Claycliffe Road, Barugh Green, Barnsley

REPORT ON A GEOENVIRONMENTAL ASSESSMENT
FOR
ALDI STORES LTD

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FOR
ALDI STORES LTD

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Executive Summary

Site investigation	The investigation has involved: A review of desk study information. 11 trial pits to a maximum depth of 2.7 metres. 7 mini percussion boreholes to a maximum depth of 3.45 metres. Installation and monitoring of 6 well installations. Geotechnical and contamination related testing.
Site history	Southern Part: The site was open fields until 1962 when a building was present within this part. Northern Part: The site was open fields until 1983 when buildings were present in the southern part of this area. Since the early 1990s all buildings were removed and the site is currently vacant open land. Claycliffe Road forms the eastern boundary of the site and from the late 1920s the area to the east of Claycliffe Road was occupied by a coke and by-product works, a chemical works and tip and re-developed with an industrial estate in the 1960s/70s. The area immediately southeast of the site was open until the late 1960s/early 1970s when it was developed with a garage and has recently been re-developed with a public house.
Topography	The site occupies an area of approximately 1.2 hectares sloping gently to the west with the southern part some 2 to 3 metres lower. An open drain runs along the northwestern boundary and is culverted in two lines across the southern part. The site is roughly grassed with areas of concrete hardstanding and semi-mature trees; an infestation of possible Japanese Knotweed occupies the northwestern part.
Environmental setting	• The site is underlain directly by the Middle Coal Measures strata. The Swallow Wood coal seam outcrops approximately 350 metres north west of the site, and dips beneath the site, however, given the distance from the site this seam is not considered to impact up on the site. • There are four former landfills within 250 metres of the site with the closest 50 metres to the south east. • The nearest surface watercourse is a drain located adjacent to the western boundary of the site. The underlying soils are classed as a minor aquifer with the site underlain by soils of high leaching potential. • There are no licensed water abstractions within 500 metres. • There are no recorded pollution incidents within 250 metres. • The site lies in an area where basic radon protective measures are necessary.
Ground conditions	A cover of reworked topsoil occupies the central part of the site and areas of concrete hardstanding overlie made ground to a maximum depth of 2.1 metres, but generally less than a metre, comprising reworked gravelly clay and granular materials including ash and cinder. The remainder of the site comprises a cover of topsoil, which together with the made ground materials, are underlain by firm to stiff and stiff clay with mudstone proved at the base of the exploratory holes. In the central part of the site relict topsoil is present beneath the made ground materials.

Groundwater and excavation stability	Groundwater was encountered at 2 metres during advancement of exploratory holes. Standing groundwater levels are generally between 1 and 2 metres.
Gas monitoring	Slightly elevated levels of carbon dioxide have been recorded with low flow levels.
Appraisal	**Contamination** – No evidence of significant contamination was noted during the investigation and the subsequent laboratory testing has shown there is no risk to human health for the proposed end use. **Remediation** - No remediation is considered necessary to facilitate development. The suspected Japanese Knotweed in the northwestern part, if confirmed, will require treatment or removal by a suitably qualified contractor. **Foundations** - For the proposed food retail store in the northern part of the site natural firm to stiff and stiff clays are present between 0.9 and 2 .1 metres and traditional pad and strip foundations are appropriate with some deepening and the use of trench fill in areas of more extensive made ground in the northwestern part. For the proposed office development in the southern part of the site traditional pad and strip foundations are considered appropriate founding upon the firm to stiff and stiff clays. Some deepening of foundations may be required within the vicinity of the former tanks and sluices in the central part. Where trees are present, or are to be removed or planted, foundations will need to be deepened assuming medium volume change potential. **Floor slabs** – Ground bearing floor slabs are considered appropriate across the site subject to treatment of the made ground materials. Alternatively, a suspended floor slab could be adopted. **Gas precautions** - Gas monitoring has identified slightly elevated levels of carbon dioxide together with low flows and, as the site is in a radon affected area, basic radon precautions are required which mitigate those for carbon dioxide. **Pavements** - A design CBR value of 4% is recommended for formations in the upper clays, with any soft spots identified by proof rolling adequately treated. **Excavations** – If man entry is proposed into excavations the use of support to excavation sides is recommended. Seepages and water ingress into excavations should be controlled adequately by localised pumping from sumps. Use of a breaker should be anticipated for excavations within mudstone bedrock. **Sulphate attack on buried concrete** – Buried concrete should be designed to BRE Special Digest 1:2005 Design Sulphate Class DS-1 with an ACEC site classification AC-1s. **Drainage** - The presence of extensive cohesive soils together with the cohesive nature of the weathered bedrock materials would preclude the use of soakaways for surface water drainage.

Claycliffe Road, Barugh Green, Barnsley
REPORT ON A SITE INVESTIGATION
FOR
Aldi Stores Ltd

1. INTRODUCTION

1.1 This investigation has been carried out for Aldi Stores Limited for a proposed retail and office development and as indicated on Waring and Netts Architects drawing 2000/439 SK14 Rev A, included in **Appendix A.**

1.2 The investigation has been designed to assess contamination issues and foundation requirements at the site and has involved a review of information provided by Aldi Stores Ltd and comprising:

- Environmental Site Assessment for a site at the junction of Claycliffe Road and Barugh Green Road, Quest, Ref: 67/826, June 1999;

- Phase I Geo-environmental Assessment, 3e Consulting Engineers Limited, Ref 7515, February 2007.

2. THE SITE

Location and Description

2.1 The site, centred on National Grid Reference 431900 408010, is located approximately 2.5 kilometres north west of Barnsley town centre within the district of Barugh Green. The site lies 100 metres north west of the junction between Claycliffe Road and Barugh Green Road. It is bound by the Chestnut Tree Public House and associated car parking to the southeast, Barugh Green Road to the south, an open drain with a works premises beyond to the west, open ground to the north and Claycliffe Road with car dealerships and a garage beyond to the east.

2.2 The site, occupying an area of approximately 1.2 hectares, is irregular in shape and currently vacant. The site can be divided into two parts, the northern part and the southern part.

Northern Part

2.3 There are two fire damaged containers in the south western corner and a rectangular concrete slab in the south eastern corner. Generally in the southern half of this area site levels are undulating and a cover of rough grass is present with occasional building materials, plant pots, plastic bags and occasional pieces of asbestos cement corrugated sheeting. The northern half falls gently to the west and is surfaced with rough grass and is covered with semi-mature trees. Along the western edge of this area, there is an approximate 5 metre fall to an open drain. An infestation of possible Japanese Knotweed is present along the edge of this embankment and extending across the majority of the western part of the site.

Southern Part

2.4 In the southern part, site levels are approximately 3 metres lower than the north and the ground is generally undulating with a gentle slope down to the west. The site is covered with rough grass, brambles and semi-mature trees with an area of concrete hardstanding located in the west. The open drain bordering the western boundary of the northern part is

present within this part of the site and culverted in a northwest – southeast direction and also a northeast – southwest direction. Former concrete tanks and a sluice, approximately 1 to 2 metres depth, are present within the north east and an electricity substation is present in the north eastern corner. The location of these features are shown on the exploratory hole location plan and included as **Figure 1**.

Site History

2.5 In order to establish the site's history an inspection of historical maps, dating between 1855 and 2004 and obtained as part of an Envirocheck report (Ref. 20945143-1-1), has been made. The following represents a summary of the map information presented in the Phase I Geo-environmental Assessment.

2.6 In summary, the site was open fields site prior to 1962 when a building was present in the southern part of the site and prior to 1983 in the northern part, when buildings were present in the southern half of this area. Since the early 1990s all buildings were removed from the site it is currently vacant open land. Claycliffe Road forms the eastern boundary of the site and from the late 1920s the area to the east of Claycliffe Road was occupied by a coke and by-product works, a chemical works and tip and re-developed with an industrial estate in the 1960s/70s. The area immediately south east of the site was open ground until the late 1960s/early 1970s when the site was developed with a garage and has recently been re-developed with a public house.

3. GEO-ENVIRONMENTAL SETTING

3.1 This section is based principally upon a search of information available on public registers through the Envirocheck search (Ref. 20945143-1-1), included in the Phase I Geo-environmental Assessment.

Geology and Mining

3.2 British Geological Survey (BGS) information, Sheet 87, 1:50,000 scale, indicates the site to be underlain by the Middle Coal Measures comprising an interbedded sequence of mudstone, siltstone, sandstone and coal. The Swallow Wood coal seam outcrops approximately 350 metres north west dipping beneath the site, however, given the distance from the site this seam is not considered to impact up on the site.

3.3 A report was requested from the Coal Authority, reference 00012743-07 dated 9 February 2007, and is included in the Phase I Geo-environmental Assessment. This identifies the site as being within the likely zone of influence from past workings in 6 seams of coal at between 50 to 340 metres depth, the last date of working being 1980. Ground movement from these should have ceased by now.

3.4 The Coal Authority also indicates that the site is not within the zone of likely physical influence at the surface from present underground workings or plans for future workings in their possession, however, reserves of coal exist in the locality that could be worked at some time in the future.

3.5 No mine entries are present at, or within 20 metres, of the site.

Landfill Sites and Waste Management Facilities

3.6 The Envirocheck report indicates there are four local authority recorded landfills within 250 metres of the site with the closest 50 metres south east of the site. There is no information available as to what these landfills have been infilled with.

Watercourses

3.7 The nearest surface watercourse is a drain present beneath the southern part and adjacent to the western boundary of the northern part of the site. There is no river quality information pertaining to this drain.

Groundwater

3.8 Reference to the "Environment Agency Policy and Practice for the Protection of Groundwater, Groundwater Vulnerability 1:100,000 Map series, Sheet 11, South Pennines" classifies the underlying soils as a minor aquifer with the site underlain by soils of high leaching potential. This classification is an assumed worst-case vulnerability relating to urban areas and based upon fewer observations.

Water Abstractions and Discharge Consents

3.9 There are no licensed water abstractions within a 500 metres radius.

3.10 There are two discharge consents within a 500 metres radius of the site and both are located approximately 250 metres north west of the site and licensed to discharge drainage into a stream/river.

Pollution Controls

3.11 The Envirocheck report indicates that there are no integrated pollution controls or local authority pollution and prevention controls within 500 metres of the site.

Pollution Incidents

3.12 The Envirocheck report indicates that there are no recorded pollution incidents within 250 metres of the site.

Radon

3.13 The Envirocheck report indicates that the site lies within an area where basic radon protective measures are necessary.

Fuel Station Entries

3.14 The area adjacent to the south eastern boundary of the site is registered as a former fuel filling station operated by Claycliffe Motors Ltd, its status now recorded as obsolete.

4. SUMMARY OF PREVIOUS INTRUSIVE INVESTIGATION

4.1 The former environmental site assessment report carried out by Quest in 1999 pertains to the former garage adjacent to the south eastern boundary of the site and was carried out prior to re-development. Its purpose was to assess hydrocarbon contamination associated with the former underground tanks and it is understood that at the time of this investigation all above and below ground tanks had been removed.

4.2 The boreholes sunk on the site proved made ground to depths of 0.4 and 1.5 metres, generally granular in composition varying from a sand to an ash fill and underlain by a natural silty clay which quickly grades into a weathered mudstone with sandstone bands.

4.3 The contamination assessment concluded that there were localised hotspots of hydrocarbon contamination but no evidence of areas of gross site wide hydrocarbon contamination.

5. 3E CONSULTING ENGINEERS INVESTIGATORY WORK

Fieldwork

5.1 Taking cognisance of the Phase I assessment and associated third party information, trial pitting and mini percussive boring was carried out to determine the general soil profile across the site on 12 April 2007. Disturbed samples were recovered as appropriate for soil descriptions and laboratory testing.

5.2 Gas and groundwater monitoring wells were installed within six mini percussion boreholes comprising slotted 50mm diameter HDPE pipe set within a granular filter, which was sealed with an upper bentonite seal and a gas tap with lockable cover fitted at the surface. These were subsequently monitored on four occasions for combustible gas, carbon dioxide and oxygen using a portable infra-red gas analyser with water levels recorded using an electronic dip meter between 9 May and 25 May 2007.

5.3 Fieldwork and soil descriptions were carried out in general accordance with BS5930:1999, "Code of Practice for Site Investigations".

5.4 The locations of the trial pits and mini percussion boreholes were determined by 3e Consulting Engineers to give a general coverage of the site where access and underground services allowed; these are indicated on the Exploratory Hole Location Plan included as **Figure 1**.

Laboratory Testing

Contamination Related Testing

5.5 In view of no previously identified contaminative activities at the site, testing was limited to screening a total of eight samples including topsoil, reworked topsoil, made ground, relict topsoil and natural soils for the determinands indicated as follows:

- Arsenic
- Cadmium
- Chromium
- Lead
- Mercury
- Selenium
- Nickel
- Vanadium
- Copper
- Boron
- Zinc
- Water soluble sulphate
- pH
- Total petroleum hydrocarbons (TPH)
- Speciated polyaromatic hydrocarbons (PAH)

5.6 A further six water-soluble sulphate and pH determinations were carried out on samples of the natural soils to assess the soil chemistry with respect to sulphate attack on buried concrete.

5.7 In addition two samples of relict topsoil were tested for percentage organic matter (BS1377).

5.8 The analyses were carried out at an UKAS accredited laboratory.

Geotechnical Testing

5.9 Geotechnical related testing was carried out to determine the physical characteristics of the soils and comprised the following:

- Seven Atterberg limits tests to determine the shrinkability of the cohesive soils to assist with foundation design;
- Five California Bearing Ratio tests to determine the strength of the natural soils to assist with pavement design.

6. RESULTS OF THE INVESTIGATION

Soil Profile

6.1 Detailed descriptions of the materials encountered together with observations of groundwater behaviour and sampling information are given on the trial pit and mini percussion borehole records attached as **Appendix B.** A summary of the materials encountered at the site is given below, however, due to the variability of the soils, it is recommended that individual exploratory hole records are consulted.

Topsoil

6.2 Excepting the areas of concrete hardstanding, topsoil was encountered across the majority of the site at between 0.1 and 0.3 metre thickness. Reworked topsoil was proved generally within the central part of the site at thicknesses of between 0.05 and 0.3 metre. Relict topsoil was encountered below the made ground in exploratory holes WS3, WS4 and WS7 located within the central part of the site at depths of between 0.4 and 1.75 metres and proved to a maximum thickness of 0.5 metre.

Made Ground

6.3 Significant areas of made ground were encountered in exploratory holes TP06 and WS4 located in the north western part of the site adjacent to the open drain to depths of between 1.75 and 2.1 metres comprising reworked firm and stiff gravelly clays with cobble and boulder size sandstone. A coated macadam layer was proved in TP06 between 0.9 and 1 metre, possibly indicative of former hardstanding.

6.4 Over the remainder of the site made ground generally comprising granular ash, clinker, brick and red shale, coated macadam hardstanding and firm and stiff reworked gravelly clay was proved at less than 0.9 metre thickness.

Cohesive Soils

6.5 Firm to stiff and stiff slightly sandy gravelly clay was encountered below the topsoil and made ground materials in all of the exploratory holes and proved to depths of between 0.25 metre and in excess of 3.45 metres. The thickness of this stratum appeared to lessen towards the north western boundary.

Bedrock

6.6 Weathered mudstone comprising clayey gravel size fragments was encountered between 0.75 and 2.3 metres depth and between 0.2 and 1.15 metres thick. This was underlain by more competent weak mudstone bedrock and proved at the majority of locations with the exception of WS3 and WS4 in the central and north western part of the site. Exploratory hole WS1 located in the southern edge of the site proved weak to moderately weak siltstone grading to sandstone at between 2.3 and 3 metres.

Contamination

6.7 Excepting the presence of ash and cinder, there was no significant visual or olfactory evidence of contamination within the exploratory holes.

Groundwater

6.8 During the advancement of WS1 and WS2 groundwater was encountered at 2 metres with the remaining exploratory holes dry. Water recorded in the monitoring wells indicated standing water levels at between 0.75 and 2.43 metres, typically between 1.5 and 2.5 metres. The raised groundwater levels above a metre are attributed to localised surface runoff flooding the monitoring installation.

6.9 It should be noted that groundwater levels vary seasonally and that a higher water table than that recorded could occur.

Contamination Related Testing

6.10 A copy of the contamination test results is included in **Appendix C.**

6.11 Generally, the results have been assessed using guidelines introduced by DEFRA, in the CLEA (Contaminated Land Exposure Assessment) Model (March 2002) and more recently by the joint Land Quality Management Ltd (LQM) and Chartered Institute of Environmental Health (CIEH), November 2006. The CLEA guidelines include Soil Guideline Values (SGVs) appropriate to standard land uses. SGVs are currently available for a limited number of metalloid and organic contaminants and provide generic assessment criteria for assessing the risk to human health. The LQM/CIEH guidelines include Generic Assessment Criteria (GAC) appropriate to standard land uses and applicable to a wider range of both inorganic and organic contaminants. With regard to the assessment of the site, the most appropriate values are considered to be the SGVs and LQM/CIEH GACs given for a commercial/industrial end use. Both the SGV and GAC values are included as **Appendix D.**

6.12 Where guideline values are absent, reference has generally been made to Dutch Intervention Values (DIV).

6.13 A summary of the contamination related testing is presented as follows:

Determinand	Maximum conc. mg/kg	Minimum conc. mg/kg	Location of maximum concentration	No of Samples Tested	Soil Screening Value (SSV) mg/kg	No of Samples Exceeding SSV
Arsenic	62.3	7	TP07 @0.1m	8	500(1)	0
Cadmium	<0.2	-	n/a	8	1400(1)	0
Chromium	20.8	13.8	TP07 @ 0.1m	8	5000(1)	0
Lead	64.9	10.1	TP10 @ 0.1m	8	750(1)	0
Mercury	<0.1	-	n/a	8	480(1)	0
Selenium	1.4	<1	TP07 @ 0.1m	8	8000(1)	0
Copper	65.1	14.8	TP08 @ 0.2m	8	45700(2)	0
Nickel	51.1	9.3	TP08 @ 0.2m	8	5000(1)	0
Vanadium	50.2	31.9	TP08 @ 0.2m	8	4250(2)	0
Zinc	81	33.4	WS4 @ 1.8m	8	188000(2)	0
Boron (water sol)	4.2	<0.5	WS4 @ 1.8m	8	3(3)	1
TPH	110.3	20.8	WS4 @ 1.8m	8	-	N/A
PAH compounds:						
Naphthalene	2.4	<0.1	TP08 @ 0.2m	8	290(2)	0
Fluorene	0.6	<0.1	TP06 @ 1m	8	5900(2)	0
Benzo(a)pyrene	3.0	<0.1	TP10 @ 0.1m	8	29.7(2)	0
Dibenzo(a,h)Anthracene	0.3	<0.1	various	8	29.7(2)	0
Water soluble sulphate	0.344	0.008	TP08 @ 0.2m	14	0.5g/l(4)	0
Acidity (pH)	7.9	5.5	TP06 @ 1m	8	<3(1)	0

Notes

(1) CLEA soil guidance value for commercial end use
(2) LQM/CIEH GAC for commercial end use
(3) Dutch Intervention Value
(4) Upper level for Class 1 concrete (BRE Special Digest:2005)

6.14 With respect to the phytotoxic metal boron, a single sample of reworked topsoil recovered from 1.8 metres within WS4 contained concentrations of water soluble boron in excess of the chosen assessment criteria.

6.15 The results of the sulphate and pH determinations within the topsoil, made ground and natural soils indicate a BRE Special Digest 1:2005 Design Sulphate Class DS-1 with an ACEC site classification AC-1s.

6.16 The relict topsoil has an organic matter content of between 6.4 and 7.8%, assessed as insignificant in terms of influencing the behaviour of the soil.

Geotechnical Related Testing

6.17 The results of the geotechnical testing are presented in **Appendix E.**

6.18 The Atterberg limits determinations indicated plasticity indexes of between 22% and 42% for the natural soils corresponding to intermediate and high plasticity clays. Modified plasticity indices, as defined within NHBC Chapter 4.2 'Building Near Trees', indicates values of between 18% and 41% with two of the six samples below 20% and a single sample above 40%, which overall corresponds to a medium volume change potential. A sample of mudstone recovered from TP4 was recorded as non-plastic.

6.19 Results of five remoulded CBR tests carried out on the shallow natural cohesive soils recorded CBR values of between 3% and 10%, of which two results were below 6% and three between 6 and 10%.

Gas Monitoring

6.20 The results of the monitoring are presented in **Appendix F.** A summary of the results together with groundwater monitoring are presented below:

Location	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Flow (l/hr)	Barometric Pressure (mb)	Groundwater (m) BGL
WS1	0	0.0 - 0.5	20.0 - 20.7	0.0 - 0.4	992 - 1008	0.8 - 1.55
WS2	0	0.0 - 1.1	19.8 - 20.7	0.0 - 0.2	992 - 1008	0.82 - 1.25
WS3	0	0.1 - 0.4	19.5 - 20.5	0.0 - 0.1	991 - 1007	1.3 - 1.85
WS4	0	1.1 - 3.7	15.1 – 20.0	0.0 - 0.1	991 - 1007	1.79 - Dry
WS5	0	0.3 - 0.8	18.5 – 20.0	0.0 - 0.1	991 – 1007	2.05 - Dry
WS6	0	0.2 - 0.7	20.0 - 20.3	0.0 - 0.2	991 - 1007	0.75 - 1.45

6.21 In summary, no combustible ground gas was detected and slightly elevated concentrations of carbon dioxide to a maximum of 3.7 % by volume with corresponding depleted oxygen concentrations were recorded on four separate occasions at all locations. Low flow rates were detected, generally between 0.1 and 0.2 l/hr, and up to a maximum of 0.4 l/hr within WS1 located within the southern part of the site.

7. DISCUSSION

7.1 Development proposals are for a new store located in the northern part of the site adjacent to Claycliffe Road and office units in the southern part adjacent to Barugh Green Road, as shown on the feasibility layout included as **Appendix A.**

Contamination

Risk Philosophy

7.2 The presence of contamination is generally only of concern if there exists an actual or potentially unacceptable risk under current legislation (i.e. Section 57 of the Environment Act 1990). The interpretation of "unacceptable risk" is termed to be one where:

"Significant harm is being caused or there is a significant possibility of such harm being caused, (where harm is defined as harm to health of living organism or other interference with the ecological systems of which they form a part of and, in the case of man, includes harm to his property); or pollution of controlled waters is being caused"

7.3 The potential for harm to occur requires three conditions to be satisfied:

- *Presence of substance (potential contaminants/pollutants) that may cause harm* ***(Source of Pollution);***
- *The presence of a receptor, which may be harmed, e.g. the water environment or humans, buildings, fauna and flora* ***(The receptor);***
- *and the existence of a linkage between the source and the receptor* ***(The Pathway).***

7.4 Therefore, the presence of a measurable concentration of contaminant within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm.

7.5 The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the intended use of the site, its characteristics and its surroundings.

Sources of Contamination

7.6 From the desk study the former fuel station to the south east is identified as the nearest potential source of contamination within the vicinity of the site. The southern part of the site is down gradient of the potential source, however, the previous investigation undertaken at the former fuel station site did not identify any significant impact of soils. Other potential sources of contamination identified are the former coke and chemical works and a tip located to the north east.

7.7 The investigation has revealed the ground conditions to comprise a cover of reworked topsoil across the central part of the site and areas of concrete hardstanding overlying made ground to a maximum depth of 2.1 metres, but generally less than a metre, comprising reworked gravelly clay and granular materials including ash and cinder. The remainder of the site comprised a cover of topsoil, which together with the made ground materials, was underlain by firm to stiff and stiff clay with mudstone proved at the base of the exploratory holes. In the central part of the site relict topsoil was encountered beneath the made ground materials. Standing groundwater levels are generally between 1 and 2 metres. There was no physical evidence to suggest significant contamination at the site.

7.8 Laboratory testing has identified no elevated concentrations of determinands considered likely to pose a risk to human health.

7.9 Monitoring at the site has generally shown slightly elevated concentrations of carbon dioxide with no combustible gas present. Low flow rates have been recorded at between 0.1 and exceptionally 0.4 l/hr.

Pollutant Linkage Assessment

7.10 In view of no elevated contaminants of concern identified at the site there are considered to be no plausible pollutant linkages.

Remediation Assessment

7.11 No remediation is considered necessary to facilitate development.

7.12 The Japanese Knotweed tentatively identified in the north western part of the site will require treatment or removal by a suitably qualified ecological contractor.

7.13 General site clearance will be required to include the removal and suitable disposal of asbestos cement corrugated sheeting identified at the site.

7.14 If during development areas of possible contamination are exposed, or conditions differ significantly from those identified, then appropriate advice should be sought.

Foundations

7.15 The proposed development will comprise a food retail store in the north of the site and an office development in the south. The northern part of the site is approximately 2 to 3 metres higher than the southern part with a drain and culverts crossing beneath the southern part of the site.

7.16 For the proposed food retail store within the northern part natural firm to stiff and stiff clays are present at varying depths, consequently traditional pad and strip/trench fill foundations are considered appropriate. The foundations should be placed in the natural clays at between 0.9 and 2 metres depth with stepped, reinforced and deepened foundations required within the north west corner around the location of exploratory holes WS4 and TP06.

7.17 For the proposed office development within the southern part, traditional pad and strip foundations are considered appropriate founding within the shallow natural firm to stiff and stiff clays proved at between 0.2 and 0.6 metre. The former deep drainage chambers and sluice present will require removal, therefore, dependent upon the final layout deepening and reinforcing of foundations will be required.

7.18 An allowable bearing capacity of 150 kN/m^2 is considered appropriate for the natural firm to stiff and stiff clays.

7.19 Where trees are present, or are to be planted or removed, foundations will need to be deepened in accordance with current guidance assuming a medium volume change potential.

Floor Slabs

7.20 Ground bearing floor slabs are considered appropriate across the site subject to treatment of the made ground materials involving excavation of the upper metre, proof rolling of the sub-grade and removal of soft spots, removal of unsuitable material and re-compaction in layers of no greater than 250mm thickness. Alternatively, a suspended floor slab could be adopted.

Gas Protection Measures

7.21 The site is within the vicinity of four former landfills, the closest being 50 metres south east of the site and gas monitoring has identified slightly elevated concentrations of carbon dioxide with low flow rates. The site lies in an area where basic radon precautions are required and these should be incorporated into the development also affording protection with regard to carbon dioxide.

Excavations and Dewatering

7.22 The use of mechanical breakers should be anticipated within the mudstone and siltstone bedrock, particularly within the north western part of the site.

7.23 If man entry is proposed into excavations the use of support to excavation sides is recommended, in line with health and safety guidelines.

7.24 Significant groundwater ingress into excavations is not anticipated, any that does occur, or within deeper excavations, should be controlled adequately by localised pumping from sumps within excavations.

Sulphate Attack on Buried Concrete

7.25 The results of the chemical analyses indicate a BRE Special Digest 1:2005 Design Sulphate Class DS-1 with an ACEC site classification AC-1s and buried concrete should be designed accordingly.

Pavement Design

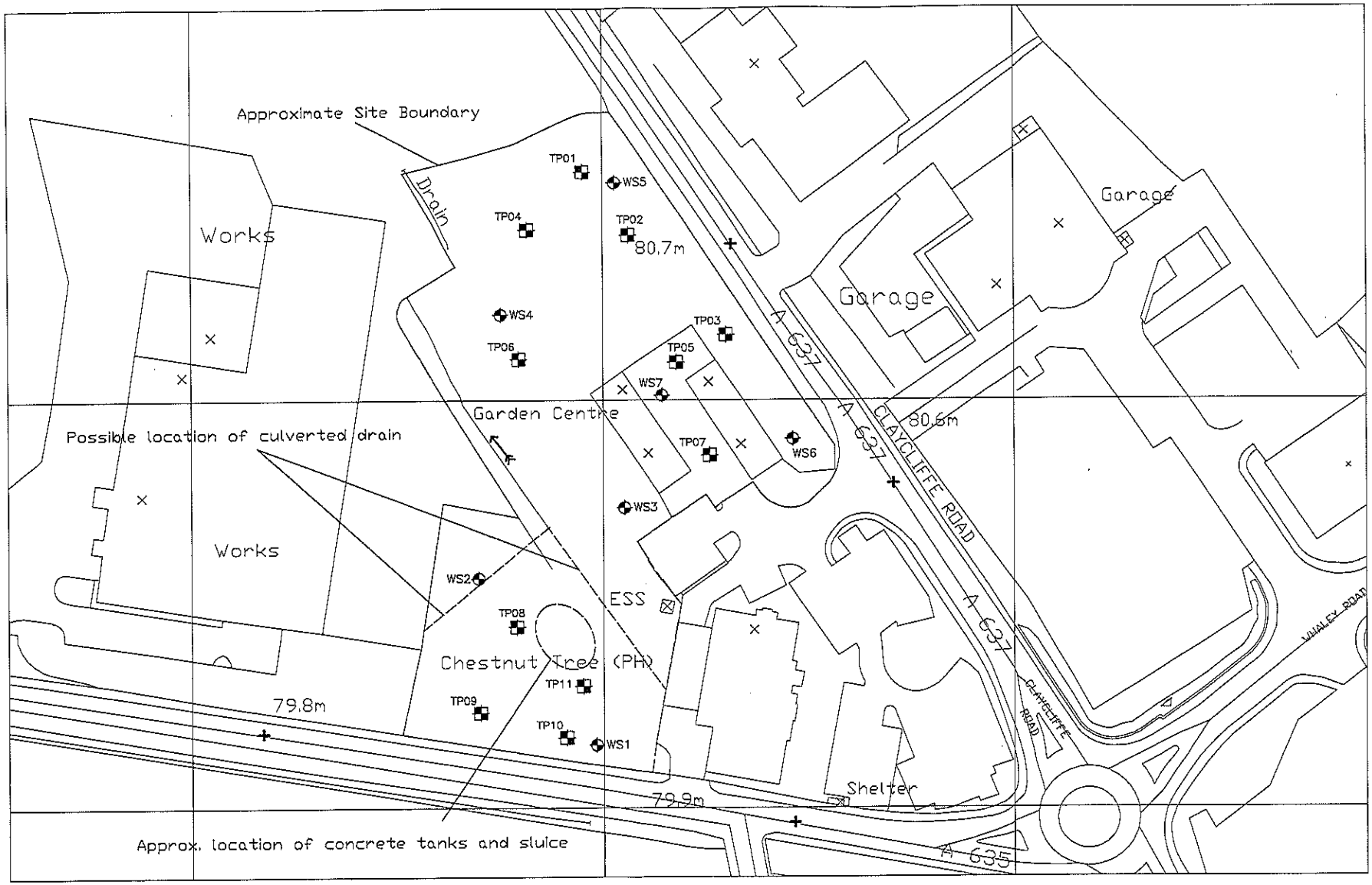
7.26 The results of the five remoulded CBR laboratory tests carried out on the near surface natural firm to stiff clays indicate CBR values of between 3% and 10%. In view of the variability an overall design CBR value of 4% is recommended for formations with any soft spots identified by proof rolling adequately treated.

Site Drainage

7.27 The presence of extensive cohesive soils together with the cohesive nature of the weathered bedrock materials would preclude the use of soakaways for surface drainage.

FIGURE 1

Exploratory Hole Location Plan



KEY

WS1 MINI RIG BOREHOLE LOCATION

TP11 TRIAL PIT LOCATION

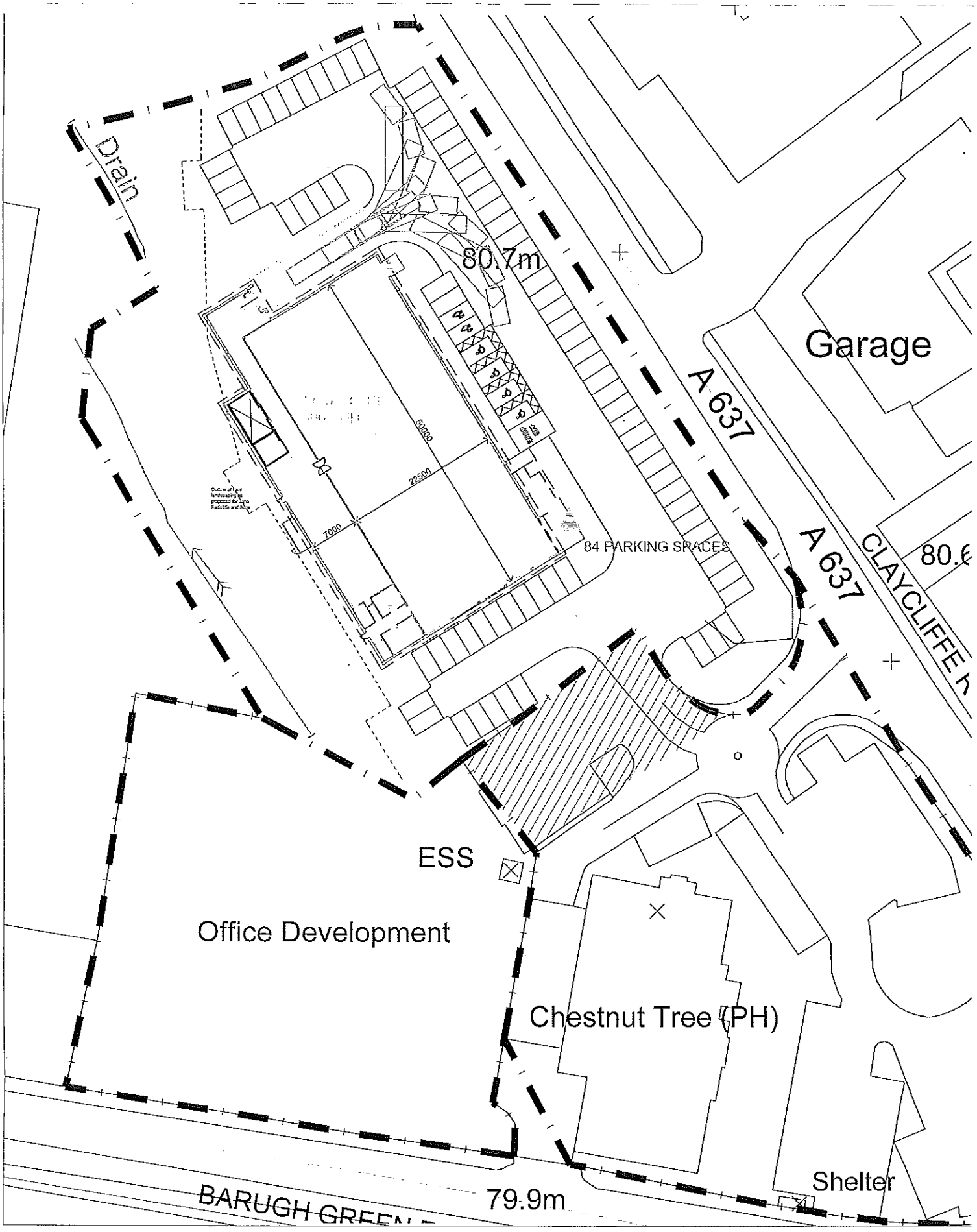
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3E consulting engineers
4 calder close
calder park
wakefield
WF4 3BA
t 01924 240 420
f 01924 240 421
www.3econsult.com

Client ALDI STORES LTD.			
Project BARUGH GREEN BARNSLEY			
Title EXPLORATORY HOLE PLAN			
Scale 1:1000 @ A3	Drawn AJB	Checked CHECKED	Date MAY 07
Job No. 7515	Drawing No. Fig 1		Rev 0

APPENDIX A

Proposed Layout



ALDI

BARUGH GREEN RD
BARNSLEY
ALDI STORES LTD

FEASIBILITY

Site no. code: 2000/439
dwg. no.: SK14
Rev. no.: A
Scale 1:500@A3
Drawn AM
Date 28 Nov 2006

WARING AND NETTS
ARCHITECTS

ARCADIA HOUSE BALLIOL BUSINESS PARK
BENTON LANE NEWCASTLE UPON TYNE NE12 8EW
TEL 0191 256 6000 FAX 0192266 6040
E-mail newcastle@waring-netts.co.uk

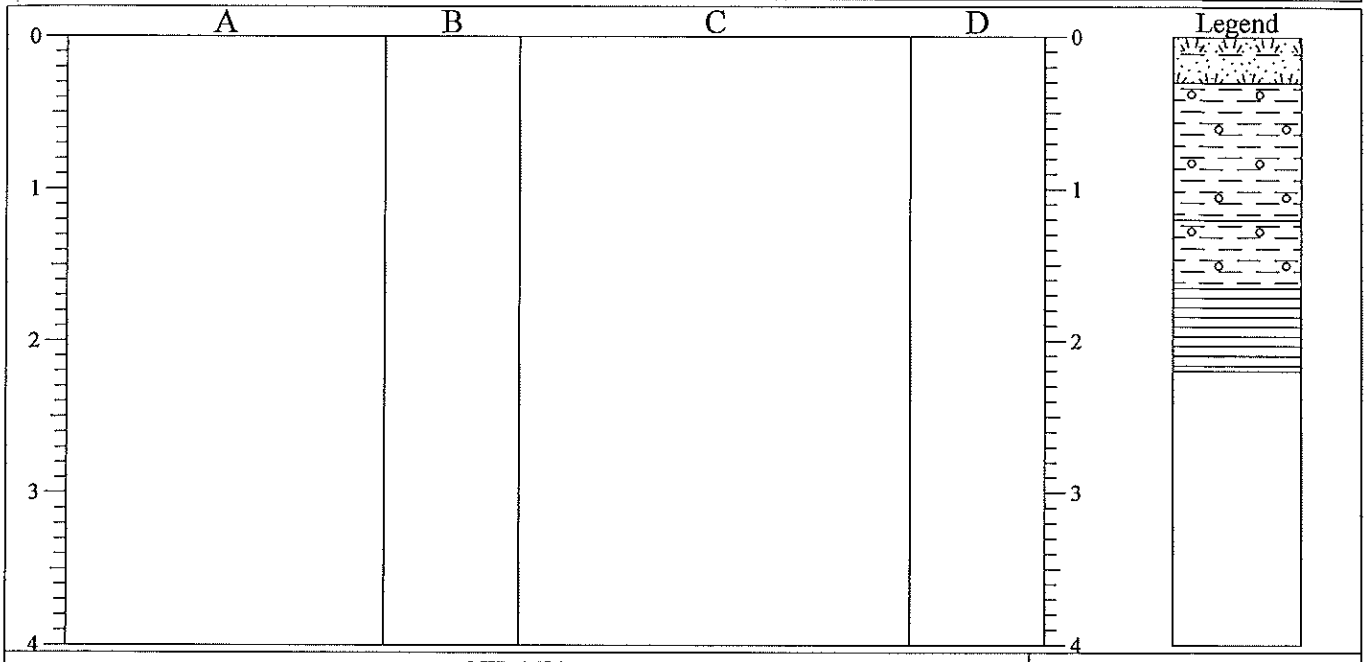
APPENDIX B

Exploratory Hole Records

3e Consulting Engineers Ltd
4 Calder Close, Calder Park
Wakefield WF2 7AU
Telephone: 01924 240420
Fax: 01924 240421

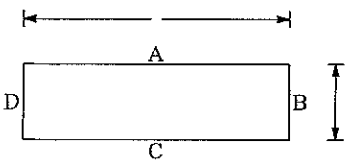
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP01
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL.	0.10	D	
0.30-1.20		Firm becoming stiff brown mottled grey slightly sandy gravelly CLAY (Weathered Middle Coal Measures).	0.60	D	
			1.00	B	
1.20-1.65		Stiff grey friable slightly gravelly CLAY (Weathered Middle Coal Measures).			
1.65-2.10		Weak grey MUDSTONE with occasional ironstone nodules recovered as gravel (Middle Coal Measures).			
2.10-2.20		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

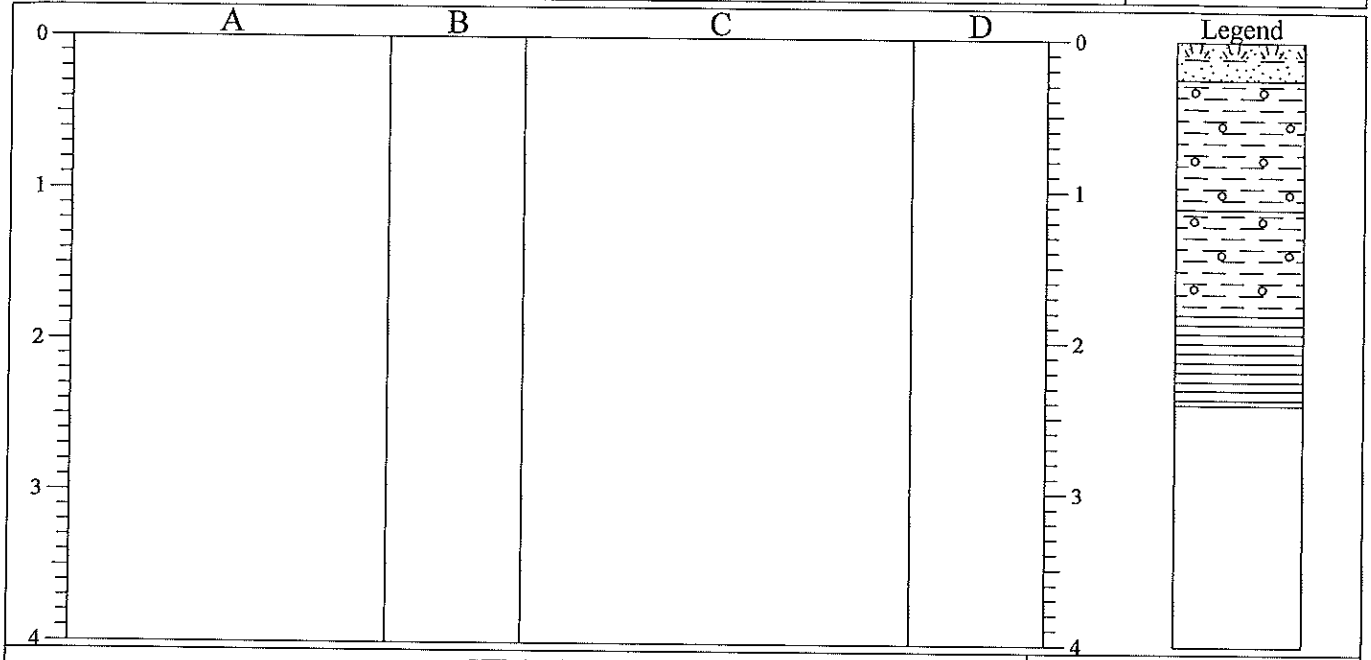
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

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3e Consulting Engineers Limited
4 Calder Close, Calder Park
Wakefield
Telephone: 01924 240420
Fax: 01924 240421

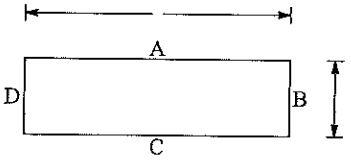
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP02
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.25		TOPSOIL.			
0.25-1.10		Firm becoming stiff brown mottled grey very slightly sandy slightly gravelly cobbly CLAY (Weathered Middle Coal Measures).	0.60	D	
1.10-1.80		Stiff grey friable slightly gravelly CLAY (Weathered Middle Coal Measures).	1.40	D	
1.80-2.30		Weak grey MUDSTONE with rare ironstone nodules, recovered as a gravel (Middle Coal Measures).	2.00	D	
2.30-2.40		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

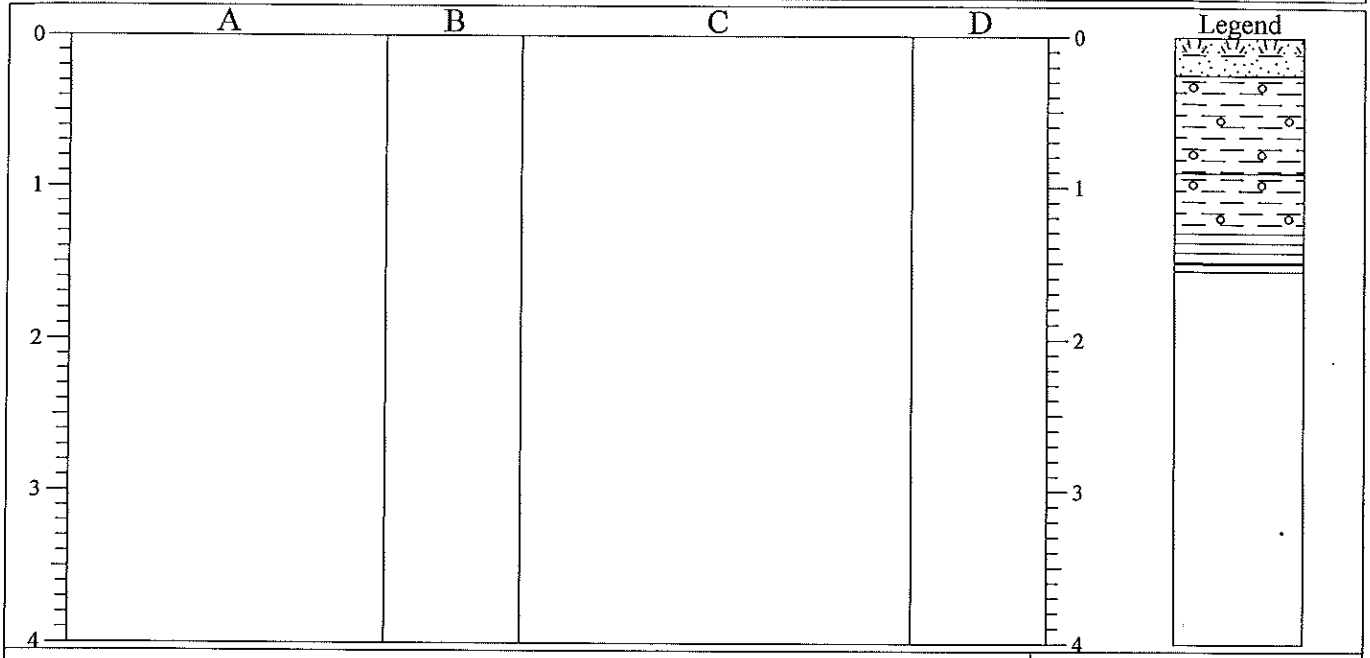
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

AGS3 UK TP 7515.GPJ AGS3_ALL.GDT 24/05/07

3e Consulting Engineers Limited
4 Calder Close, Calder Park
Wakefield
Telephone: 01924 240420
Fax: 01924 240421

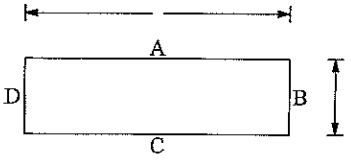
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP03
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.25		TOPSOIL.	0.10	D	
0.25-0.90		Firm becoming stiff with depth brown mottled grey very slightly sandy slightly gravelly CLAY (Weathered Middle Coal Measures).	0.40	D	
0.90-1.30		Stiff grey friable slightly gravelly CLAY (Weathered Middle Coal Measures).	1.00	B	
1.30-1.50		Weak grey MUDSTONE, recovered as a gravel (Weathered Middle Coal Measures).			
1.50-1.55		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

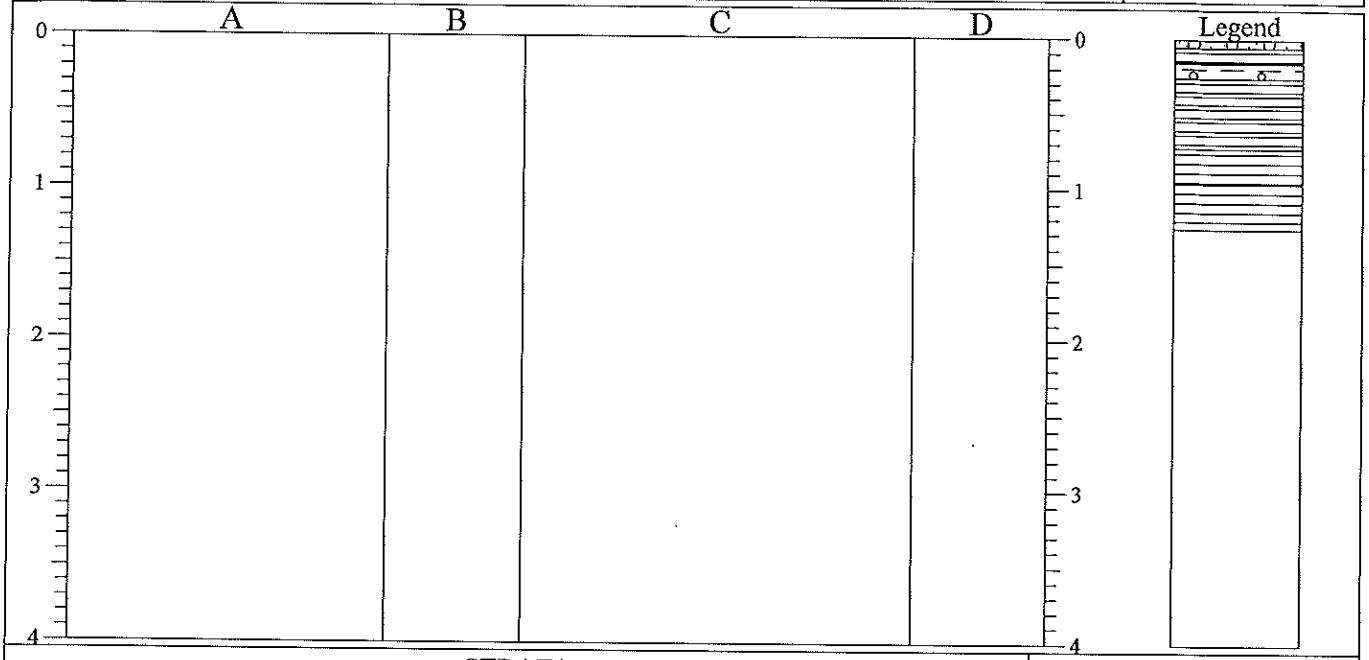
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

AGS3 UK TP 7515.GPJ AGS3_ALL.GDT 24/05/07

3e Consulting Engineers Limited
4 Calder Close, Calder Park
Wakefield
Telephone: 01924 240420
Fax: 01924 240421

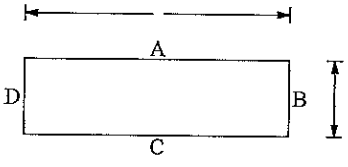
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP04
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.05		TOPSOIL.			
0.05-0.15		Very weak black thinly laminated SHALE, recovered as a gravel (Weathered Middle Coal Measures).	0.10	D	
0.15-0.25					
0.25-0.75		Firm brown mottled grey gravelly CLAY (Weathered Middle Coal Measures).	0.40	D	
		Very weak grey SHALE, recovered as gravel (Weathered Middles Coal Measures).			
0.75-0.95		Weak grey MUDSTONE recovered as gravel (Weathered Middle Coal Measures).			
0.95-1.20		Weak grey MUDSTONE recovered a gravelly cobbles (Middle Coal Measures).			
1.20-1.25		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

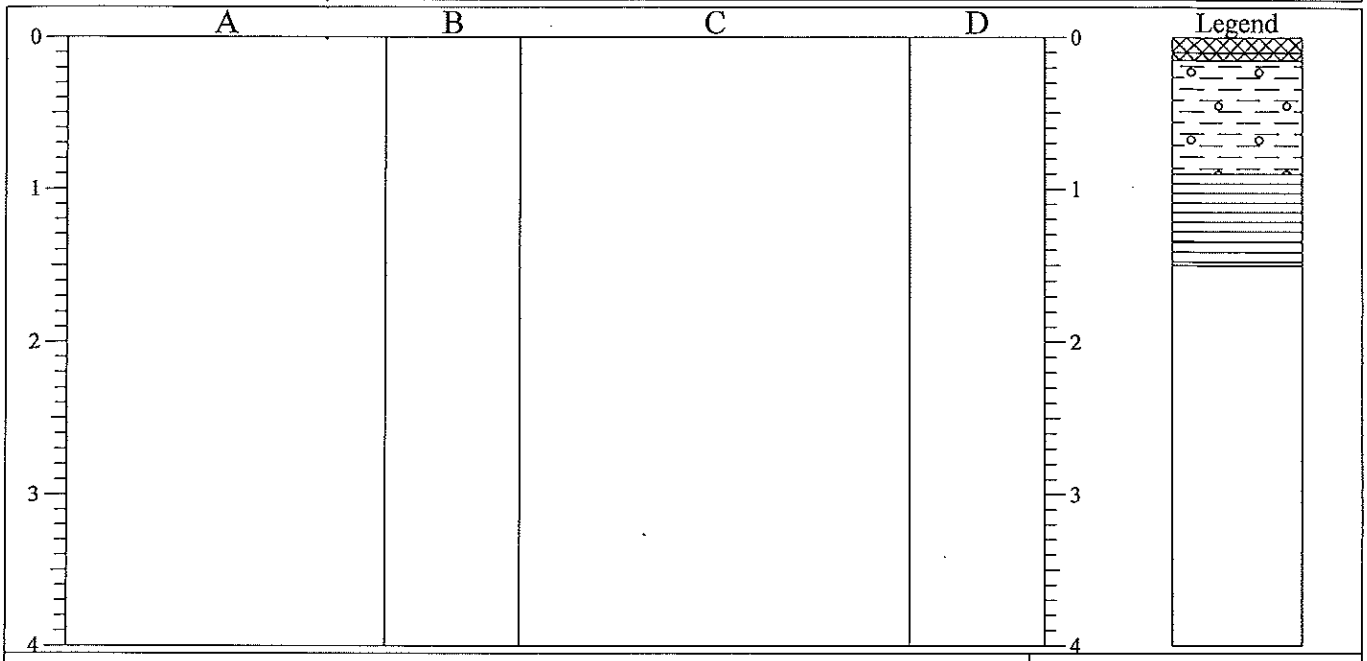
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

AGS3 UK TP 7515.GPJ AGS3_ALL.GDT 24/05/07

3e Consulting Engineers Limited
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Wakefield
Telephone: 01924 240420
Fax: 01924 240421

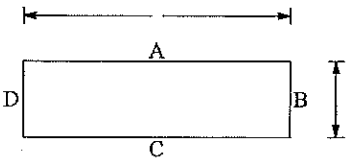
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP05
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.10		MADE GROUND comprising sand.			
0.10-0.15		MADE GROUND comprising pea gravel.			
0.15-0.90		Firm becoming stiff with depth very slightly sandy slightly gravelly CLAY (Weathered Middle Coal Measures).	0.30 0.50	D HSV	
0.90-1.35		Weak grey MUDSTONE, recovered as a gravel and cobbles (Middle Coal Measures).	1.00	D	
1.35-1.50		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

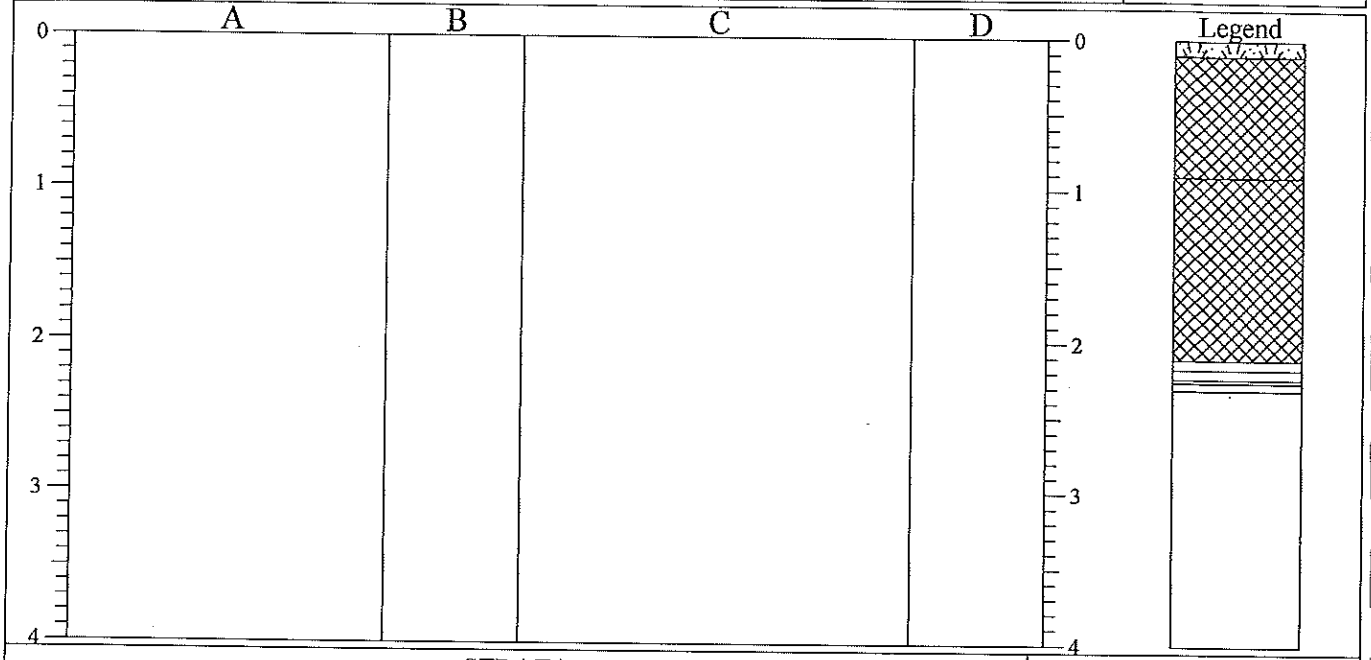
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

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3e Consulting Engineers Limited
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Fax: 01924 240421

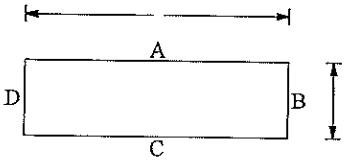
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP06
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.10		TOPSOIL.			
0.10-0.90		MADE GROUND comprising reworked gravelly clay.	0.05	D	
0.90-2.10		MADE GROUND comprising reworked gravelly clay and sandstone cobbles and boulders. 0.90 - 1.00 Tarmac layer in the north of the pit.	1.00	D	
2.10-2.25		Weak grey MUDSTONE recovered as gravel (Middle Coal Measures).			
2.25-2.30		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Relatively unstable to 2.10m



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

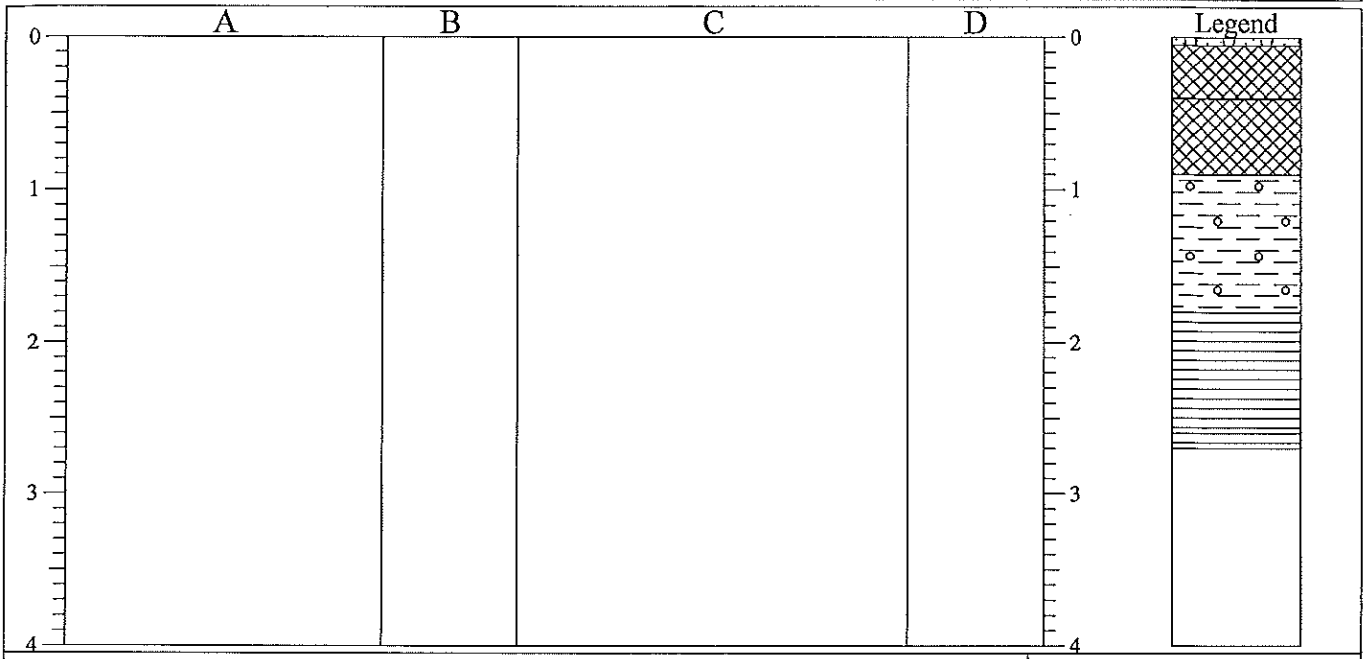
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

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3e Consulting Engineers Limited
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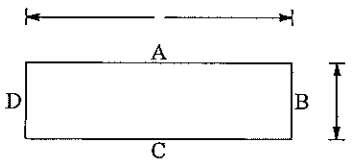
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP07
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.05		Ashy TOPSOIL.			
0.05-0.40		MADE GROUND comprising burnt red shale.	0.10	D	
0.40-0.90		MADE GROUND comprising reworked black very silty slightly gravelly clay.	0.50	D	
0.90-1.80		Firm becoming stiff brown mottled grey sandy slightly gravelly CLAY (Weathered Middle Coal Measures).	1.00 1.10	D B	
1.80-2.60		Weak grey MUDSTONE, becoming stronger with depth (Middle Coal Measures).			
2.60-2.70		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on competent strata.
3. Pit backfilled with arisings.
4. Gas main encountered at 0.65m.

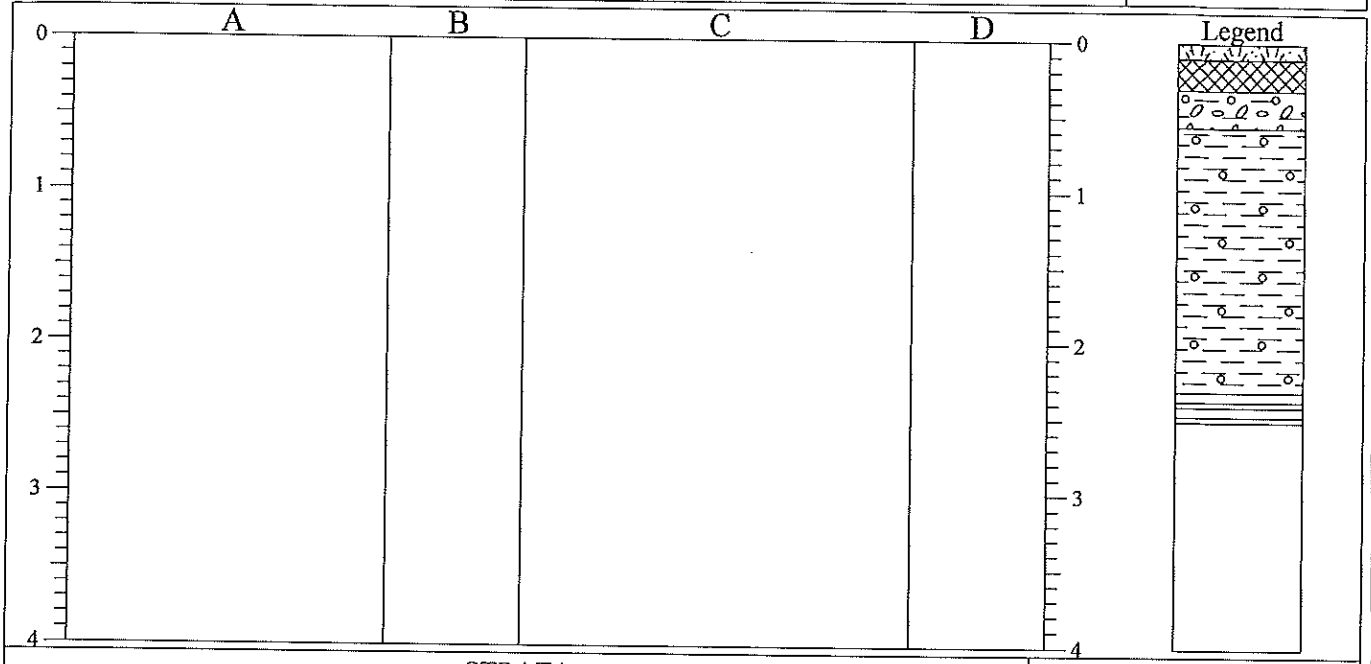
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

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Wakefield
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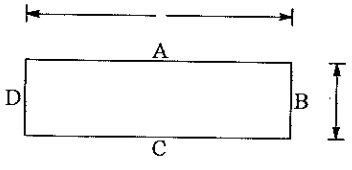
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP08
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.10		TOPSOIL.			
0.10-0.30		MADE GROUND comprising black ashy gravel of clinker.			
0.30-0.55		Medium dense grey clayey sub angular to angular GRAVEL of mudstone (Weathered Middle Coal Measures).	0.20	D	
0.55-2.30		Firm brown mottled grey friable slightly sandy gravelly CLAY (Weathered Middle Coal Measures).	0.40	D	
			0.60	D	
2.30-2.40		Weak grey MUDSTONE recovered as gravel and cobbles (Middle Coal Measures).			
2.40-2.50		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

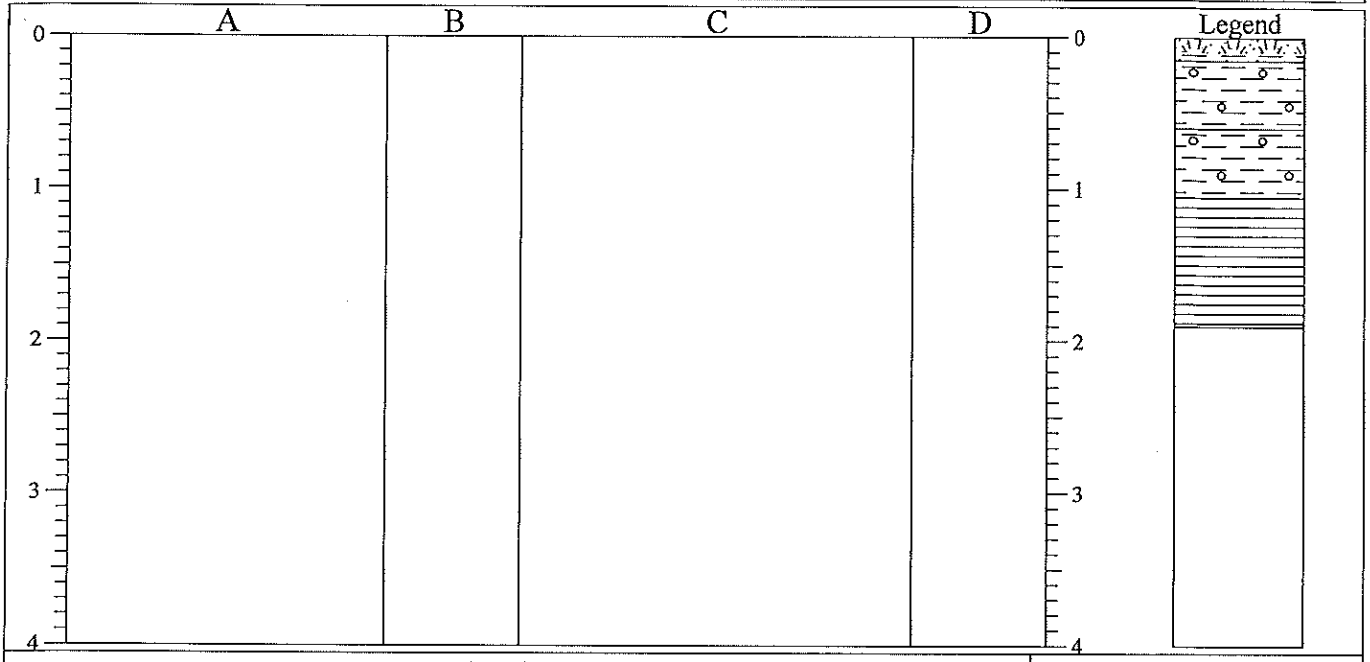
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

AGS3 UK TP 7515.GPJ AGS3_ALL.GDT 24/05/07

3e Consulting Engineers Limited
4 Calder Close, Calder Park
Wakefield
Telephone: 01924 240420
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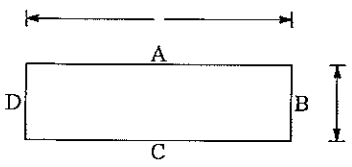
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				**TP09**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.15		TOPSOIL.			
0.15-0.60		Soft to firm brown friable gravelly CLAY (Potentially reworked).	0.20	D	
0.60-1.05		Firm becoming stiff grey mottled brown slightly sandy gravelly CLAY (Weathererd Middle Coal Measures).	0.70	D	
			0.75	HSV	
1.05-1.75		Weak grey MUDSTONE with some ironstone banding (Middle Coal Measures).	0.80	B	
1.75-1.90		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

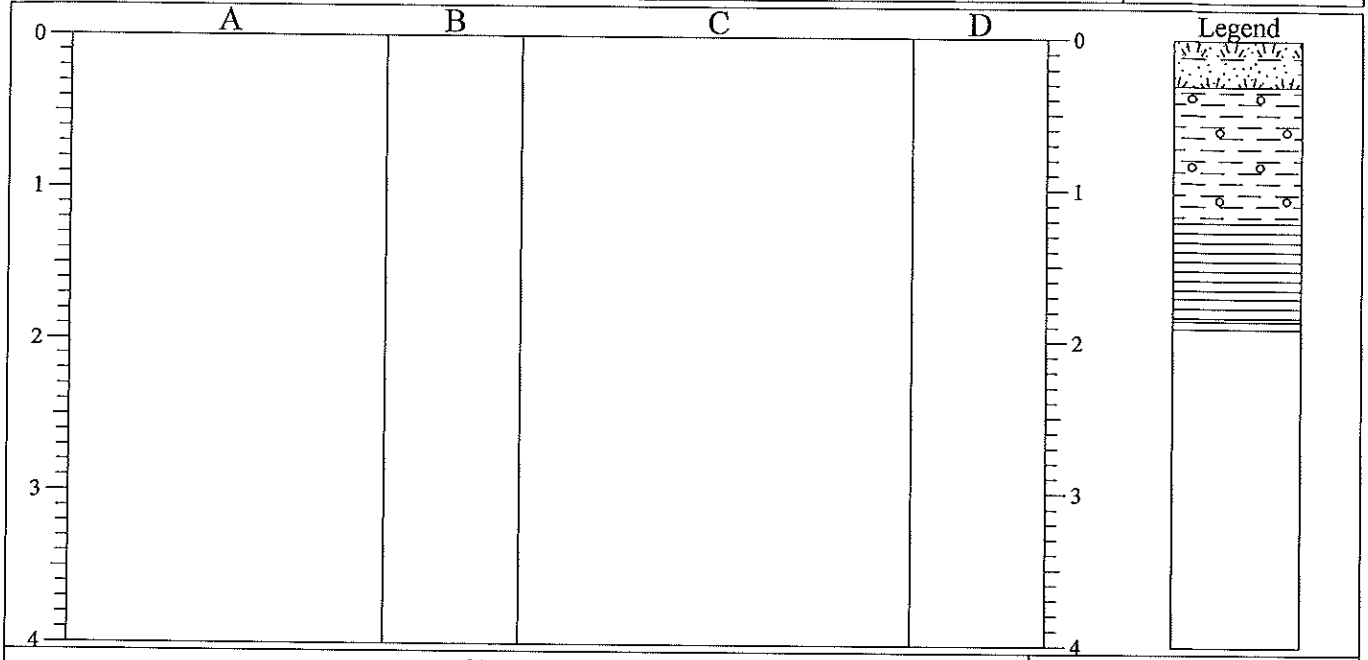
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

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3e Consulting Engineers Limited
4 Calder Close, Calder Park
Wakefield
Telephone: 01924 240420
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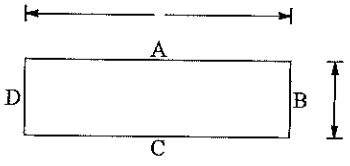
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP10
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL.			
0.30-1.20		Firm becoming stiff grey mottled brown very slightly sandy gravelly slightly cobbly CLAY (Weathered Middle Coal Measures).	0.60	D	
1.20-1.70		Very weak black/grey carbonaceous MUDSTONE recovered as gravel (Weathered Middle Coal Measures).	1.30	D	
1.70-1.85		Weak grey MUDSTONE recovered as a gravel (Middle Coal Measures)			
1.85-1.90		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

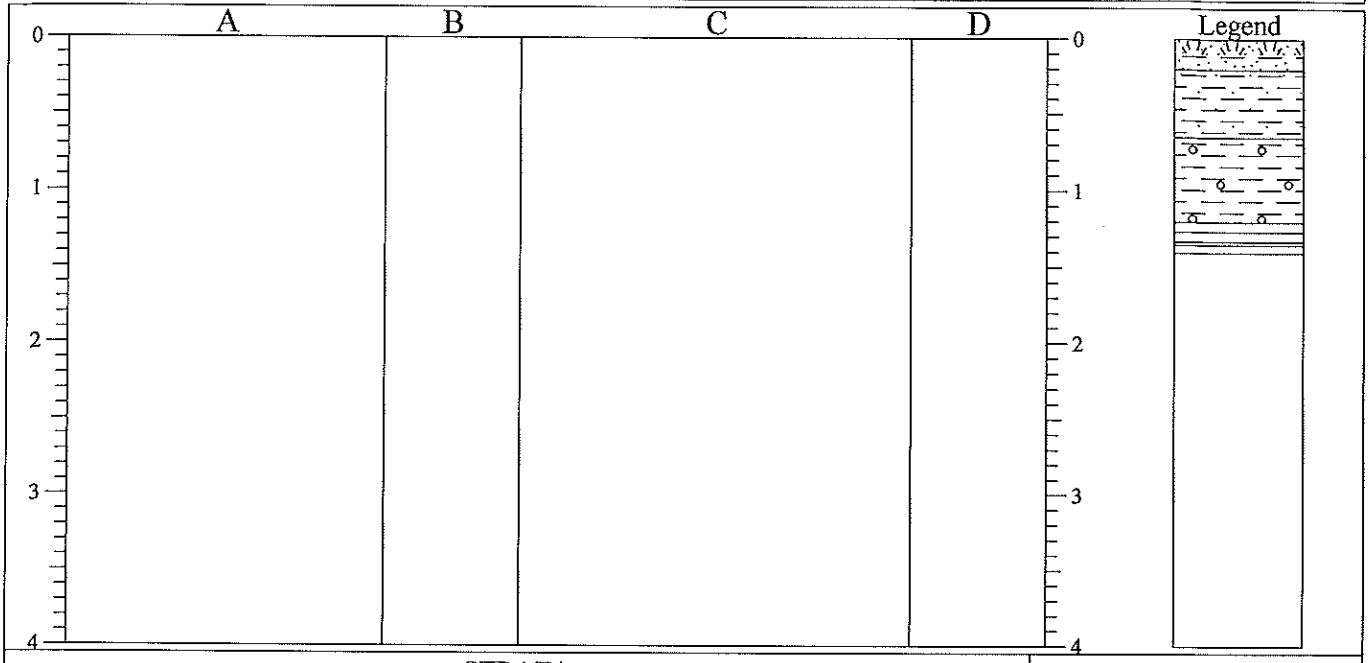
All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

AGS3 UK TP 7515.GPJ AGS3_ALL.GDT 24/05/07

3e Consulting Engineers Limited
4 Calder Close, Calder Park
Wakefield
Telephone: 01924 240420
Fax: 01924 240421

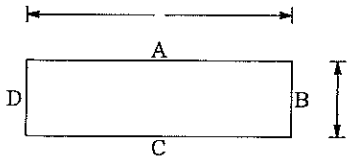
TRIAL PIT LOG

Project				TRIAL PIT No
Barugh Green, Barnsley				TP11
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL.			
0.20-0.65		Soft to firm brown friable slightly sandy CLAY (Potentially reworked).	0.30	D	
0.65-1.20		Firm brown mottled grey very slightly sandy gravelly CLAY (Weathered Middle Coal Measures).	0.90	D	
1.20-1.35		Weak grey MUDSTONE recovered as a gravel (Middle Coal Measures).	1.00	B	
1.35-1.40		Weak grey MUDSTONE (Middle Coal Measures).			

Shoring/Support: None
Stability: Very good



GENERAL REMARKS

1. No groundwater encountered.
2 Pit terminated on hard strata.
3. Pit backfilled with arisings.

All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used JCB 3cx	Logged By AJB

AGS3 UK TP 7515.GPJ AGS3_ALL.GDT 24/05/07

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4 Calder Close, Calder Park
Wakefield WF2 7AU
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Fax: 01924 240421

BOREHOLE LOG

Project				BOREHOLE No
Barugh Green, Barnsley				WS1
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
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	D					0.30	TOPSOIL		
0.80	D						Firm fissured orange brown mottled grey gravelly to very gravelly CLAY		
1.00	D	N26				(2.00)	1.50 Becoming stiff and very gravelly		
			▼1			2.30			
2.40	D					(0.70)	Weak to moderately weak thinly laminated grey and yellow brown sandy SILTSTONE		
						3.00	2.70 Becoming moderately weak silty fine grained SANDSTONE		

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	Groundwater strike at 2m. Monitoring well installed at 3m.

All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used Mini Percussive Sampler	Logged By JR

AGS3 UK BH 7515.GPJ AGS3_ALL.GDT 14/05/07

3e Consulting Engineers Ltd
4 Calder Close, Calder Park
Wakefield WF2 7AU
Telephone: 01924 240420
Fax: 01924 240421

BOREHOLE LOG

Project				BOREHOLE No
Barugh Green, Barnsley				WS2
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
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	TOPSOIL		
0.60	D						Firm to stiff becoming stiff fissured orange brown mottled grey gravelly to very gravelly CLAY		
0.90	D					(2.30)			
1.70	D		▼1			2.50			
						(0.50)	Weak thinly laminated grey MUDSTONE with occasional gravel size ironstone nodules		
						3.00			

Boring Progress and Water Observations						Chiselling			Water Added	
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To

GENERAL REMARKS

Groundwater strike at 2m. Monitoring well installed at 3m.

All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used Mini Percussive Sampler	Logged By JR

AGS3 UK BH 7515.GPJ AGS3_ALL.GDT 14/05/07

3e Consulting Engineers Ltd
4 Calder Close, Calder Park
Wakefield WF2 7AU
Telephone: 01924 240420
Fax: 01924 240421

BOREHOLE LOG

Project				BOREHOLE No
Barugh Green, Barnsley				WS3
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1

SAMPLES & TESTS			Water	STRATA					
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Geology	Instrument/ Backfill
						0.10	Reworked TOPSOIL		
						(0.40)	MADE GROUND: Grey brown sandy angular to subangular gravel size part brick, burnt shale and concrete		
0.40	D					0.50			
						0.60	MADE GROUND: Stiff brown gravelly clay		
						0.70	MADE GROUND: Coated macadam		
0.90	D					(0.50)	Relict TOPSOIL		
						1.20			
1.40	D						Firm to stiff fissured orange brown mottled grey gravelly becoming very gravelly CLAY		
2.00	D	N13				(2.25)			
						3.45			

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

GENERAL REMARKS

No groundwater encountered. Monitoring well installed at 3m.

All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used Mini Percussive Sampler	Logged By JR

AGS3 UK BH 7515.GPJ AGS3_ALL.GDT 14/05/07

3e Consulting Engineers Ltd
4 Calder Close, Calder Park
Wakefield WF2 7AU
Telephone: 01924 240420
Fax: 01924 240421

BOREHOLE LOG

Project				BOREHOLE No
Barugh Green, Barnsley				WS4
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
						0.25	Reworked TOPSOIL		
0.80	D					(1.50)	MADE GROUND: Stiff brown mottled grey and orange brown gravelly clay. Gravel is angular to subangular of mudstone, sandstone, shale, occasional part brick and cinder fragments		
1.20	D					1.75			
1.80	D					2.00	Relict TOPSOIL		
2.40	D					(1.00)	Stiff fissured orange brown mottled grey gravelly CLAY		
						3.00			

Boring Progress and Water Observations						Chiselling			Water Added	
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To

GENERAL REMARKS

No groundwater encountered. Monitoring well installed at 3m.

All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used Mini Percussive Sampler	Logged By JR

AGS3 UK BH 7515.GPJ AGS3_ALL.GDT 14/05/07

3e Consulting Engineers Ltd
4 Calder Close, Calder Park
Wakefield WF2 7AU
Telephone: 01924 240420
Fax: 01924 240421

BOREHOLE LOG

Project				BOREHOLE No
Barugh Green, Barnsley				WS5
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.10	D					0.20	TOPSOIL		
						(0.80)	Stiff fissured orange brown mottled grey gravelly CLAY		
0.80	D					1.00			
0.90	D						Weak thinly laminated grey stained orange brown MUDSTONE		
1.50	D					(2.00)			
						3.00			

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

GENERAL REMARKS

No groundwater encountered. Monitoring well installed at 3m.

All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used Mini Percussive Sampler	Logged By JR

AGS3 UK BH 7515.GPJ AGS3_ALL.GDT 14/05/07

3e Consulting Engineers Ltd
4 Calder Close, Calder Park
Wakefield WF2 7AU
Telephone: 01924 240420
Fax: 01924 240421

BOREHOLE LOG

Project				BOREHOLE No
Barugh Green, Barnsley				WS6
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet
				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
						0.30	TOPSOIL		
0.70	D					(1.60)	Stiff fissured orange brown mottled grey CLAY		
0.90	D						1.20 Becoming gravelly		
						1.90			
						(1.10)	Weak thinly laminated grey stained black MUDSTONE		
						3.00			

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	No groundwater encountered. Monitoring well installed at 3m.

All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used Mini Percussive Sampler	Logged By JR

AGS3 UK BH 7515.GPJ AGS3_ALL.GDT 14/05/07

3e Consulting Engineers Ltd
4 Calder Close, Calder Park
Wakefield WF2 7AU
Telephone: 01924 240420
Fax: 01924 240421

BOREHOLE LOG

Project				BOREHOLE No
Barugh Green, Barnsley				WS7
Job No	Date	Ground Level (m)	Co-Ordinates ()	
7515	12-04-07			
Contractor				Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
						0.10	Reworked TOPSOIL		
0.25	D					0.40	MADE GROUND: Stiff dark grey brown sandy gravelly clay. Gravel is angular to subangular of cinder, burnt shale and brick		
0.50	D					0.70	Relict TOPSOIL		
1.00	D	N11				(0.60) 1.30	Stiff fissured orange brown mottled grey CLAY		
						(1.70) 3.00	Weak thinly laminated yellow brown becoming light brown sandy MUDSTONE		

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

GENERAL REMARKS

No groundwater encountered.

All dimensions in metres Scale 1:50	Client Aldi Stores Ltd.	Method/ Plant Used Mini Percussive Sampler	Logged By JR

AGS3 UK BH 7515.GPJ AGS3_ALL.GDT 14/05/07

APPENDIX C

Contamination Testing Results

Client: **3e Consulting Engineers Limited**
4 Calder Close
Calder Park
Wakefield
WF4 3BA

FAO: Mr A Cooper

Analytical Report Number: R07/0831

Client Project Name:	**Baugh Green, Barnsley**
Client Project Number:	**7515**
Your Order Number:	**None Specified**
Order Receipt Date:	**03/05/07**
Reporting Date:	**Friday 18 May 2007**

If you have any queries regarding this report please contact our Customer Services Section

ECõS Environmental Limited
Low Moor Business Park, Common Road, Bradford BD12 0NB
Tel: 01274 691122 Fax: 01274 608100

Client Project Name: Baugh Green, Barnsley

Project Number: 7515

Client: 3e Consulting Engineers Limited

Reporting Date: Friday 18 May 2007

Comments

All analyses are carried out using the laboratory's standard methods unless otherwise agreed.

The test results in this report refer only to the actual samples on which testing has been performed.

Any opinions and/or interpretations expressed herein are outside the scope of the testing laboratory's UKAS accreditation.

The test report shall not be reproduced, except in full, without the testing laboratory's written approval.

This testing laboratory cannot be held responsible for the condition or suitability of samples submitted for testing by a third party or for the competency of personnel other than its own staff.

This testing laboratory cannot be held responsible for the accuracy of test sample locations or descriptions when supplied by a third party.

Soil Samples

Results are expressed based on dried mass @ 40°C unless otherwise stated.

See key in Notes section for explanation of numerical categories for asbestos results, if applicable.

Stones (for example inert flints and inorganic minerals) >10mm are removed prior to analysis. Unless otherwise stated, results have not been corrected for this loss.

Samples submitted for leachate determination were prepared using agreed procedures and analysed using UKAS accredited methodology where appropriate.

Results are expressed without correction for recovery factors.

Sample Pretreatment (Appended to Method of Detection)

AD = Assisted drying @ 40°C R = As Received

Sample Type

B = Bulk disturbed sample
C = Core Sample
D = Small disturbed sample
P = Piston sample
U = Undisturbed sample - open drive
W = Water Sample

Sample Results

Analysis not requested
*** Test not completed. Please see notes on last page

Signed: _____

For and on behalf of ECõS Environmental Limited

Approved signatories:

Name	Position
J R Brown	Business Development Manager
L Dewell	Production Manager
P Richardson	Section Head
J Stoddart ✓	Technical Manager

Client Project Name: Baugh Green, Barnsley

Project Number: 7515

Client: 3e Consulting Engineers Limited

Reporting Date: Friday 18 May 2007

Soil Samples

Method Statement

Determinand	Method of Detection	Sample Pretreatment	Limit of Detection	UKAS Accreditation	Sub-Contracted	Result Date
Arsenic	ICP-OES	AD	0.1 mg/kg	Yes	No	17/05/07
Cadmium	ICP-OES	AD	0.2 mg/kg	Yes	Yes	11/05/07
Chromium (total)	ICP-OES	AD	0.2 mg/kg	Yes	No	11/05/07
Lead	ICP-OES	AD	0.5 mg/kg	Yes	No	11/05/07
Mercury	ICP-OES	AD	0.1 mg/kg	Yes	No	17/05/07
Selenium	ICP-OES	AD	1.0 mg/kg	Yes	No	11/05/07
Boron (water soluble)	ICP-OES	AD	0.5 mg/kg	Yes	No	17/05/07
Copper	ICP-OES	AD	0.2 mg/kg	Yes	No	11/05/07
Nickel	ICP-OES	AD	0.2 mg/kg	Yes	No	11/05/07
Vanadium	ICP-OES	AD	0.2 mg/kg	No	No	11/05/07
Zinc	ICP-OES	AD	0.2 mg/kg	Yes	No	11/05/07
Sulphate (water soluble)	HPLC-IC	AD	0.001 g/l SO4	Yes	No	15/05/07
pH	pH-meter	AD	N/A	Yes	No	11/05/07
TPH (with clean up)	GC-FID	AD	5.0 mg/kg	Yes	No	14/05/07
PAH (sum of PAH 17)	GC-MS	AD	0.1 mg/kg	No	No	15/05/07
Naphthalene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Acenaphthylene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Acenaphthene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Fluorene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Phenanthrene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Anthracene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Fluoranthene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Pyrene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Benzo(a)anthracene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Chrysene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Benzo(b)+(j)fluoranthene	GC-MS	AD	0.1 mg/kg	No	No	15/05/07
Benzo(k)fluoranthene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Benzo(a)pyrene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Indeno(1,2,3-cd)pyrene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Dibenz(a,h)anthracene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
Benzo(g,h,i)perylene	GC-MS	AD	0.1 mg/kg	Yes	No	15/05/07
TOC	Colorimetry	AD	0.1 %	No	No	17/05/07
Organic Matter	Titration	AD	0.1 %	No	No	11/05/07

ECõS

Client Project Name: Baugh Green, Barnsley

Project Number: 7515

Client: 3e Consulting Engineers Limited

Reporting Date: Friday 18 May 2007

	Hole No./Sample ID	TP01	TP06	TP06	TP07	TP08
	Top Depth / m	0.10	0.05	1.00	0.10	0.20
	Bottom Depth / m					
	Sample No.					
	Sample Type					
	Date Sampled					
	Receipt Date	03/05/07	03/05/07	03/05/07	03/05/07	03/05/07
	ECõS Sample ID	S0706581	S0706582	S0706583	S0706584	S0706585
	Matrix Type	Soil	Soil	Soil	Soil	Soil
Determinand	Units					
Arsenic	mg/kg	14.3	17.9	7.9	62.3	53.6
Cadmium	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (total)	mg/kg	13.8	19.0	17.4	20.8	14.1
Lead	mg/kg	42.1	56.7	10.1	26.7	14.5
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	mg/kg	<1.0	<1.0	<1.0	1.4	<1.0
Boron (water soluble)	mg/kg	<0.5	0.6	<0.5	0.5	0.5
Copper	mg/kg	26.3	33.8	22.0	36.7	65.1
Nickel	mg/kg	13.5	16.0	27.8	18.3	51.1
Vanadium	mg/kg	31.9	36.5	35.6	49.3	50.2
Zinc	mg/kg	63.7	73.3	62.2	39.8	33.4
Sulphate (water soluble)	g/l SO4	0.011	0.013	0.018	0.098	0.344
pH	N/A	5.5	6.4	7.9	7.5	6.6
TPH (with clean up)	mg/kg	22.7	51.2	34.0	25.3	51.6
PAH (sum of PAH 17)	mg/kg	6.4	11.1	21.1	13.4	3.9
Naphthalene	mg/kg	0.3	0.3	0.2	0.6	2.4
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Acenaphthene	mg/kg	<0.1	0.1	0.4	<0.1	0.1
Fluorene	mg/kg	<0.1	<0.1	0.6	<0.1	0.3
Phenanthrene	mg/kg	<0.1	1.2	2.8	1.7	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.6	0.3	<0.1
Fluoranthene	mg/kg	1.5	2.0	4.2	2.6	0.5
Pyrene	mg/kg	1.2	1.7	3.3	2.2	0.5
Benzo(a)anthracene	mg/kg	0.5	0.9	1.5	0.8	<0.1
Chrysene	mg/kg	0.7	0.8	1.5	1.1	0.2
Benzo(b)+(j)fluoranthene	mg/kg	0.9	1.2	1.9	1.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.3	0.6	0.8	0.6	<0.1
Benzo(a)pyrene	mg/kg	0.3	0.8	1.4	1.0	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.3	0.6	0.9	0.7	<0.1
Dibenz(a,h)anthracene	mg/kg	<0.1	0.2	0.3	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.4	0.8	1.1	0.9	<0.1
TOC	%	2.9	4.2	1.3	1.5	5.2

ECõS

Client Project Name: Baugh Green, Barnsley

Project Number: 7515

Client: 3e Consulting Engineers Limited

Reporting Date: Friday 18 May 2007

	Hole No./Sample ID	TP09	TP10	WS4	WS3	TP01
	Top Depth / m	0.20	0.10	1.80	0.90	0.60
	Bottom Depth / m					
	Sample No.					
	Sample Type					
	Date Sampled					
	Receipt Date	03/05/07	03/05/07	03/05/07	03/05/07	03/05/07
	ECõS Sample ID	S0706586	S0706587	S0706588	S0706589	S0706590
	Matrix Type	Soil	Soil	Soil	Soil	Soil
Determinand	**Units**					
Arsenic	mg/kg	7.0	20.3	21.1	#	#
Cadmium	mg/kg	<0.2	<0.2	<0.2	#	#
Chromium (total)	mg/kg	14.3	15.4	15.3	#	#
Lead	mg/kg	13.1	64.9	59.5	#	#
Mercury	mg/kg	<0.1	<0.1	<0.1	#	#
Selenium	mg/kg	<1.0	1.0	1.0	#	#
Boron (water soluble)	mg/kg	<0.5	0.8	4.2	#	#
Copper	mg/kg	14.8	43.3	31.0	#	#
Nickel	mg/kg	24.4	9.3	15.5	#	#
Vanadium	mg/kg	32.8	42.1	38.9	#	#
Zinc	mg/kg	58.3	74.8	81.0	#	#
Sulphate (water soluble)	g/l SO4	0.008	0.014	0.073	#	0.009
pH	N/A	7.8	7.5	6.3	#	#
TPH (with clean up)	mg/kg	6.4	110.3	20.8	#	#
PAH (sum of PAH 17)	mg/kg	<0.1	35.3	9.6	#	#
Naphthalene	mg/kg	<0.1	0.4	0.2	#	#
Acenaphthylene	mg/kg	<0.1	0.1	<0.1	#	#
Acenaphthene	mg/kg	<0.1	0.2	<0.1	#	#
Fluorene	mg/kg	<0.1	0.2	<0.1	#	#
Phenanthrene	mg/kg	<0.1	2.5	1.3	#	#
Anthracene	mg/kg	<0.1	0.4	0.2	#	#
Fluoranthene	mg/kg	<0.1	6.5	2.1	#	#
Pyrene	mg/kg	<0.1	5.4	1.6	#	#
Benzo(a)anthracene	mg/kg	<0.1	3.0	0.6	#	#
Chrysene	mg/kg	<0.1	2.9	0.8	#	#
Benzo(b)+(j)fluoranthene	mg/kg	<0.1	4.2	0.9	#	#
Benzo(k)fluoranthene	mg/kg	<0.1	1.8	0.4	#	#
Benzo(a)pyrene	mg/kg	<0.1	3.0	0.6	#	#
Indeno(1,2,3-cd)pyrene	mg/kg	<0.1	2.1	0.5	#	#
Dibenz(a,h)anthracene	mg/kg	<0.1	0.3	0.1	#	#
Benzo(g,h,i)perylene	mg/kg	<0.1	2.4	0.5	#	#
TOC	%	1.7	3.9	3.8	#	#
Organic Matter	%	#	#	7.8	6.4	#

Client Project Name: Baugh Green, Barnsley

Project Number: 7515

Client: 3e Consulting Engineers Limited

Reporting Date: Friday 18 May 2007

	Hole No./Sample ID	TP03	TP05	TP08	TP10	TP11
	Top Depth / m	0.40	1.00	0.60	1.30	0.90
	Bottom Depth / m					
	Sample No.					
	Sample Type					
	Date Sampled					
	Receipt Date	03/05/07	03/05/07	03/05/07	03/05/07	03/05/07
	ECõS Sample ID	S0706591	S0706592	S0706593	S0706594	S0706595
	Matrix Type	Soil	Soil	Soil	Soil	Soil
Determinand	Units					
Sulphate (water soluble)	g/l SO4	0.062	0.064	0.031	0.075	0.011

Client Project Name: Baugh Green, Barnsley

Project Number: 7515

Client: 3e Consulting Engineers Limited

Reporting Date: Friday 18 May 2007

Notes and Preservation Details

Cadmium analysis undertaken by UKAS laboratory number 2531.

APPENDIX D

Assessment Criteria

		Assessment Criteria	Residential with plant uptake			Residential w/o plant uptake			Commercial / Industrial			HCV	Notes
			1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM		
PAH	Benzo(a)pyrene (BaP)	LQM CIEH GAC	1.12	1.08	1.09	1.3	1.31	1.32	29.7	29.7	29.9		
	Dibenzo(a,h)anthracene	LQM CIEH GAC	1.14	1.13	1.1	1.3	1.34	1.32	29.7	29.7	29.9		
	Fluorene	LQM CIEH GAC	38.4	91.4	184	2770	2640	2700	59000	59400	59500		
	Napthalene	LQM CIEH GAC	3.47	8.47	17	6.94	17.1	33.7	290	720	1440		
	Napthalene	CLEA SGV 19 (DRAFT)	7	17	34	7	17	34	290	720	1400	Threshold	
	Chlorobenzene	LQM CIEH GAC	10.6	24.8	50	32.9	79.3	155	140000	143000	143000		
	1,2-dichloroethane (DCA)	LQM CIEH GAC	0.00791	0.0172	0.0328	0.0118	0.0256	0.0486	0.536	1.16	2.2		
	Hexachlorobutadiene (HCBD)	LQM CIEH GAC	0.00422	0.0103	0.0206	0.0496	0.12	0.23	1.98	4.72	8.77		
	Tetrachloroethane (PCA)	LQM CIEH GAC	0.562	1.25	2.38	3.6	8.05	15.3	160	332	620		
	Tetrachloroethene (PCE)	LQM CIEH GAC	1.01	2.32	4.5	1.46	3.39	6.58	63.1	146	283		
	1,1,1-Trichloroethane (TCA)	LQM CIEH GAC	11.7	27.2	53.1	12.9	29.8	57.9	552	1280	2490		
	Trichloroethene (TCE)	LQM CIEH GAC	0.134	0.308	0.598	0.15	0.346	0.673	6.42	14.8	28.8		
	Trichloromethane	LQM CIEH GAC	0.888	1.99	3.86	1.72	3.91	7.52	79.4	180	345		
	Vinyl Chloride	LQM CIEH GAC	0.000953	0.00184	0.00329	0.00129	0.00248	0.00447	0.0587	0.113	0.203		
	Atrazine	LQM CIEH GAC	0.0204	0.0489	0.0984	7.04	6.86	7.03	152	157	157		
	Phenol	CLEA SGV 8	78	150	280	21900	34400	37300	21900	43000	78100	Threshold	Allotment values 80, 155, 280
Metals	Arsenic	CLEA SGV 1		20			20			500		Non-threshold	
	Cadmium	CLEA SGV 3	1 (pH 6)	2 (pH 7)	8 (pH 8)		30			1400		Threshold (Oral) / Non-threshold (Inhalation)	
	Chromium	CLEA SGV 4		130			200			5000		Threshold (Oral) / Non-threshold (Inhalation)	
	Inorganic Mercury	CLEA SGV 5		8			15			480		Threshold	
	Nickel	CLEA SGV 7		50			75			5000		Threshold	Threshold inhalation dose more protective to HH than ID
	Selenium	CLEA SGV 9		35			250			8000		Threshold	
	Lead	CLEA SGV 10		450			450			750		Non-threshold	Based on lead in blood concentration
	Beryllium	LQM CIEH GAC		12.1			84.9			1950			
	Copper	LQM CIEH GAC		111			2080			45700			
	Vanadium	LQM CIEH GAC		140			150			4250			
	Zinc	LQM CIEH GAC		330			8250			188000			
TPHCWG	Aliphatic EC 5-6	LQM CIEH GAC	2.11	3.72	6.38	2.11	3.72	6.39	95.3	168	288		
	Aliphatic EC C6-8	LQM CIEH GAC	5.37	11.9	22.7	5.37	11.9	22.7	242	535	1020		
	Aliphatic EC >8-10	LQM CIEH GAC	1.46	3.55	7	1.46	3.56	7.05	65.9	160	317		
	Aliphatic EC >10-12	LQM CIEH GAC	8.53	20.8	40.1	8.6	21.2	41.7	29900	30600	30400		
	Aliphatic EC >12-16	LQM CIEH GAC	40.7	93.4	163	42.1	101	187	29800	30800	30400		
	Aliphatic EC >16-35	LQM CIEH GAC	16400	16400	16300	27600	27600	26800	617000	631000	627000		
	Aliphatic EC >35-44	LQM CIEH GAC	16400	16400	16300	27600	27600	26800	617000	631000	627000		
	Aromatic 5-7 (Benzene)	LQM CIEH GAC	0.575	1.33	2.57	0.613	1.41	2.75	26.9	26.9	121		
	Aromatic EC >7-8 (Toluene)	LQM CIEH GAC	0.624	1.46	2.85	0.694	1.63	3.18	30.4	30.4	139		
	Aromatic EC >8-10	LQM CIEH GAC	1.09	2.67	5.3	2.39	5.88	11.6	107	107	513		
	Aromatic EC >10-12	LQM CIEH GAC	1.94	4.76	9.44	14.2	34.1	63.9	625	625	2600		
	Aromatic EC >12-16	LQM CIEH GAC	2.19	5.39	10.7	72.7	52	235	12200	12500	12400		
	Aromatic EC >16-21	LQM CIEH GAC	115	132	133	291	336	362	9180	9400	9350		
	Aromatic EC >21-35	LQM CIEH GAC	157	161	157	417	417	404	9250	9460	9410		
	Aromatic EC >35-44	LQM CIEH GAC	157	161	157	417	417	404	9250	9460	9410		
	Aliphatic & Aromatic EC >44-70	LQM CIEH GAC	174	179	174	417	417	404	9250	9460	9410		
BTEX	Benzene	CLEA SGV 12 (DRAFT)	0.024	0.056	0.109	0.038	0.097	0.168	1.66	3.8	7.32	Non-threshold	Allotment values 0.068, 0.154, 0.3
	Toluene	CLEA SGV 15	3	7	14	3	8	15	150	350	680	Threshold	Allotment values 31, 73, 140
	Ethylbenzene	CLEA SGV 16	9	21	41	16	41	80	1800	4800		Threshold	Allotment values 18, 43, 85
	Xylenes	CLEA SGV 18 (DRAFT)	6	15	30	8	19	38	340	825	1650	Threshold	Allotment values 30, 70, 144

Notes: LQM/CIEH GAC 'Generic Assessment Criteria for Human Health Risk Assessment', Nov. 2006
SGV 'Contaminated Land Exposure Assessment' DEFRA March 2002
Units mg/kg

APPENDIX E

Geotechnical Testing Results

PSL
Professional Soils Laboratory

LABORATORY REPORT

UKAS TESTING
4043

Contract Number: PSL07/0810

Client's Reference:

Report Date: 15 May 2007

Client Name: 3E Consulting
4 Calder Close
Calder Park
Wakefield
WF4 3BA

For the attention of: Jonny Roberts

Contract Title: Baugh Green, Barnsley

Date Received: 13-Apr-07
Date Commenced: 13-Apr-07
Date Completed: 15-May-07

Notes: **Observations and Interpretations are outside the UKAS Accreditation**

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

Approved Signatories:

R Gunson (Director)
A Watkins (Director)
D Lambe (Senior Technician)

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Doncaster DN4 0AG
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fax: +44 (0)870 240 1965
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Trial Pit Number	Sample Number	Depth m	Description of Sample
TP01		1.00	Brown mottled grey sandy CLAY.
TP02		0.60	Pale brown mottled grey gravelly slightly sandy CLAY.
TP03		1.00	Grey mottled brown slightly sandy CLAY.
TP04		0.40	Dark brown GRAVEL.
TP05		0.30	Pale brown mottled grey slightly gravelly slightly sandy CLAY.
TP07		1.00	Brown slightly gravelly slightly sandy CLAY.
TP07		1.10	Brown slightly gravelly sandy CLAY.
TP08		0.40	Dark brown gravelly slightly sandy CLAY.
TP09		0.70	Brown mottled grey gravelly slightly sandy CLAY.
TP09		0.80	Brown and grey slightly gravelly sandy CLAY.
TP10		0.60	Pale brown slightly gravelly sandy CLAY.
TP11		1.00	Brown slightly gravelly slightly sandy CLAY.

PSL
Professional Soils Laboratory

Compiled by	Date	Checked by	Date	Approved by	Date
	14/5/07		14/5/07		14/5/07

BAUGH GREEN, BARNSLEY.

Contract No: PSL07/0810

Client Ref: 7515

SUMMARY OF SOIL CLASSIFICATION TESTS

(B.S. 1377 : PART 2 : 1990)

Trial Pit Number	Sample Number	Depth m	Moisture Content % Clause 3.2	Bulk Density Mg/m^3 Clause 7.2	Dry Density Mg/m^3 Clause 7.2	Particle Density Mg/m^3 Clause 8.	Liquid Limit % Clause 4.3/4.4	Plastic Limit % Clause 5.	Plasticity Index % Clause 5.	% Passing .425mm	Remarks
TP02		0.60	15				43	22	21	86	Intermediate plasticity CI.
TP04		0.40	9					NP			
TP05		0.30	25				67	25	42	97	High plasticity CH.
TP07		1.00	28				56	26	30	94	High plasticity CH.
TP08		0.40	17				57	26	31	80	High plasticity CH.
TP09		0.70	18				45	23	22	87	Intermediate plasticity CI.
TP10		0.60	25				51	23	28	94	High plasticity CH.

SYMBOLS : NP : Non Plastic * : Liquid Limit and Plastic Limit Wet Sieved.

PSL Professional Soils Laboratory

Compiled by	Date	Checked by	Date	Approved by	Date
[signature]	14/5/07	[signature]	14/5/07	[signature]	14/5/07

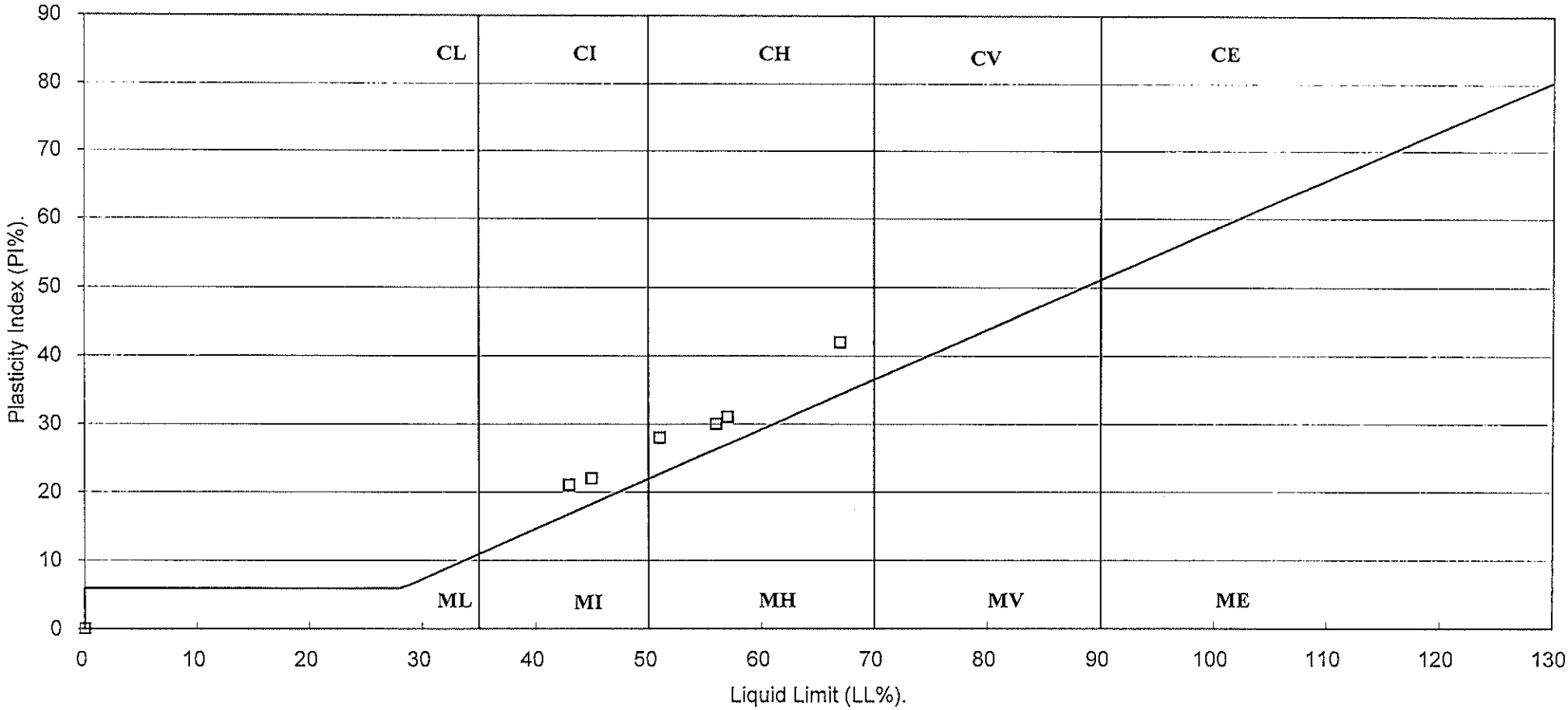
BAUGH GREEN, BARNSLEY.

Contract No: PSL07/0810

Client Ref: 7515

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)

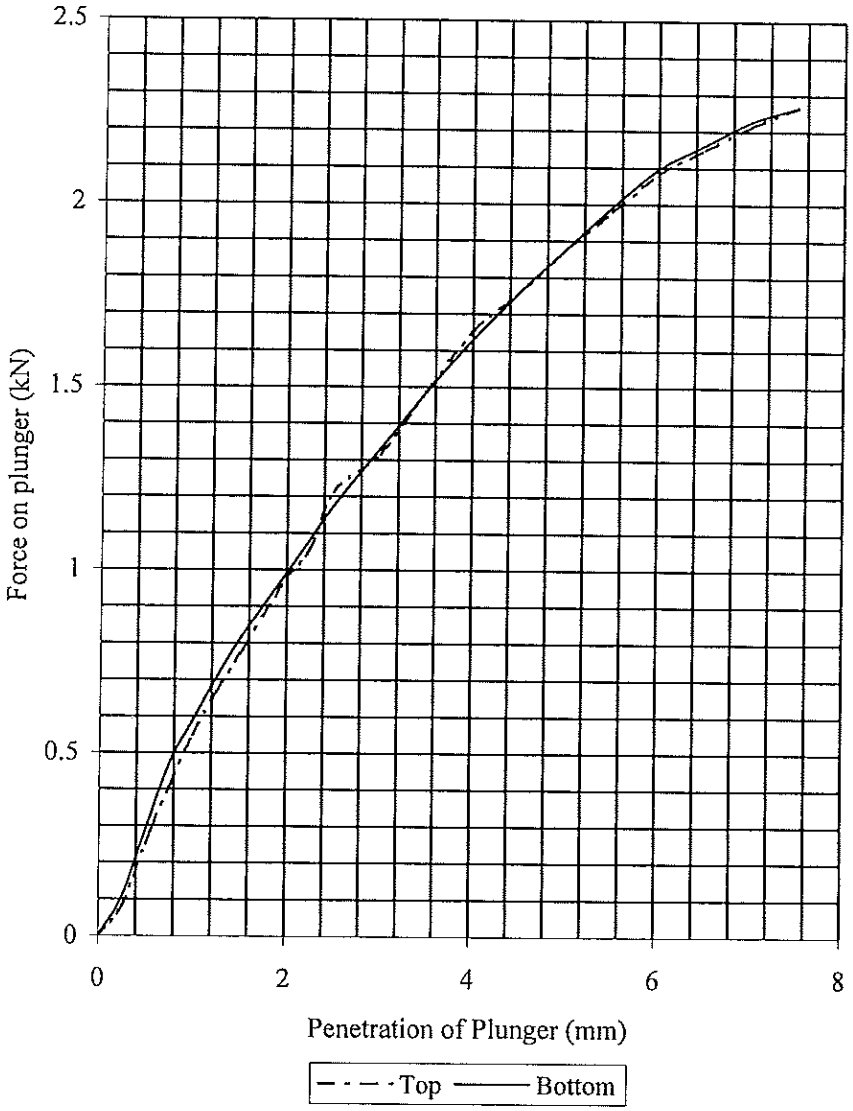


PSL Professional Soils Laboratory	Compiled by	Date	Checked by	Date	Approved by	Date
		14/5/07		14/5/07		14/5/07
	BAUGH GREEN, BARNSLEY.				Contract No:	PSL07/0810
					Client Ref:	7515

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Trial Pit Number TP01 Depth (m) : 1.00



Initial Sample Conditions		Test Conditions		Method of compaction		4.5Kg	
Moisture Content:	19.3	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.12	Soaking Time hrs	0	Sample Top	19.3	Sample Top	9.4
Dry Density Mg/m3:	1.78	Swelling mm:	0	Sample Bottom	19.2	Sample Bottom	9.4
Percentage retained on 20mm BS test sieve:	0	Remarks:	See Summary of Soil Description.				

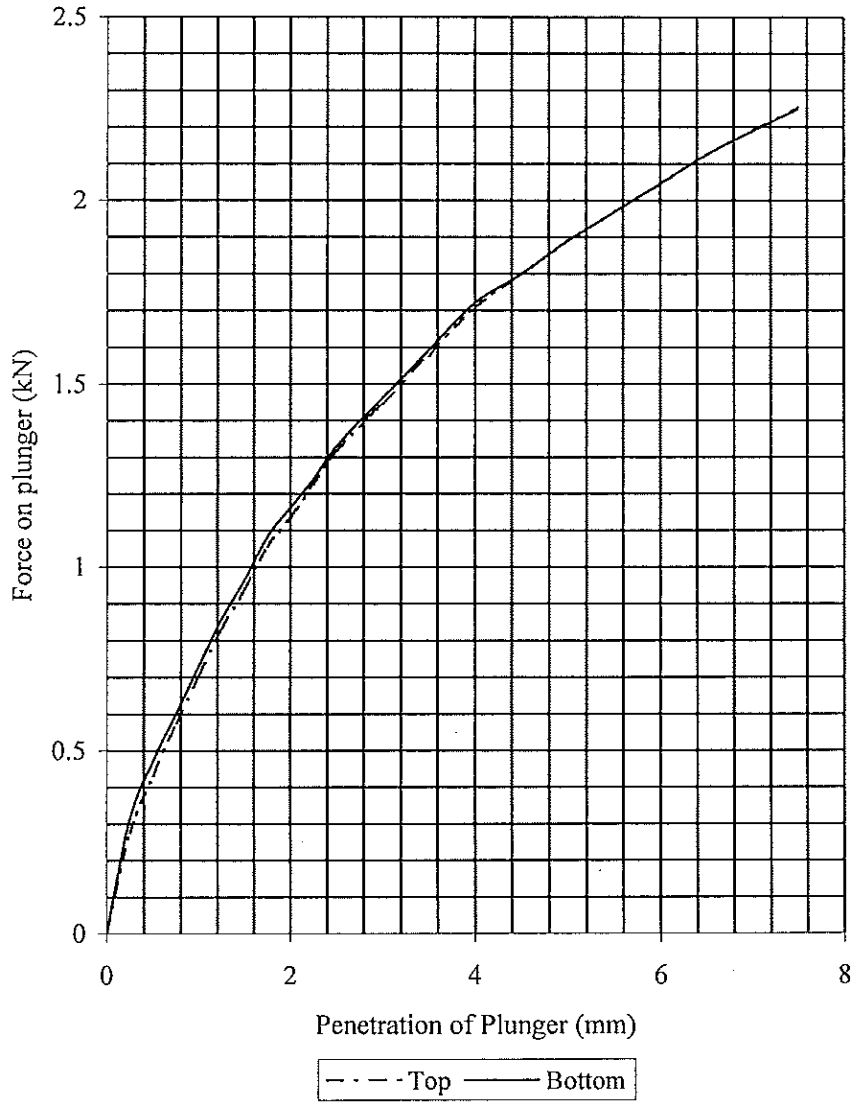
Checked by	Date	Approved By	Date
RC	14/5/07	RC	14/5/07

PSL Professional Soils Laboratory	BAUGH GREEN, BARNSLEY.	Contract No. PSL07/0810

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Trial Pit Number TP03 Depth (m) : 1.00



Initial Sample Conditions		Test Conditions		Method of compaction		4.5Kg	
Moisture Content:	20.2	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.11	Soaking Time hrs	0	Sample Top	20.4	Sample Top	10.0
Dry Density Mg/m3:	1.76	Swelling mm:	0	Sample Bottom	19.9	Sample Bottom	10.1
Percentage retained on 20mm BS test sieve:	0	Remarks:	See Summary of Soil Description.				

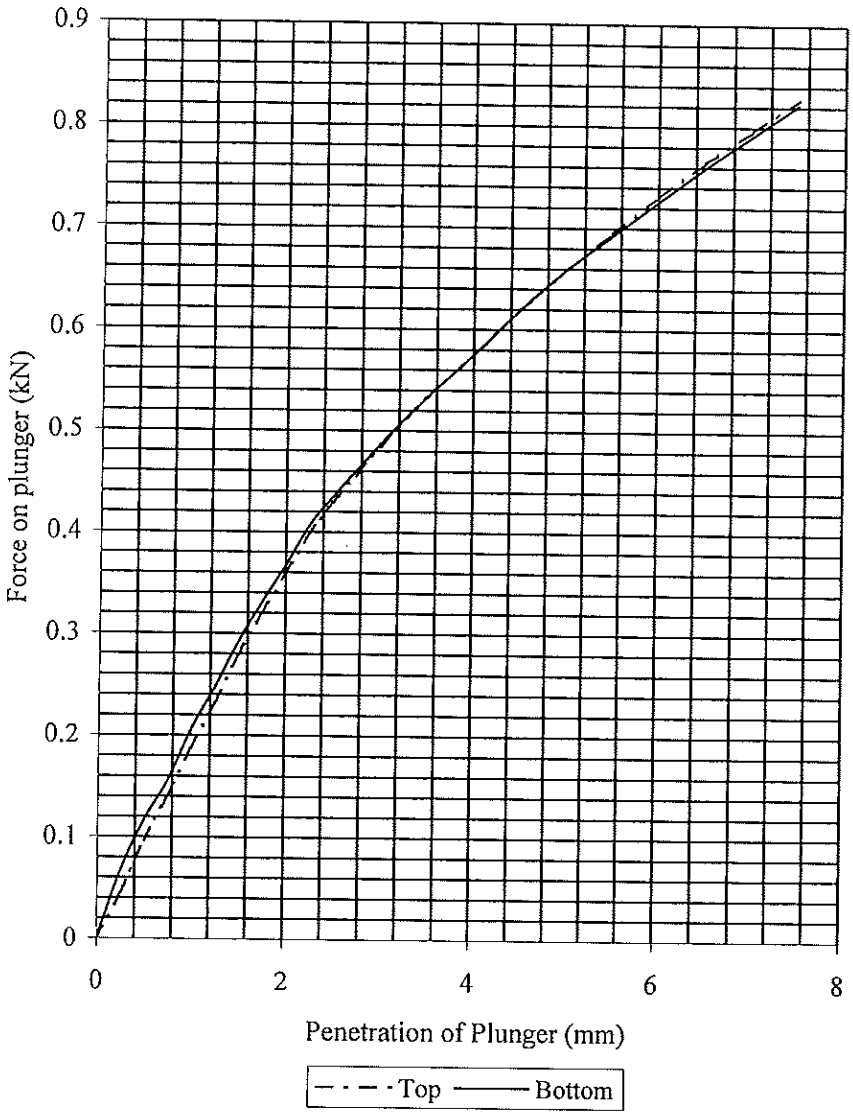
Checked by	Date	Approved By	Date
	14/5/07		14/5/07

PSL Professional Soils Laboratory	BAUGH GREEN, BARNSLEY.	Contract No. PSL07/0810

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Trial Pit Number TP07 Depth (m) : 1.10



Initial Sample Conditions		Test Conditions		Method of compaction		4.5Kg	
Moisture Content:	24.0	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.05	Soaking Time hrs	0	Sample Top	24.1	Sample Top	3.3
Dry Density Mg/m3:	1.66	Swelling mm:	0	Sample Bottom	24.0	Sample Bottom	3.3
Percentage retained on 20mm BS test sieve:	0	Remarks:	See Summary of Soil Description.				

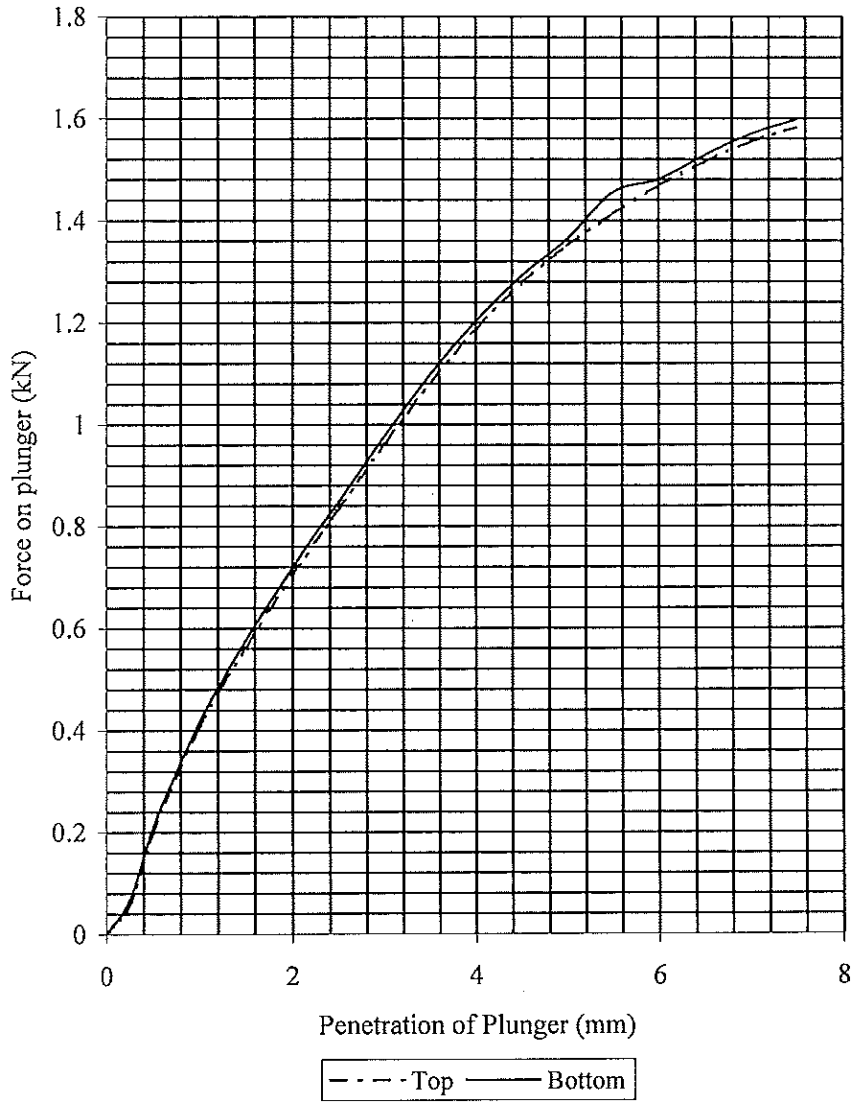
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	14/5/07		14/5/07

PSL Professional Soils Laboratory	BAUGH GREEN, BARNSLEY.	Contract No. PSL07/0810

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Trial Pit Number TP09 Depth (m) : 0.80



Initial Sample Conditions		Test Conditions		Method of compaction		4.5Kg	
Moisture Content:	21.5	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.11	Soaking Time hrs	0	Sample Top	21.5	Sample Top	6.8
Dry Density Mg/m3:	1.74	Swelling mm:	0	Sample Bottom	21.5	Sample Bottom	6.8
Percentage retained on 20mm		Remarks:	See Summary of Soil Description.				
BS test sieve:	0						

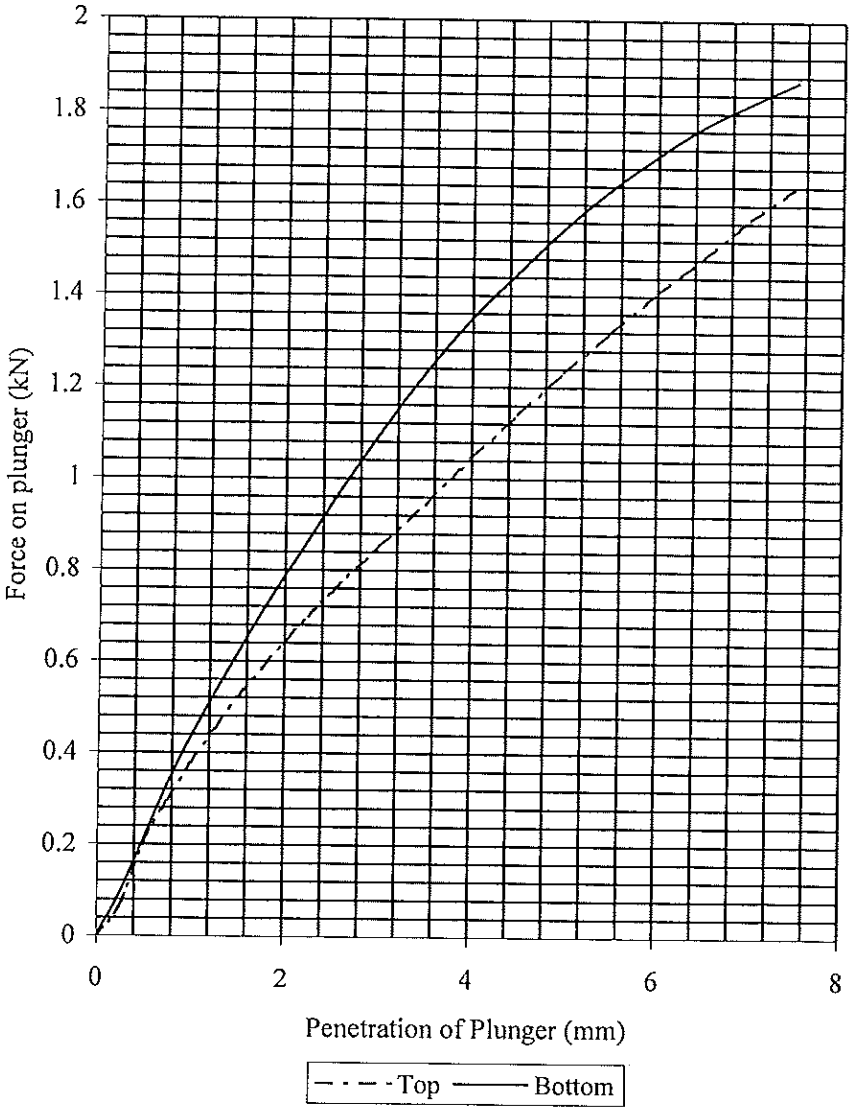
Checked by	Date	Approved By	Date
	14/5/07		14/5/07

PSL Professional Soils Laboratory	BAUGH GREEN, BARNSLEY.	Contract No. PSL07/0810

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Trial Pit Number TP11 Depth (m) : 1.00



Initial Sample Conditions		Test Conditions		Method of compaction		4.5Kg	
Moisture Content:	25.9	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.14	Soaking Time hrs	0	Sample Top	26.2	Sample Top	6.2
Dry Density Mg/m3:	1.70	Swelling mm:	0	Sample Bottom	25.4	Sample Bottom	7.7
Percentage retained on 20mm BS test sieve:	0	Remarks:	See Summary of Soil Description.				

Checked by	Date	Approved By	Date
	14/5/07		14/5/07

PSL Professional Soils Laboratory

BAUGH GREEN, BARNSLEY.

Contract No. PSL07/0810

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

4043

Accredited to ISO/IEC 17025:2005

Professional Soils Laboratory Ltd

Issue No: 001 **Issue date:** 26 October 2006

5/7 Hexthorpe Road
Hexthorpe
Doncaster
DN4 0AG

Contact: Mr A Watkins
Tel: +44 (0)870 240 1964
Fax: +44 (0)870 240 1965
E-Mail: awatkin@prosoils.co.uk
Website: www.prosoils.co.uk

Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
AGGREGATES	Particle size distribution - sieving method	BS EN 933-1:1997
SOILS for civil engineering purposes	Moisture content - oven drying method	BS 1377-2:1990
	Liquid limit - cone penetrometer	BS 1377-2:1990
	Liquid limit - cone penetrometer - one point	BS 1377-2:1990
	Plastic limit	BS 1377-2:1990
	Plasticity index and liquidity index	BS 1377-2:1990
	Particle size distribution - wet sieving	BS 1377-2:1990
	Particle size distribution - dry sieving	BS 1377-2:1990
	Particle size distribution - sedimentation - pipette method	BS 1377-2:1990
	Dry density/moisture content relationship (2.5 kg rammer)	BS 1377-4:1990
	Dry density/moisture content relationship (4.5 kg rammer)	BS 1377-4:1990
	California Bearing Ratio (CBR) *(loads from 0.2 to 50 kN)*	BS 1377-4:1990

4043 Accredited to ISO/IEC 17025:2005	**Schedule of Accreditation** issued by **United Kingdom Accreditation Service** 21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK **Professional Soils Laboratory Ltd** **Issue No:** 001 **Issue date:** 26 October 2006
Testing performed at main address only	

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
SOILS for civil engineering purposes	Moisture condition value (MCV)	BS 1377-4:1990
	MCV - natural moisture content	BS 1377:Part 4:1990
	MCV/moisture content relation	BS 1377:Part 4:1990
	Uniformity coefficient (221 2217)	BS 6100-2.2.1:1992
END		

APPENDIX F

Gas Monitoring Results

Gas Monitoring Record

3e Consulting Engineers Ltd
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Job no: 7515
Site: Barugh Green, Barnsley

Date: 09-May-07
Weather: Overcast & windy
Barometric pressure trend: Steady

WS No	Methane (%v/v)	Carbon dioxide (%v/v)	Oxygen (%v/v)	Barometric Pressure (mb)	Flow (l/hr)	Water level (m bgl)	Remarks
1	0.0	0.5	20.0	1002	0.4	1.50	
2	0.0	1.1	19.8	1002	0.2	1.25	
3	0.0	0.4	19.5	1002	0.1	1.85	
4	0.0	1.1	18.9	1002	0.0	DRY	
5	0.0	0.3	20.0	1002	0.0	DRY	
6	0.0	0.6	20.0	1002	0.2	1.45	

Date: 11-May-07
Weather: Heavily overcast
Barometric pressure trend: Steady

WS No	Methane (%v/v)	Carbon dioxide (%v/v)	Oxygen (%v/v)	Barometric Pressure (mb)	Flow (l/hr)	Water level (m bgl)	Remarks
1	0.0	0.5	20.2	992	0.3	1.55	
2	0.0	1.1	20.0	992	0.2	1.20	
3	0.0	0.4	20.0	991	0.0	1.85	
4	0.0	3.7	15.2	991	0.0	1.80	
5	0.0	0.8	19.6	991	0.0	DRY	
6	0.0	0.7	20.0	991	0.0	1.45	

Date: 21-May-07
Weather: Dry and sunny
Barometric pressure trend: Steady

WS No	Methane (%v/v)	Carbon dioxide (%v/v)	Oxygen (%v/v)	Barometric Pressure (mb)	Flow (l/hr)	Water level (m bgl)	Remarks
1	0.0	0.0	20.6	1008	0.0	0.80	
2	0.0	0.0	20.6	1008	0.1	0.82	
3	0.0	0.1	20.5	1007	0.1	1.30	
4	0.0	1.9	15.1	1007	0.1	1.50	
5	0.0	0.3	18.5	1007	0.0	2.05	
6	0.0	0.3	20.0	1007	0.1	0.75	

Date: 25-May-07
Weather: Overcast
Barometric pressure trend: Steady

WS No	Methane (%v/v)	Carbon dioxide (%v/v)	Oxygen (%v/v)	Barometric Pressure (mb)	Flow (l/hr)	Water level (m bgl)	Remarks
1	0.0	0.1	20.7	1000	0.0	1.32	
2	0.0	0.0	20.7	1000	0.0	0.90	
3	0.0	0.2	20.3	1000	0.0	1.46	
4	0.0	0.4	20.0	1000	0.1	1.79	
5	0.0	0.6	19.5	1000	0.1	2.43	
6	0.0	0.2	20.3	1000	0.0	0.82	