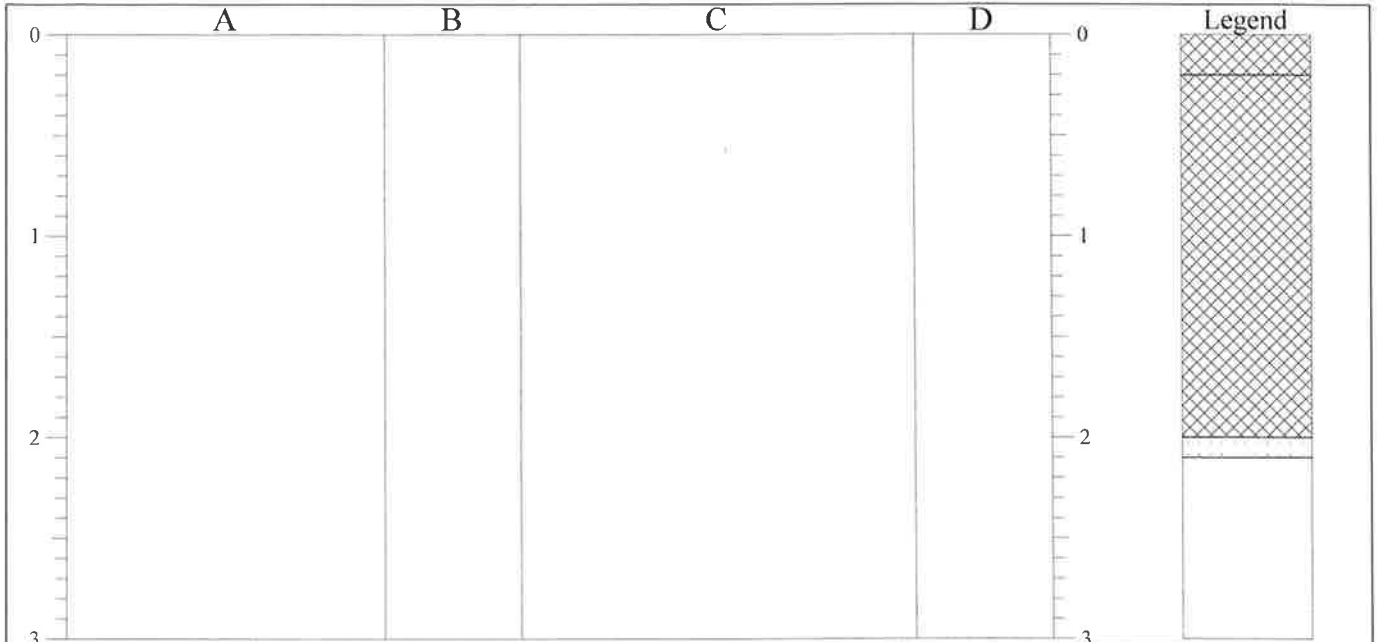
PF

ORD_TRIAL_PIT_LOG S130818 GPJ AGS3 ALL GDT 24/10/13

TRIAL PIT LOG

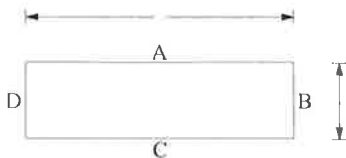
Tel 01642607083
Fax 01642612355

Project Lamb Lane, Barnsley				TRIAL PIT No TP5
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests
0.00-0.20		MADE GROUND: Brown sandy topsoil.			
0.20-2.00		MADE GROUND: Brown to reddish brown sandy fine to coarse gravel fill of angular to sub rounded brick, sandstone and concrete with occasional glass and whole bricks.	0.30	CBR	=5%
			0.50	B	
			0.60	CBR	=8%
2.00-2.10		Dense (engineers description) light brown SANDSTONE.			

Shoring/Support:
Stability:



GENERAL REMARKS

No groundwater encountered.
Made ground loose basement wall to South.

All dimensions in metres
Scale 1:37.5

Client **Acanthus WSM**

Method/
Plant Used

JCB 3CX

Logged By

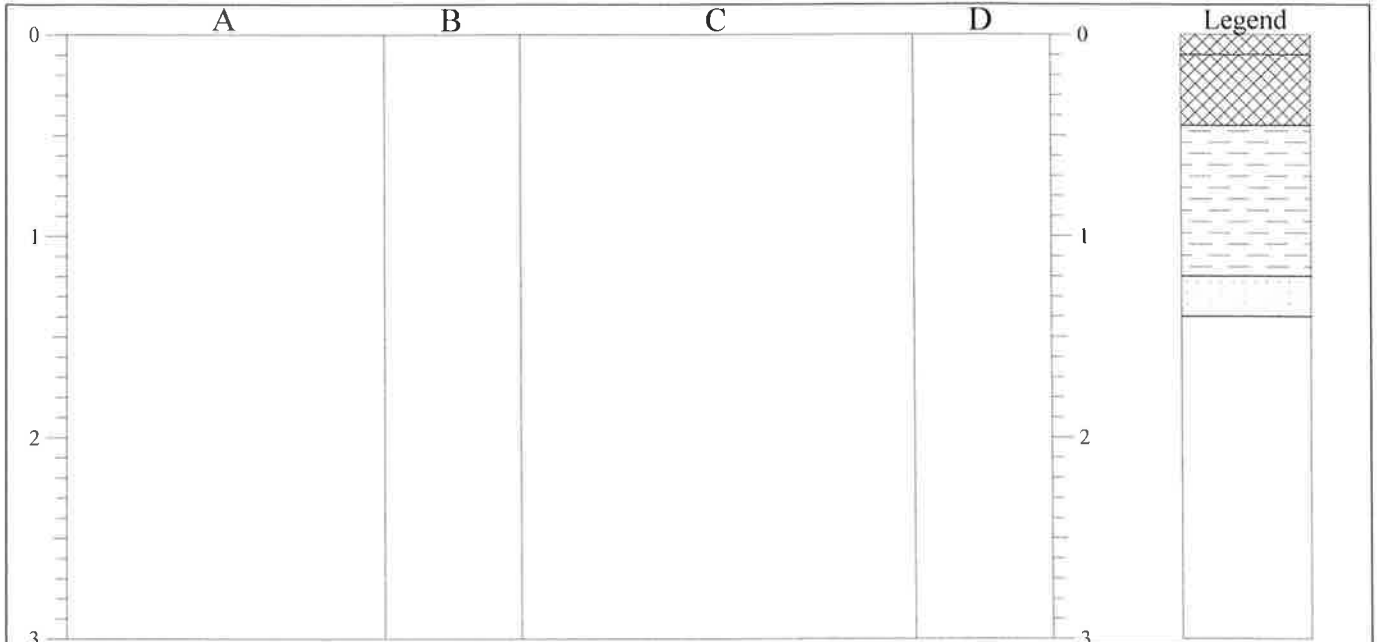
PF

GRD_TRIAL_PIT_LOG_S130818.GPJ AGS3 ALL GDT 24/10/13

TRIAL PIT LOG

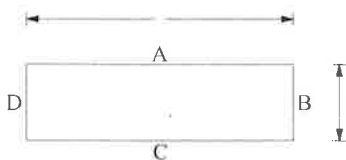
Tel 01642607083
Fax 01642612355

Project Lamb Lane, Barnsley				TRIAL PIT No TP6
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests
0.00-0.10		MADE GROUND: Light brown to black fine to coarse gravel fill of angular to sub rounded dolomite and tarmac.			
0.10-0.45		MADE GROUND: Reddish brown fine to coarse gravel fill of angular to sub rounded siltstone/shale.	0.30	CBR	=10%
0.45-1.20		Medium dense (engineers description) light brown slightly clayey gravelly CLAY. Clayey above 0.55m.	0.60	CBR	=6%
1.20-1.40		Light brown SANDSTONE.			

Shoring/Support:
Stability:



GENERAL REMARKS

No groundwater encountered.

All dimensions in metres
Scale 1:37.5

Client **Acanthus WSM**

Method/
Plant Used

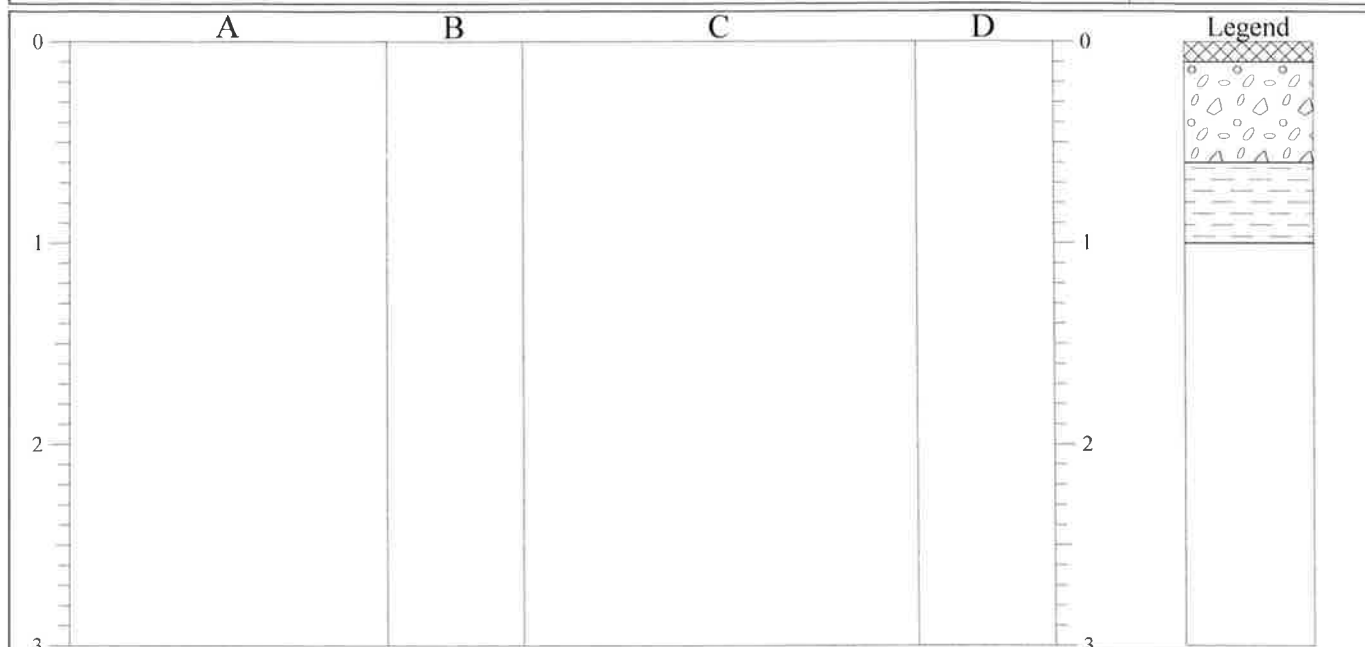
JCB 3CX

Logged By

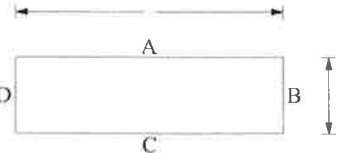
PF

Tel 01642607083
Fax 01642612355

Project Lamb Lane, Barnsley				TRIAL PIT No TP7
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				
				Sheet 1 of 1

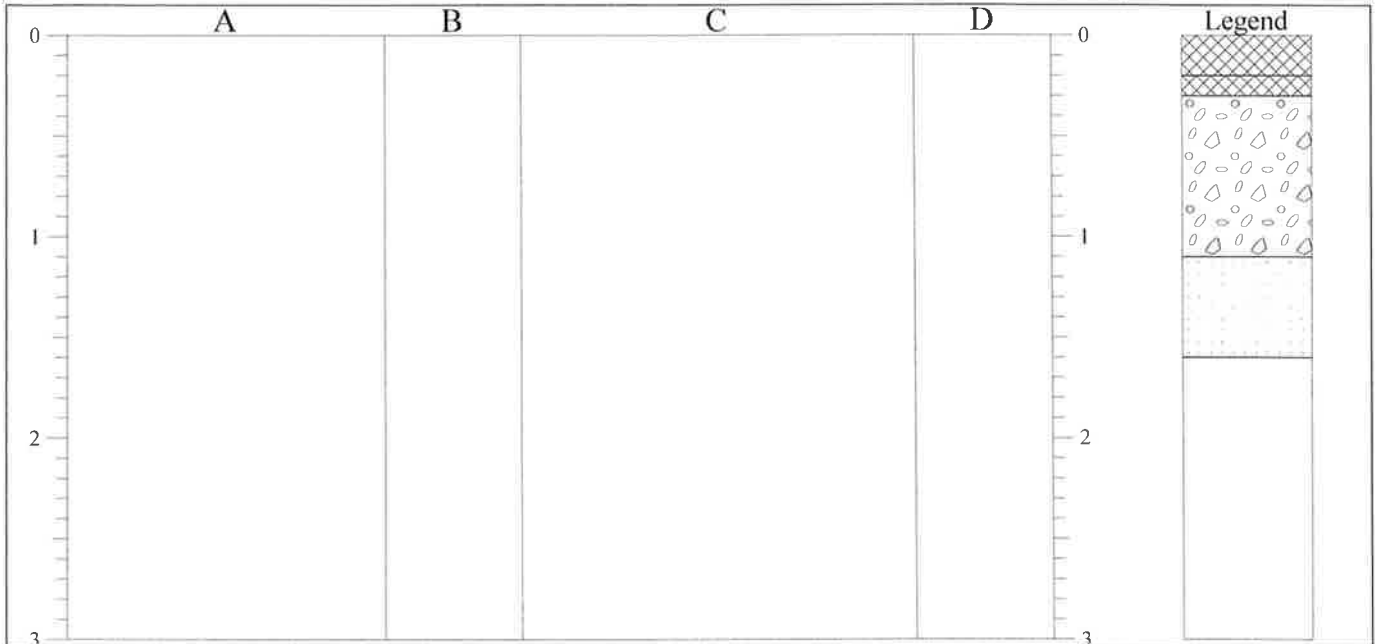


STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests
0.00-0.10		MADE GROUND: Brown sandy topsoil .			
0.10-0.60		Medium dense (engineers description) light brown sandy fine to coarse GRAVEL of angular to sub rounded sandstone.	0.30	CBR	=7%
0.60-1.00		Very stiff orangey brown to grey silty CLAY (weathered siltstone).	0.60 0.70	CBR B	=10%+

Shoring/Support: Stability: 	GENERAL REMARKS
	No groundwater encountered.

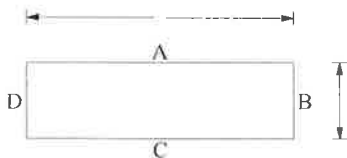
TRIAL PIT LOG

Project Lamb Lane, Barnsley				TRIAL PIT No TP8
Job No S130818	Date 30-08-13	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 1 of 1



STRATA				SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests	
0.00-0.20		MADE GROUND: Brown sandy topsoil.				
0.20-0.30		MADE GROUND: Reddish brown fine to coarse gravel fill of angular to sub rounded siltstone/shale.				
0.30-1.10		Medium dense to dense light brown sandy fine to coarse GRAVEL of angular to sub rounded sandstone. Flagging at 1.10m.				
1.10-1.60		Light brown SANDSTONE.				

Shoring/Support:
Stability:



GENERAL REMARKS

No groundwater encountered.

All dimensions in metres
Scale 1:37.5

Client **Acanthus WSM**

Method/
Plant Used

JCB 3CX

Logged By

PF

APPENDIX C:

Geotechnical Test Results

SOLMEK Laboratory Report

Contract Number: S130818

Report Date: 07/10/2013

Client's Reference:

Client Name: Solmek
12 Yarm Road
Stockton on Tees
TS18 3NA

For the attention of: Paul Fannimore

Contract Title: Lamb Lane, Barnsley

Date Received: 04/09/2013

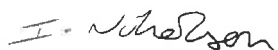
Date Commenced: 10/09/2013

Date Complete: 02/10/2013

Notes:

Samples will be held at the laboratory for a period of 6 weeks after the report date. After the **18/11/2013** all samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Checked and Approved Signatories:



I Nicholson
(Lab Manager)

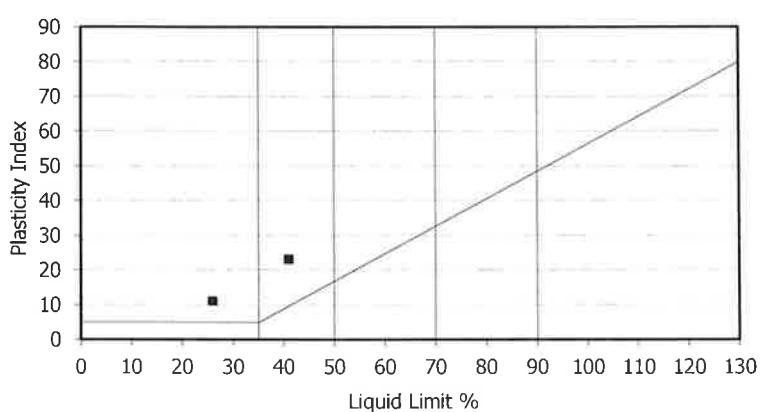


M Atkins
(Assistant Lab Manager)

D Simpson
(Office Manager)

12 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Fax: 01642 612355
e-mail: lab@solmek.com

LAMB LANE, BARNSELEY
S130818

[illegible]

		Liquid Limit
CE	Extremely high plasticity CLAY	>90%
ME	Extremely high plasticity SILT	
CV	Very high plasticity CLAY	70 - 90%
MV	Very high plasticity SILT	
CH	High plasticity CLAY	50 - 70%
MH	High plasticity SILT	
CI	Intermediate plasticity CLAY	35 - 50%
MI	Intermediate plasticity SILT	
CL	Low plasticity CLAY	<35%
ML	Low plasticity SILT	

Comments

Date: 07/10/2013

Date: 07/10/2013

Date: 07/10/2013

Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

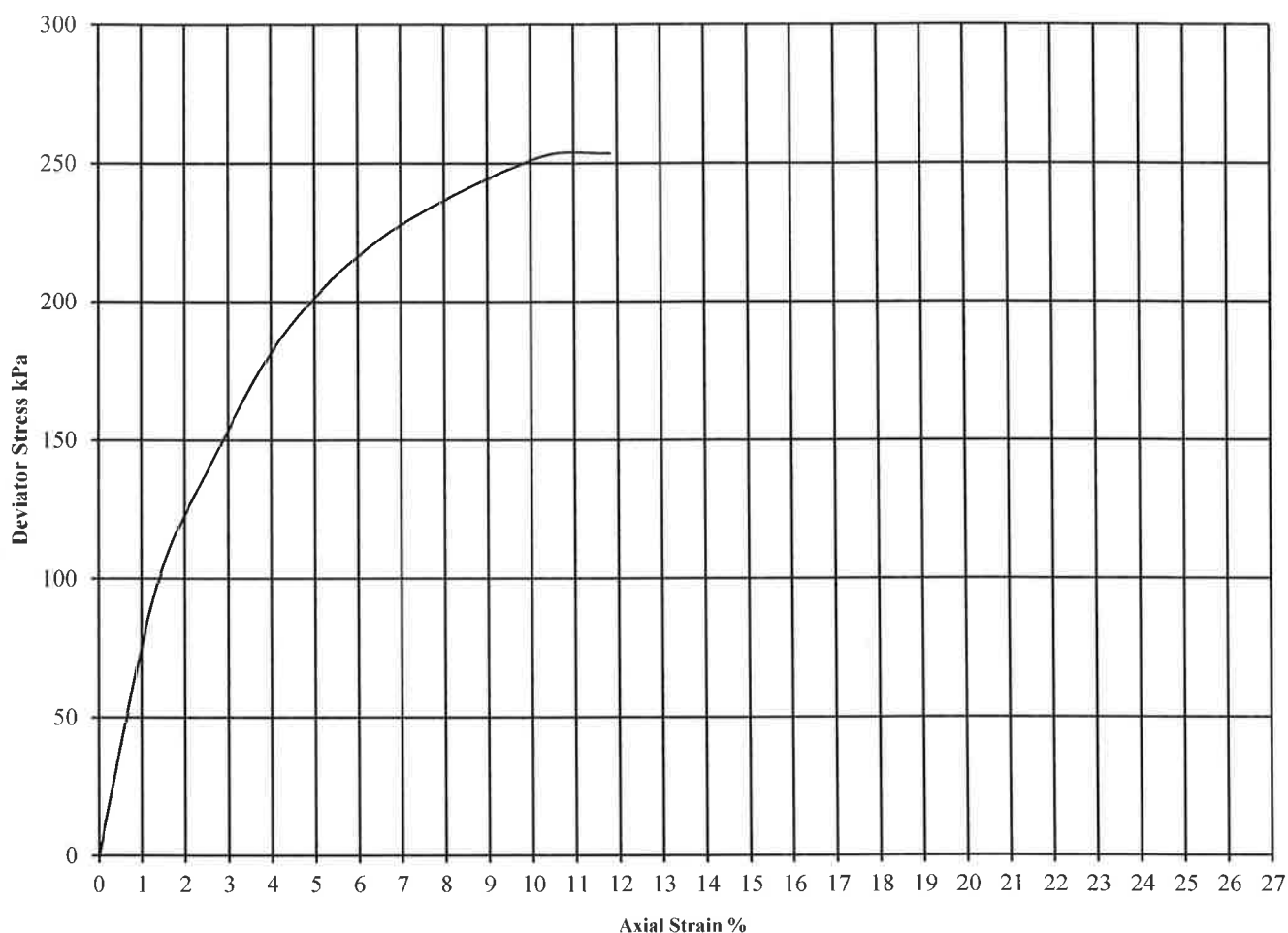
B.S. 1377 : Part 7 : Clause 8 : 1990

Hole Reference

BH 4

Depth (m)

0.8



Diameter (mm):		38	Height (mm):		76	Test:	38 mm Single Stage.			Diagram
Stage	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Shear Strength (kPa)	
1	20	2.11	1.76	20	254	127	11.8	Brittle	127	
Description		Stiff brown slightly sandy slightly gravelly CLAY								

Checked and Approved	Date
IN	07/10/13
Contract No S130818	



Lamb Lane, Barnsley

Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

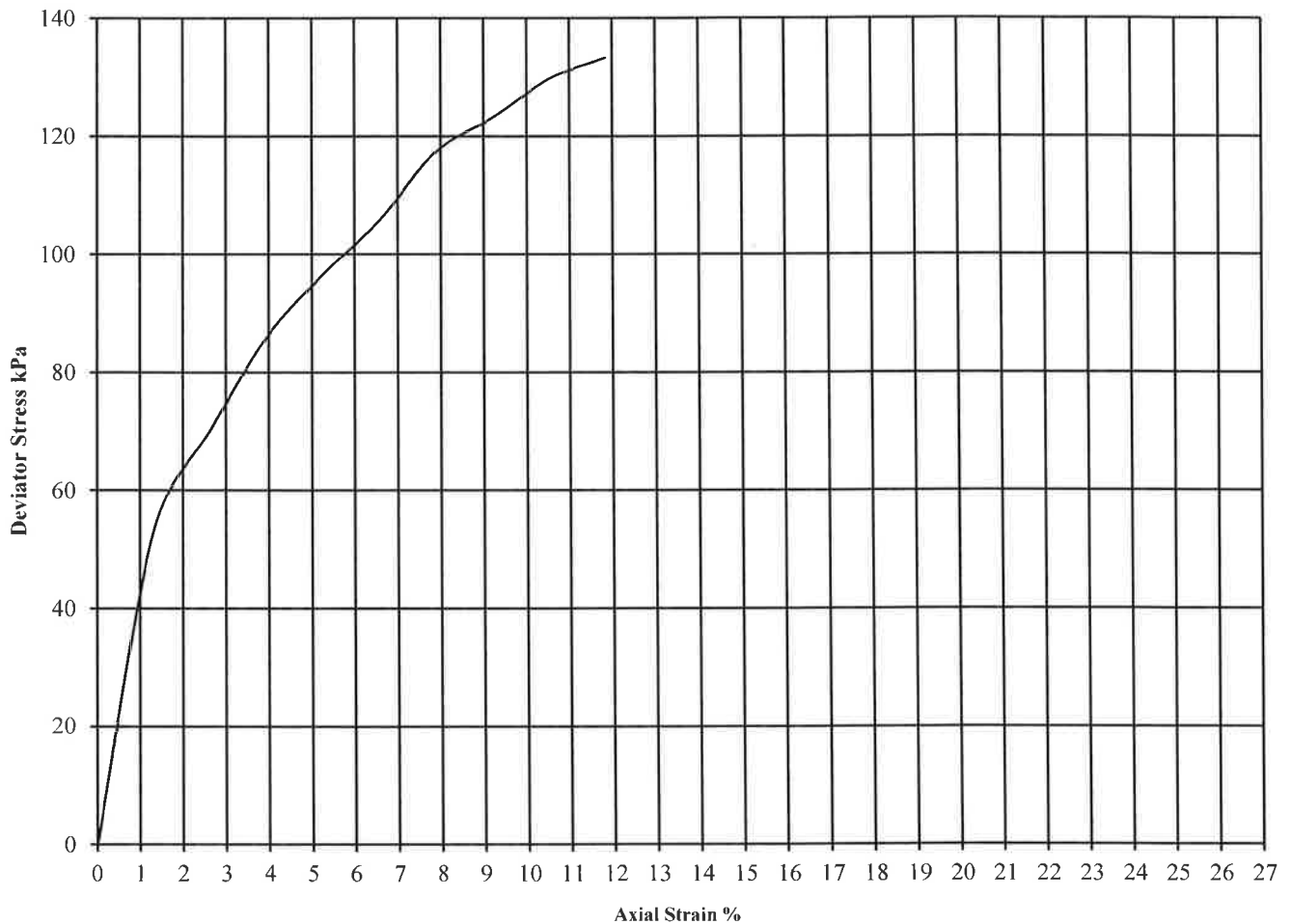
B.S. 1377 : Part 7 : Clause 8 : 1990

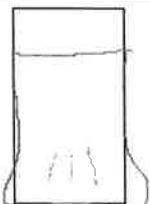
Hole Reference

TP 7

Depth (m)

0.7



Diameter (mm):		38	Height (mm):		76	Test:	38 mm Single Stage.			Diagram
Stage	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Cohesion (kPa)	Failure Strain (%)	Mode of Failure	Shear Strength (kPa)	
1	18	2.13	1.80	20	133	67	11.8	Plastic	67	
Description		Stiff brown slightly gravelly sandy CLAY								



Lamb Lane, Barnsley

Checked and Approved

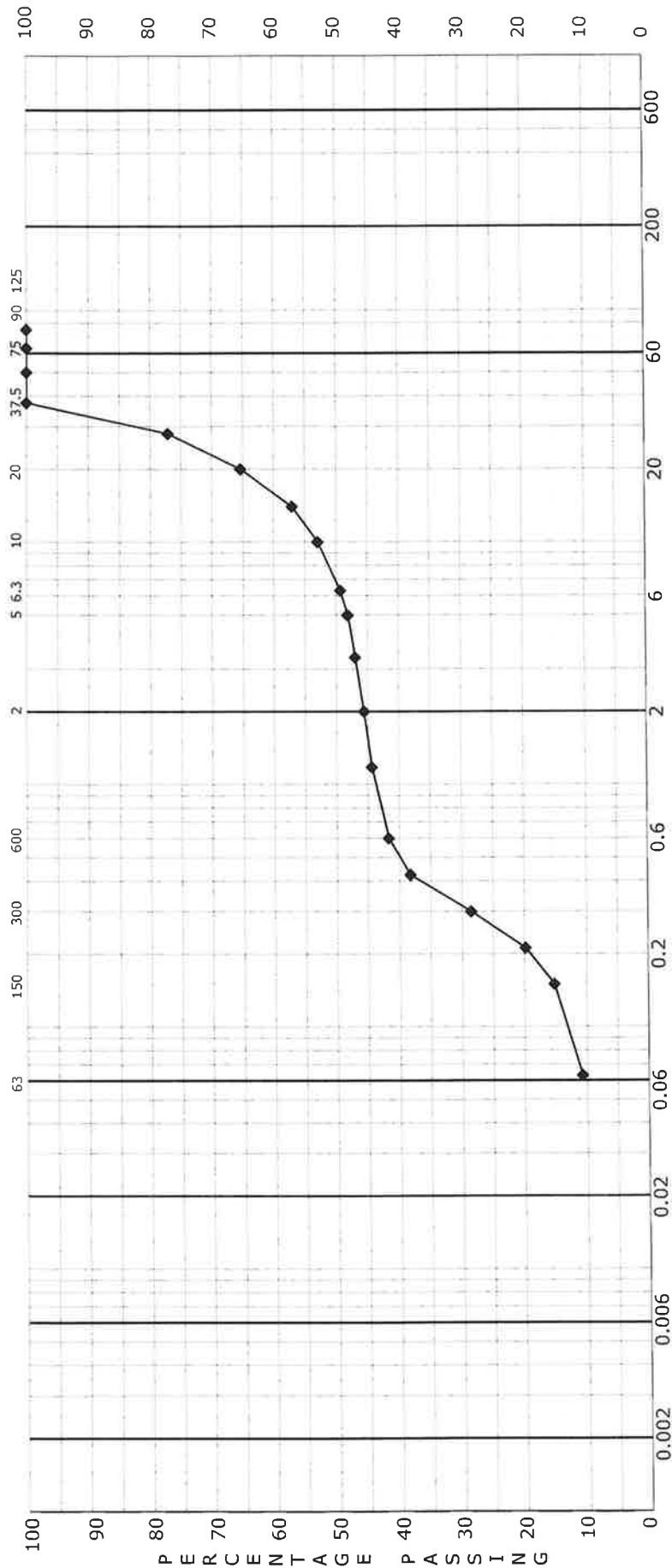
IN

Date

07/10/13

Contract No
S130818

BS Test Sieves In mm and microns



PARTICLE SIZE IN MILLIMETRES

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		

Hole No.	Depth	MC	C _u	C _z	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%GRAVEL	%SAND	%SILT and/or %CLAY
BH1	0.80	6.5			37.5000	16.1423	0.3188		54	35	11

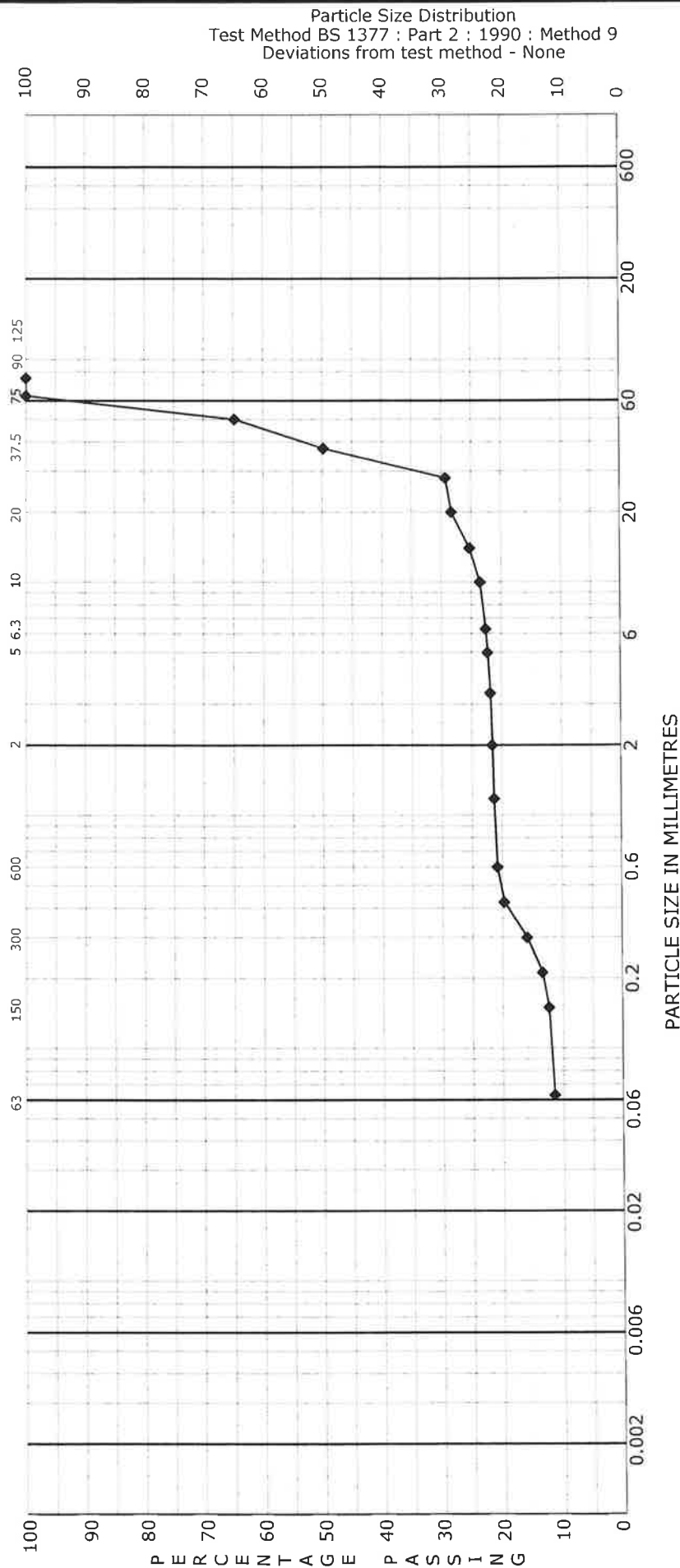
Report. S130818

Scheme : Lamb Lane, Barnsley
Client :



12 Yarm Road
Stockton-on-Tees
TS18 3NA
01642 607083

BS Test Sieves In mm and microns



CLAY			SILT			SAND			GRAVEL			COBBLES	BOULDERS
Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		

Hole No.	Depth	MC	C _u	C _z	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%GRAVEL	%SAND	%SILT and/or %CLAY
BH2	0.80	5.4			63.0000	45.9731	28.3227		78	11	11

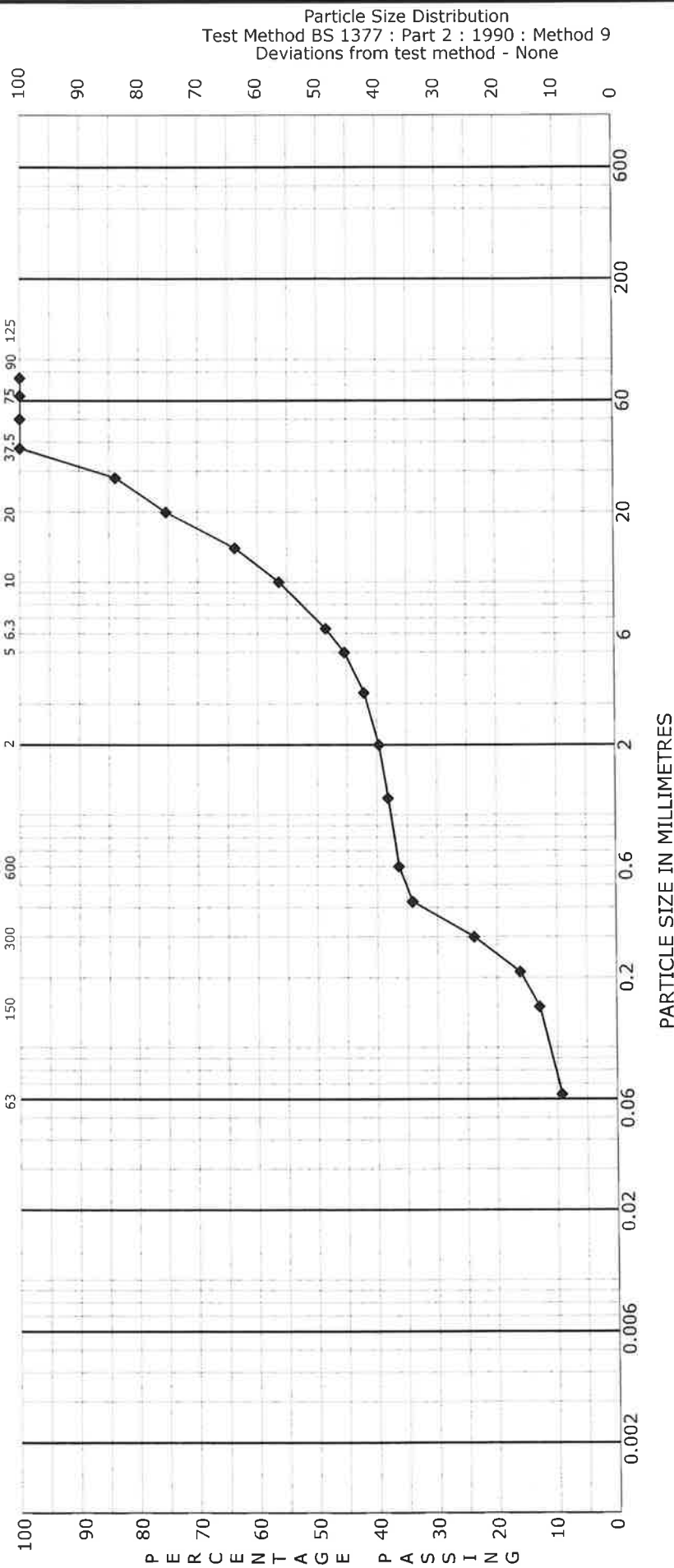
Report. S130818

12 Yarm Road
Stockton-on-Tees
TS18 3NA
01642 607083

Scheme : Lamb Lane, Barnsley

Client :

BS Test Sieves In mm and microns

[illegible][illegible]

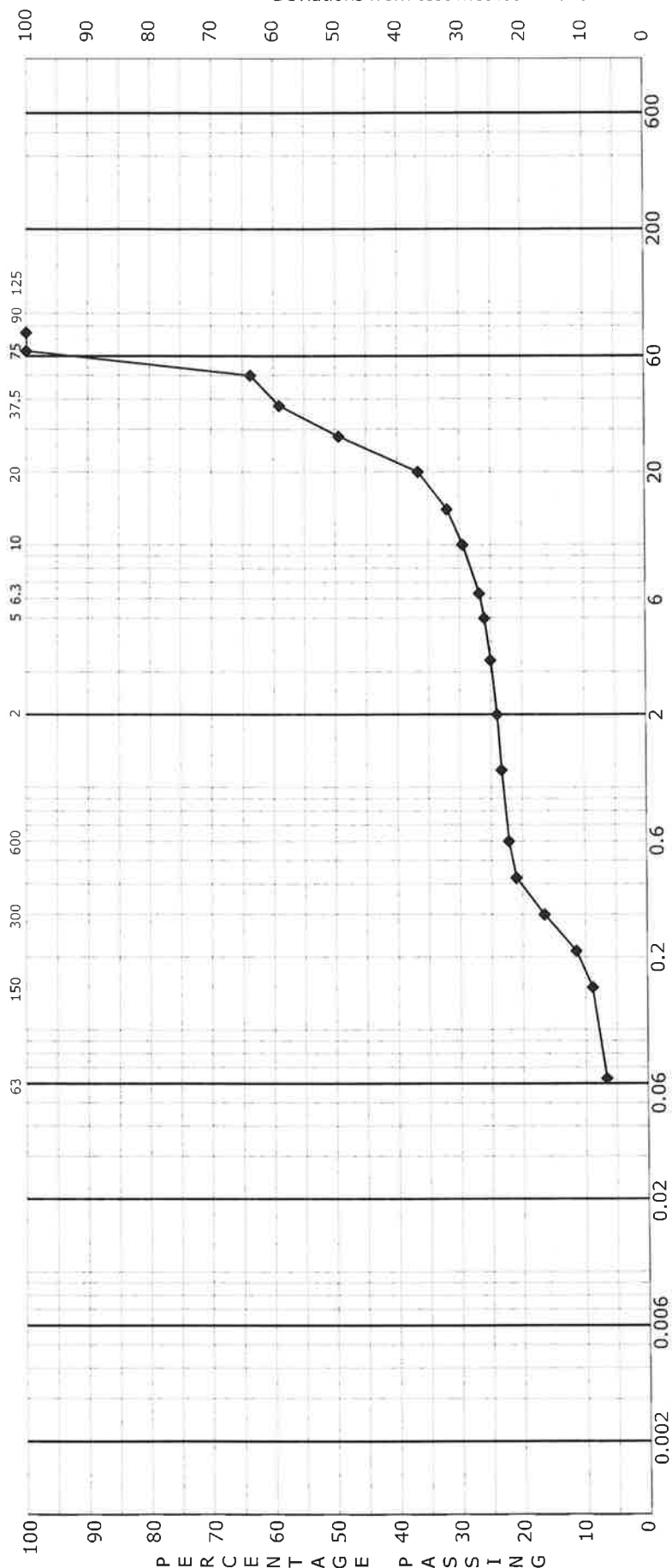
Report. S130818

Scheme	:	Lamb Lane, Barnsley
Client	:	

Stockton-on-Tees
TS18 3NA
01642 607083



BS Test Sieves In mm and microns



PARTICLE SIZE IN MILLIMETRES

CLAY			SILT			SAND			GRAVEL			COBBLES			BOULDERS		
Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse

Hole No.	Depth	MC	C _u	C _z	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	%GRAVEL	%SAND	%SILT and/or %CLAY	
BH3	1.00	7.8	225.6	16.62	63.0000	40.0532	10.8695	0.1775	76	17	7	

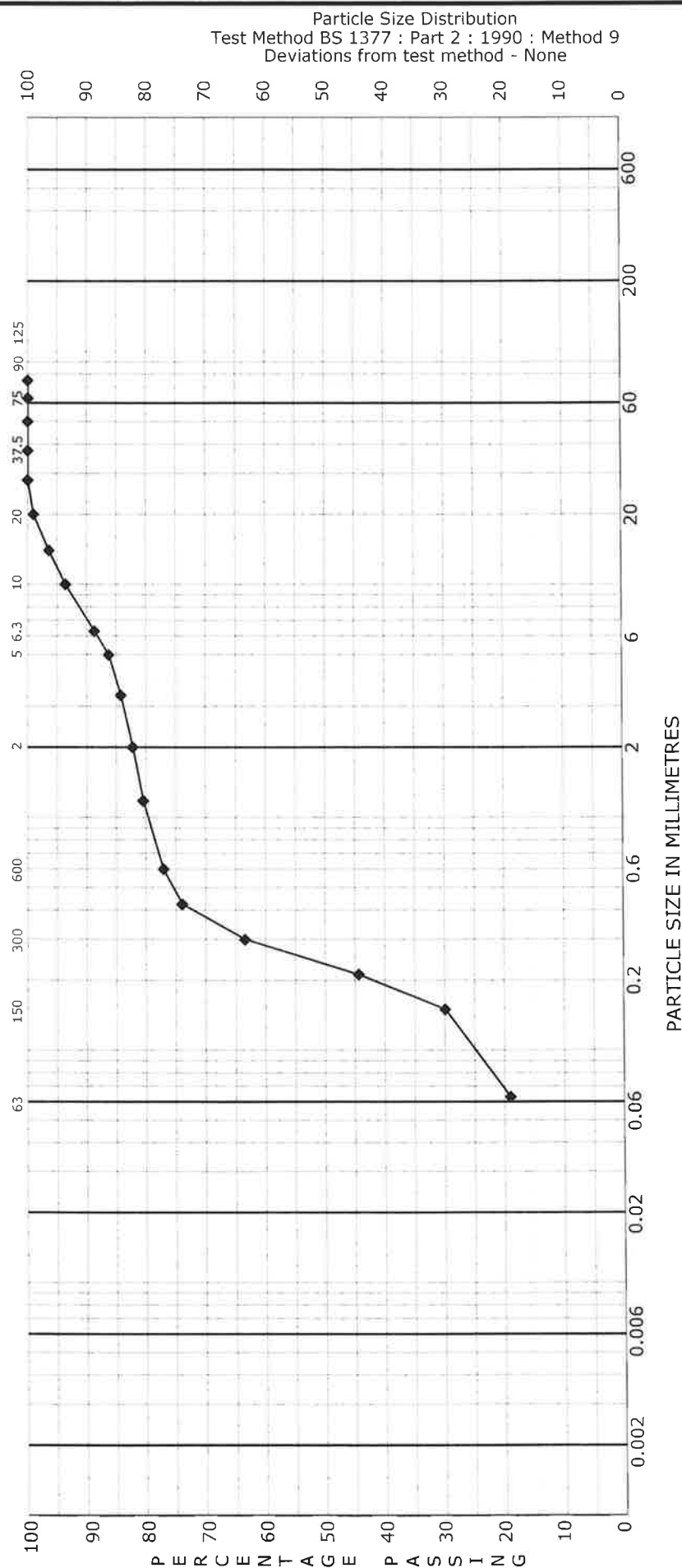
Report. S130818

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Stockton-on-Tees
TS18 3NA
01642 607083



Scheme : Lamb Lane, Barnsley
Client :

BS Test Sieves In mm and microns



Particle Size Distribution
Test Method BS 1377 : Part 2 : 1990 : Method 9
Deviations from test method - None

Report. S130818

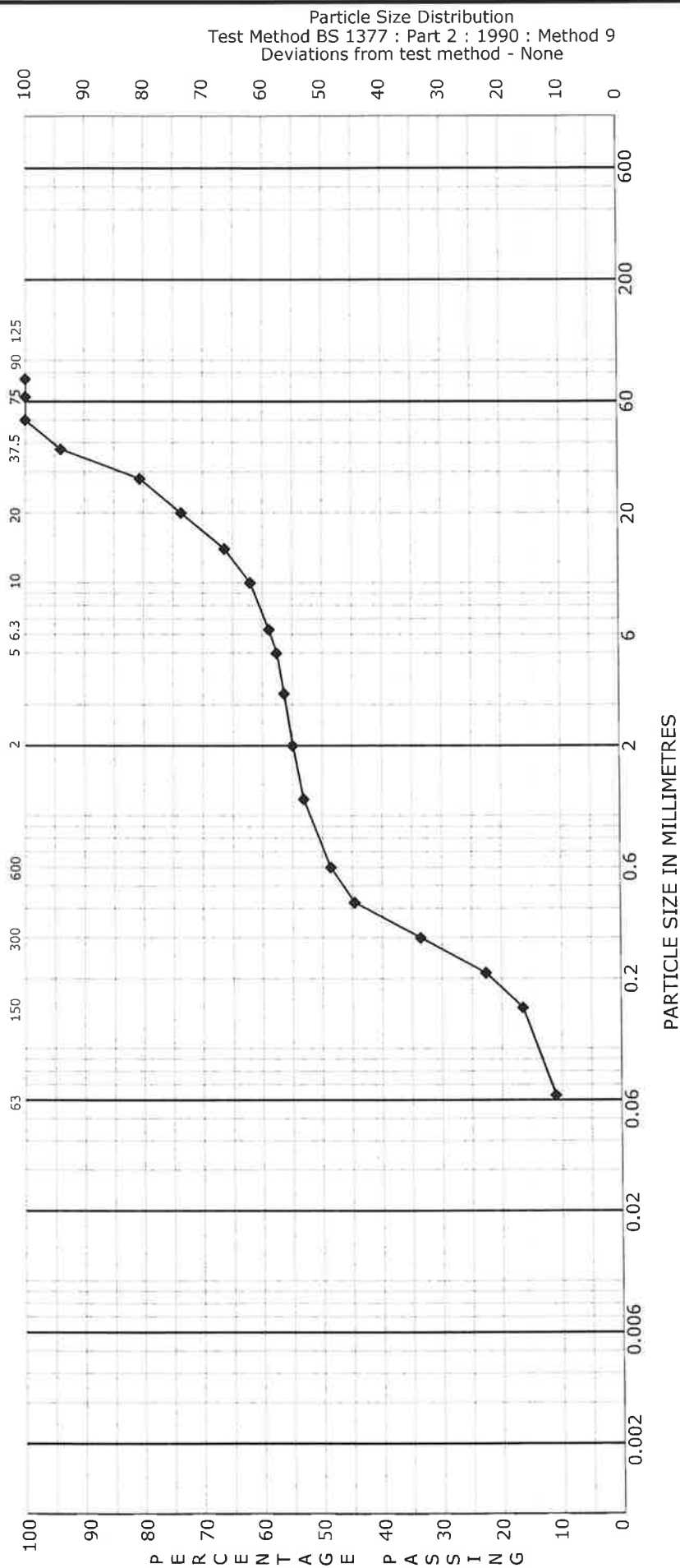
[illegible]

Scheme	:	Lamb Lane, Barnsley
Client	:	

12 Yarm Road
Stockton-on-Tees
TS18 3NA
01642 607083



BS Test Sieves In mm and microns



	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		BOULDERS
CLAY		SILT			SAND			GRAVEL			COBBLES

[illegible]

Report. S130818

Scheme	•	Lamb Lane, Barnsley
Client	•	

12 Yarm Road
Stockton-on-Tees
TS18 3NA
01642 607083

SOLMEK 

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5
Client: Acanthus WSM Architects Ltd

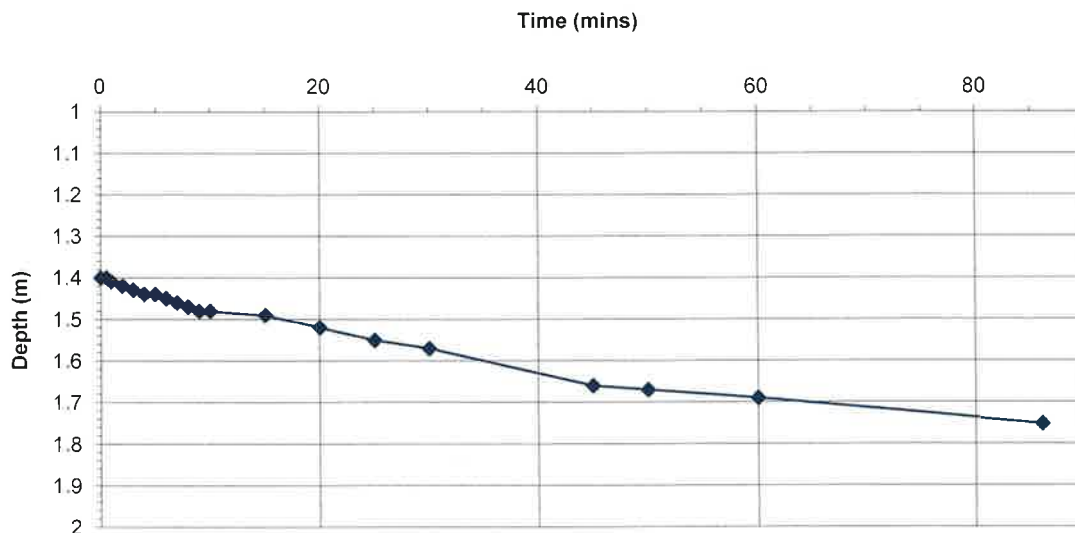
Site: Lamb Lane, Barnsley

Job No: S130818

Pit No: TP1

Test No:
1
CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)	Pit Dimensions	Length (m) =	1.60	
0	1.4		Width (m) =	0.60	
0.5	1.4		Depth (m) =	1.85	
1	1.41				
2	1.42	Depth at start of test (m) =		1.400	
3	1.43	Depth at end of test (m)=		1.750	
4	1.44	75% level (m)=		1.488	
5	1.44	50% Effective Depth		0.175	
6	1.45	25% level (m)=		1.663	
7	1.46				
8	1.47	Base area of pit (m ²) =		0.960	
9	1.48	V _{p75-25} (m ³) =		0.168	
10	1.48	a _{n50} (m ²) =		1.730	
15	1.49				
20	1.52		From the graph:		
25	1.55		tp 75 (min) = 15		
30	1.57		tp 25 (min) = 48		
45	1.66				
50	1.67	Soil infiltration rate, f, (m/s) =		4.90E-05	normal test
60	1.69				
86	1.75				
120		Input by:	PF	Date:	21/10/2013
180		Checked by:	DS	Date:	21/10/2013



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991

BRE Digest 365, Figure 2, Page 5

Client: Acanthus WSM Architects Ltd

Site: Lamb Lane, Barnsley

Job No: S130818

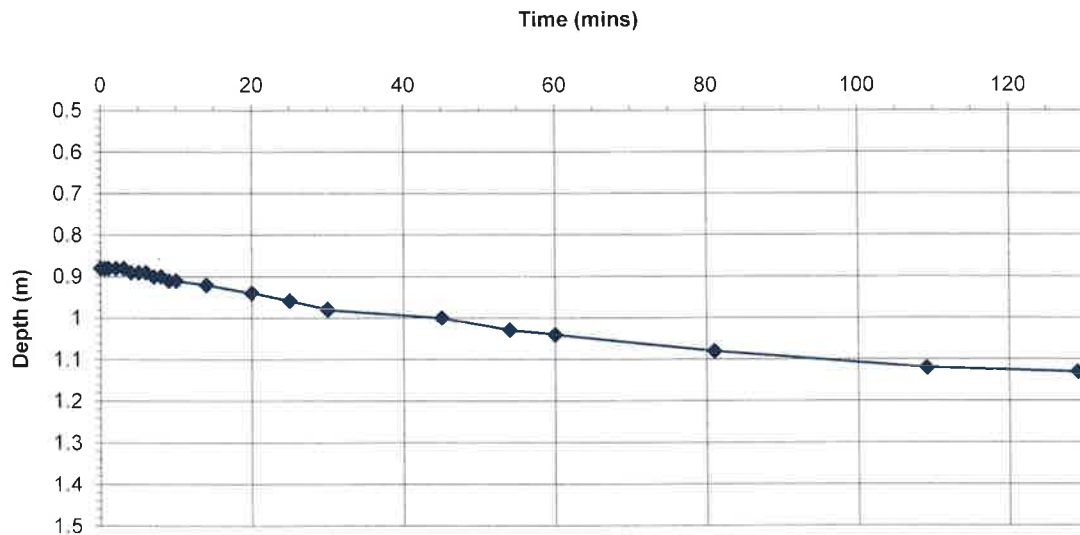
Pit No: TP2

Test No:

1

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)	Pit Dimensions	Length (m) =	1.80
0	0.88		Width (m) =	0.60
0.5	0.88		Depth (m) =	1.45
1	0.88			
2	0.88	Depth at start of test (m) = 0.880		
3	0.88	Depth at end of test (m) = 1.130		
4	0.89	75% level (m) = 0.943		
5	0.89	50% Effective Depth 0.125		
6	0.89	25% level (m) = 1.068		
7	0.9			
8	0.9	Base area of pit (m ²) = 1.080		
9	0.91	V _{p75-25} (m ³) = 0.135		
10	0.91	a _{n50} (m ²) = 1.680		
14	0.92			
20	0.94	From the graph:		
25	0.96	tp 75 (min) = 20		
30	0.98	tp 25 (min) = 104		
45	1			
54	1.03	Soil infiltration rate, f, (m/s) = 1.59E-05 normal test		
60	1.04			
81	1.08			
109	1.12	Input by:	PF	Date: 21/10/2013
129	1.13	Checked by:	DS	Date: 21/10/2013



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5
Client: Acanthus WSM Architects Ltd

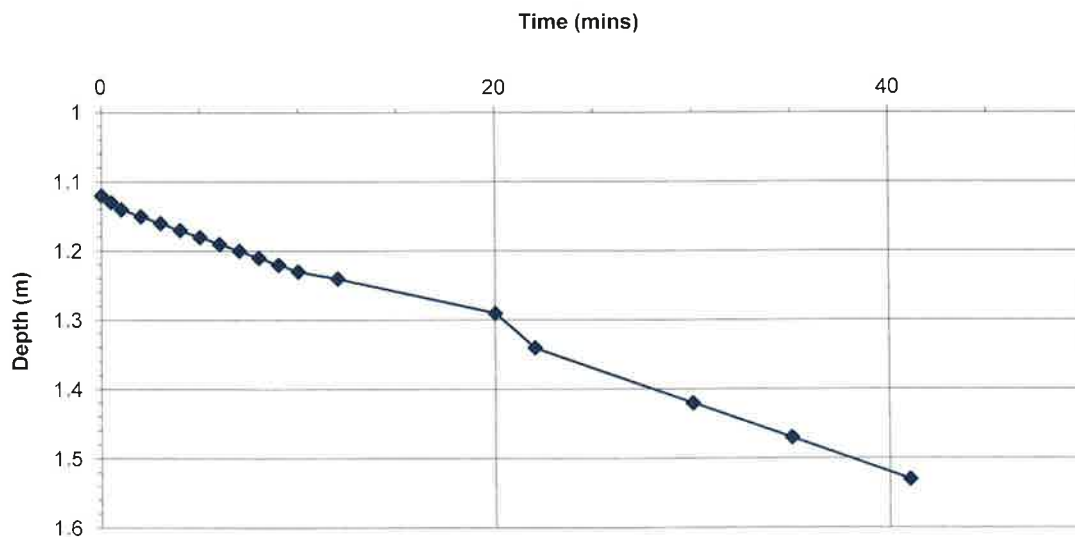
Site: Lamb Lane, Barnsley

Job No: S130818

Pit No: TP3

Test No:
1
CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)	Pit Dimensions	Length (m) =	2.10
0	1.12		Width (m) =	0.60
0.5	1.13		Depth (m) =	1.60
1	1.14			
2	1.15	Depth at start of test (m) =		1.120
3	1.16	Depth at end of test (m)=		1.530
4	1.17	75% level (m)=		1.223
5	1.18	50% Effective Depth		0.205
6	1.19	25% level (m)=		1.428
7	1.2			
8	1.21	Base area of pit (m ²) =		1.260
9	1.22	V _{p75-25} (m ³) =		0.258
10	1.23	a _{n50} (m ²) =		2.367
12	1.24			
20	1.29	From the graph:		
22	1.34	tp 75 (min) =		9
30	1.42	tp 25 (min) =		31
35	1.47			
41	1.53	Soil infiltration rate, f, (m/s) =		8.27E-05
60				normal test
81				
109		Input by:	PF	Date: 21/10/2013
129		Checked by:	DS	Date: 21/10/2013



APPENDIX D:
Chemical Test Results and CLEA Model Output



2139

Certificate of Analysis

Date: 20/09/2013

Certificate Number: 13-88527

Client: SOLMEK
12 Yarm Road
Stockton On Tees
Cleveland
TS18 3NA

Our Reference: 13-88527

Client Reference: S130818

Contract Title: Lamb Lane, Barnsley

Description: 5 soil samples

Date Received: 10 September 2013

Date Started: 10 September 2013

Date Completed: 20 September 2013

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082)

Notes: Observations and interpretations are outside the scope of UKAS accreditation

Approved By:



Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425um sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28oC +/-2oC.

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-88527

Client Ref: S130818

Contract Title: Lamb Lane, Barnsley

				Lab No.	553726	553727	553728
				Sample ID	BH2	BH3	BH4
				Depth	0.20	0.20	0.20
				Sample Ref			
				Sample Type			
				Sampling Date	30/08/2013	30/08/2013	30/08/2013
				Sampling Time			
Test	Units	DETSxx	LOD				
Mercury	mg/kg	DETSC 2325#	0.05		0.11	< 0.05	< 0.05
Arsenic	mg/kg	DETSC2301#	0.2		12	8.6	13
Cadmium	mg/kg	DETSC2301#	0.1		0.5	0.9	0.3
Chromium	mg/kg	DETSC2301#	0.15		14	16	36
Copper	mg/kg	DETSC2301#	0.2		19	16	32
Nickel	mg/kg	DETSC2301#	1		16	15	14
Lead	mg/kg	DETSC2301#	0.3		39	20	8.1
Selenium	mg/kg	DETSC2301#	0.5		< 0.5	< 0.5	1.8
Zinc	mg/kg	DETSC2301#	1		45	76	10
Hexavalent Chromium	mg/kg	DETSC 2204*	1		< 1.0	< 1.0	< 1.0
Boron (water soluble)	mg/kg	DETSC2123#	0.2		1.8	2.3	5.4
Cyanide total	mg/kg	DETSC 2130#	0.1		0.3	0.4	< 0.1
Organic matter	%	DETSC 2002#	0.1		3.6	2.3	6.7
Sulphide	mg/kg	DETSC 2024#	10		20	38	2500
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		12	24	2200
pH		DETSC 2008#			6.7	8.1	10.5
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5			< 1.5	< 1.5
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2			< 1.2	1.6
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5			< 1.5	5.5
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4			< 3.4	33
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9			< 0.9	< 0.9
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5			< 0.5	4.9
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6			1.4	140
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4			3.5	290
Aliphatic C5-C35	mg/kg	DETSC 3072*	10			< 10	40
Aromatic C5-C35	mg/kg	DETSC 3072*	10			< 10	430
TPH Ali/Aro	mg/kg	DETSC 3072*	10			< 10	470

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-88527
 Client Ref: S130818
 Contract Title: Lamb Lane, Barnsley

				Lab No.	553726	553727	553728
				Sample ID	BH2	BH3	BH4
				Depth	0.20	0.20	0.20
				Sample Ref			
				Sample Type			
				Sampling Date	30/08/2013	30/08/2013	30/08/2013
				Sampling Time			
Test	Units	DETSxx	LOD				
Acenaphthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	
Acenaphthylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	
Anthracene	mg/kg	DETSC 3301	0.1		< 0.1	10	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1		< 0.1	24	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	26	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	19	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	12	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1		< 0.1	15	
Chrysene	mg/kg	DETSC 3301	0.1		< 0.1	26	
Dibenzo(a,h)anthracene	mg/kg	DETSC 3301	0.1		< 0.1	2.3	
Fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	58	
Fluorene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	17	
Naphthalene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	
Phenanthrene	mg/kg	DETSC 3301	0.1		< 0.1	33	
Pyrene	mg/kg	DETSC 3301	0.1		< 0.1	51	
PAH	mg/kg	DETSC 3301	1.6		< 1.6	290	
Phenol - Monohydric	mg/kg	DETSC 2130#	0.3		1.2	1.2	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-88527

Client Ref: S130818

Contract Title: Lamb Lane, Barnsley

				Lab No.	553729	553730
				Sample ID	BH5	TP5
				Depth	0.20	0.50
				Sample Ref		
				Sample Type		
				Sampling Date	30/08/2013	30/08/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Mercury	mg/kg	DETSC 2325#	0.05		0.29	0.20
Arsenic	mg/kg	DETSC2301#	0.2		7.6	18
Cadmium	mg/kg	DETSC2301#	0.1		0.6	1.0
Chromium	mg/kg	DETSC2301#	0.15		37	66
Copper	mg/kg	DETSC2301#	0.2		23	41
Nickel	mg/kg	DETSC2301#	1		18	26
Lead	mg/kg	DETSC2301#	0.3		28	140
Selenium	mg/kg	DETSC2301#	0.5		< 0.5	< 0.5
Zinc	mg/kg	DETSC2301#	1		87	160
Hexavalent Chromium	mg/kg	DETSC 2204*	1		< 1.0	< 1.0
Boron (water soluble)	mg/kg	DETSC2123#	0.2		1.8	2.2
Cyanide total	mg/kg	DETSC 2130#	0.1		0.1	0.3
Organic matter	%	DETSC 2002#	0.1		3.3	5.0
Sulphide	mg/kg	DETSC 2024#	10		180	410
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		140	150
pH		DETSC 2008#			11.7	10.0
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01			< 0.01
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01			< 0.01
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01			< 0.01
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5			< 1.5
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2			< 1.2
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5			< 1.5
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4			< 3.4
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01			< 0.01
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01			< 0.01
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01			< 0.01
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9			< 0.9
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5			0.7
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6			5.9
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4			23
Aliphatic C5-C35	mg/kg	DETSC 3072*	10			< 10
Aromatic C5-C35	mg/kg	DETSC 3072*	10			30
TPH Ali/Aro	mg/kg	DETSC 3072*	10			30

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-88527
 Client Ref: S130818
 Contract Title: Lamb Lane, Barnsley

				Lab No.	553729	553730
				Sample ID	BH5	TP5
				Depth	0.20	0.50
				Sample Ref		
				Sample Type		
				Sampling Date	30/08/2013	30/08/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Acenaphthene	mg/kg	DETSC 3301	0.1			< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1			< 0.1
Anthracene	mg/kg	DETSC 3301	0.1			< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1			< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1			< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1			< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1			< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1			< 0.1
Chrysene	mg/kg	DETSC 3301	0.1			< 0.1
Dibenzo(a,h)anthracene	mg/kg	DETSC 3301	0.1			< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1			< 0.1
Fluorene	mg/kg	DETSC 3301	0.1			< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1			< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1			< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1			< 0.1
Pyrene	mg/kg	DETSC 3301	0.1			< 0.1
PAH	mg/kg	DETSC 3301	1.6			< 1.6
Phenol - Monohydric	mg/kg	DETSC 2130#	0.3		< 0.3	< 0.3

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-88527

Client Ref: S130818

Contract Title: Lamb Lane, Barnsley

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
553727	BH3 0.20	Soil	NAD	na	John Leeson
553728	BH4 0.20	Soil	NAD	na	John Leeson
553729	BH5 0.20	Soil	NAD	na	John Leeson
553730	TP5 0.50	Soil	NAD	na	John Leeson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
553726	BH2 0.20 SOIL	30/08/2013	Plastic Bag			
553727	BH3 0.20 SOIL	30/08/2013	Plastic Bag		Aliphatics/Aromatics Solid, BTEX Solid, Naphthalene, PAH FID Solid	
553728	BH4 0.20 SOIL	30/08/2013	Plastic Bag		Aliphatics/Aromatics Solid, BTEX Solid, Naphthalene, PAH FID Solid	
553729	BH5 0.20 SOIL	30/08/2013	Plastic Bag			
553730	TP5 0.50 SOIL	30/08/2013	Plastic Bag		Aliphatics/Aromatics Solid, BTEX Solid, Naphthalene, PAH FID Solid	

CLEA Software Version 1.06		Page 1 of 11
Report generated	08-Oct-13	 Environment Agency
Report title	Lamb Lane, Barnsley	
Created by	PF at Solmek	
RESULTS		

[illegible]

CLEA Software Version 1.06		Page 1 of 11
Report generated	08-Oct-13	 Environment Agency
Report title	Lamb Lane, Bamsley	
Created by	PF at Solmek	
RESULTS		

CLEA Software Version 1.06		Page 1 of 11
Report generated	08-Oct-13	 Environment Agency
Report title	Lamb Lane, Barnsley	
Created by	RW at Solmek	
RESULTS		

[illegible]

APPENDIX E:
Notes on Limitations & Contamination Guidance

These conditions accompany our tender and supercede any previous conditions issued. Solmek will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of Solmek. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from Solmek. A charge may be levied against such approval, the same to be made at the discretion of Solmek. Solmek was a trading name of Hymas Geoenvironmental Ltd.

Solmek cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. Solmek are not responsible for the action negligent of otherwise of subcontractors or third parties.

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, ground gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Solmek cannot be held liable for any unrecorded or unforeseen obstructions between exploratory boreholes and trial pits. This includes instances where previous structures on the site (buried man made structures) or the presence of boulder clay (cobbles and/or boulder obstructions) have been anticipated. All types of piling operations should make allowance for obstructions within the construction budget to accommodate this. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2001 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, Solmek cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

All information acquired by Solmek in the course of investigation is the property of Solmek, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. Solmek reserve the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. The presence or otherwise of Japanese Knotweed or other invasive plants can be difficult to identify especially during winter months. If Japanese Knotweed or other invasive species are suspect, it should be confirmed by an ecologist. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning Solmek you understand and accept that you/your agent have a contractual relationship with Solmek & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Solmek are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete, and Solmek has not allowed for this. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If warranties are required, legal costs incurred will be passed on to you assuming Solmek agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We reserve the right to pursue full payment of the invoice prior to release of any information including reports. We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. Solmek are exempt from the CIS Scheme. Solmek offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. Solmek are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by Solmek. Solmek give notice that consequential loss as a direct or indirect result of Solmek's activities or omission of the same are excluded.