White Young Green

Geo-Environmental Site Investigation Factual and Interpretative Report

Houghton Main Business Park, Grimethorpe

for

William Saunders Partnership

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WHITE YOUNG GREEN ENVIRONMENTAL LIMITED				
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EXECUTIVE SUMMARY

Proposed Development	It is proposed that a number of industrial / commercial units varying in size from 10,000ft^2 to 1,000ft^2 be built on the site along with associated parking areas and access roads.
Previous Ground Investigations and Reports	Extracts of compaction certification report by Babtie, Desk Study by WSP and Opencast completion drawings from UK Coal were provided by WSP prior to the start of fieldwork. Signs of previous investigations are present on site including a number of raised and flush borehole covers. These are presumed to be associated with the post-compaction monitoring undertaken by Babtie as part of their Compaction Certification
Site Conditions	The northern boundary of the site is on the outside of disused railway which bends in a 'U' shape, the site is bounded to the east by Park Spring Road, *to the west by a wire and post fence and to the south by a access* roundabout and fencing for the adjacent energy plant site. The site is predominantly flat with an elongated bund, rising to 3m in height in places, which follows the line of the northern boundary. There is a small round bund within the site approximately 2-3m in height and the site is between 0.5m and 3m higher than the level of the adjacent Park Spring Road. The site predominantly lies in an area which used to form part of Houghton Main Colliery. To this ends previous land uses include railway sidings to serve the colliery, as well as being part of an opencast coal mine
Geo-Environmental Assessment	Due to elevated concentrations of carbon dioxide, a site Characteristic Gas Situation of 2, low hazard potential, is assessed. Basic gas protection measures, for example a suspended floor slab and membrane providing an aggregate protection score of 2 (Ref. BS8485), will be required for Commercial development. No potential for sulphate attack of concrete has been identified. No indication of conditions unsuitable for plant growth have been identified. No significant contamination has been identified. Risk to development workers is considered **low**, though due to the potential for hazardous ground gases, controls will be required before entry into excavations. Leachability testing has indicated a **low** risk of pollution of controlled waters.
Geotechnical Assessment	The majority of California Bearing test results fell between 3 and 11%, although five of the CBR values were below 5%. It is likely that the CBR values at the base level of pavement construction (assumed to be around 0.5mbgl) will be adequate for pavement design, if local soft spots are identified during construction works sub base depths can be locally extended to competent strata. The mean infiltration rate using the BRE 2007 approach to soakaway tests was 1.99E-05m.s^{-1}, if the result from the failed soakaway test is excluded then the mean infiltration rate can be taken to be 2.51E-05 m.s^{-1} Atterberg Limits testing undertaken on materials from the site indicated that *materials were typically CLAY's of intermediate plasticity* The results of the water soluble sulphate tests all indicated a concrete class DS-1 to be sufficient. The total potential sulphate value, calculated using the total sulphur solid result, indicated that a concrete class DS-3 would be required.

	The monitored groundwater levels on site to be concurrent with the regional water level within shallow mineworkings as monitored by The Coal Authority at the Dearne Valley borehole. The water level within the opencast backfill on the site can therefore be said to have recovered. Geophysical Resistivity and Seismic surveys have been interpreted and indicate the locations of the opencast high wall along eleven separate survey lines within the site.
Recommendations	A mean infiltration rate of 1.99E-05m.s^{-1} was calculated from on site Soakaway tests. Calculations for Soakaway design should take into consideration variations in permeability measured across the site. It is our opinion that in order to construct any development on the site that ground improvement techniques are utilised to improve the bearing capacity and minimise the potential for ongoing settlement. There are several options for ground treatment that could be utilised across the site. These include dynamic compaction with the industrial units constructed on raft foundations or the founding of the industrial units on vibro stone columns. The nature of any ground improvement should be confirmed after discussions with a suitable ground improvement contractor. To limit potential for differential settlement across the highwall it is important to ensure that building foundations are not constructed across the zone of *influence of this interface. Layouts should be amended to account for this.*

This sheet is intended as a summary of the assessment of the site in relation to ground contamination and geotechnical conditions. It does not provide a definitive engineering analysis.

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1.0 INTRODUCTION

1.1 Instruction

White Young Green Environmental Limited (WYGE) were commissioned by William Saunders Partnership (WSP) on behalf of Strategic Sites Ltd to undertake a site investigation for the site known as Houghton Main Business Park, Grimethorpe.

The scope of the investigation to be undertaken was designed by WSP and outlined in a letter dated 3rd January 2008 in which WYGE were invited to provide a quotation for carrying out the specified works.

Further site investigation was proposed by WYGE on the 16th April 2008 the scope of which is described below in Section 1.3.

1.2 Project Description

It is proposed that a number of industrial / commercial units varying in size from 10,000ft^2 to 1,000ft^2 be built on the site along with associated parking areas and access roads.

1.3 Scope of Services

The objectives of the investigation were:

- To confirm the location of the opencast highwall.
- To ascertain shallow ground conditions and provide samples for chemical and geotechnical testing.
- To ascertain deeper ground conditions providing samples for geotechnical testing and provide installations for gas and groundwater monitoring.
- To validate backfill compaction.
- To ascertain infiltration rates to assess suitability of soakaway design.
- To provide a full topographic survey of the site.

The scope of the fieldwork programme included:

- The excavation of 16No. trial pits.
- The drilling of 5No. cable percussive boreholes.
- The drilling of 15No. dynamic probe holes.
- The undertaking of 10No. in-situ California Bearing Ratio (CBR) tests.
- The undertaking of 5No. 2D Resistivity Imaging Profiles & 4No. Seismic Refraction Profiles

A further Geophysical investigation was carried out on the 3rd April 2008 and comprised the undertaking of 3No. 2D Resistivity Imaging Profiles & 3No. Seismic Refraction Profiles

Due to the complexities of the rockhead profile across the site additional works were carried out on the site to fully ascertain the extent of the cuttings, highwall and backfill. These works were carried out on the 1st and 2nd May and included the following:

- The excavation of 3No. trial trenches.
- The drilling of 14No. Rotary Open Holes.
- The Undertaking of 4No. 2D Resistivity Imaging Profiles & 4No. Seismic Refraction Profiles

1.4 Terms and Conditions

Attention is drawn to the report conditions, included in Appendix A, and the terms and conditions of the engagement.

2.0 SITE DESCRIPTION

2.1 Site Locality

The site area is approximately 9.26 acres (3.75 hectares) in total and can be located by National Grid Reference: 441660, 406420. The development site is located Off Park Spring Road to the North East of Barnsley, to the far West of Doncaster and to the South of Wakefield/Pontefract.

In relation to the local road network, the site provides easy access to the M1 (junctions 37 or 38) and to the A1(M) (junctions 37 or 38) via the A635, A628, and A637.

2.2 Site History

A detailed site history is presented in the Desk Study report by Wm. Saunders Partnership LLP

The site predominantly lies in an area which used to form part of Houghton Main Colliery. To this end previous land uses include railway sidings to serve the colliery, as well as being part of an opencast coal mine.

The colliery operated from the late 1800s and closed during 1992-1993. Open cast operations began on the site in July 1997 and site works were completed in May 2001. Following the removal of coal during the open cast operations the site was restored to original levels using earthworks compaction methods.

2.3 Geology

A review of Geological Survey of Great Britain, Solid with Drift, Barnsley, Sheet 87, 1976, 1:50,000 scale plan and The Geological Survey of England & Wales, York.275.SW, 1931, 1:10,560 scale plan indicates that to the west of the site within the western edges of the site are alluvial deposits associated with the nearby River Dearne. No other superficial deposits are shown.

The site is shown to be underlain by Upper Carboniferous Middle Coal Measures, the Mexborough or Royston Rock (sandstone) is to the west of the site, and the Ackworth Rock (sandstone) is located to the east of the site. The Shafton coal seam appears to crop very close to or within the site.

In the compaction certificate report written by Babtie on the Houghton Main Opencast Site the geology underlying the entire former opencast site was described as shown below:

> *The Houghton Main site is within an area that forms part of the Yorkshire Coalfields and lies directly on the Carboniferous Westphalian C Series (the Upper Coal Measures). These strata beneath the site comprise a cyclic series of sandstones, siltstones, mudstones and coal with seat earth that have a general dip of 5o (a gradient of 1 in 11 to 1 in 12) towards the east. There is limited surface drift in the area. Alluvium, comprising silts, sands and gravels, overlies bedrock parallel to and either side of the River Dearne.....*
>
> *....The three coal seams that were worked by open cast methods at the site were the Highgate and the Shafton Seams and the Highgate Rider that had a limited occurrence in the north east part of the site. Their location beneath the site was delineated by site investigations carried out in 1966 and 1995.....*
>
> *.....The Shafton Coal outcrops along the south western boundary of the site. The Highgate Coal outcrops across the centre of the site in a north west to south east direction. There are no records to indicate that these seams were worked in the past by underground methods although there is some field evidence of old pillar and stall workings, Reference 4. The site in underlain at depth (greater than 10m) by the Mexborough Rock, a coarse-grained sandstone, iron stained gritstone, which is a minor aquifer in the area. This stratum outcrops to the west of the River Dearne. A fault, trending north east to south west, is located in the southern part of the site. It has a small, south easterly downthrow of less than 2m that diminishes towards the south west.*

3.0 PREVIOUS INVESTIGATIONS

Extracts of the following documentation was provided by WSP prior to the start of fieldwork :

- Opencast completion drawings as completed by UK Coal
- Desk Study prepared by WSP
- Draft Opencast Compaction Certification Report prepared by Babtie on behalf of UK Coal.

Signs of previous investigations are present on site including a number of raised and flush borehole covers. These are presumed to be associated with the post-compaction monitoring undertaken by Babtie as part of their Compaction Certification, the figures for this document including the monitoring locations drawing were not present within the document provided.

4.0 WYGE GROUND INVESTIGATION

Ground investigation was undertaken by WYGE as specified by William Saunders Partnership LLP.

The objectives of the investigation were:

- To confirm the location of the opencast highwall.
- To ascertain shallow ground conditions and provide samples for chemical and geotechnical testing.
- To ascertain deeper ground conditions providing samples for geotechnical testing and provide installations for gas and groundwater monitoring.
- To validate backfill compaction.
- To ascertain infiltration rates to assess suitability of soakaway design.
- To provide a full topographic survey of the site.

The initial site investigation was carried out intermittently between 13th and 26th February 2008 with a second Geophysical survey carried out on the 3rd April.

The exploratory hole locations and topographic levels are shown in Figure 2.

4.1.1 Trial pits

Sixteen trial pits were excavated using a 360° tracked excavator to depths of between 1.50m and 3.20mbgl.

4.1.2 Cable Percussive Boreholes

Five cable percussive boreholes were bored on the site to depths between 6.20m and 10.00mbgl

4.1.3 Dynamic Probe Holes

Fifteen super-heavy dynamic probe holes were drilled on site to depths between 2.50m and 11.10mbgl.

Additional Site Investigation

Additional Site Investigation works were carried out on the 1st and 2nd May 2008. The Exploratory hole locations are shown in Figure 2.

4.1.4 Trial Trenches

Four trial trenches were excavated to rockhead which was encountered at depths of up to 4.9m using a JCB 3CX.

4.1.5 Rotary Open Holes

Fourteen Rotary Open Holes were bored to rockhead which was encountered at depths of between 4.7 and 13.8mbgl.

4.1.6 Contamination Testing

Selected samples recovered during the field investigation were submitted to a UKAS accredited laboratory subcontractor for contamination testing.

The laboratory testing suite undertaken comprised:

- 11No. WYGE Standard soil contamination suites.
- 11No. 2:1 Water soluble sulphate tests.
- 5 No. WYGE Standard soil leachability suites.
- 5 No. WAC 'inert' suites.
- 3 No. WYGE Standard Water contamination suites.

The results of this testing are attached in Appendix C, and are discussed in Section 6.

5.0 ENCOUNTERED SUBSURFACE CONDITIONS

The materials encountered across the site comprised variable depths of 2 separate strata of MADE GROUND.

5.1 Made Ground

The made ground at the site comprised two distinct layers of material, a mottled brown and grey sandy and gravelly clay from the ground surface, overlying light grey-blue clayey gravel with rare to some cobbles of mudstone.

The upper stratum of made ground (generally comprising a mottled grey and light brown sandy gravelly clay, gravel is is sub-angular grey mudstone) was encountered between depths of 0.0mbgl to 1.2mbgl. TP08 encountered this material to a depth of 3.2mbgl however the trial pit was located on top of a bund approximately 3m high. This material could be considered to be a capping layer placed on top of the opencast backfill.

The underlying stratum of made ground which was encountered to an unproven depth generally comprised a blue grey very clayey gravel or blue grey very gravelly clay where the gravel comprised sub angular blue-grey mudstone. This material is presumed to be the material used as opencast backfill.

5.2 Superficial Materials

No superficial natural strata were encountered within the site

5.3 Solid Geological Strata

Solid geological strata was encountered in all Rotary Open Holes at depths of between 4.7 and 13.8mbgl.

5.4 Groundwater

Groundwater was not encountered in any of the trial pits.

Groundwater was encountered in all cable percussive boreholes and the levels were recorded during monitoring visits. Figure 11 shows the variation of groundwater levels during the monitoring period.

Data gathered from the Coal Authority for recorded water levels within shallow mine workings, taken from the Dearne Valley borehole National Grid Reference SE4231105757, is shown in Figure 12.

This data would seem to indicate that the groundwater level within the opencast site is concurrent with the regional groundwater levels within the shallow mineworkings.

6.0 CONTAMINATION ASSESSMENT

6.1 Legislation

Part IIA of the Environmental Protection Act 1990 (inserted by Section 57 of the Environment Act 1995) provides a regime for the control of specific threats to health or the environment from existing land contamination. In accordance with the Act and the statutory guidance document on the Contaminated Land (England) Regulations 2000, the definition of contaminated land is intended to embody the concept of risk assessment. Within the meaning of the Act, land is only "contaminated land" where it appears to the regulatory authority, by reason of substances within or under the land, that:

- significant harm is being caused or there is significant possibility of such harm being caused; or
- pollution of controlled waters is being, or is likely to be, caused.

The guidance defines "risk" as the combination of:

- the probability, or frequency, of occurrence of a defined hazard (for example, exposure of a property to a substance with the potential to cause harm); and
- the magnitude (including the seriousness) of the consequences.

For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

- a **source**, i.e. a substance that is capable of causing pollution or harm.
- a **pathway**, i.e. a route by which the contaminant can reach the receptor.
- a **receptor** (or target), i.e. something which could be adversely affected by the contaminant.

If one of these elements is missing there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

6.2 Contamination Assessment Methodology

In order to assess the environmental risk posed by contaminants WYGE have undertaken an appraisal of contamination data using Tier 1 Screening Values (TSVs).

Contaminant concentrations below the TSVs are considered not to warrant further risk assessment. Concentrations of contaminants above the TSVs require further consideration of the potential pollutant linkages. It should be noted that exceedance of a TSV does not necessarily indicate that the site requires remediation.

Soils: Derivation of TSVs

In order to assess the soil analysis results with regard to potential human health risks, WYGE TSVs have been derived in accordance with the UK framework set out in the most recent CLR (Contaminated Land Report) documents.

Ongoing research by the EA is being undertaken to produce toxicology reports (TOX series) for each of the contaminants identified within the CLR framework and then to produce Soil Guideline Values (SGVs) using the Contaminated Land Exposure Assessment (CLEA) model. To date, SGVs have been published for only a limited suite of contaminants, each for four standard land use scenarios:

- residential with plant uptake;
- residential without plant uptake
- allotments
- commercial and industrial.

Where SGVs have been published, these are adopted as the TSV. For all other contaminants, TSVs have been derived in accordance with the CLR framework. The soil TSVs derived are provided in Appendix D, together with an indication of the method used for derivation.

For the purposes of this analysis, the 'commercial / industrial' scenario has been utilised with reference to the proposed development.

The CLEA model states that 'the contamination is assumed to be at or within 1m of the surface' (CLR10 pg10). It is considered that at depths greater than 1m, the probability of human exposure via the direct contact pathways are significantly reduced, leaving inhalation of volatile compounds as the dominant pathway with regard to human health risks. However, as it is anticipated that some disturbance of made ground will take place, all made ground data (to 1.4m) has been included in the assessment.

The criteria for petroleum hydrocarbons in Appendix D are based on the TPH CWG carbon-banded hydrocarbons classes, as used by WYGE for detailed hydrocarbons risk assessment. A tentative screening criterion, 500mg/kg, has been applied to results available only as 'TPH'. This is considered conservative, assuming that contamination by hydrocarbons more volatile than diesel is unlikely, and that no odours indicative of hydrocarbons contamination were identified.

Leachability

The results of the soil leachability analyses have been assessed against groundwater TSVs. The site is located on a minor aquifer, with the River Dearne and a large lake nearby [1]. Consequently the controlled waters criteria applied have been based on Environmental Quality Standards (EQS) criteria where available, consistent with the Environment Agency 'Level 1' groundwater risk assessment.

6.3 Ground Contamination Assessment

The assessment has been developed based on the proposed development of the site for commercial / industrial use. It should be noted that at the time of writing, analytical data for Waste Acceptance Criteria available from the testing laboratory is incomplete and the report is consequently subject to revision.

Soils

Test results do not indicate any evidence of contamination which may present any risk to human health. All results were considered to be within the range typical of natural soils.

Leachability

All leachability results were within the Level 1 criteria proposed in Appendix D, based on published EQS values except where not available. The only exception was aluminium, for which the Water Supply (Water Quality) Regulations criterion, 200µg/l, was applied. A 2007 Environment Agency document proposes that a future EQS should be based on inorganic monomeric aluminium, the component of most significant toxicity. Consequently, whilst the use of the Water Supply Regulations criterion indicates that leachate may be unsuitable for potable use without treatment, exceedence of this criterion by total aluminium should not be taken as indicative of environmental toxicity. Exceedence of the WSR criterion by 3 of 5

samples, maximum 520µg/l, may not be of concern where the receptor of interest is surface waters.

Groundwater

Three samples of groundwater have been scheduled, the results of this testing will be included within the final version of this report.

Ground Gas

Ground gas monitoring was initially undertaken on 3 occasions between 07 March 2008 and 17 March 2008. Of five boreholes installed for gas monitoring, it has not been possible to monitor 2 (CP-01 and CP-03) due to surface water flooding the borehole location or due to vandalism damage.

Three further visits were carried out between the 09 May 2008 and 03 June 2008, all boreholes were monitored during these visits.

Methane was not detected at any location in excess of 0.1%.

Peak carbon dioxide concentrations of up to 10.8% were recorded, with flow rates of up to 8.2 l/h (not coincident with peak concentration). It was noted that gas emission data for the first 3 monitoring rounds did not identify significant gas concentrations or flows, the variation in later monitoring assumed to be due to variations in atmospheric pressure or groundwater conditions. A maximum carbon dioxide flow rate of 0.06 l/h was recorded.

Based on the guidance in BS8485, the Site Characteristic Gas Situation is assessed as CGS 2 (low hazard potential), based on peak carbon dioxide concentration. All measured gas flow rates were within the CGS 1 (very low hazard) range. Assuming Commercial development, a gas protection score of 2 is required (ref. BS8485, Table 2). Although the selection of gas protection measures is a matter for detailed building design, a score of 2 could for example be achieved by use of a reinforced concrete cast in situ suspended floor slab with minimal services penetrations (score 1.5) and a taped and sealed membrane (0.5).

Waste assessment

Five soil samples were submitted for Waste Acceptance Criteria (WAC) testing. Results are currently awaited from the sub-contracted laboratory and will be issued within the final version of the report.

6.4 Ground Contamination Hazard Assessment

All available data has been collated and evaluated to establish an initial Conceptual Site Model of the site identifying sources, pathways and receptors and pollutant linkages.

Contamination Sources

The site was historically occupied by colliery rail sidings and more recently utilised for opencast coal extraction. Although rail sidings may have potential for contamination by spillage of coal and other cargos; hydrocarbons, coal and ash from locomotives and materials used as track fill, the site has since been substantially disturbed and materials of this nature were not encountered. Materials encountered during the investigation were consistent with natural mineral, and contamination was considered unlikely.

Contamination Pathways

Potential contamination pathways which may apply to the proposed development include:

- Dermal contact
- Ingestion of contaminated soil
- Inhalation of gases, vapours or dusts
- Leaching to surface run-off / drainage / surface waters
1. Leaching to groundwater
- Physical contact with building materials
- Plant root contact with soils

The proposed use of the site comprises commercial premises, likely to include associated car parking and landscape areas.

Contamination Receptors

The potential receptors below are anticipated with regard to the development and use of the site.

- Development workers
- Underlying groundwater (minor aquifer)
- Surface waters (River Dearne)
- Occupiers of the proposed development
- Future buildings and installations, and
- Landscape / garden planting

Risks posed to each of the identified potential receptors are discussed separately and assessed against a low, moderate or high scale.

Development Workers

No significant contamination has been identified. Risk to development workers is considered **low**, though due to the potential for hazardous ground gases, controls will be required before entry into excavations.

Underlying Groundwater and Surface Waters

Leachability testing has indicated a **low** risk of pollution of controlled waters.

Occupiers of the proposed development

Risk to occupiers is considered **low.**

Future Buildings and installations

No potential for sulphate attack of concrete has been identified.

Landscape Planting

No indication of conditions unsuitable for plant growth have been identified.

7.0 GEOTECHNICAL ASSESSMENT

7.1 In-Situ Testing

Standard Penetration Tests (SPTs) were undertaken at nominal intervals in all cable percussive boreholes.

The SPT'N' results are shown on Figures 3 – 7. Where dynamic probes have been undertaken in close proximity to the cable percussive boreholes comparison plots have been created. These plots highlight the variation in results from the two separate test methods despite both tests utilising the same falling weight, over the same fall distance. The general trends of increasing SPT N Value are shown to correlate however.

The standard penetration tests indicate that a minimum SPT N value of 20 could be assumed for the opencast backfill. The comparison plots indicate however that the dynamic probing has recorded lower SPT N values and therefore an SPT N value of 20 should be considered over-optimistic at shallower depths.

7.2 Dynamic Probe tests

15No. Dynamic probe tests were carried out to depths between 2.6m and 11.10mbgl. All probe holes were driven to refusal. Results are included on logs attached in Appendix B.

The table below shows the average SPT N value taken from all of the dynamic probe tests to a depth of 2.0mbgl, the depth of interest for any shallow foundations and also where there is minimal SPT testing within the cable percussive boreholes.

Depth mbgl	Average blow count	Average SPT N Value	Average SPT N Value over depth range
0.1	0.60		8.58
0.2	1.20		
0.3	1.67	4.67	
0.4	1.80	5.60	
0.5	2.13	6.07	
0.6	2.13	6.73	
0.7	2.47	7.60	
0.8	3.00	10.40	
0.9	4.93	12.87	
1	4.93	14.67	
1.1	4.80	15.13	18.10
1.2	5.40	16.53	
1.3	6.33	19.33	
1.4	7.60	21.27	
1.5	7.33	21.60	
1.6	6.67	19.33	
1.7	5.33	19.07	
1.8	7.07	18.20	
1.9	5.80	18.80	
2	5.93	11.73	

An SPT N value of 8 at 1.0mbgl and 18 at 2.0mbgl can therefore be assumed.

7.3 California Bearing Ratio Tests (CBR)

Ten CBR's were carried out across the site at the locations shown in Figure 2. The locations were chosen relative to the proposed highways and parking areas although some locations

were moved on site due to the presence of boggy ground. CBR 10 was attempted but was not completed due to water flowing into the pit, a suitable additional position could not be located.

The CBR results are summarised in the table below and attached in Appendix E.

CBR NO.	Equivalent CBR %
1A	8.7
2	0.9
3	0.6
4	3.3
5	11.1
6A	9.4
7	3.1
8A	7.4
9	1.5
10	NO RESULT

The majority of California Bearing test results fell between 3 and 11%, although five of the CBR values were below 5%. It is likely that the CBR values at the base level of pavement construction (assumed to be around 0.5mbgl) will be adequate for pavement design, if local soft spots are identified during construction works sub base depths can be locally extended to competent strata.

7.4 Soakaway Tests

Four successful infiltration tests were conducted in purpose-dug trial holes (TP05, TP07, TP15 & TP16), one test failed as the pit failed to drain (TP07).

The soakaway tests were calculated in accordance with BRE Digest 365 Soakaway design. Trial pits were excavated to the test strata and the sides squared off. The trial pits were then filled up to the required effective depth and the time taken for the water to soakaway was recorded. The infiltration rate was calculated using the following formula:

$$f = \frac{V_{p75\text{-}25}}{a_{p50} \times t_{p75\text{-}25}}$$

The mean infiltration rate using the BRE 2007 approach was 1.99E-05m.s^{-1}, if the result from the failed soakaway test is excluded then the mean infiltration rate can be taken to be 2.51E-05 m.s^{-1}

Where full emptying of the pits was unachievable values were calculated based on the testing period undertaken.

7.5 Geotechnical Laboratory Analysis Results

Selected samples recovered during the site investigation were submitted to a UKAS accredited laboratory for geotechnical testing. The geotechnical testing suite undertaken consisted of the following:

- 14 Atterberg Limits tests.
- 12 Particle Size Distribution tests (wet sieve)
- 14 Bulk Density tests
- 15 Moisture Content tests
- 14 2:1 Sulphate tests
- 14 Total Sulphate tests
- 12 Total Sulphur tests

Full laboratory test results for the testing are included in Appendix F, and the results are discussed below.

7.5.1 Moisture Content

Moisture content tests produced moisture contents of between 7% and 20%.

Figure 8 shows that the moisture content does not vary with depth below ground level

7.5.2 Atterberg Limits Testing

Atterberg Limits testing undertaken on materials from the site indicated that materials were typically CLAY's of intermediate plasticity. 9 results were indicative of intermediate plasticity clays and 2 results were indicative of low plasticity. 1 result was indicative of a intermediate plasticity silt and two samples were not tested due to insufficient sample.

Liquid limit values ranged between 33% to 40% while plasticity indices ranged between 14% and 19%.

7.5.3 Particle Size Distribution and Sedimentation tests

Twelve Particle Size Distribution (PSD) tests were carried out across the site and all results were indicative of a reasonably uniform material classified as a sandy very gravelly SILT/CLAY.

Figure 9 compares the total soil fractions for all particle size distribution tests and illustrates the uniformity of material.

The samples tested had a GRAVEL content of between 17.58% and 40.74%, a SAND content of between 7.32% and 25.52% and a SILT or CLAY content of between 33.74% and 74.68%.

7.5.4 Aggressive Chemical Environment for Concrete

Fourteen samples were tested for Acid Soluble Sulphate, fourteen samples were tested for water soluble sulphate and twelve samples were tested for total sulphur solid.

As a data set of more than ten samples had been collected the analysis fo test results has been undertaken on the top 20% of test results as specified within Concrete in aggressive ground BRE Special Digest 1. A summary table of the results is included within this report as

Appendix G.

The results of the water soluble sulphate tests all indicated a concrete class DS-1 to be sufficient. The total potential sulphate value, calculated using the total sulphur solid result, indicated that a concrete class DS-3 would be required. The material was found to have an oxidisable sulfide level of 0.73%.

7.6 Excavations

It is anticipated that excavation to normal founding depths should be possible using normal hydraulic plant.

Should excavations be required to remain open for a period of time, or where collapse may threaten existing or proposed works, plant or equipment, or where man entry is proposed, trench support will be required. Support to excavations should follow guidance given in CIRIA Report 97 'Trenching Practice'.

8.0 GEOPHYSICAL INVESTIGATION

APEX Geoservices (UK) Ltd. were requested by White Young Green Environmental Ltd to carry out geophysical surveys of the site to investigate the presence and location of the former opencast high wall. The work was carried out in three phases with the first phase of the field work carried out between the 14th and 15th February 2008.
The second phase of the work was carried out on the 3rd April 2008 and the third phase was carried out on the 29th April 2008.

The APEX Geoservices (UK) Ltd report is included within this report as Appendix H and is summarized below. Figure 10 shows the location of all survey lines and the interpreted locations of the opencast high wall.

8.1 Geophysical Section A

This section was located in the central and northern part of the site and crossed a bund between the
edge of the site and a disused railway. The observed resistivities (2D Resistivity Profile R1) were generally in the range of 10 – 80 ohm m (interpreted as backfill material), but higher resistivities (> 80 ohm m) were observed near the base of the profile towards the edge of the backfilled opencast area.

Seismic Refraction Profile S3 indicated a four-layer model with a low velocity surface layer (441 m/s) interpreted as soil or loose fill, over the bund, and extending to approximately 2m over the leveled part of the site. The underlying seismic layers indicated a gradual increase in velocity from 1050 – 1200 m/s as might be expected from compacted landfill. The seismic layers indicated an upward gradient towards the edge of the backfilled area which was coincident with the higher resistivity zone. The higher resistivity zone (> 80 ohm m) and the upward gradient of the seismic layers has been interpreted as the location of the highwall in this area.

8.2 Geophysical Section B

This section was located in the north-west of the site, and was over flat ground.
An obvious increase in resistivity was seen towards the edge of the backfilled area and at the base of 2D Resistivity Profile 2. This has been interpreted as the boundary between backfill and in-situ coalmeasures, and was therefore used to interpret the other resistivity profiles.

Seismic Refraction profile S2 indicated a three layer model with soil/loose fill within an apparent surface depression on the edge of the backfilled area (561 m/s), and compacted material towards the centre of the site (871 m/s). An increase in velocity to 1957 m/s towards the edge of the backfilled area and at a depth of approximately 14m correlates well with the higher resistivity zone on Resistivity Profile R2.

8.3 Geophysical Section C

This section was located in the south-western part of the site over gently sloping ground. Initially, 2D Resistivity Imaging Profile R3 was acquired and indicated resistivities in the range of 10 – 70 ohm m, which were interpreted as backfill material. It was therefore decided to acquire an additional Profile (R5) to ensure that the highwall had been crossed. Profile R5 indicated an increase in resistivity (>80 ohm m) away from the backfilled area and has been interpreted as indicating the location of the
highwall.

A four layer model was constructed from Seismic Refraction Profile S1 which indicated a gradual increase in P-wave velocity similar to Profile S3 of Geophysical Section A, and has been interpreted as compacted fill.

8.4 Geophysical Section D

This section was located in the north-eastern part of the site and crossed the bund. 2D Resistivity Profile R4 indicated resistivities in the range of 10 – 60 ohm m over the bund and

towards the central part of the site over the backfilled area. An increase in resistivities (> 80 ohm m) away from the backfilled area was interpreted as the location of the highwall.

Seismic refraction profile S4 indicated a two layer model with a thin (1 - 2m) layer with a velocity of 244 m/s indicative of soil or loose fill, over a layer of velocity 1093 m/s which was interpreted as homogeneous backfilled material.

8.5 Geophysical Section E

This section was located in the north-eastern part of the site and crossed the bund between and parallel to Geophysical Sections A and D, closer to Geophysical Section A.
2D Resistivity Profile R6 indicated resistivities in the range of 10 – 60 ohm m from beneath the bund and towards the central part of the site over the backfilled area which has been interpreted as the backfill material. Towards the edge of the site (to the NW), the resistivities increase slightly, but do not reach 80 ohm m until about 6m from the end of the profile where the depth of investigation is minimal. However, the character of the profile is similar to Geophysical Section F (see below) where the high wall has been fairly confidently interpreted, and thus the character of Section F was used to refine the interpretation of the highwall on Section E. An increase in resistivities (>80 ohm m) at depth of between 6 – 14m beneath the central area of the resistivity profile has been interpreted as evidence of a ridge of bedrock running along the openpit floor.
Seismic refraction profile S5 indicated a three layer model with a thin (2 - 3m) layer with a velocity of 556 m/s indicative of soil or loose fill, over a layer of velocity 862 m/s interpreted as more compact fill material showing a similar increase in compaction of the fill as seen in Sections A and C. A third layer of P-wave velocity 1596 m/s correlating with the 70 ohm m resistivity contour, and giving further credence to an interpretation of a ridge of bedrock running along the former openpit floor.

8.6 Geophysical Section F

This section was located in the north-eastern part of the site and crossed the bund between and parallel to Geophysical Sections A and D, closer to Geophysical Section D.
2D Resistivity Profile R7 indicated resistivities in the range of 10 – 60 ohm m over the bund and towards the central part of the site over the backfilled area. An increase in resistivities (> 80 ohm m) away from the backfilled area was interpreted as the location of the highwall. At depth to the NW of the profile a localised increase in resistivities (> 80 ohm m) has been tentatively interpreted as an indication of a bench.
Seismic refraction profile S6 indicated a three layer model with a thin (1 - 3m) layer with a velocity of 613 m/s indicative of soil or loose fill, over successive layers of 746 m/s and 871 m/s interpreted as homogeneous backfilled material with compaction increasing with depth.

8.7 Geophysical Section G

This section was located in the western part of the site between Geophysical Sections A and D, parallel to Geophysical Section A.
2D Resistivity Profile R8 is similar in character to the neighbouring Profile R2, and again indicated resistivities in the range of 10 – 60 ohm m over the bund and towards the central part of the site over the backfilled area. An increase in resistivities (> 80 ohm m) away from the backfilled area was confidently interpreted as the location of the highwall, but the absence of an increase in resistivity along the base of the profile suggests that the original openpit floor may be deeper in this area.
Seismic refraction profile S7 indicated a three layer model with a thin (1m) layer with a velocity of 542 m/s indicative of soil or loose fill, over successive layers of 782 m/s and 922 m/s interpreted as homogeneous backfilled material with compaction increasing with depth.

8.8 Geophysical Section H

This section was located in the south-western part of the site parallel to and some 60m from Geophysical Section C.
The 2D resistivity imaging profile (R10) exhibits an obvious zone of higher resistivities (>80 ohm m) 38 m from the western end which was interpreted as the location of the highwall. This position is approximately 5m further away from the River Dearne than the position marked on

the abandonment plan. A refracting horizon of 1965 m/s has been interpreted as indicating the base of the landfill.

8.9 Geophysical Section J

This section was located in the western part of the site parallel to and some 36m from Geophysical Section B.
The 2D resistivity imaging profile (R11) is similar in character to profile R10 of Geophysical Section H, with an obvious zone of higher resistivities (>80 ohm m) 58.5 m from the western end which was interpreted as the location of the highwall. This position is approximatey 3m further away from the River Dearne than the position marked on the abandonment plan. A refracting horizon of 1948 m/s has been interpreted as indicating the base of the landfill.

8.10 Geophysical Section K

This section was located in the northern part of the site sub-parallel to and approximately 45 m from Geophysical Section D.
The 2D resistivity imaging profile (R12) is similar in character to the profiles on the southern boundaries of the site, with an obvious zone of higher resistivities (>80 ohm m) 59 m from the northern end and is coincident with the position marked on the abandonment plan. A second zone of higher resistivities (>80 ohm m) is also apparent approximately 13 m further along the profile, and extending for 18 m. This zone has resistivities similar to those interpreted as in-situ Coal Measures, but has a P-wave velocity of 586 m/s, which is consistent with loose fill material. The feature is therefore interpreted as a zone of higher resistivity fill material, possibly backfilled sandstone. A refracting horizon of 1837 m/s has been interpreted as indicating the base of the landfill.

9.0 FOUNDATION ASSESSMENT

It is understood that the proposed development is for a number of industrial units with varying sizes of car parking areas and associated carriageways, all constructed using standard construction techniques.

The interpreted location of the opencast highwall impacts on the proposed development. Due to the risk associated with differential settlement of a building founded across an opencast highwall the development currently proposed should be reviewed and the size and location of some units amended.

In the upper sections of the dynamic probe boreholes the opencast backfill shows considerable variation in potential bearing capacity and in its current state would not be suitable for shallow foundations. It is therefore our opinion that in order to construct any development on the site that ground improvement techniques are utilised to improve the bearing capacity and minimise the potential for ongoing settlement.

There are several options for ground treatment that could be utilised across the site. These include

1. The area could undergo dynamic compaction to provide a uniform development area with a minimum bearing capacity of 75kN/m^2 and the industrial units constructed on raft foundations.

2. The industrial units could be founded on vibro stone columns.

The nature of any ground improvement should be confirmed after discussions with a suitable ground improvement contractor.

10.0 GEOTECHNICAL CONCLUSIONS

- An SPT N value of 8 at 1.0mbgl and 18 at 2.0mbgl can be assumed although the dynamic probe boreholes indicated a wide variation in recorded N values within the upper sections of the opencast backfill.

- The majority of California Bearing test results fell between 3 and 11%, although five of the CBR values were below 5%. It is likely that the CBR values at the base level of pavement construction (assumed to be around 0.5mbgl) will be adequate for pavement design, if local soft spots are identified during construction works sub base depths can be locally extended to competent strata.

- The mean infiltration rate using the BRE 2007 approach to soakaway tests was 1.99E-05m.s^{-1}, if the result from the failed soakaway test is excluded then the mean infiltration rate can be taken to be 2.51E-05 m.s^{-1}

- Moisture content tests produced moisture contents of between 7% and 20%.

- Atterberg Limits testing undertaken on materials from the site indicated that materials were typically CLAY's of intermediate plasticity

- Particle Size Distribution (PSD) tests were were indicative of a reasonably uniform material classified as a sandy very gravelly SILT/CLAY

- The results of the water soluble sulphate tests all indicated a concrete class DS-1 to be sufficient. The total potential sulphate value, calculated using the total sulphur solid result, indicated that a concrete class DS-3 would be required. The material was found to have an oxidisable sulfide level of 0.73%.

- It is anticipated that excavation to normal founding depths should be possible using normal hydraulic plant

- A review of Figures 10 & 11 indicate the monitored groundwater levels on site to be concurrent with the regional water level within shallow mineworkings as monitored by The Coal Authority at the Dearne Valley borehole. The water level within the opencast backfill on the site can therefore be said to have recovered.

- Geophysical Resistivity and Seismic surveys have been interpreted and indicate the locations of the opencast high wall along eleven separate survey lines within the site.

- In the upper sections of the dynamic probe boreholes the opencast backfill shows considerable variation in potential bearing capacity and in its current state would not be suitable for shallow foundations. It is therefore our opinion that in order to construct any development on the site that ground improvement techniques are utilised to improve the bearing capacity and minimise the potential for ongoing settlement.

11.0 GEO-ENVIRONMENTAL CONCLUSIONS

- No significant contamination has been identified. Risk to development workers is considered **low**, though due to the potential for hazardous ground gases, controls will be required before entry into excavations.
- Leachability testing has indicated a **low** risk of pollution of controlled waters.
- Due to elevated concentrations of carbon dioxide, a site Characteristic Gas Situation of 2, low hazard potential, is assessed. Basic gas protection measures, for example a suspended floor slab and membrane providing an aggregate protection score of 2 (Ref. BS8485), will be required for Commercial development.
- No potential for sulphate attack of concrete has been identified.
- No indication of conditions unsuitable for plant growth have been identified.

12.0 RECOMENDATIONS

A mean infiltration rate of 1.99E-05m.s^{-1} was calculated from on site Soakaway tests. Calculations for Soakaway design should take into consideration variations in permeability measured across the site.

It is our opinion that in order to construct any development on the site that ground improvement techniques are utilised to improve the bearing capacity and minimise the potential for ongoing settlement.
There are several options for ground treatment that could be utilised across the site. These include

- The area could undergo dynamic compaction to provide a uniform development area with a minimum bearing capacity of 75kN/m^2 and the industrial units constructed on raft foundations.

- The industrial units could be founded on vibro stone columns.

The nature of any ground improvement should be confirmed after discussions with a suitable ground improvement contractor.

To limit potential for differential settlement across the highwall it is important to ensure that building foundations are not constructed across the zone of influence of this interface. Layouts should be amended to account for this.

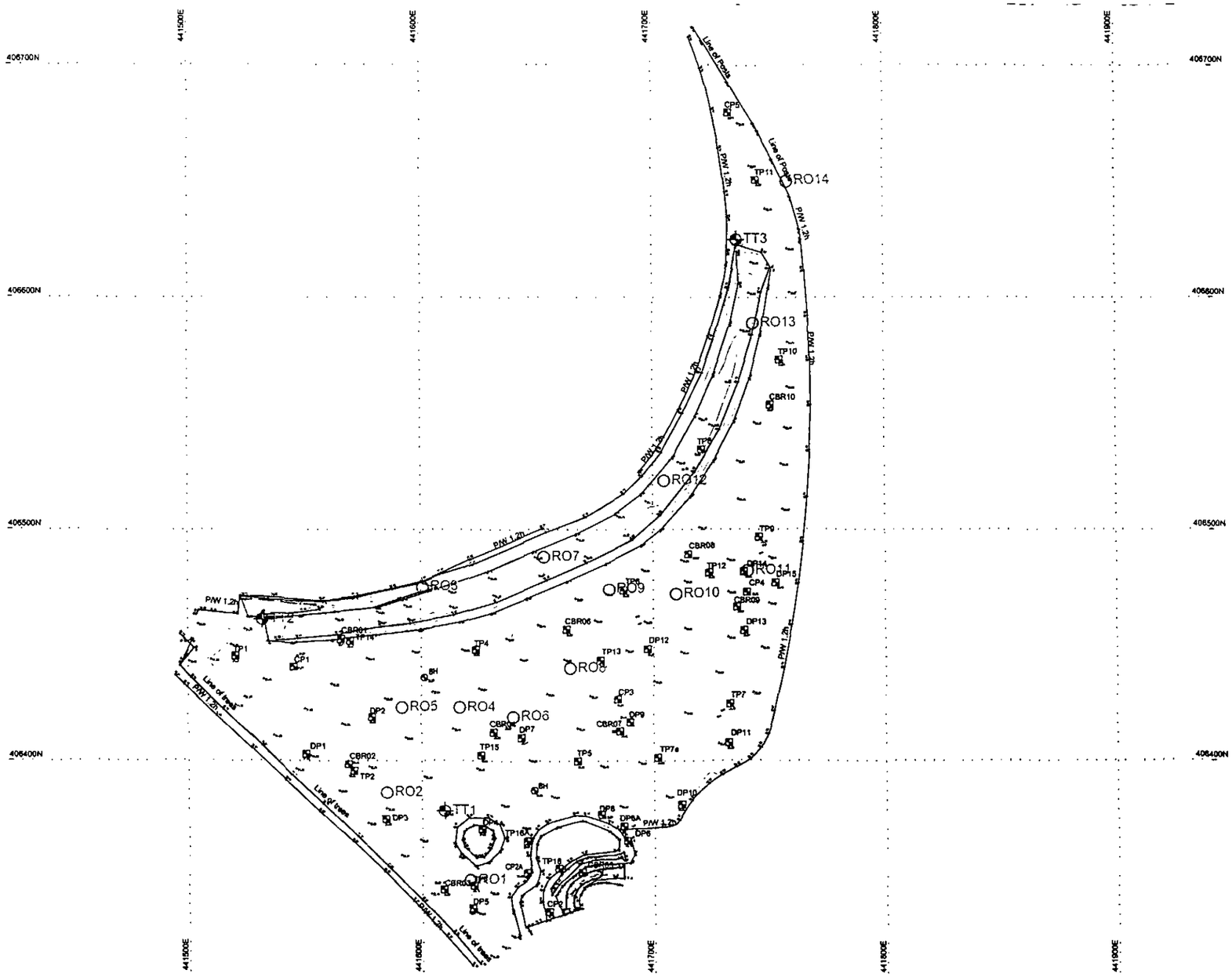
References:

1. Desk Study report by Wm. Saunders Partnership LLP
2. Houghton Main Opencast Site, Draft Compaction Certification by Babtie
3. BS5930 Code of practice for site investigations
4. Concrete in aggressive ground BRE Special Digest 1

Figure 1: Site Location Plan


A6195
Lundwood
A628
A6195
B6273
Mook Lane
B6273
Great Houghton
B6411
A6195
Little Houghton
Rotherham Road
Park Spring Road
B6273
Ardsley
A635
A635
A635
Low Laithes
A633
Billingley
B6098
A635
A6195
Darfield
A635
A635
A633
B6098
A633
A6195
Wombwell
B6098
B6098
A633
A6195

KEY
- BOREHOLE
- EXPLORATORY BOREHOLE



Rev	Description	By	Chk	App	Date
A	'RO' & 'TT' POSITIONS ADDED	ATF	TY		18.06.08

Saved location path

Client
WILLIAM SAUNDERS PARTNERSHIP LLP

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Fax: 01623 684551
e-mail: postingham@wyg.com
website: www.wyg.com

White Young Green
Consulting Engineers
Civil Electrical Environmental Health & Safety Highways Management Services Municipal Rail Structural Town Planning Transportation

Project
MOUGHTON MAIN BP GRIMETHROPE

Drawing Title
TOPOGRAPHIC SURVEY &
EXPLORATORY LOCATION PLAN

Scale at A1	Drawn By	Date	Checked By	Date	Approved By	Date
1:1000	P Melandre	25.01.08	CR	25.01.08		

Project No.	Office	Type	Drawing No.	Revision
A042741	5101	ENV	FIGURE 2	

APPROVAL ☐ INFORMATION ☐ TENDER ☐ CONTRACT ☐ CONSTRUCTION ☐

Figure 3 - CP01 / DP01 / DP02 COMPARISON

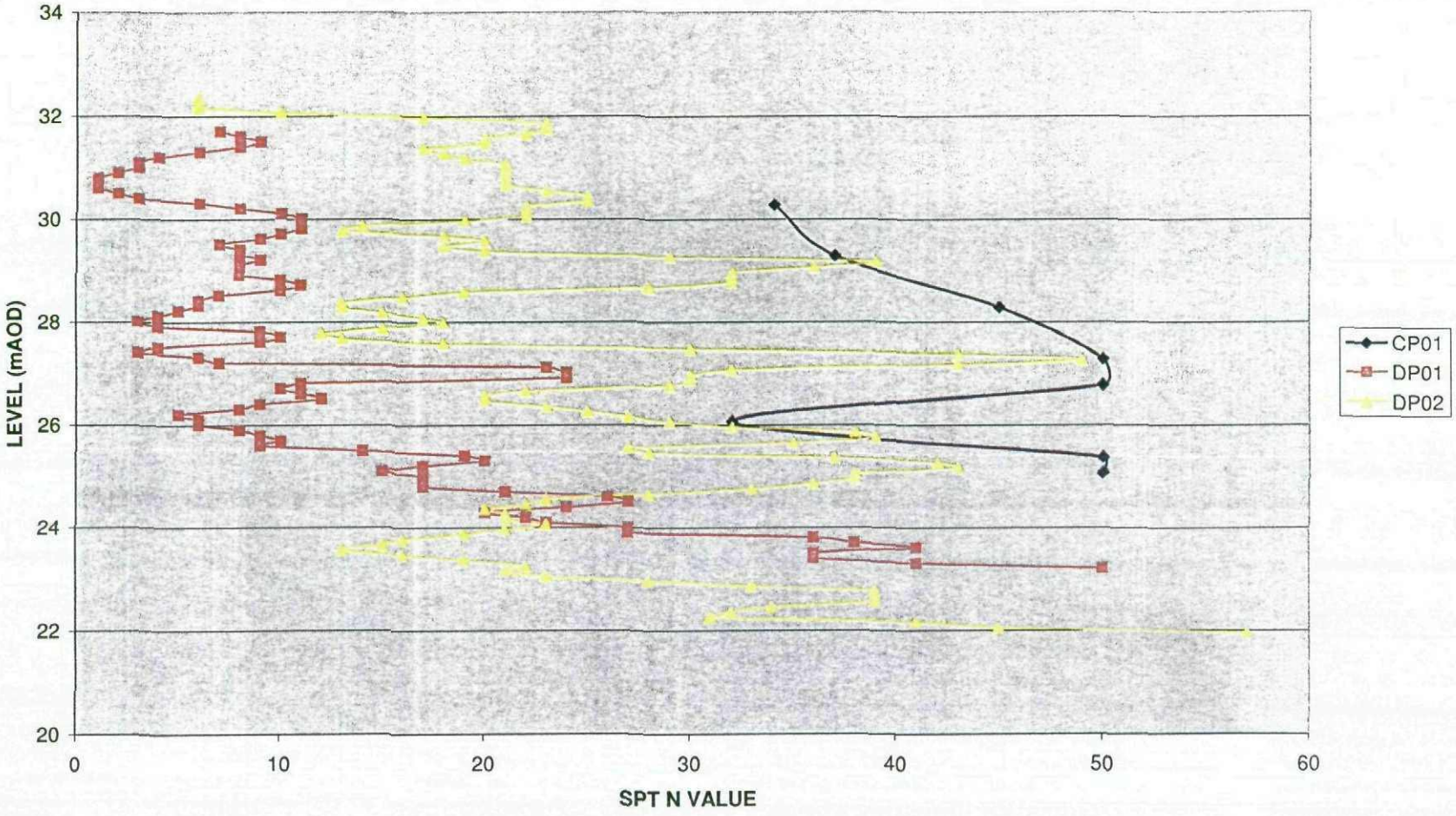


Figure 4 - CP02 / DP05 / DP04 COMPARISON

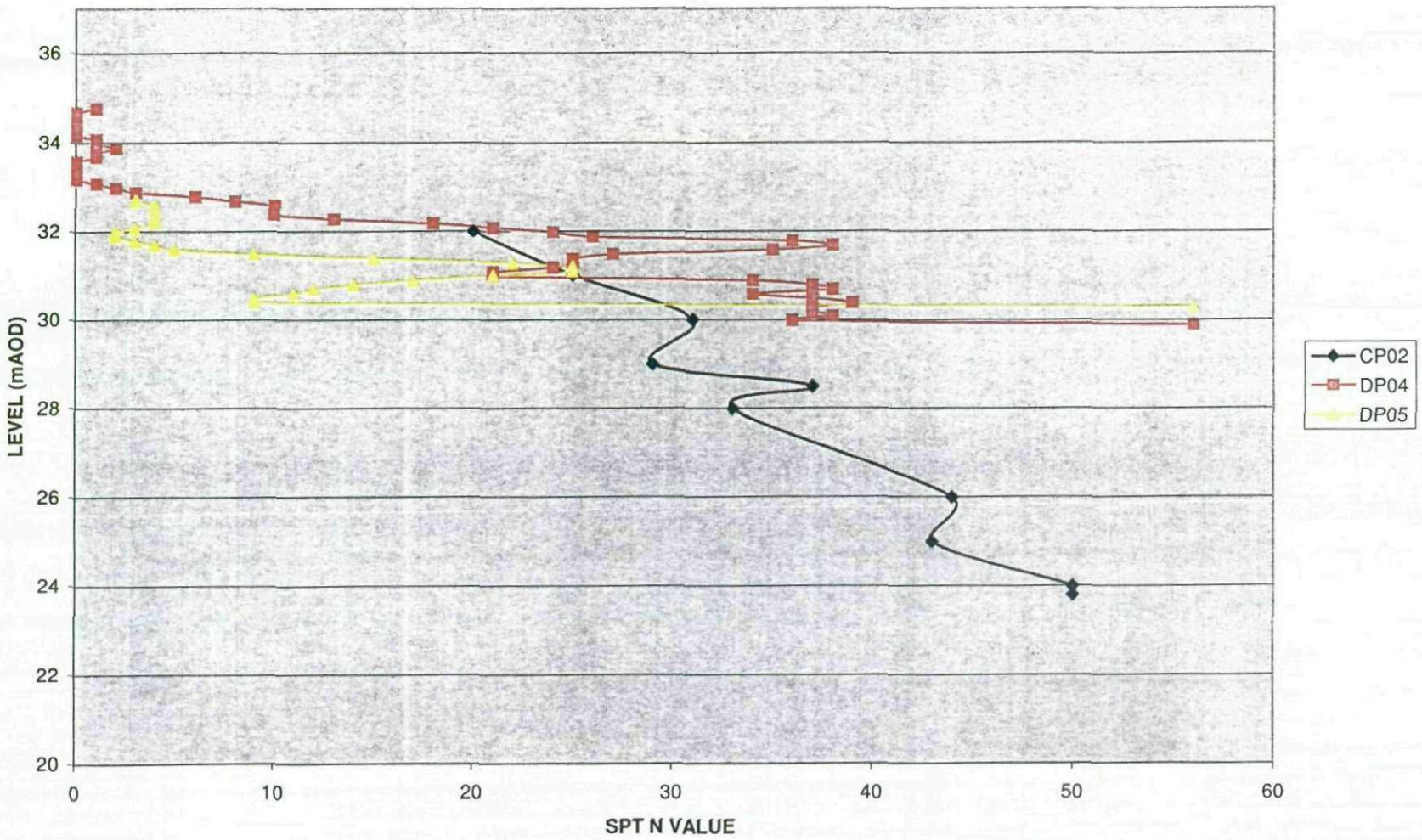


Figure 5 - CP03 / DP09 COMPARISON

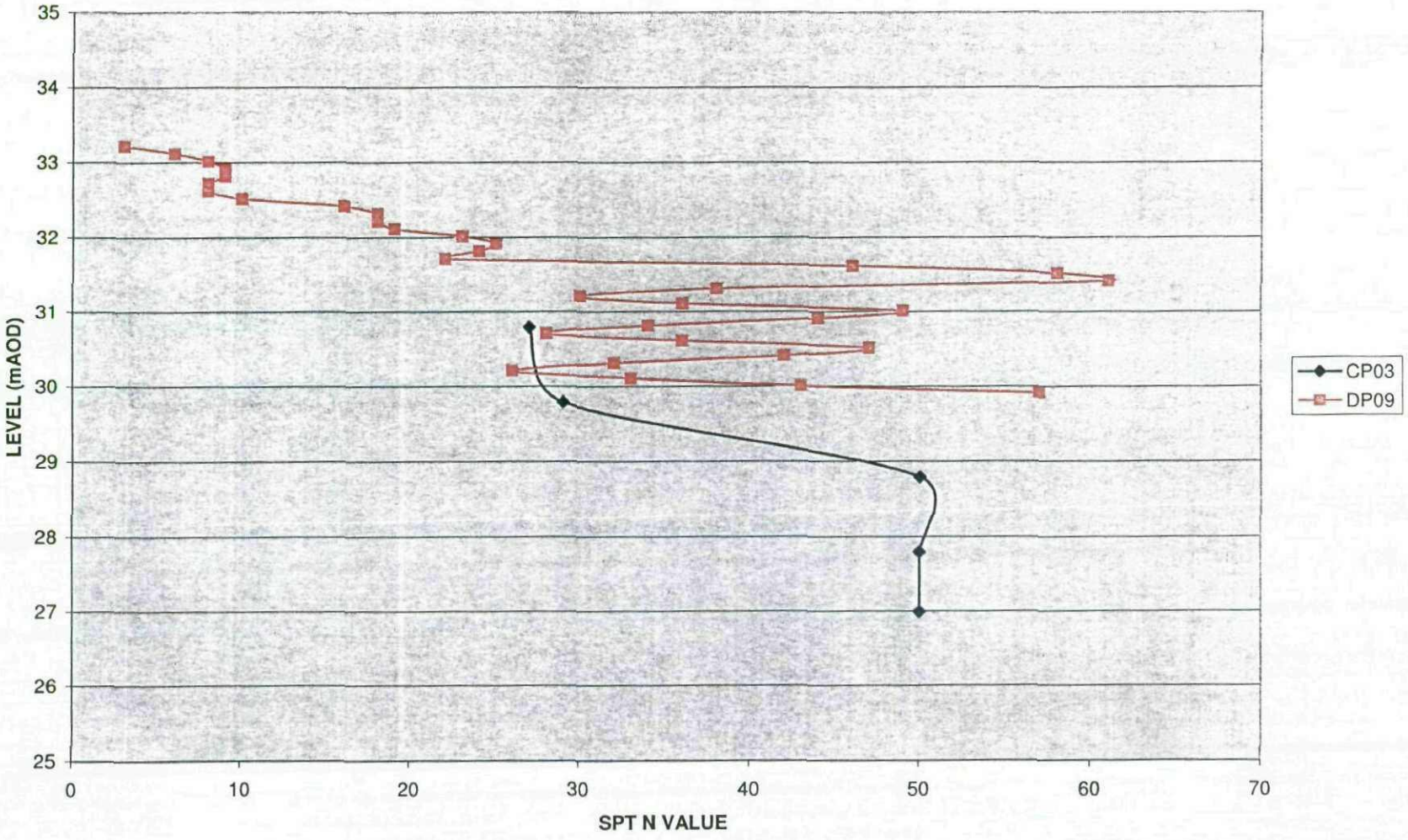


Figure 6 - CP04 / DP13 / DP14 / DP15 COMPARISON

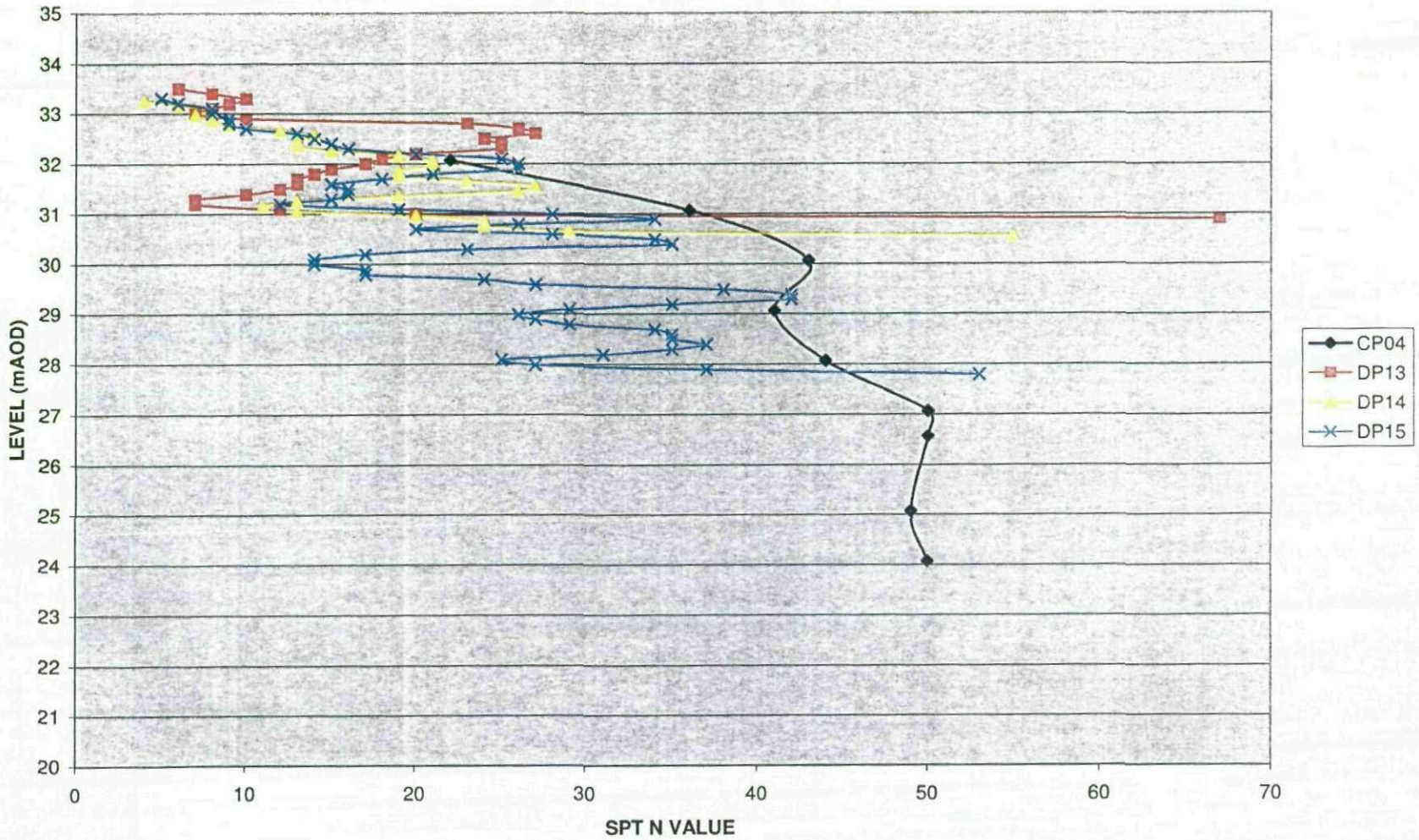


Figure 7 - CP05 SPT Plot

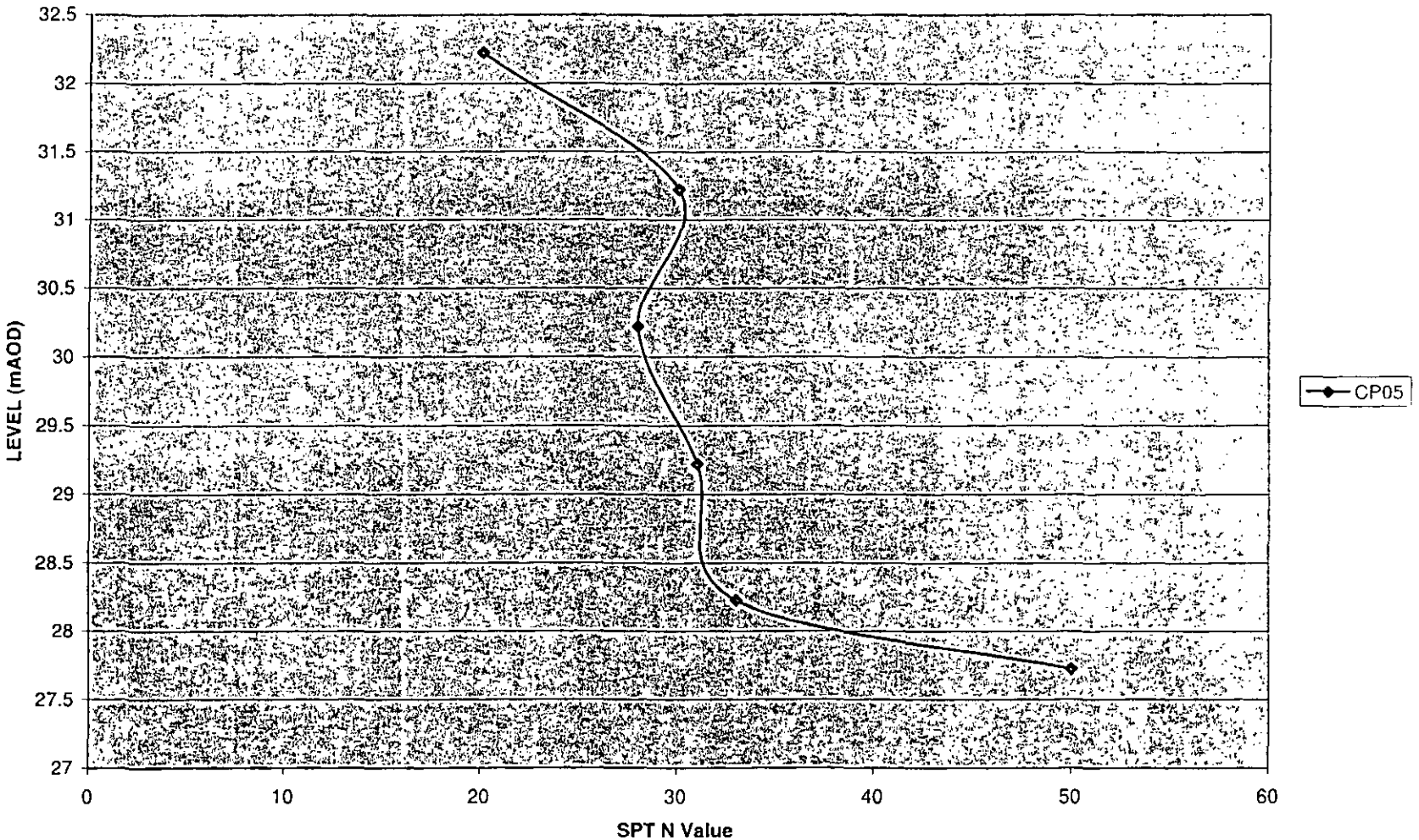


Figure 8 - Moisture Content v Depth

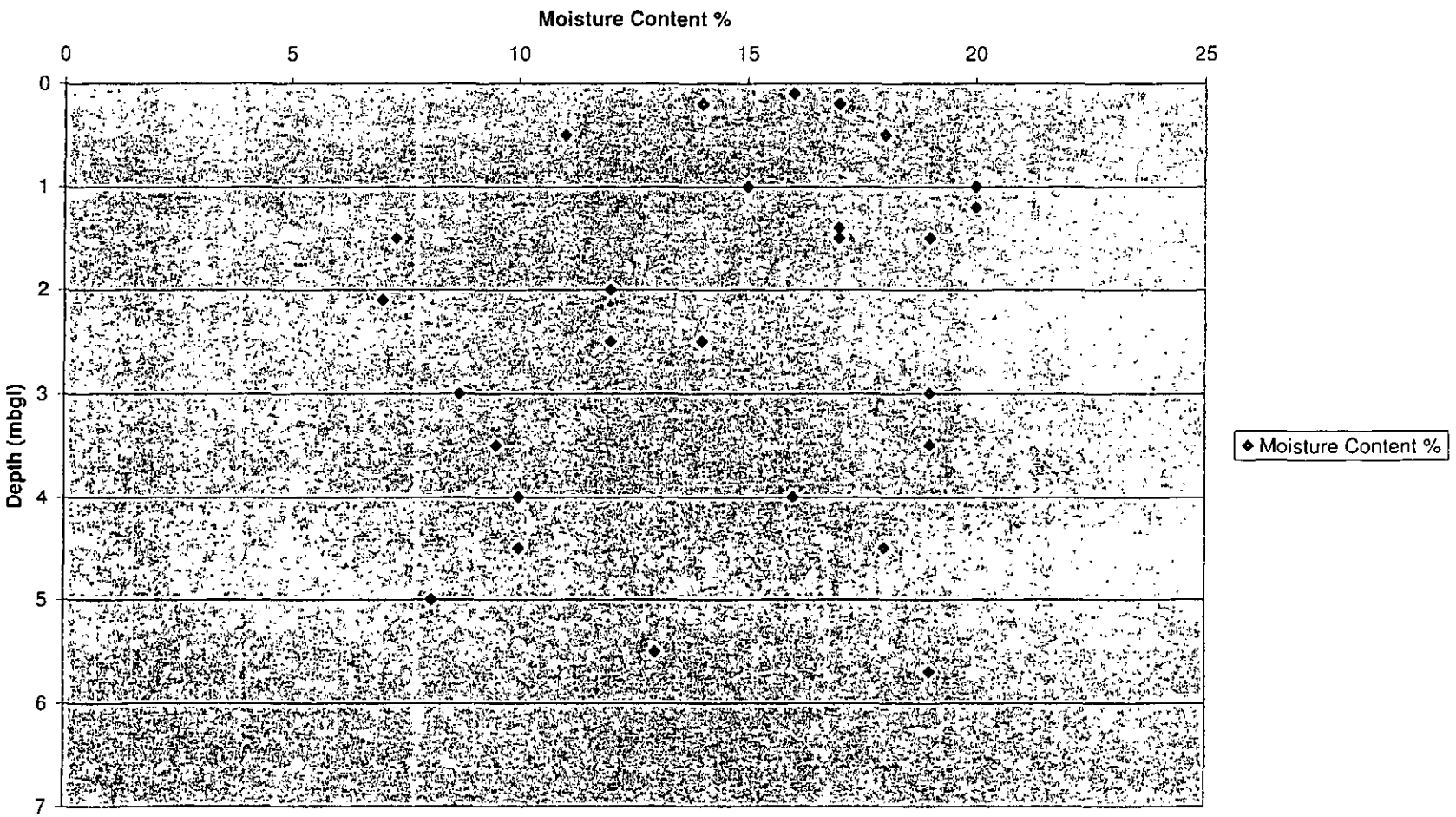
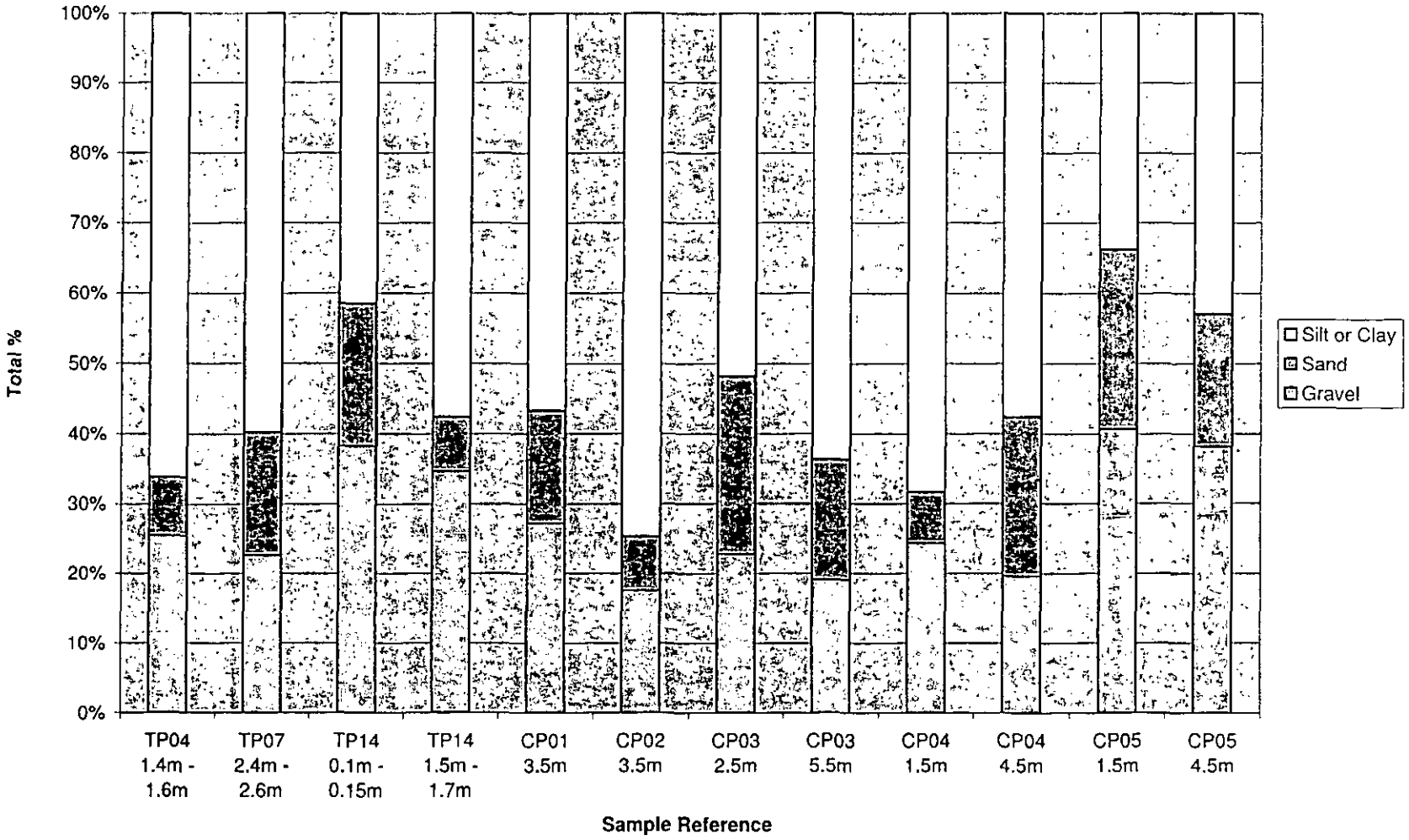
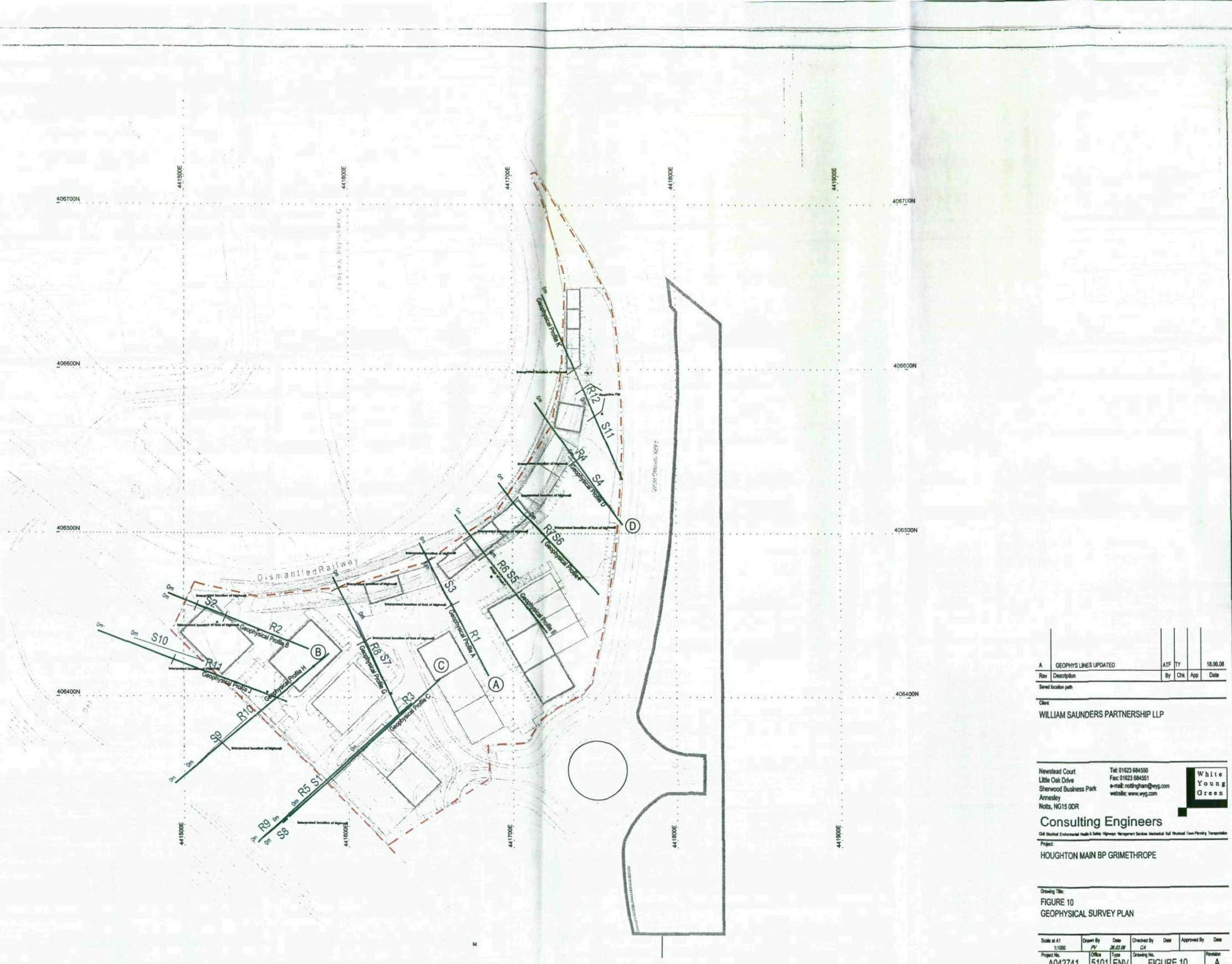


Figure 9 - PSD - Soil Fraction Comparison





Rev	Description	By	Chk	App	Date
A	GEOPHYS LINES UPDATED	ATF	TY		18.06.08

Saved location path

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e-mail: nottingham@wyg.com
website: www.wyg.com

White Young Green

Consulting Engineers

Civil Electrical Environmental Health & Safety Highways Management Services Mechanical Rail Structural Town Planning Transportation

Project:

HOUGHTON MAIN BP GRIMETHROPE

Drawing Title:

FIGURE 10
GEOPHYSICAL SURVEY PLAN

Scale at A1	Drawn By	Date	Checked By	Date	Approved By	Date
1:1000	AV	26.03.08	CA			

Project No.	Office	Type	Drawing No.	Revision
A042741	5101	ENV	FIGURE 10	A

Figure 11 - Monitored Groundwater Levels

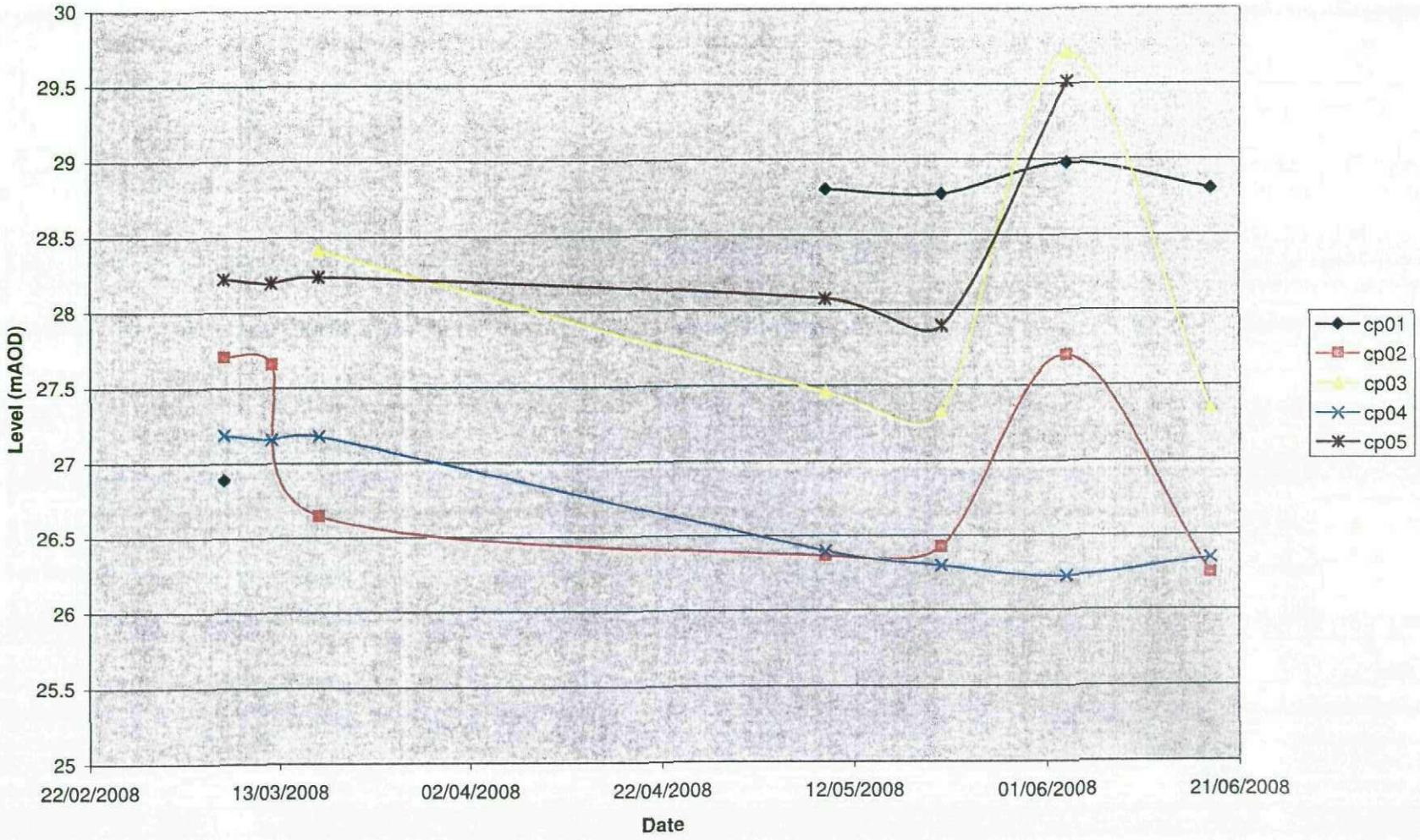


Figure 12 - Coal Authority Shallow Mineworkings Water Level

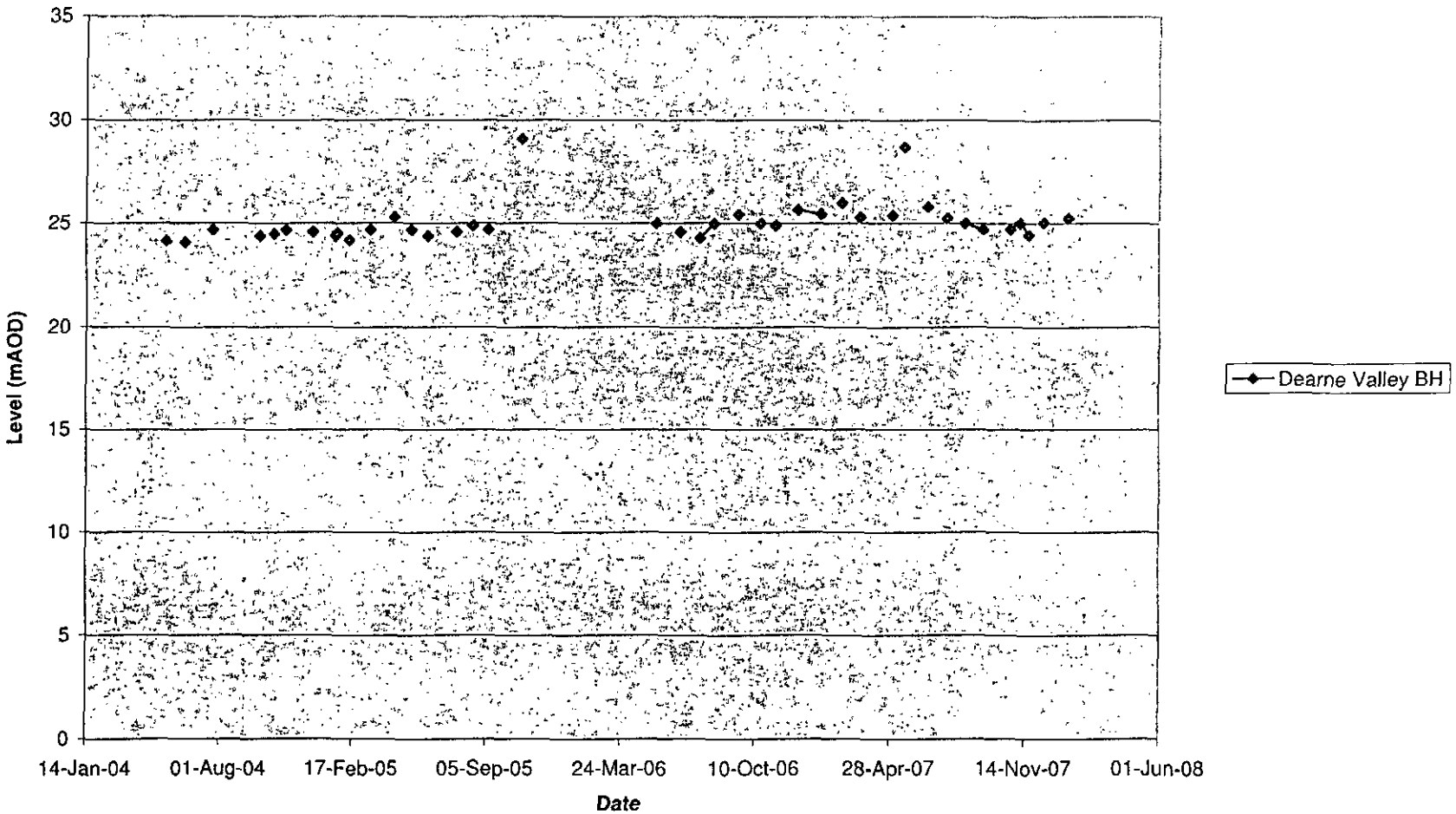


FIGURE 13 - TP05 SOAKAWAY

Project :	Grimethorpe			Trial Pit	TP05 Test 1
Project No:	A042741			Date	05.12.2007
TEST NO	1				
		Trial pit length (m)	2.9		
ELAPSED TIME	WATER LEVEL				
(minutes)	(mbgl)	Trial pit width (m)	0.7		
0	0.31				
10	0.41	Trial pit depth (m)	2.65		
23	0.54				
50	0.74	Effective depth (head of water)	2.34		
67	0.85				
100	1.06				
108	1.11				
133	1.24				
155	1.36				
173	1.44				
188	1.49			gl	
212	1.6				
229	1.66				
		Total depth			Effective depth

Soil Infiltration rate f = **1.90785E-05 m/s**

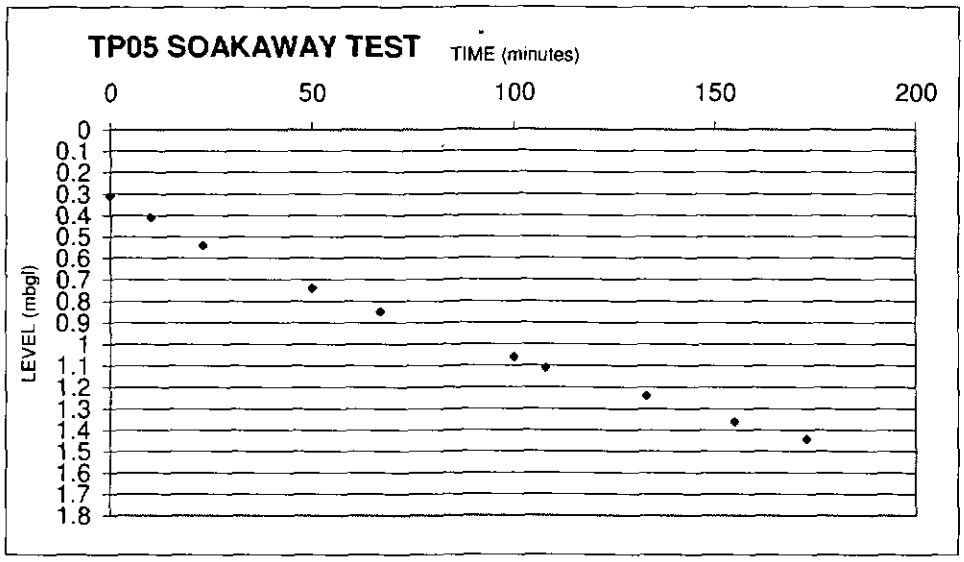


FIGURE 14 - TP07 SOAKAWAY

Project :	**Grimethorpe**			**Trial Pit**	**TP07 Test 1**
Project No:	**A042741**			**Date**	**05.12.2007**
TEST NO					
	1	**Trial pit length (m)**	2.8		
ELAPSED TIME					
(minutes)	**WATER LEVEL**	**Trial pit width (m)**	0.7		
0	**(mbgl)**				
21	0.12	**Trial pit depth (m)**	2.6		
37	0.17				
59	0.19	**Effective depth (head of water)**	2.48		
81	0.22				
126	0.25	**Level at Tp 25%**			
143	0.32				
161	0.35	**Level at Tp75%**			
183	0.37				
200	0.39				
	0.41			gl	
		Total depth			Effective depth

Soil Infiltration rate f = **4.4504E-06 m/s**

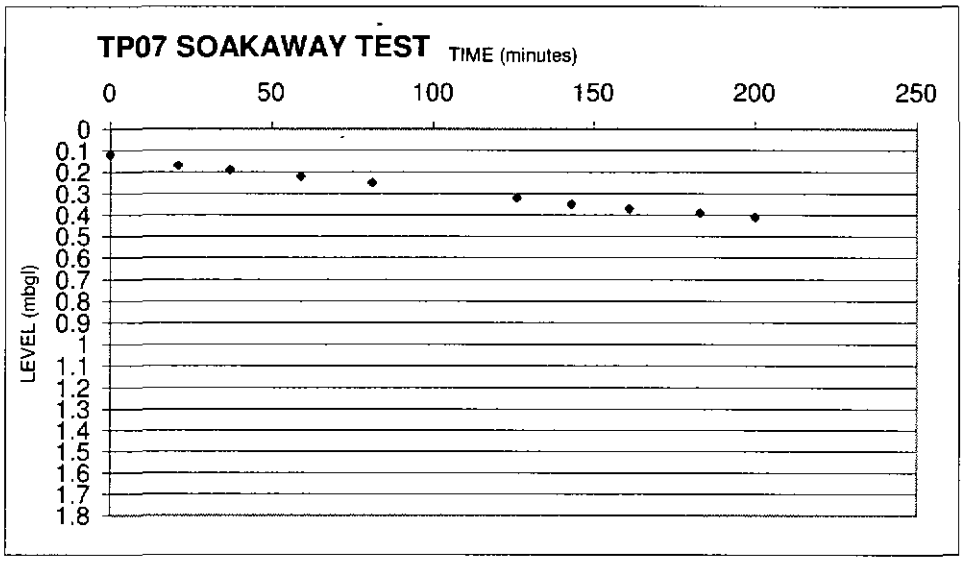


FIGURE 15 - TP15 SOAKAWAY

Project :	Grimethorpe			Trial Pit	TP15 Test 1
Project No:	A042741			Date	05.12.2007
TEST NO	1				
		Trial pit length (m)	2.8		
ELAPSED TIME (minutes)	WATER LEVEL (mbgl)	Trial pit width (m)	0.7		
0	0.09				
6	0.175	Trial pit depth (m)	2.3		
21	0.44				
27	0.53	Effective depth (head of water)	2.21		
36	0.64				
47	0.76	Level at Tp 25%			
58	0.91				
74	1.06	Level at Tp75%			
90	1.23				
108	1.36				
				gl	
		Total depth		Effective depth	

Soil Infiltration rate f = **1.90785E-05 m/s**

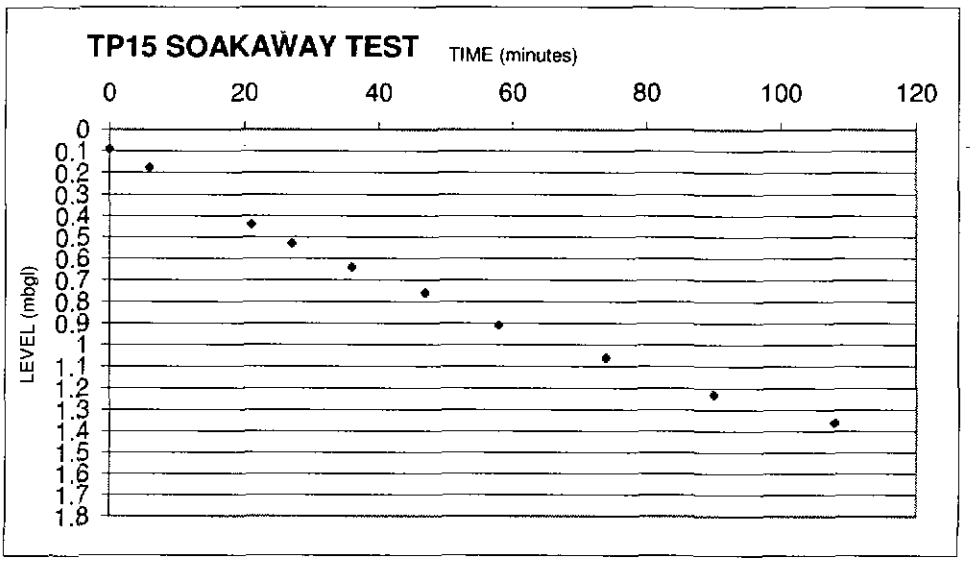
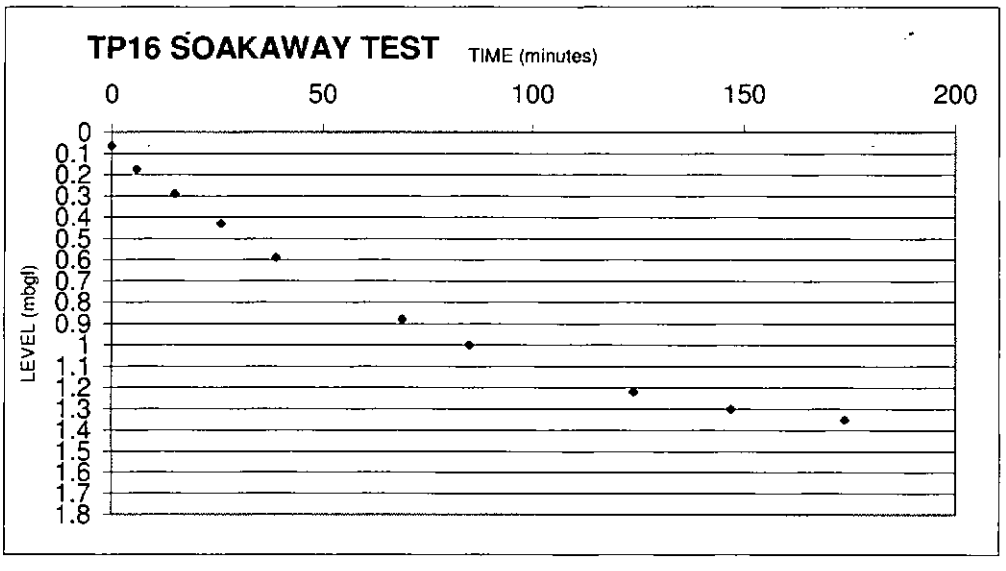


FIGURE 16 - TP16 SOAKAWAY

Project :	Grimethorpe			Trial Pit	TP16 Test 1
Project No:	A042741			Date	05.12.2007
TEST NO	1				
		Trial pit length (m)	2.8		
ELAPSED TIME (minutes)	WATER LEVEL (mbgl)	Trial pit width (m)	0.7		
0	0.065				
6	0.175	Trial pit depth (m)	2.6		
15	0.29				
26	0.43	Effective depth (head of water)	2.535		
39	0.59				
69	0.88				
85	1				
124	1.22				
147	1.3				
174	1.35				
191	1.37			gl	
202	1.39				
231	1.41				
247	1.42				
		Total depth			
					Effective depth

Soil Infiltration rate f = 1.65426E-05 m/s



APPENDICES

APPENDIX A

REPORT CONDITIONS

WHITE YOUNG GREEN ENVIRONMENTAL

APPENDIX A - REPORT CONDITIONS

Geo-Environmental Site Investigation Factual and Interpretative Report

This report is produced solely for the benefit of ***William Saunders Partnership*** *and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise. This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site as characteristics, especially liquid and gaseous materials, are likely to vary with time.*

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development requires evaluation by other involved parties.

Whilst confident in the findings detailed within this report because ground conditions is not an exact science, subject to risk analysis, we are unable to give categoric assurances that they will be accepted by others as they may have differing objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to WYGE. In time improved practices or amended legislation may necessitate a re-assessment.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tested for some of the more common chemicals generally expected, including any highlighted in the client's instructions. Other concentrations or types of chemicals may exist. Factual results are presented initially compared to commonly adopted guidelines which are not definitive in the UK and should be further assessed for actual risk.

APPENDIX B:

EXPLORATORY HOLE RECORDS AND KEY

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **CP1**

Sheet 1 of 1
Scale 1:50

Project: **A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Cable Percussive**

Co-ordinates: 441545.09E - 406440.67N
Ground Level : 31.77 mAOD

Start Date : 26/02/08
Finish Date : 26/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Depth (m)	Sample Type	Notes
MADE GROUND consisting of firm blue-grey very gravelly clay. gravel is sub angular to angular fine to coarse weak blue-grey mudstone. (MADE GROUND)							0.00	B	
							0.50	D	
								B	
							1.00	D	
							1.50	S	
								D	
								B	N=34 (7,9,8,9,8,9)
							2.00	D	
		29.27	2.50				2.50	S	
MADE GROUND consisting of blue-grey clayey gravel. gravel is sub angular to angular fine to coarse blue-grey mudstone. (MADE GROUND)								D	
								B	N=37 (8,9,9,8,9,11)
							3.00	D	
							3.50	S	
								D	
								B	N=45 (10,15,11,12,10,12)
							4.00	D	
							4.50	S	
								D	
								B	N=50 (10,12,14,13,12,11)
							5.00	S	
								D	
								B	N=80 (13,12,30,22,25,3)
		26.07	5.70				5.70	S	
MADE GROUND consisting of soft to firm blue-grey very gravelly clay. gravel is sub *angular* to angular fine to coarse weak blue-grey mudstone. (MADE GROUND)					6.00			D	
								B	N=32 (4,8,10,8,9,5)
		25.57	6.20				6.20	D	
		25.37	6.40				6.40	S	
		25.27	6.50					D	
MADE GROUND consisting of grey gravel. gravel is sub angular to angular fine to coarse mudstone and sandstone. (MADE GROUND)							6.70	S	50/75mm (25,50)
								D	
MADE GROUND consisting of grey gravel. gravel is sub angular to angular fine to coarse mudstone. (MADE GROUND)					6.80				70/225mm (16,9,20,24,26)
Exploratory Hole complete at 7.00 m									

Observations:

JOB NUMBER
Logged By : TCY
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **CP2**

Sheet 1 of 1

Scale 1:50

Project: **A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Cable Percussive**

Co-ordinates: 441654.57E - 406334.47N
Ground Level : 34.25 mAOD

Start Date : 22/02/08
Finish Date : 22/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Depth (m)	Sample Type	Test Notes
MADE GROUND consisting of soft to firm brown slightly sandy slightly gravelly clay. gravel is sub angular to angular medium to coarse very weak to weak blue-grey mudstone. (MADE GROUND)		33.25	1.00				0.00	B	
							0.50	D	
								B	
							1.00	D	
MADE GROUND consisting of blue-grey clayey gravel. gravel is very weak to weak sub angular to angular fine to coarse blue-grey mudstone. (MADE GROUND)		32.75	1.50				1.50	S	
								D	
								B	
MADE GROUND consisting of soft to firm grey very gravelly clay. gravel is sub angular to angular fine to coarse very weak to weak blue-grey mudstone (MADE GROUND)							2.00	D	N=20 (4,3,4,5,6,5)
							2.50	S	
								D	
								B	
							3.00	D	N=25 (5,5,6,6,7,6)
							3.50	S	
								D	
								B	
							4.00	D	N=31 (7,9,8,6,7,8)
							4.50	S	
								D	
								B	
							5.00	S	N=29 (6,8,7,7,8,7)
								D	
							5.50	S	N=37 (8,9,9,10,9,9)
								D	
								B	
		28.25	6.00				6.00	D	N=33 (7,7,7,8,9,9)
MADE GROUND consisting of soft to firm black very gravelly clay. gravel is sub angular to angular fine to coarse very weak to weak coal and blue-grey mudstone (MADE GROUND)		27.75	6.50				6.50	D	
								B	
MADE GROUND consisting of soft to firm grey very gravelly clay. gravel is sub angular to angular fine to coarse very weak to weak blue-grey mudstone (MADE GROUND)							7.00	D	
							7.50	S	
								D	
								B	
							8.00	D	N=44 (8,9,10,13,10,11)
							8.50	S	
								D	
								B	
							9.00	D	N=43 (9,9,12,11,10,10)
							9.50	S	
								D	
		24.55	9.70				9.70	S	
								D	50/75mm (20,5,50)
Continued on next sheet		24.25	10.00						50/75mm (25,50)

Observations:

JOB NUMBER

Logged By : TCY

Checked By :

Figure No.. FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **CP2**

Sheet 1+ of 1

Scale 1:50

Project: **A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Cable Percussive**

Co-ordinates: 441654.57E - 406334.47N
Ground Level : 34.25 mAOD

Start Date : 22/02/08
Finish Date : 22/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm black very gravelly clay. gravel is sub angular to *angular fine* to coarse very weak to weak coal and blue-grey mudstone. (MADE GROUND)									
Exploratory Hole complete at 10.00 m									

Observations:

JOB NUMBER

Logged By : TCY

Checked By :

Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **CP3**

Sheet 1 of 1
Scale 1:50

Project: **A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Cable Percussive**

Co-ordinates: 441684.64E - 406426.60N
Ground Level : 33.29 mAOD

Start Date : 25/02/08
Finish Date : 25/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm blue-grey very gravelly clay. gravel is sub angular to angular medium to coarse very weak to weak blue-grey mudstone and rare coal. (MADE GROUND)							0.00	B	
							0.50	D B	
							1.00	D	
							1.50	D B	
							2.00	D	
							2.50	S D B	
		30.29	3.00				3.00	D	N=27 (4,6,6,7,6,8)
MADE GROUND consisting of blue-grey clayey gravel. gravel is sub angular to angular fine to coarse blue-grey mudstone. (MADE GROUND)		29.79	3.50				3.50	S D B	
MADE GROUND consisting of soft to firm blue-grey very gravelly clay. gravel is sub angular to angular medium to coarse very weak to weak blue-grey mudstone and rare coal. (MADE GROUND)							4.00	D	N=29 (5,7,6,7,8,8)
							4.50	S D B	
							5.00	D	N=50 (12,13,17,12,16,5)
		27.79	5.50				5.50	S D B	
MADE GROUND consisting of blue-grey clayey gravel. gravel is sub angular to angular fine to coarse blue-grey mudstone. (MADE GROUND)		27.29	6.00				6.00	D	50/225mm (15,10,16,18,16)
MADE GROUND consisting of soft to firm blue-grey very gravelly clay. gravel is sub angular to angular medium to coarse very weak to weak blue-grey mudstone and rare coal. (MADE GROUND)		26.99	6.30				6.30	S D	
MADE GROUND consisting of very weak sub angular to angular fine to coarse gravel of orange sandstone and grey mudstone. (MADE GROUND)		26.74	6.55						50/225mm (10,15,20,21,9)
Exploratory Hole complete at 6.70 m									

Observations:

JOB NUMBER
Logged By : TCY
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
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Borehole Number **CP4**

Sheet 1 of 1
Scale 1:50

Project: **A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Cable Percussive**

Co-ordinates: 441740.54E - 406472.80N
Ground Level : 33.56 mAOD

Start Date : 25/02/08
Finish Date 25/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Depth (m)	Sample Type	Test Notes
MADE GROUND consisting of firm orange-grey gravelly clay. gravel is sub angular to angular fine to coarse weak blue-grey mudstone. (MADE GROUND)							0.00	B	
							0.50	D	
								B	
		32.56	1.00				1.00	D	
MADE GROUND consisting of soft to firm blue-grey very gravelly clay. gravel is sub angular to angular fine to coarse weak blue-grey mudstone. (MADE GROUND)							1.50	S	
								D	
								B	N=22 (3,3,4,6,5,7)
							2.00	D	
							2.50	S	
								D	
								B	N=36 (8,9,8,9,9,10)
							3.00	D	
							3.50	S	
								D	
								B	N=43 (7,9,8,10,13,12)
							4.00	D	
							4.50	S	
								D	
								B	N=41 (8,9,9,9,10,13)
							5.00	D	
							5.50	S	
								D	
								B	N=44 (7,8,8,9,12,15)
							6.00	D	
							6.50	S	
								D	
								B	N=50 (12,9 10,11,15,14)
							7.00	S	
								D	
								B	N=51 (9,10,13,15,16,7)
							7.50	D	
							8.00	D	
							8.50	S	
					8.80			D	
								B	N=49 (10,10,12,11,12,14)
							9.00	D	
					9.20		9.50	S	
								D	
								B	63/225mm (15,10,20 19,24)
Continued on next sheet		23.56	10.00						

Observations:

JOB NUMBER
Logged By : TCY
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **CP4**

Sheet 1+ of 1
Scale 1:50

Project: **A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Cable Percussive**

Co-ordinates: 441740.54E - 406472.80N
Ground Level : 33.56 mAOD

Start Date : 25/02/08
Finish Date : 25/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of grey gravel. gravel is sub angular to angular fine to coarse sandstone. (MADE GROUND) MADE GROUND consisting of grey gravel. gravel is sub angular to angular fine to coarse sandstone. (MADE GROUND)							10.00	D	
Exploratory Hole complete at 10.00 m									

Observations:

JOB NUMBER
Logged By : **TCY**
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
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Borehole Number **CP5**

Sheet 1 of 1

Scale 1:50

Project: **A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Cable Percussive**

Co-ordinates: 441733.34E - 406679.68N
Ground Level : 33.72 mAOD

Start Date : -
Finish Date : -

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Depth (m)	Sample Type	Test Notes
MADE GROUND consisting of soft to firm blue-grey very gravelly clay. gravel is sub angular to angular fine to coarse weak blue-grey mudstone with rare cobbles. (MADE GROUND)							0.50	D	
								B	
							1.00	D	
								B	
		32.22	1.50				1.50	S	
								D	
MADE GROUND consisting of grey sandy gravel. gravel is very weak sub angular to angular fine to coarse gravel of grey sandstone. (MADE GROUND)								B	
		31.72	2.00						N=20 (5,5,4,5,6,5)
							2.00	D	
MADE GROUND consisting of soft to firm blue-grey very gravelly clay. gravel is sub angular to angular fine to coarse weak blue-grey mudstone with rare cobbles. (MADE GROUND)							2.50	S	
								D	
								B	
									N=30 (6,7,6,8,7,9)
							3.00	D	
							3.50	S	
								D	
								B	
		29.72	4.00						N=28 (5,6,6,7,8,7)
MADE GROUND consisting of grey slightly clayey gravel. gravel is very weak sub angular to angular fine to coarse gravel of grey mudstone. (MADE GROUND)							4.00	D	
		29.22	4.50				4.50	S	
								D	
MADE GROUND consisting of soft to firm blue-grey very gravelly clay. gravel is sub angular to angular fine to coarse weak blue-grey mudstone with rare cobbles. (MADE GROUND)								B	
									N=31 (7,6,7,9,7,8)
							5.00	D	
							5.50	S	
								D	
								B	
		27.72	6.00						N=33 (7,7,9,8,8,8)
MADE GROUND consisting of soft to firm blue-grey sandy gravelly clay. gravel is sub angular to angular fine to coarse weak blue-grey sandstone (MADE GROUND)		27.52	6.20				6.00	S	
								D	
							6.20	B	
								D	50/75mm (25,50)
Exploratory Hole complete at 6.55 m									

Observations:

JOB NUMBER

Logged By :

Checked By :

Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations.

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Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP1**

Sheet 1 of 1

Scale 1:50

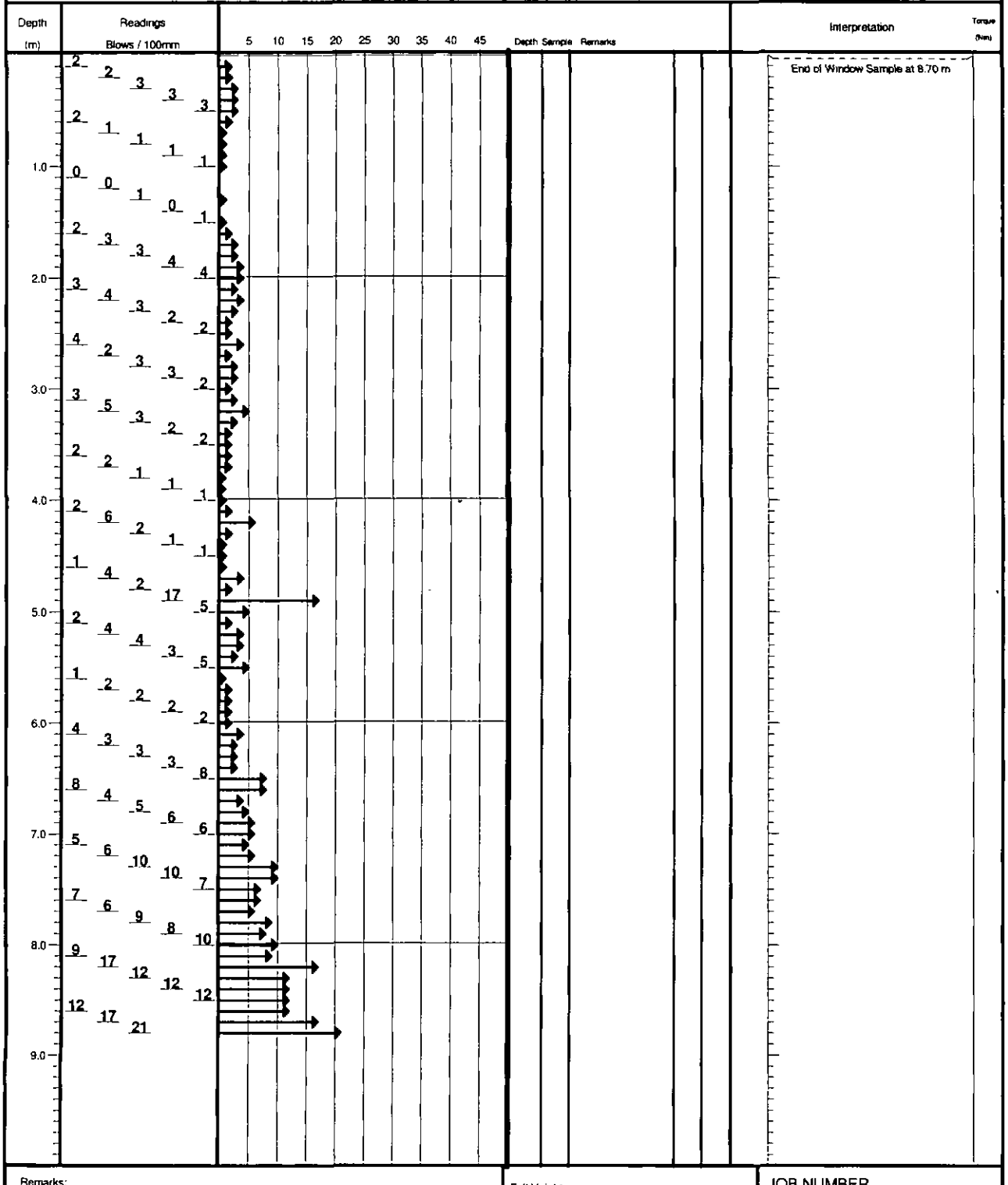
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:32mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations.

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Probe Number **DP2**

Sheet 1 of 2

Scale 1:50

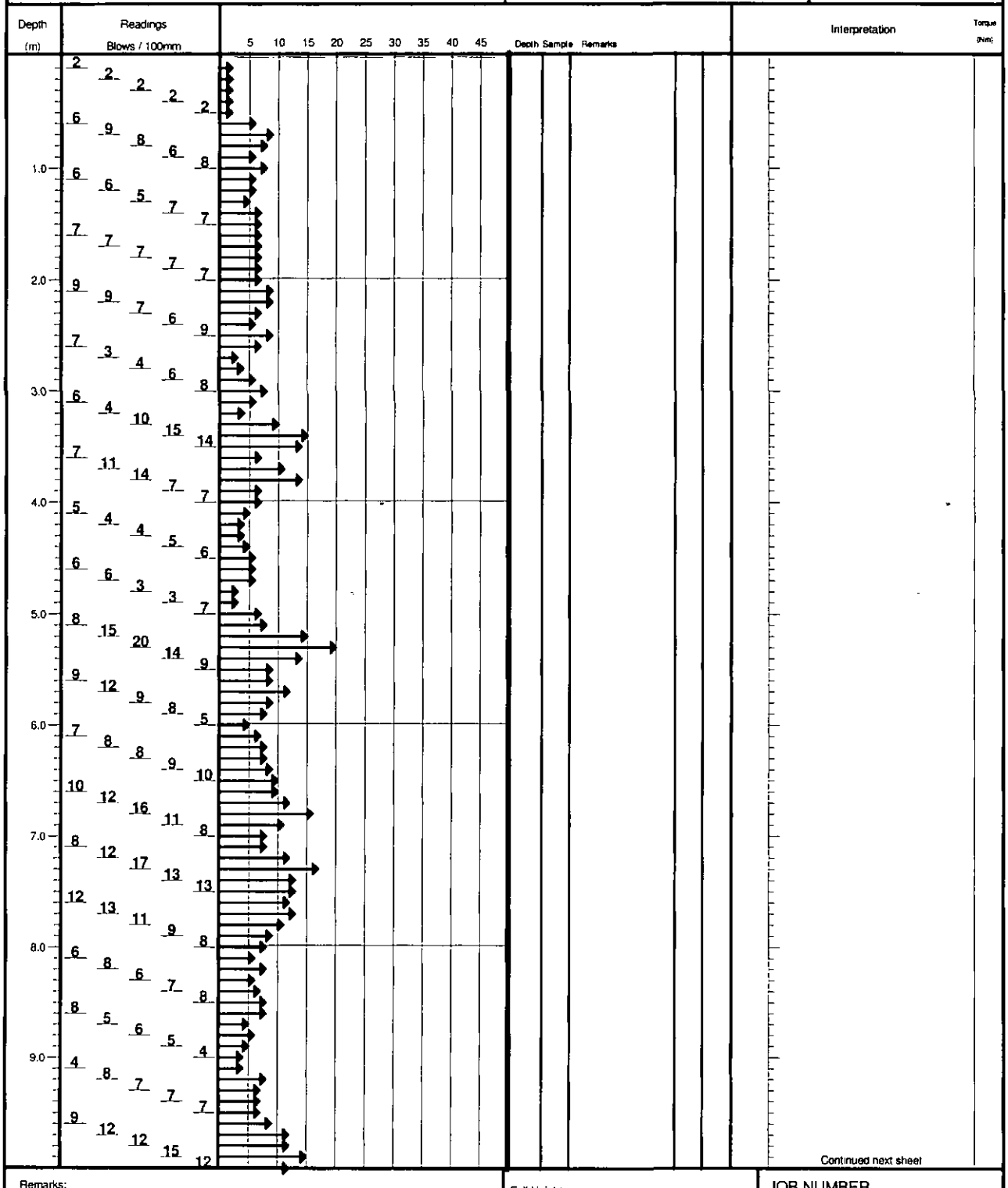
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

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Probe Number **DP2**

Sheet 2 of 2

Scale 1:50

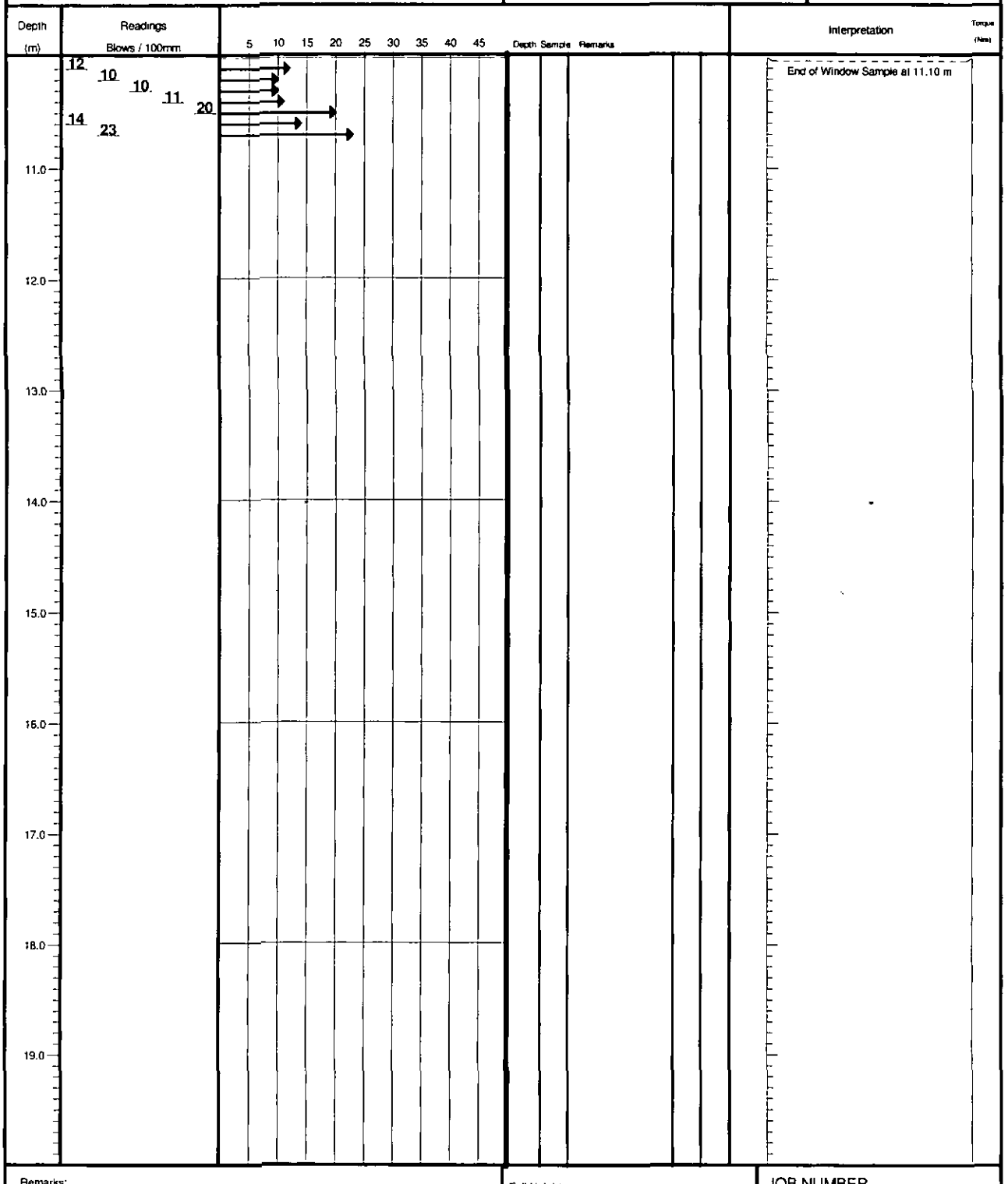
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations.

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP3**

Sheet 1 of 1

Scale 1:50

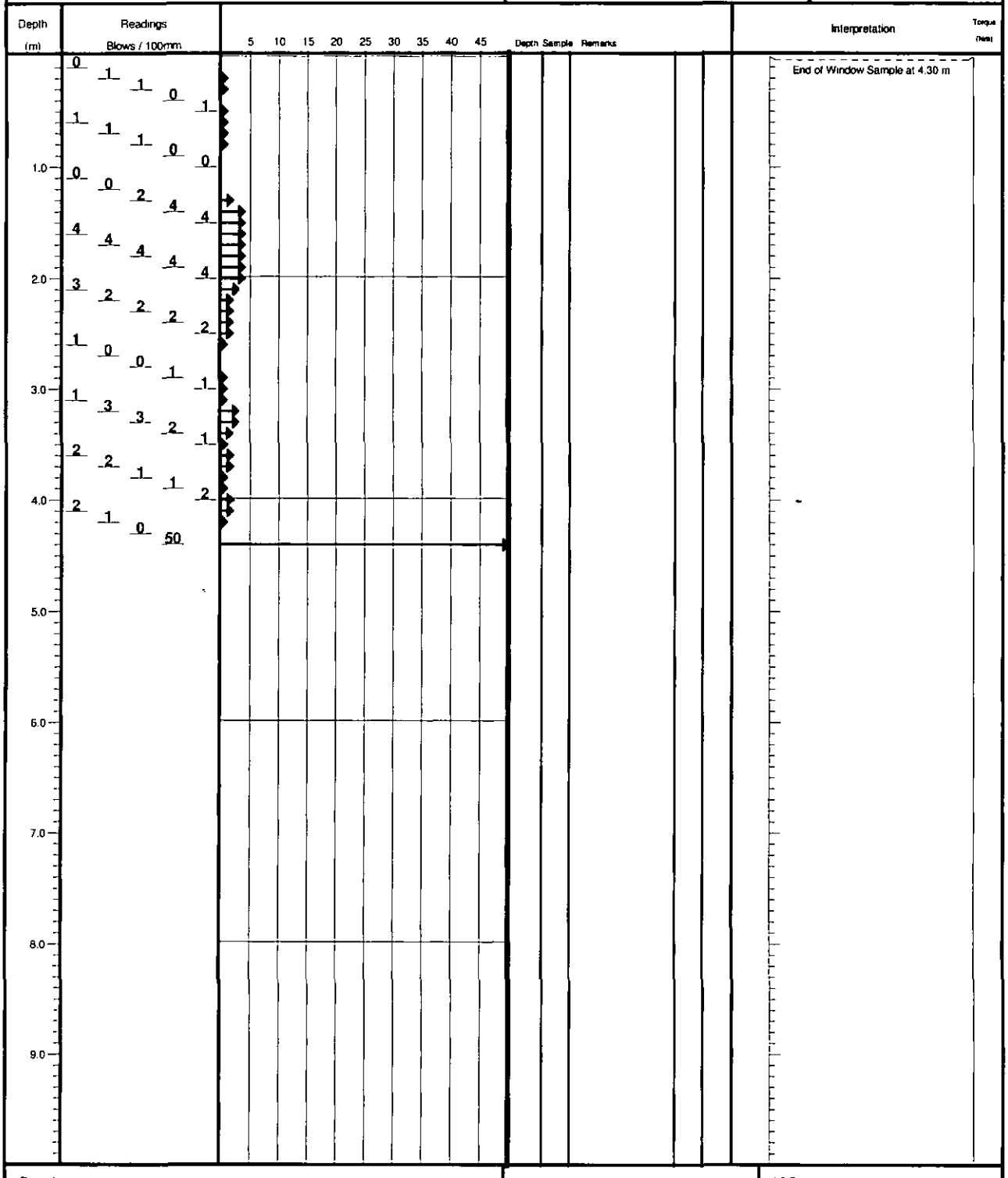
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations.

Sherwood Business Park, Annesley, Notts, NG15 0DR
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Probe Number **DP4**

Sheet 1 of 1

Scale 1:50

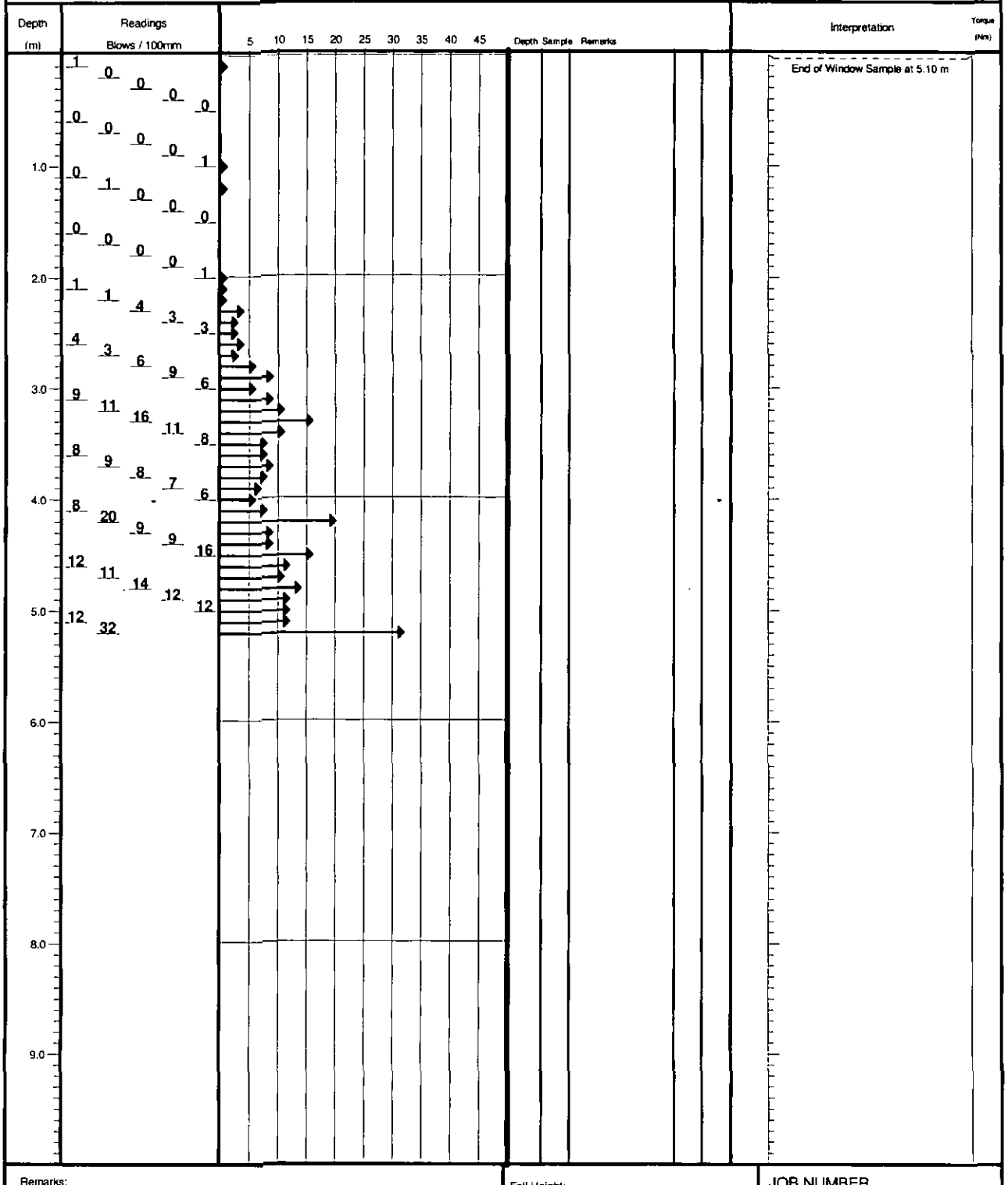
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:35mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL
Ground Technologies and Investigations.
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP5**

Sheet 1 of 1

Scale 1:50

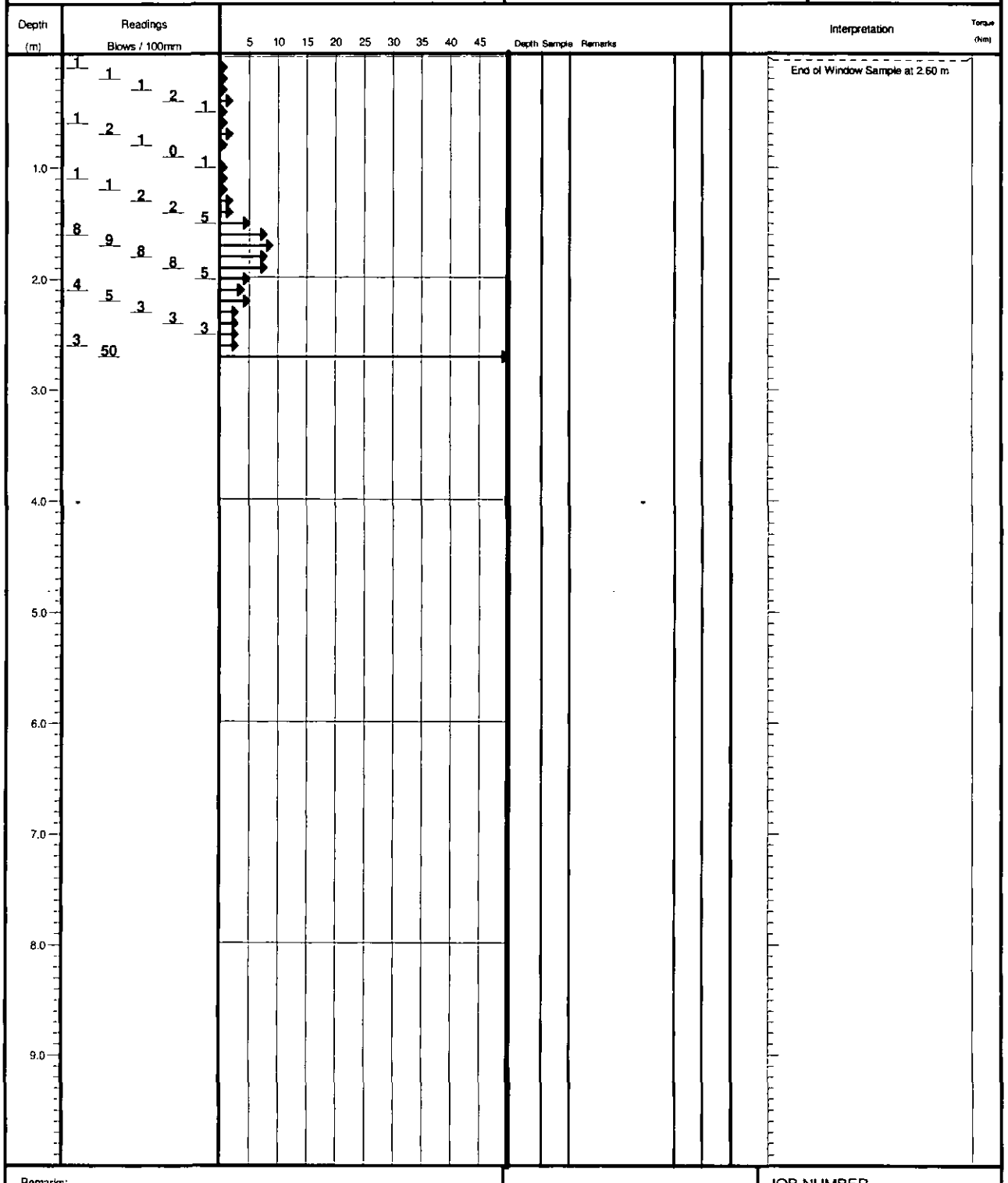
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

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Probe Number **DP6**

Sheet 1 of 1

Scale 1:50

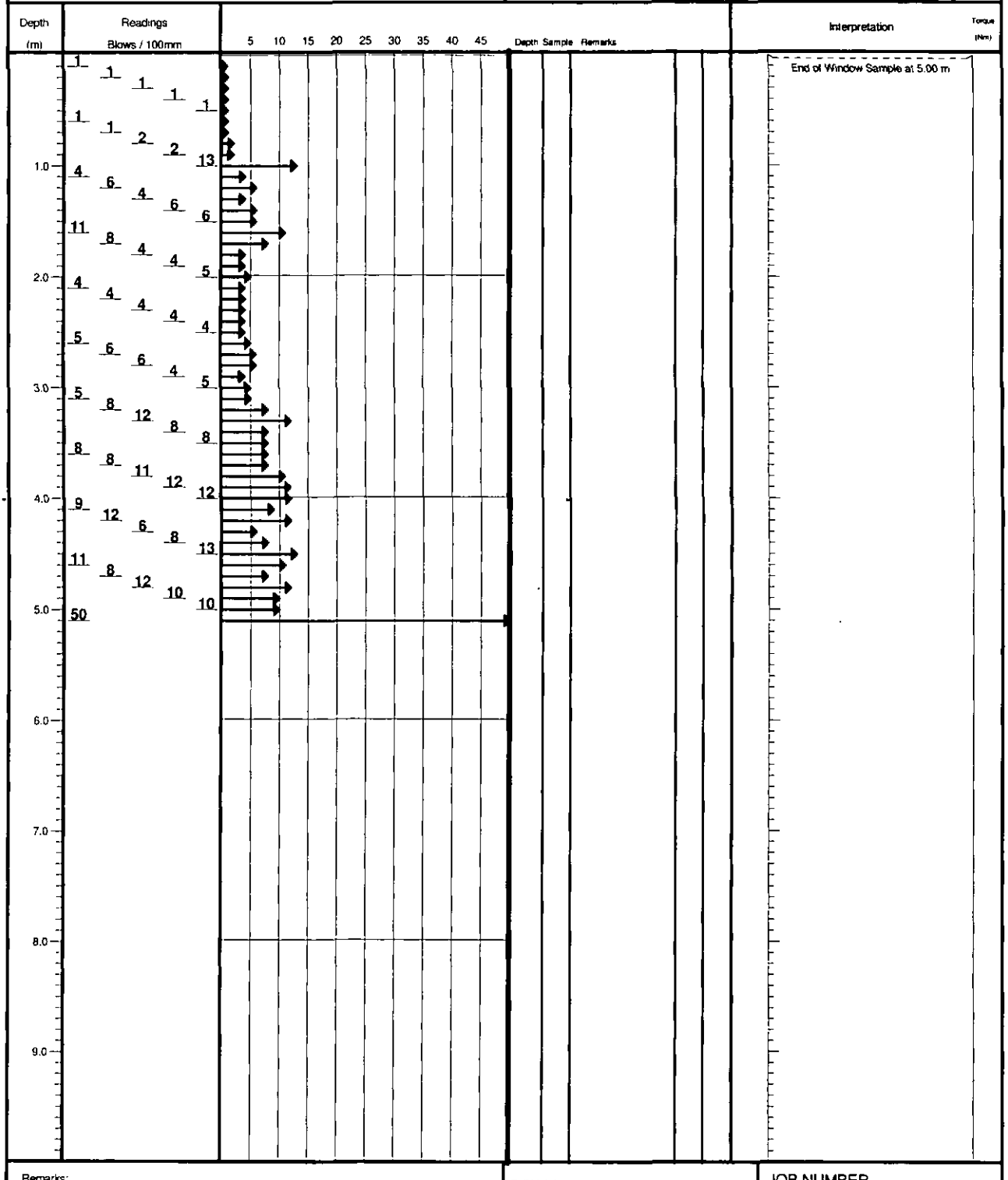
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL
Ground Technologies and Investigations.
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP6A**

Sheet 1 of 1

Scale 1:50

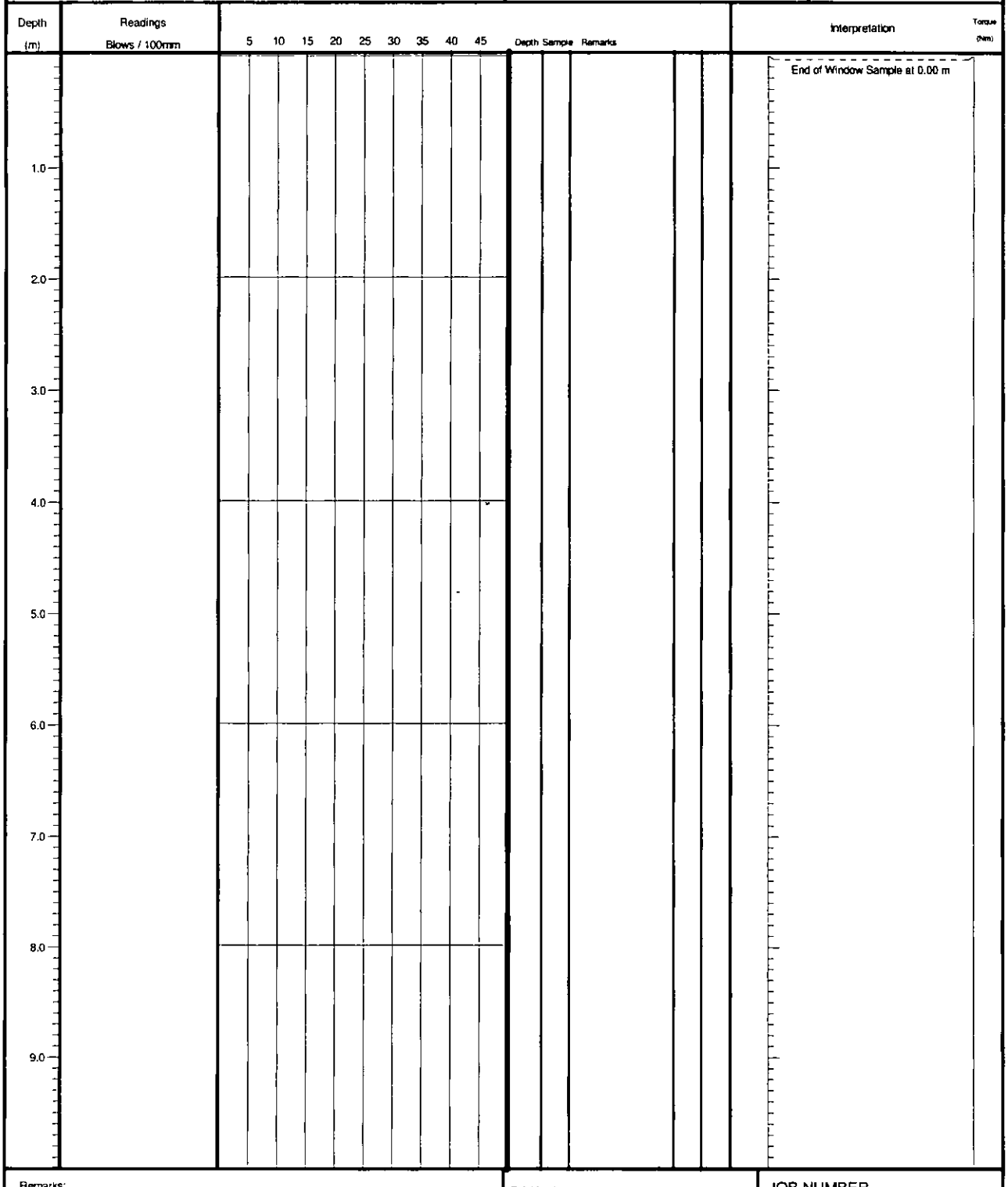
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:34mAOD

Date -



Remarks:

Fall Height:

Hammer Wt:

Probe Type:

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations.

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP7**

Sheet 1 of 1

Scale 1:50

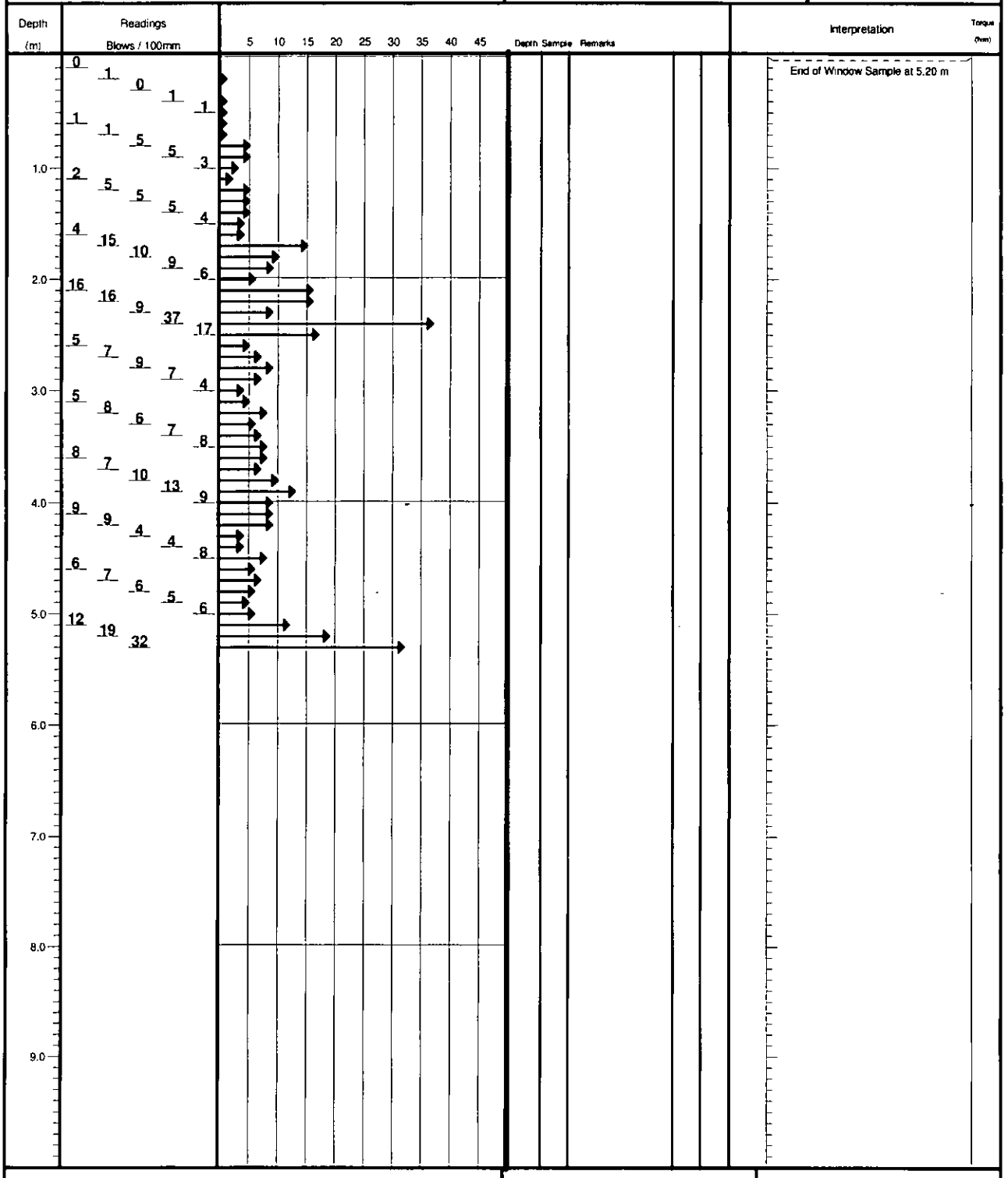
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height:	-
Hammer Wt:	-
Probe Type:	DPSH
Cone Size:	15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations.

Sherwood Business Park, Annesley, Notts, NG15 0DR
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Probe Number **DP8**

Sheet 1 of 1

Scale 1:50

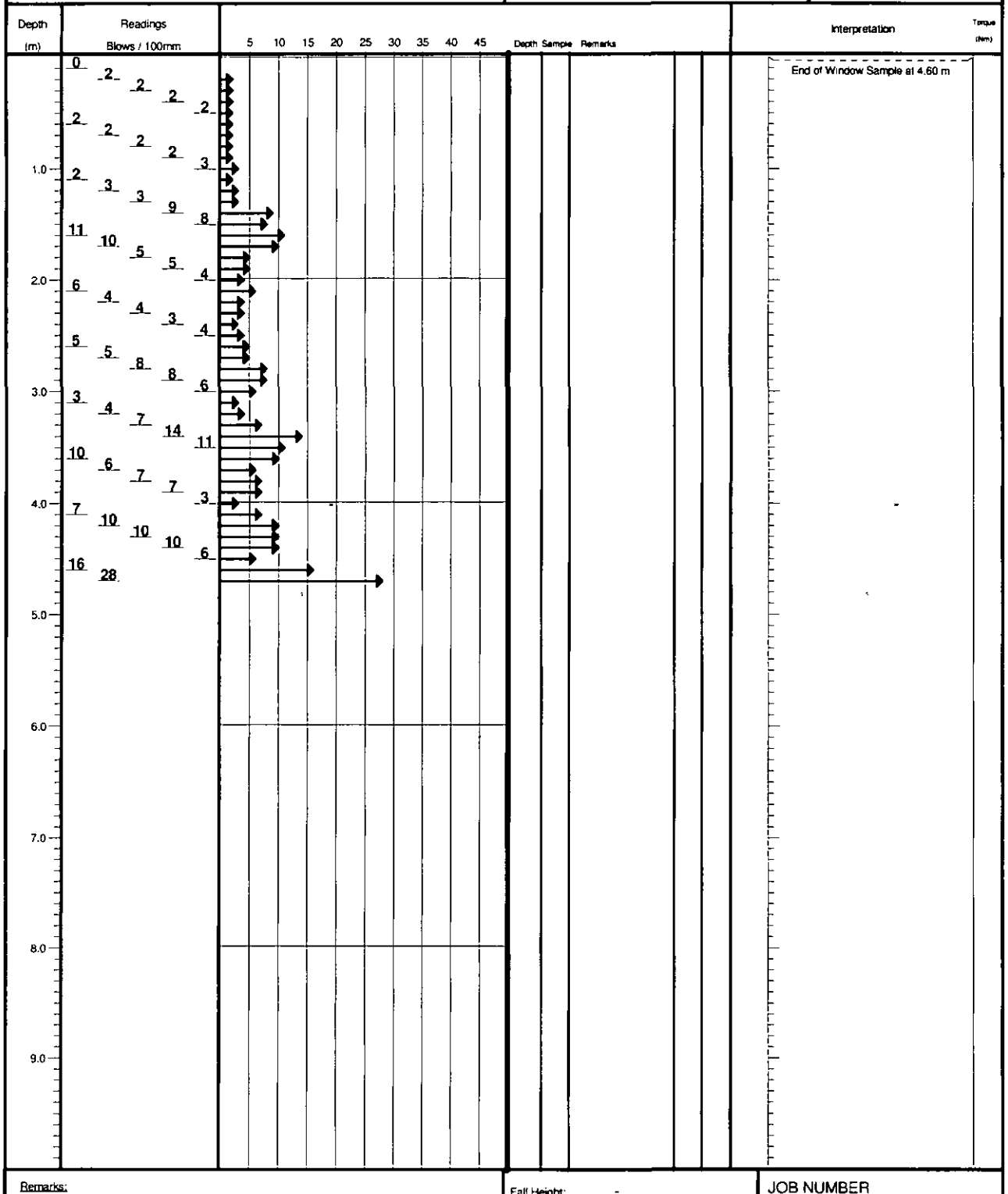
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:34mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL
Ground Technologies and Investigations.
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP9**

Sheet 1 of 1

Scale 1:50

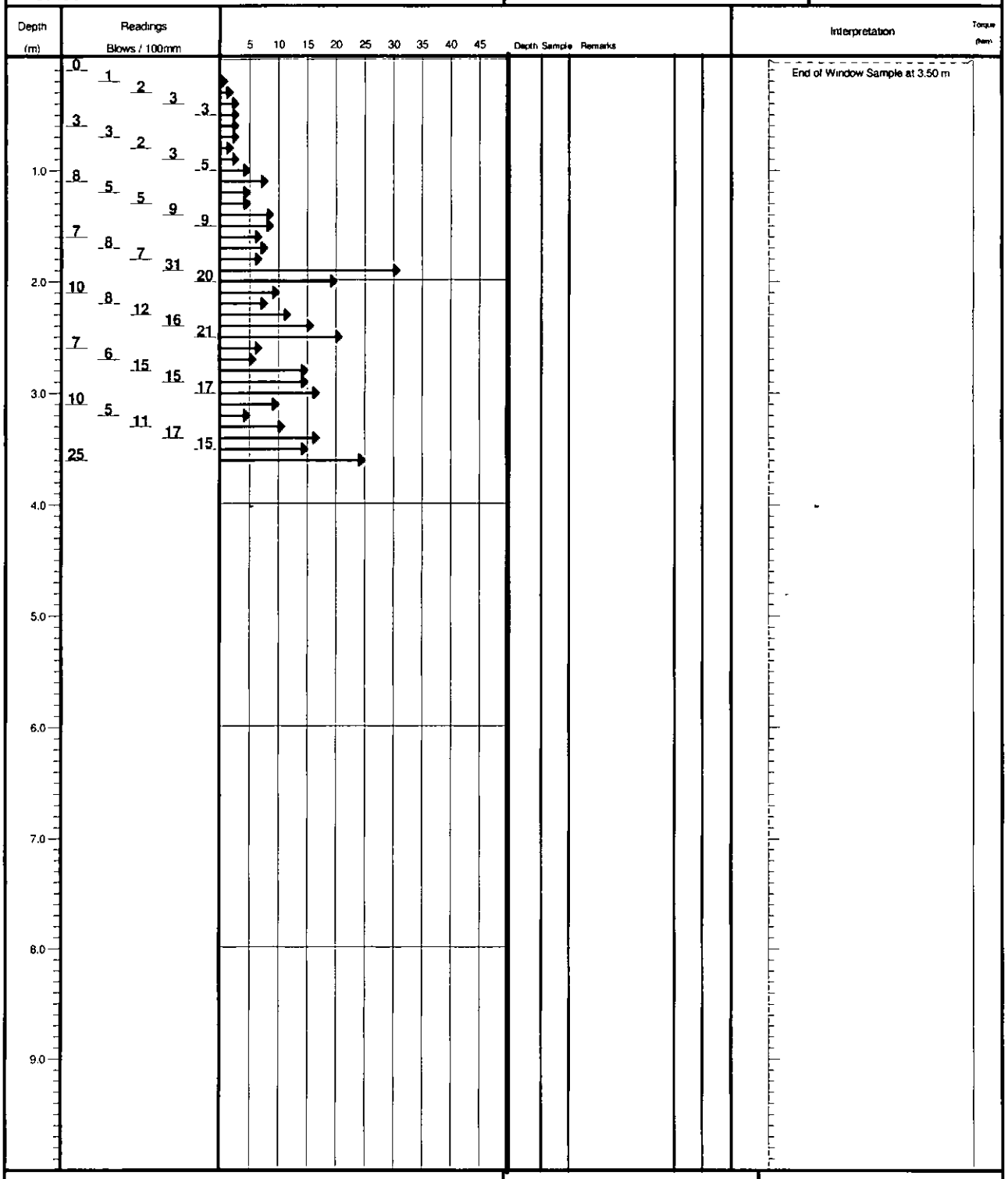
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations.

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Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP10**

Sheet 1 of 1

Scale 1:50

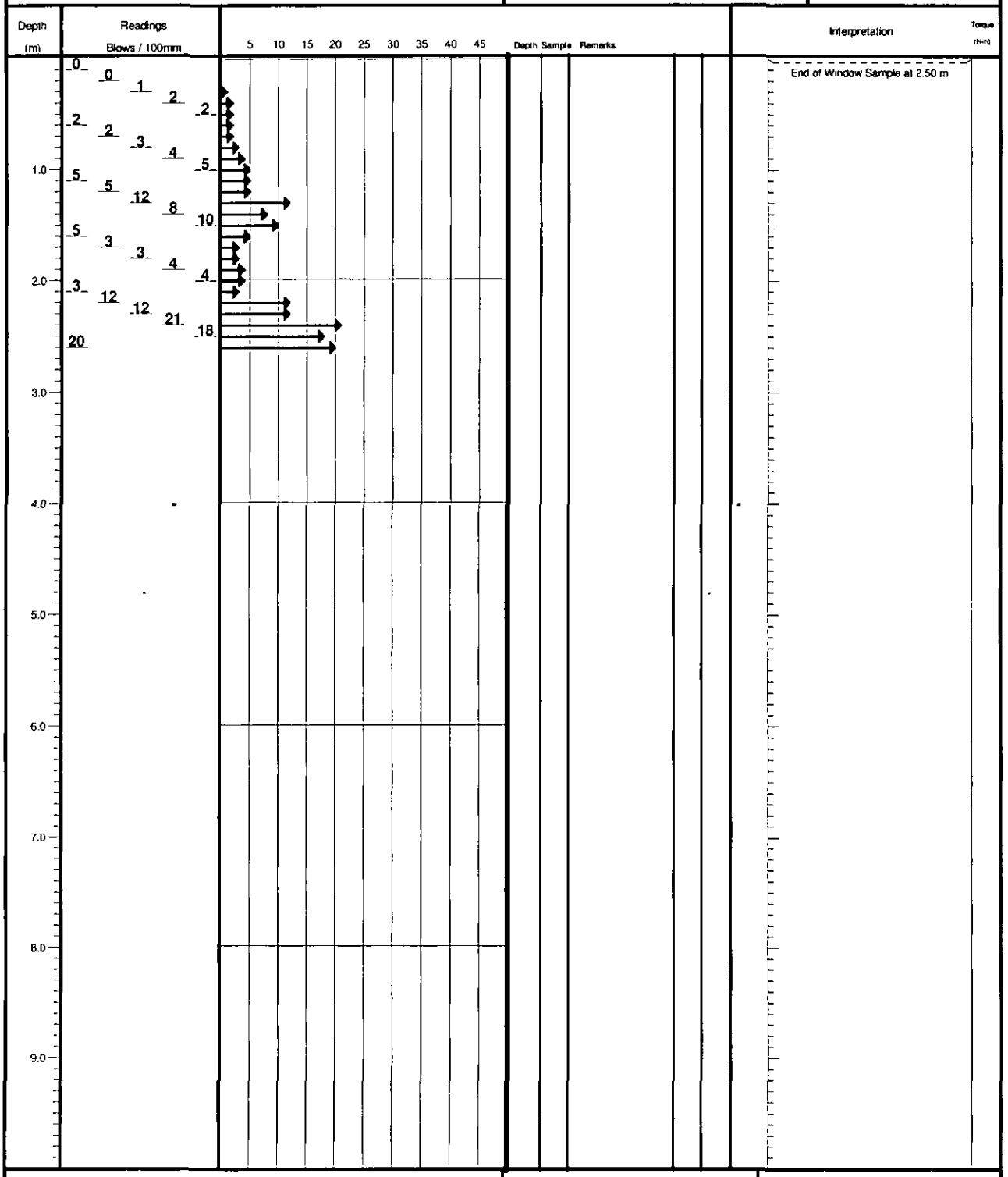
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:34mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL
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Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP11**

Sheet 1 of 1

Scale 1:50

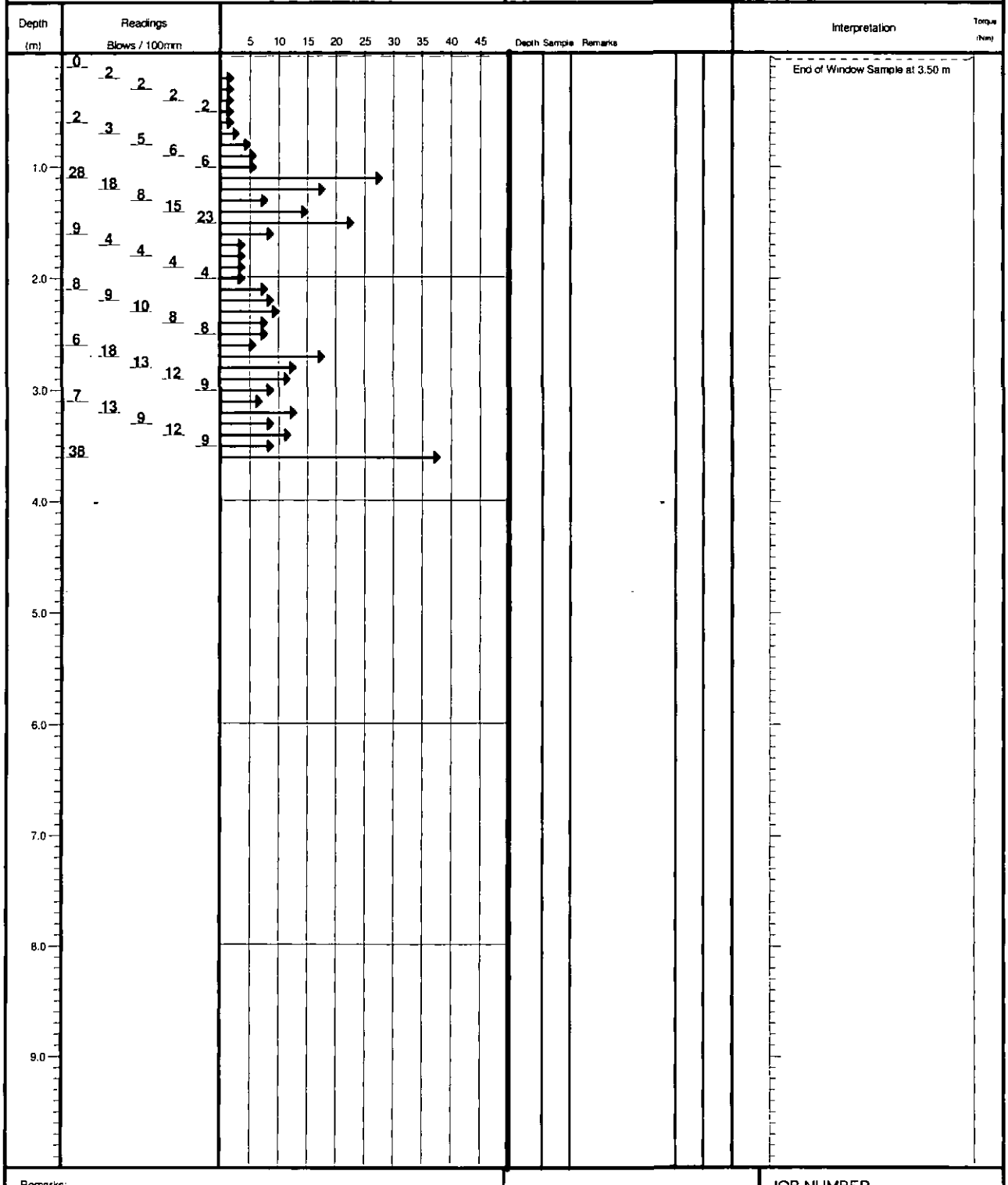
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:34mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL
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Probe Number **DP12**

Sheet 1 of 1

Scale 1:50

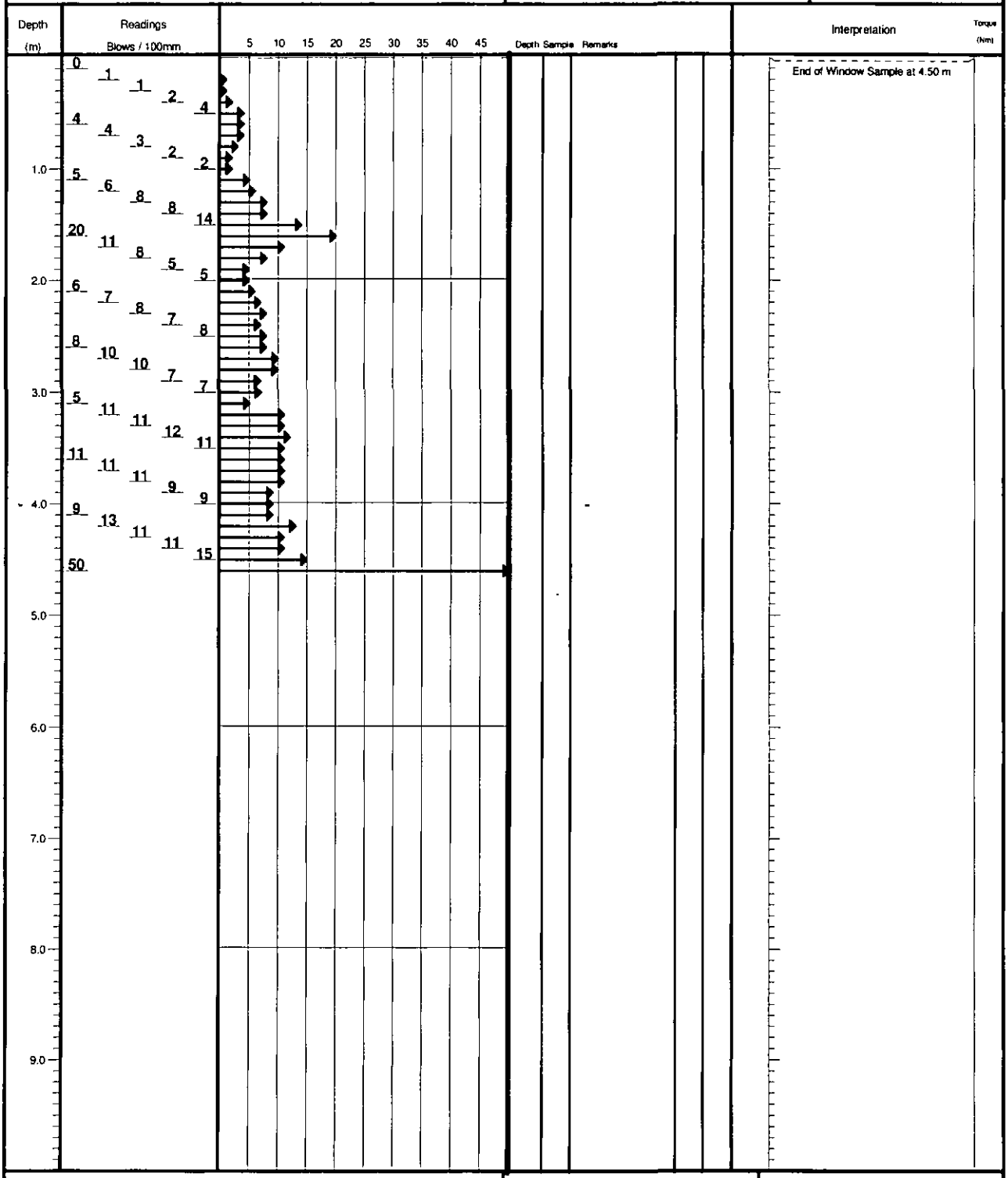
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

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Probe Number **DP13**

Sheet 1 of 1

Scale 1:50

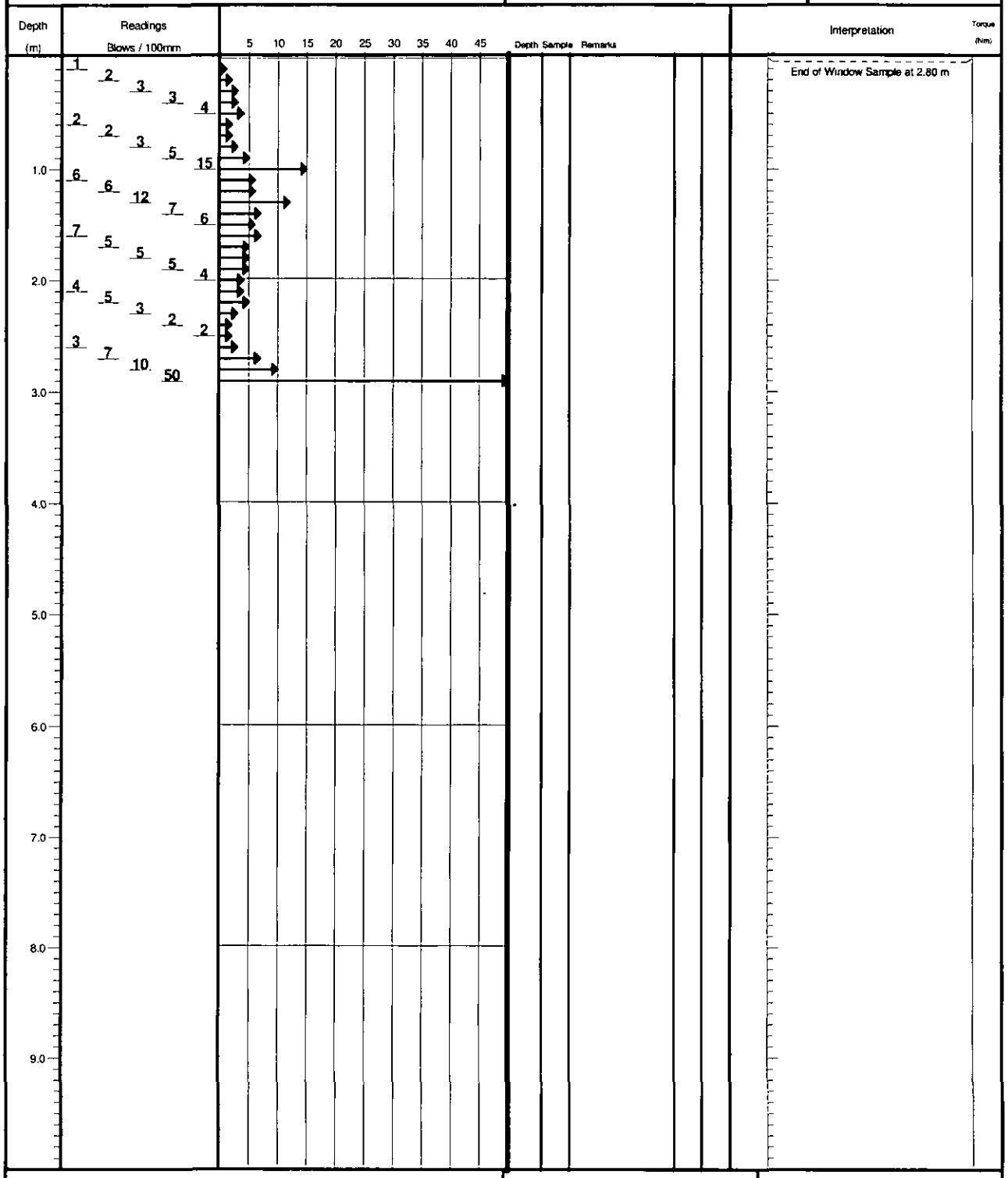
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:34mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL
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Tel. 01623 684550 Fax. 01623 684 551

Probe Number **DP14**

Sheet 1 of 1

Scale 1:50

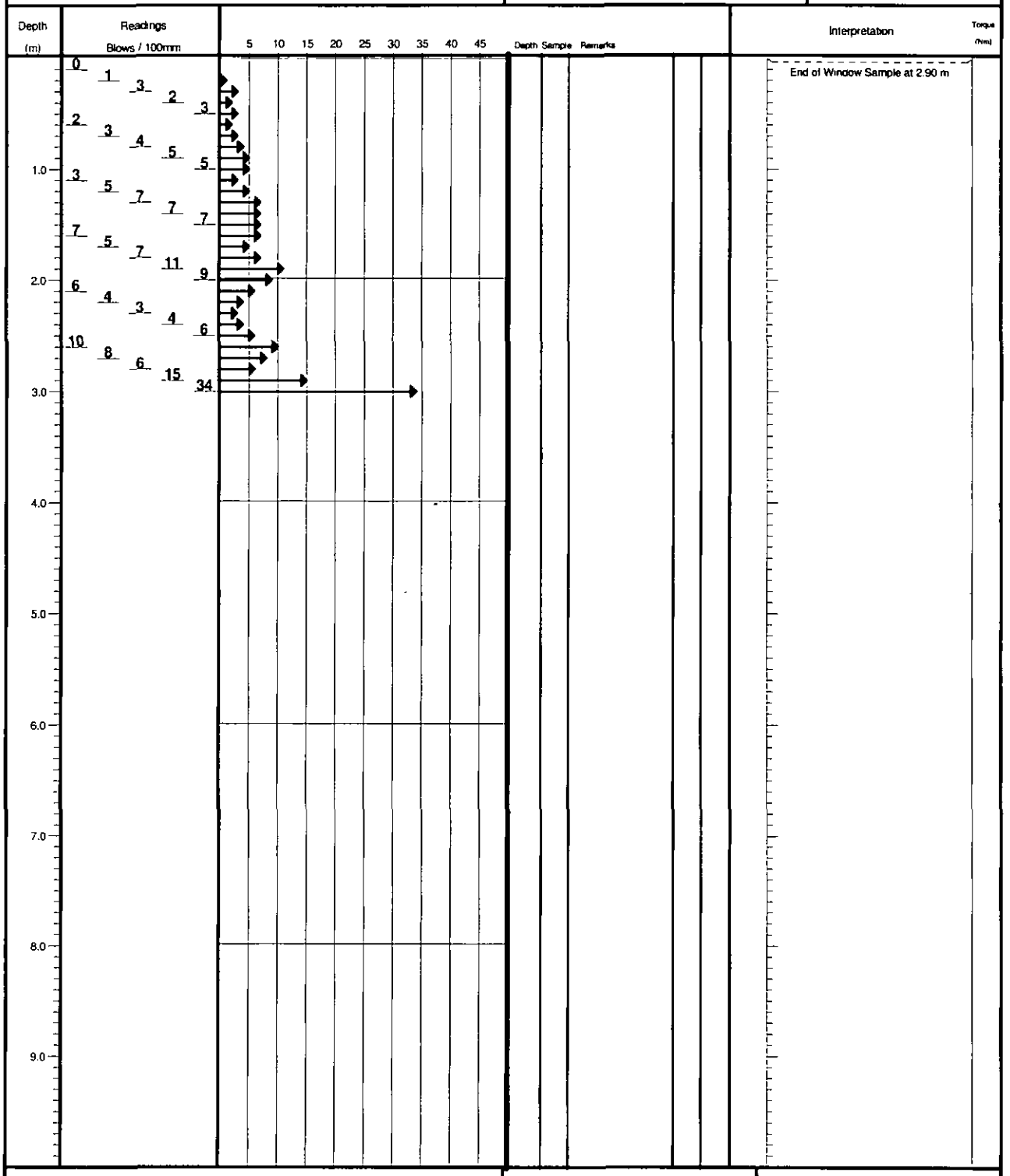
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

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Probe Number **DP15**

Sheet 1 of 1

Scale 1:50

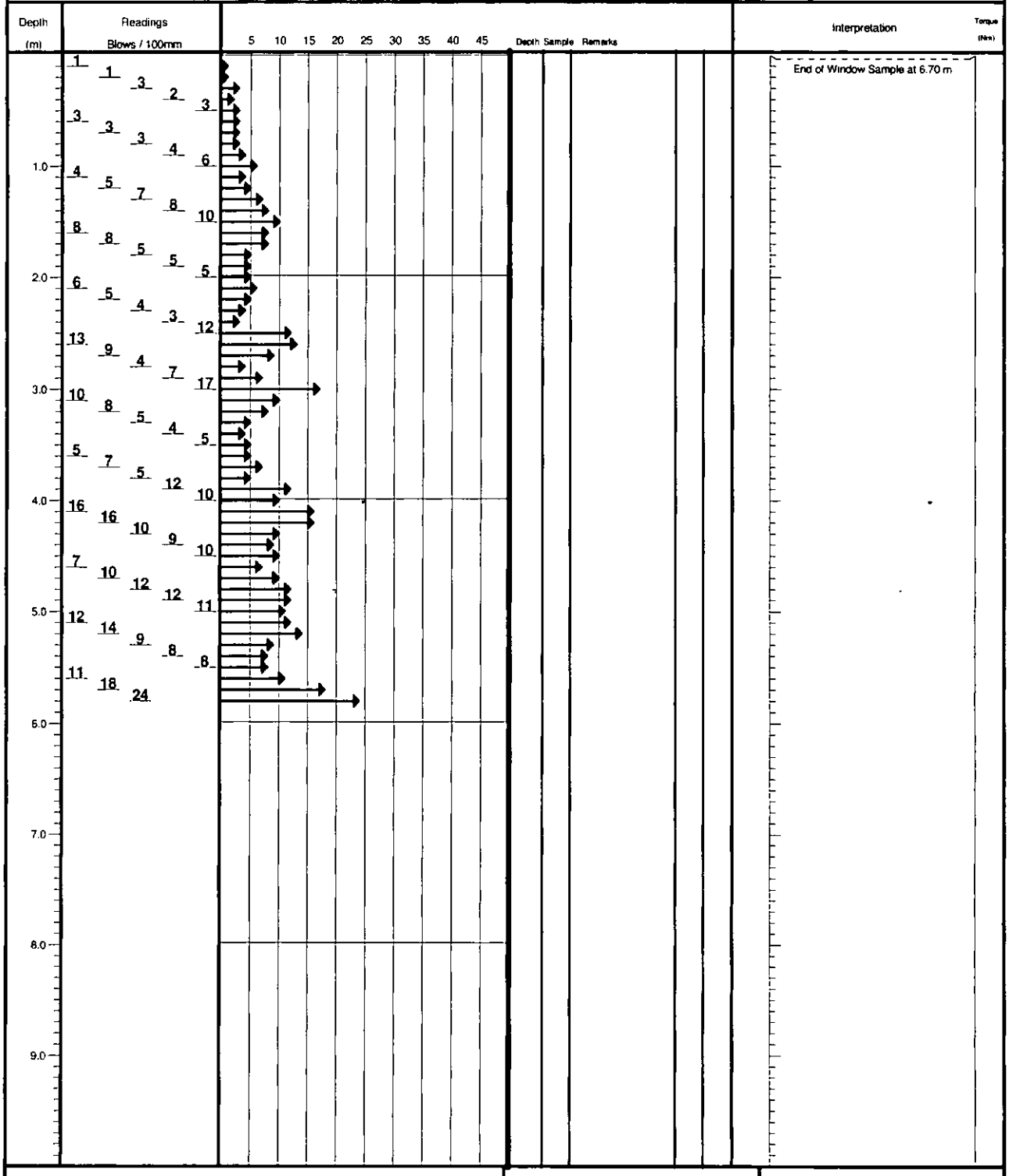
Project: **A042741 - Grimethorpe**

Client: **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Ground Level:33mAOD

Date -



Remarks:

Fall Height: -

Hammer Wt: -

Probe Type: DPSH

Cone Size: 15cm sq

JOB NUMBER

Logged by:

Checked by:

FIGURE NO: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP1**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Co-ordinates: 441520E - 406445N
Ground Level : 31.27 mAOD

Start Date: 13/02/08
Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm mottled light brown and grey sandy gravelly clay. gravel is angular to sub-angular light brown and dark grey mudstone ()		30.17	1.10			0.20 - 0.40 0.20 - 0.40	A B	
MADE GROUND consisting of mottled light brown and blue-grey very gravelly clay. gravel is angular to sub-angular dark grey-blue mudstone, rare to some boulders of light brown and grey sandy thinly bedde mudstone ()		28.27	3.00			1.20 - 1.40 2.40 - 2.60	B B	
Trial Pit completed at 3.00m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 3.0m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP2**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441571E - 406395N

Ground Level : 32.26 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm mottled light brown and grey sandy gravelly clay. gravel is angular to sub-angular light brown and dark grey mudstone ()						0.20 - 0.40	A	
						0.20 - 0.40	B	
		31.26	1.00					
MADE GROUND consisting of light brown and grey sandy very clayey gravel. Gravel is angular to sub-angular grey mudstone and sandy brown mudstone. rare sub-angular boulder of mudstone ()						1.40 - 1.60	B	
						2.50 - 2.80	B	
		29.06	3.20					
Trial Pit completed at 3.20m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 2.8m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP3**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441623E - 406346N

Ground Level : 33.13 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm mottled light brown and grey sandy gravelly clay. gravel is angular to sub-angular light brown and dark grey mudstone ()						0.20 - 0.40	A	
						0.20 - 0.40	B	
		31.93	1.20					
MADE GROUND consisting of dark blue-grey clayey gravel. gravel is sub angular to angular dark blue-grey mudstone and occasionally orange brown sandy mudstone. Some to many cobbles () @1.2mbgl in E end of pit very large boulder? grey mudstone boulder prevented further excavation at E end						1.20 - 1.40	B	
						2.40 - 2.60	B	
		29.93	3.20					
Trial Pit completed at 3.20m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 3.0m
Width: 0.7m
Orientation:

JOB NUMBER

Logged By :

Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP4**

Sheet 1 of 1
Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441624E - 406448N
Ground Level : 33.05 mAOD

Start Date: 13/02/08
Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of light brown and mottled grey very gravelly clay. Gravel is sub-angular to angular mudstone. rare coal fragments ()						0.20 - 0.40	A	
						0.20 - 0.40	B	
		32.30	0.75					
MADE GROUND consisting of blue-grey slightly clayey gravel to boulders. Gravel is blue-grey mudstone, some to many boulders ()						1.40 - 1.60	B	
						2.40 - 2.60	B	
		30.05	3.00					
Trial Pit completed at 3.00m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 2.9m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP5**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441667E - 406400N

Ground Level : 33.38 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of mottled grey and light brown sandy gravelly clay. Gravel is angular to sub-angular grey-blue mudstone ()						0.20 - 0.30	A	
						0.20 - 0.30	B	
		32.83	0.55					
MADE GROUND consisting of light grey-blue clayey gravel. gravel is angular to sub-angular grey-blue mudstone. Rare to some boulder of grey-blue mudstone. ()						1.20 - 1.50	B	
						2.20 - 2.40	B	
		30.73	2.65					
Trial Pit completed at 2.65m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 2.9m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By :

2.65

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP6**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441687E - 406474N

Ground Level : 33.23 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of light brown and mottled grey very gravelly clay. Gravel is sub-angular to angular mudstone. rare coal fragments ()		32.58	0.65			0.20 - 0.40	A	
MADE GROUND consisting of blue-grey slightly clayey slightly sandy gravel to boulders. Gravel is blue-grey mudstone, some to many boulders ()						1.40 - 1.60	B	
						2.20 - 2.40	B	
		30.23	3.00					
Trial Pit completed at 3.00m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 3.0m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

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Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP7**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441733E - 406425N

Ground Level : 33.79 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of mottled grey and light brown very sandy gravelly clay. Gravel is sub-angular grey mudstone ()		33.24	0.55			0.20 - 0.30 0.20 - 0.40	A B	
MADE GROUND consisting of light grey-blue clayey gravel. gravel is angular to sub-angular grey-blue mudstone. Rare to some boulder of grey-blue mudstone. Pit sides unstable ()						1.20 - 1.40	B	
						2.40 - 2.60	B	
		31.19	2.60					
Trial Pit completed at 2.60m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 2.8m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

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Trial Pit Number **TP7A**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Co-ordinates: 441702E - 406401N

Ground Level : 33.64 mAOD

Start Date: -

Finish Date: -

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
Trial Pit completed at 0.00m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: -
Width: -
Orientation:

JOB NUMBER
Logged By :
Checked By :

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

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Trial Pit Number **TP8**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441721E - 406535N

Ground Level : 36.26 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of firm to stiff light brown and mottled grey very sandy very gravelly clay. gravel is angular to sub-angular orange brown sandy mudstone. rare to some coal fragments, rare to some sandy mudstone cobbles to boulders ()						0.30 - 0.50	A	
		33.06	3.20					
Trial Pit completed at 3.20m bgl								

Stability:

Groundwater Observations:

Other Observations: 1. TP excavated on top of bund ~3-4m high

Pit Dimensions:
Length: 3.1m
Width: 0.7m
Orientation:

JOB NUMBER

Logged By :

Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP9**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441746E - 406497N

Ground Level : 33.37 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of light brown and mottled grey very gravelly clay. Gravel is sub-angular to angular mudstone. rare coal fragments ()		32.62	0.75					
MADE GROUND consisting of blue-grey slightly clayey gravel to boulders. Gravel is blue-grey mudstone, some to many boulders ()								
		30.47	2.90					
Trial Pit completed at 2.90m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 3.1m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

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Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP10**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441755E - 406573N

Ground Level : 33.66 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of firm mottled light brown and grey sandy very gravelly clay. Gravel is angular to sub-angular brown sandy mudstone and rare to some coal fragments ()		32.96	0.70			0.20 - 0.30 0.20 - 0.30	A B	
MADE GROUND consisting of dark blue-grey slightly clayey gravel. Gravel is angular to sub-angular blue-grey mudstone, some to many blue-grey mudstone cobbles ()		32.16	1.50			1.20 - 1.40	B	
Trial Pit completed at 1.50m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 3.1m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP11**

Sheet 1 of 1
Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441745E - 406651N
Ground Level : 33.84 mAOD

Start Date: 13/02/08
Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of firm mottled light brown and grey sandy very gravelly clay. Gravel is angular to sub-angular brown sandy mudstone and rare to some coal fragments ()		33.09	0.75			0.20 - 0.30 0.20 - 0.30	A B	
MADE GROUND consisting of dark blue-grey slightly clayey gravel. Gravel is angular to sub-angular blue-grey mudstone, some to many blue-grey mudstone cobbles ()		32.64	1.20			1.00 - 1.20	B	
MADE GROUND consisting of light orange-brown slightly clayey very sandy gravel. Gravel is angular to sub-angular sandy orange boren thinly laminated mudstone ()		32.29	1.55					
MADE GROUND consisting of dark blue-grey slightly clayey gravel. Gravel is angular to sub-angular blue-grey mudstone, some to many blue-grey mudstone cobbles ()		30.94	2.90			2.20 - 2.40	B	
Trial Pit completed at 2.90m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 4.0m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP12**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441724E - 406481N

Ground Level : 33.34 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of light brown and mottled grey very gravelly clay. Gravel is sub-angular to angular mudstone. rare coal fragments ()						0.10 - 0.30	A	
						0.10 - 0.30	B	
		32.99	0.35					
MADE GROUND consisting of blue-grey slightly clayey gravel to boulders. Gravel is blue-grey mudstone, some to many boulders ()						1.30 - 1.50	B	
						2.40 - 2.60	B	
		30.24	3.10					
Trial Pit completed at 3.10m bgl								

Stability:

Groundwater Observations:

Other Observations:

Pit Dimensions:
Length: 2.9m
Width: 0.7m
Orientation:

JOB NUMBER

Logged By :

Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP13**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441677E - 406443N

Ground Level : 33.20 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of light brown and mottled grey very gravelly clay. Gravel is sub-angular to angular mudstone. rare coal fragments ()						0.20 - 0.40	A	
						0.20 - 0.40	B	
		32.45	0.75					
MADE GROUND consisting of blue-grey slightly clayey gravel to boulders. Gravel is blue-grey mudstone, some to many boulders ()						1.40 - 1.60	B	
						2.40 - 2.60	B	
		30.60	2.60					
Trial Pit completed at 2.60m bgl								

Stability:

Groundwater Observations:

Other Observations: 1. TP stopped at 2.6mbgl as compacted mudstone too hard

Pit Dimensions:
Length: 3.1m
Width: 0.7m
Orientation:

JOB NUMBER

Logged By :

Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP14**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441569E - 406452N

Ground Level : 32.28 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of light brown and mottled grey very gravelly clay. Gravel is sub-angular to angular mudstone. rare coal fragments ()						0.10 - 0.15	A	
						0.10 - 0.15	B	
		31.93	0.35					
MADE GROUND consisting of blue-grey slightly clayey gravel to boulders. Gravel is blue-grey mudstone, some to many boulders ()						1.50 - 1.70	B	
						2.30 - 2.50	B	
		29.18	3.10					
Trial Pit completed at 3.10m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 3.0m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP15**

Sheet 1 of 1

Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441626E - 406402N

Ground Level : 33.44 mAOD

Start Date: 13/02/08

Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of mottled grey and light brown sandy gravelly clay. Gravel is angular to sub-angular grey-blue mudstone ()		33.04	0.40			0.20 - 0.30 0.20 - 0.30	A B	
MADE GROUND consisting of light grey-blue clayey gravel. gravel is angular to sub-angular grey-blue mudstone. Rare to some boulder of grey-blue mudstone. Pit sides unstable ()						1.20 - 1.50	B	
						2.00 - 2.20	B	
		31.14	2.30					
Trial Pit completed at 2.30m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 3.0m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP16**

Sheet 1 of 1
Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB**

Co-ordinates: 441658E - 406353N
Ground Level : 34.46 mAOD

Start Date: 13/02/08
Finish Date: 13/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of mottled grey and light brown sandy gravelly clay. Gravel is angular to sub-angular grey-blue mudstone ()						0.20 - 0.30	A	
						0.20 - 0.30	B	
		33.91	0.55					
MADE GROUND consisting of light grey-blue clayey gravel. gravel is angular to sub-angular grey-blue mudstone. Rare to some boulder of grey-blue mudstone. Pit sides unstable. Rare black mudstone boulder and rare coal / black mudstone fragments ()						1.10 - 1.40	B	
						2.10 - 2.30	B	
		31.86	2.60					
Trial Pit completed at 2.60m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: 2.8m
Width: 0.7m
Orientation:

JOB NUMBER
Logged By :
Checked By : CA

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TP16A**

Sheet 1 of 1
Scale 1:25

Project :**A042741 - Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method:

Co-ordinates: 441645E - 406365N
Ground Level : 33.55 mAOD

Start Date: -
Finish Date: -

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
Trial Pit completed at 0.00m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: -
Width: -
Orientation:

JOB NUMBER
Logged By :
Checked By :

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TT1**

Sheet 1 of 1

Scale 1:25

Project :**Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB 3CX**

Co-ordinates: 441610E - 406378N

Ground Level :

Start Date: 02/05/08

Finish Date: 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
Grass over brown clayey TOPSOIL (TOPSOIL)			0.20					
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey and occasional brown sandy mudstone. Some to many cobbles and occasional boulders with depth. (MADE GROUND)								
Trial Pit completed at 4.90m bgl			4.90					

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: -
Width: -
Orientation:

JOB NUMBER A042741

Logged By :

Checked By :

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TT2**

Sheet 1 of 1
Scale 1:25

Project :**Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB 3CX**

Co-ordinates: 441532E - 406461N
Ground Level :

Start Date: 02/05/08
Finish Date: 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
Grass over brown clayey TOPSOIL (TOPSOIL)			0.20					
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey and occasional brown sandy mudstone. Some to many cobbles and occasional boulders with depth. (MADE GROUND)								
			4.70					
Trial Pit completed at 4.70m bgl								

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: -
Width: -
Orientation:

JOB NUMBER A042741
Logged By :
Checked By :

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel: 01623 684 550 Fax: 01623 684 551

Trial Pit Number **TT3**

Sheet 1 of 1

Scale 1:25

Project :**Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **JCB 3CX**

Co-ordinates: 441737E - 406625N

Ground Level :

Start Date: 02/05/08

Finish Date: 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Backfill	Sample Test Depth (m)	Sample Test Type	Notes
Grass over brown clayey TOPSOIL (TOPSOIL)			0.20					
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey and occasional brown sandy mudstone. Some to many cobbles and occasional boulders with depth. (MADE GROUND)								
Trial Pit completed at 4.50m bgl			4.50					

Stability:
Groundwater Observations:
Other Observations:

Pit Dimensions:
Length: -
Width: -
Orientation:

JOB NUMBER A042741

Logged By :

Checked By :

FIG. NO.

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO1**

Sheet 1 of 1
Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441621.00E - 406348.00N
Ground Level :

Start Date : 01/05/08
Finish Date : 01/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			5.10						
Exploratory Hole complete at 5.10 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO2**

Sheet 1 of 1
Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441585.00E - 406386.00N
Ground Level :

Start Date : 01/02/08
Finish Date : 01/02/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			5.00						
Exploratory Hole complete at 5.00 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO3**

Sheet 1 of 1

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441601.00E - 406475.00N
Ground Level :

Start Date : / /
Finish Date : / /

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone with some brown grey sandy mudsone with depth. (MADE GROUND)									
			8.40						
Exploratory Hole complete at 8.40 m									

Observations:

JOB NUMBER A042741

Logged By :

Checked By :

Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO4**

Sheet 1 of 1
Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441617.00E - 406423.00N
Ground Level :

Start Date : 01/05/08
Finish Date : 01/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone with some brown grey sandy mudsone with depth. (MADE GROUND)									
			8.50						
Exploratory Hole complete at 8.50 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO5**

Sheet 1 of 1

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441592.00E - 406423.00N
Ground Level :

Start Date : 01/05/08
Finish Date : 01/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			5.10						
Exploratory Hole complete at 5.10 m									

Observations:

JOB NUMBER A042741

Logged By :

Checked By :

Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

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Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO6**

Sheet 1 of 1

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441640.00E - 406419.00N
Ground Level :

Start Date : 01/05/08
Finish Date : 01/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			5.40						
Exploratory Hole complete at 5.40 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO7**

Sheet 1 of 2
Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441653.00E - 406488.00N
Ground Level :

Start Date : 01/05/08
Finish Date : 01/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone with some brown grey sandy mudsone with depth. (MADE GROUND)									

Continued on next sheet

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO7**

Sheet 2 of 2

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441653.00E - 406488.00N
Ground Level :

Start Date : 01/05/08
Finish Date : 01/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone with some brown grey sandy mudsone with depth. (MADE GROUND)									
			12.40						
Exploratory Hole complete at 12.40 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO8**

Sheet 1 of 1

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441664.00E - 406440.00N
Ground Level :

Start Date : 01/05/08
Finish Date : 01/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			6.10						
Exploratory Hole complete at 6.10 m									

Observations:

JOB NUMBER A042741

Logged By :

Checked By :

Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO9**

Sheet 1 of 1
Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441681.00E - 406474.00N
Ground Level :

Start Date : 01/05/08
Finish Date : 01/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			5.30						
Exploratory Hole complete at 5.30 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO10**

Sheet 1 of 1
Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441710.00E - 406472.00N
Ground Level :

Start Date : 02/05/08
Finish Date : 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			6.60						
Exploratory Hole complete at 6.60 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO11**

Sheet 1 of 1

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441741.00E - 406482.00N
Ground Level :

Start Date : 02/05/08
Finish Date : 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			4.70						
Exploratory Hole complete at 4.70 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO12**

Sheet 1 of 2
Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441705.00E - 406521.00N
Ground Level :

Start Date : 02/05/08
Finish Date : 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone with some brown grey sandy mudsone with depth. (MADE GROUND)									

Continued on next sheet

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO12**

Sheet 2 of 2

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441705.00E - 406521.00N
Ground Level :

Start Date : 02/05/08
Finish Date : 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone with some brown grey sandy mudsone with depth. (MADE GROUND)									
			12.10						
Exploratory Hole complete at 12.10 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO13**

Sheet 1 of 2

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441744.00E - 406589.00N
Ground Level :

Start Date : 02/05/08
Finish Date : 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone with some brown grey sandy mudsone with depth. (MADE GROUND)									

Continued on next sheet

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations
Sherwood Business Park, Annesley, Notts, NG15 0DR
Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO13**

Sheet 2 of 2
Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441744.00E - 406589.00N
Ground Level :

Start Date : 02/05/08
Finish Date : 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone with some brown grey sandy mudsone with depth. (MADE GROUND)									
			13.80						
Exploratory Hole complete at 13.80 m									

Observations:

JOB NUMBER A042741
Logged By :
Checked By :
Figure No.: FIG

WHITE YOUNG GREEN ENVIRONMENTAL

Ground Technologies and Investigations

Sherwood Business Park, Annesley, Notts, NG15 0DR

Tel. 01623 684550 Fax. 01623 684551

Borehole Number **RO14**

Sheet 1 of 1

Scale 1:50

Project: **Grimethorpe**

Client : **WILLIAMS SAUNDERS PARTNERSHIPS LLP**

Method: **Lorry mounted Commachio Rotary Rig**

Co-ordinates: 441759.00E - 406650.00N
Ground Level :

Start Date : 02/05/08
Finish Date : 02/05/08

Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth (m)	Sample Test Type	Notes
MADE GROUND consisting of soft to firm grey brown sandy gravelly clay. Gravel is angular to subangular grey mudstone. (MADE GROUND)									
			4.90						
Exploratory Hole complete at 4.90 m									

Observations:

JOB NUMBER A042741

Logged By :

Checked By :

Figure No.: FIG

APPENDIX C:

GEOCHEMICAL TESTING REPORTS

L 499594 White Young Green: Grimethorpe A42741

STL Laboratory Number				10461946	10461947	10461948	10461949	10461950	10461951	10461952	10461953
Customer Sample Ref				TP1 0.20m	TP2 1.40m	TP3 0.20m	TP5 0.20m	TP6 0.20m	TP8 0.30m	TP10 1.20m	TP11 0.20m
Analyte	Method	Units	Acc								
Stones BG 2.6/3.0	Stones	%	*	28	18	15	18	17	20	18	18
Moisture content at 30 C	33A	%	*	15	12	14	14	14	14	7.3	12
Arsenic as As, dry weight	30/30C	mg/kg		7.6	3.4	6.9	12	7.4	7	20	8.8
Boron as B, hot water sol dw	6	mg/kg		0.78	1.1	0.95	0.91	0.63	1.5	1.6	2.6
Cadmium as Cd, dry weight	30	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hexavalent Chromium as dw	30B	mg/kg		0.2	0.34	0.13	0.2	0.13	0.13	0.3	0.16
Chromium as Cr, dry weight	30	mg/kg		29	31	30	29	30	29	34	28
Copper, as Dry Weight	30	mg/kg		30	33	30	31	34	33	37	29
Lead, as Dry Weight	30	mg/kg		26	27	23	26	25	23	23	26
Mercury as Hg, dry weight	30C	mg/kg		<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nickel as Ni, dry weight	30	mg/kg		47	54	51	50	49	52	65	46
Selenium as Se, dry weight	30C	mg/kg		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Zinc as Zn, dry weight	30	mg/kg		97	120	100	110	100	100	99	95
Cyanide (Complex)	14	mg/kg		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cyanide (Free)	14	mg/kg		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tot. Steam Dist. Monophenols	40A	mg/kg		<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75
Sulphate as SO4, Water Soluble	46	g/l		<0.060	<0.060	<0.060	0.067	0.062	<0.060	0.11	<0.060
pH	39	pH units		7.1	7.7	7.1	7.1	7.5	7.6	8.1	7.3
TPH (Total)	317	mg/kg		<59	<57	<58	<58	<58	<58	57	<57
naphthalene	YWP PAH	mg/kg	*	0.85	0.65	0.75	0.94	0.88	0.37	0.76	0.43
acenaphthylene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
acenaphthene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
fluorene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
phenanthrene	YWP PAH	mg/kg	*	0.24	0.29	0.2	0.35	0.27	0.11	0.5	0.11
anthracene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
fluoranthene	YWP PAH	mg/kg	*	0.26	0.18	0.25	0.13	<0.10	0.46	0.17	0.56
pyrene	YWP PAH	mg/kg	*	0.12	<0.10	<0.10	0.17	0.12	<0.10	0.15	<0.10
benzo(a)anthracene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.17	<0.10
chrysene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.1	<0.10
benzo(b)fluoranthene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	0.13	<0.10	<0.10	0.15	<0.10
benzo(k)fluoranthene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
benzo(a)pyrene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	<0.10
dibenzo(ah)anthracene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
benzo(ghi)perylene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	0.17	<0.10

Key

N/S - Not Scheduled

I/S - Insufficient Sample

To Follow - analysis incomplete (interim reports only)

Acc = Accreditation codes: * = not UKAS accredited.

L 499594 White Young Green: Grimethorpe A42741

STL Laboratory Number				10461946	10461947	10461948	10461949	10461950	10461951	10461952	10461953
Customer Sample Ref				TP1 0.20m	TP2 1.40m	TP3 0.20m	TP5 0.20m	TP6 0.20m	TP8 0.30m	TP10 1.20m	TP11 0.20m
Analyte	Method	Units	Acc								
indeno(123cd)pyrene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
PAH (Total)	YWP PAH	mg/kg	*	1.5	1.1	1.2	1.8	1.3	<1.0	2.3	1.1

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L 499594 White Young Green: Grimethorpe A42741

STL Laboratory Number				10461954	10461955	10461956
Customer Sample Ref				TP13 0.20m	TP15 0.20m	TP16 1.10m
Analyte	Method	Units	Acc			
Stones BG 2.6/3.0	Stones	%	*	16	17	24
Moisture content at 30 C	33A	%	*	16	14	7.4
Arsenic as As, dry weight	30/30C	mg/kg		9	8.6	11
Boron as B, hot water sol dw	6	mg/kg		1.4	1.7	0.81
Cadmium as Cd, dry weight	30	mg/kg		<0.50	<0.50	<0.50
Hexavalent Chromium as dw	30B	mg/kg		0.16	0.16	0.26
Chromium as Cr, dry weight	30	mg/kg		29	31	28
Copper, as Dry Weight	30	mg/kg		34	36	39
Lead, as Dry Weight	30	mg/kg		29	27	36
Mercury as Hg, dry weight	30C	mg/kg		<0.25	<0.25	<0.25
Nickel as Ni, dry weight	30	mg/kg		46	58	55
Selenium as Se, dry weight	30C	mg/kg		<0.30	<0.30	0.38
Zinc as Zn, dry weight	30	mg/kg		95	110	100
Cyanide (Complex)	14	mg/kg		<5.0	<5.0	<5.0
Cyanide (Free)	14	mg/kg		<5.0	<5.0	<5.0
Tot. Steam Dist. Monophenols	40A	mg/kg		<0.75	<0.75	<0.75
Sulphate as SO4, Water Soluble	46	g/l		0.07	<0.060	0.26
pH	39	pH units		6.8	7.6	7.9
TPH (Total)	317	mg/kg		<60	<58	<54
naphthalene	YWP PAH	mg/kg	*	0.68	0.55	0.41
acenaphthylene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
acenaphthene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
fluorene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
phenanthrene	YWP PAH	mg/kg	*	0.34	0.13	0.29
anthracene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
fluoranthene	YWP PAH	mg/kg	*	0.18	<0.10	0.41
pyrene	YWP PAH	mg/kg	*	0.16	<0.10	<0.10
benzo(a)anthracene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
chrysene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
benzo(b)fluoranthene	YWP PAH	mg/kg	*	<0.10	<0.10	0.12
benzo(k)fluoranthene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
benzo(a)pyrene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
dibenzo(ah)anthracene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
benzo(ghi)perylene	YWP PAH	mg/kg	*	<0.10	<0.10	0.13

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L 499594 White Young Green: Grimethorpe A42741

STL Laboratory Number				10461954	10461955	10461956
Customer Sample Ref				TP13 0.20m	TP15 0.20m	TP16 1.10m
Analyte	Method	Units	Acc			
indeno(123cd)pyrene	YWP PAH	mg/kg	*	<0.10	<0.10	<0.10
PAH (Total)	YWP PAH	mg/kg	*	1.4	<1.0	1.4

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L 499594 White Young Green: Grimethorpe A42741

STL Laboratory Number				10461957	10461958	10461959	10461960	10461961
Customer Sample Ref				TP3 0.20m	TP8 0.30m	TP10 1.20m	TP13 0.20m	TP16 1.10m
Analyte	Method	Units	Acc					
NRA Leachate	NRA Leachate		*	Y	Y	Y	Y	Y
Aluminium (Soluble)	53F	ug/l		280	440	130	520	49
Arsenic (Soluble)	56	ug/l		<1.0	<1.0	3.2	<1.0	<1.0
Boron (Soluble)	56	mg/l		<0.050	<0.050	<0.050	<0.050	0.052
Cadmium (Soluble)	56	ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
Chromium (Soluble)	56	ug/l		<2.0	<2.0	<2.0	<2.0	<2.0
Copper (Soluble)	56	ug/l		<5.0	<5.0	<5.0	<5.0	<5.0
Iron (Soluble)	56	mg/l		0.13	0.14	0.11	0.076	0.042
Lead (Soluble)	56	ug/l		<1.0	<1.0	<1.0	1.6	<1.0
Mercury (Soluble)	56	ug/l		<0.20	<0.20	<0.20	<0.20	<0.20
Nickel (Soluble)	56	ug/l		<2.0	<2.0	<2.0	<2.0	26
Selenium (Soluble)	56	ug/l		<0.30	<0.30	2.5	<0.30	5.8
Zinc (Soluble)	56	ug/l		<5.0	<5.0	<5.0	<5.0	<5.0
Chromium (Hexavalent)	13	ug/l		<20	<20	<20	<20	<20
Cyanide (Total)	14c	mg/l	*	<0.050	<0.050	<0.050	<0.050	<0.050
Sulphate as SO4	60	g/l		<0.024	<0.024	<0.024	<0.024	0.043
Ammonia as N	60	mg/l		<0.20	<0.20	<0.20	<0.20	0.26
COD (filtered) as O2	11	mg/l		13	10	10	10	<10
Chloride as Cl	60	mg/l		<2.0	<2.0	<2.0	<2.0	<2.0
Sulphide as S	38A	mg/l		<0.010	<0.010	<0.010	<0.010	<0.010
pH	31	pH units		8	8	8	8	7.6
Total Phenol	PHOHLOW1	ug/l	*	<0.50	0.76	<0.50	1.2	<0.50

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L 499594 White Young Green: Grimethorpe A42741

STL Laboratory Number	Customer Sample Ref	Visual Description
10461946	TP1 0.20m	Brown clay with occasional stones and organic matter
10461947	TP2 1.40m	Brown clay with occasional stones
10461948	TP3 0.20m	Brown clay with occasional stones and organic mater
10461949	TP5 0.20m	Brown clay with occasional stones and organic mater
10461950	TP6 0.20m	Brown loam with occasional stones and organic mater
10461951	TP8 0.30m	Brown loam with occasional stones and organic mater
10461952	TP10 1.20m	Brown loam with occasional stones
10461953	TP11 0.20m	Brown loam with occasional stones
10461954	TP13 0.20m	Brown loam with occasional stones and organic mater
10461955	TP15 0.20m	Brown clay with occasional organic matter and some stones
10461956	TP16 1.10m	Brown loam with some stones

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L 499594 White Young Green: Grimethorpe A42741

STL Laboratory Number	Customer Sample Ref	Comment
10461946	TP1 0.20m	
10461947	TP2 1.40m	
10461948	TP3 0.20m	
10461949	TP5 0.20m	
10461950	TP6 0.20m	
10461951	TP8 0.30m	
10461952	TP10 1.20m	
10461953	TP11 0.20m	
10461954	TP13 0.20m	
10461955	TP15 0.20m	
10461956	TP16 1.10m	
10461957	TP3 0.20m	
10461958	TP8 0.30m	
10461959	TP10 1.20m	
10461960	TP13 0.20m	
10461961	TP16 1.10m	

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L 499589 White Young Green: Grimethorpe A42741

STL Laboratory Number				10461888	10461889	10461890	10461891	10461892
Customer Sample Ref				TP2 0.20m	TP4 0.20m	TP7 1.20m	TP12 0.10m	TP15 1.20m
Analyte	Method	Units	Acc					
Stones BG 2.6/3.0	Stones	%	*	1.4	3.5	8.7	3.2	10
Moisture content at 30 C	33A	%	*	20	14	10	11	7.5
EN 12457-3 Leachate	EN12457-3		*	To Follow	To Follow	To Follow	To Follow	To Follow
Moisture Content Ratio at 105C	33	% ratio	*	To Follow	To Follow	To Follow	To Follow	To Follow
Conductivity @ 20 C	19A	uS/cm	*	150	<100	<100	<100	380
Moisture at 105c	33	%	*	To Follow	To Follow	To Follow	To Follow	To Follow
TOC (Ignition in O2)	27	%	*	1.1	1.1	1.5	0.84	1.6
pH	39	pH units		7.1	7.1	7	6.9	7.6
PCB 7 Total	312	mg/kg		To Follow	To Follow	To Follow	To Follow	To Follow
Mineral Oils C10-C40	317	mg/kg		To Calculate	To Calculate	To Calculate	To Calculate	To Calculate
Total PAH for WAC	307WAC	mg/kg	*	<2.0	2.4	<2.0	<2.0	2.6
BTEX (Total)	336	mg/kg		To Calculate	To Calculate	To Calculate	To Calculate	To Calculate
Dry Ratio (BSEN 12457)	CALC	%	*	To Follow	To Follow	To Follow	To Follow	To Follow

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L 499589 White Young Green: Grimethorpe A42741

STL Laboratory Number				10461893	10461894	10461895	10461896	10461897	10461898
Customer Sample Ref				TP2 0.20m 2:1	TP2 0.20m 8:1	TP4 0.20m 2:1	TP4 0.20m 8:1	TP7 1.20m 2:1	TP7 1.20m 8:1
Analyte	Method	Units	Acc						
EN Leachate 2:1	EN12457-3 2:1		*	To Follow	N/S	To Follow	N/S	To Follow	N/S
EN Leachate 8:1	EN12457-3 8:1		*	N/S	To Follow	N/S	To Follow	N/S	To Follow
Molybdenum (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Antimony (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Arsenic (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Barium (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Cadmium (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Chromium (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Copper (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Lead (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Mercury (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Nickel (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Selenium (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Zinc (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Phenol Index	32A	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Sulphate as SO4	60	mg/l		To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Chloride as Cl	60	mg/l		To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Dissolved Solids	18	mg/l	*	To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Fluoride as F-	20	mg/l		To Follow	To Follow	To Follow	To Follow	To Follow	To Follow
Total Org.Carbon (Filt)	41	mg/l		To Follow	To Follow	To Follow	To Follow	To Follow	To Follow

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L 499589 White Young Green: Grimethorpe A42741

STL Laboratory Number				10461899	10461900	10461901	10461902
Customer Sample Ref				TP12 0.10m 2:1	TP12 0.10m 8:1	TP15 1.20m 2:1	TP15 1.20m 8:1
Analyte	Method	Units	Acc				
EN Leachate 2:1	EN12457-3 2:1		*	To Follow	N/S	To Follow	N/S
EN Leachate 8:1	EN12457-3 8:1		*	N/S	To Follow	N/S	To Follow
Molybdenum (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Antimony (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Arsenic (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Barium (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Cadmium (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Chromium (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Copper (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Lead (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Mercury (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Nickel (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Selenium (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Zinc (Soluble) WAC	56 WAC	mg/l	*	To Follow	To Follow	To Follow	To Follow
Phenol Index	32A	mg/l	*	To Follow	To Follow	To Follow	To Follow
Sulphate as SO4	60	mg/l		To Follow	To Follow	To Follow	To Follow
Chloride as Cl	60	mg/l		To Follow	To Follow	To Follow	To Follow
Dissolved Solids	18	mg/l	*	To Follow	To Follow	To Follow	To Follow
Fluoride as F-	20	mg/l		To Follow	To Follow	To Follow	To Follow
Total Org.Carbon (Filt)	41	mg/l		To Follow	To Follow	To Follow	To Follow

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L 499589 White Young Green: Grimethorpe A42741

STL Laboratory Number	Customer Sample Ref	Visual Description
10461888	TP2 0.20m	Brown clay with many stones and occasional sand
10461889	TP4 0.20m	Brown and grey clay with many stones
10461890	TP7 1.20m	Brown and grey loam with many stones and some clay
10461891	TP12 0.10m	Brown and grey loam with many stones, some clay and occasional roots
10461892	TP15 1.20m	Grey clay with many made ground

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L 499589 White Young Green: Grimethorpe A42741

STL Laboratory Number	Customer Sample Ref	Comment
10461888	TP2 0.20m	
10461889	TP4 0.20m	
10461890	TP7 1.20m	
10461891	TP12 0.10m	
10461892	TP15 1.20m	
10461893	TP2 0.20m 2:1	
10461894	TP2 0.20m 8:1	
10461895	TP4 0.20m 2:1	
10461896	TP4 0.20m 8:1	
10461897	TP7 1.20m 2:1	
10461898	TP7 1.20m 8:1	
10461899	TP12 0.10m 2:1	
10461900	TP12 0.10m 8:1	
10461901	TP15 1.20m 2:1	
10461902	TP15 1.20m 8:1	

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APPENDIX D:

CONTAMINATION ASSESSMENT CRITERIA

(WYGE Tier 1 TSV's)

APPENDIX D: Contamination Screening Criteria (Human Health)

Residential Without Plant Uptake

Determinand	Units	WYGE Soil Screening Value	Derivation Tool
pH		<5, >9	
Asbestos	%	Presence	Lab Screening
HEAVY METALS/METALLOIDS			
Arsenic	mg/kg	20	SGV Report 1
Cadmium	mg/kg	30	SGV Report 3
Chromium (VI)	mg/kg	200	SGV Report 4
Copper	mg/kg	135	Defra [1]
Lead	mg/kg	450	SGV Report 10
Mercury	mg/kg	15	SGV Report 5
Nickel	mg/kg	75	SGV Report 7
Selenium	mg/kg	260	SGV Report 9
Zinc	mg/kg	300	Defra [1]
GENERAL INORGANICS			
Easily Liberatable Cyanide (free)	mg/kg	36	Acute effects infant 1 dose 3g soil
US EPA PRIORITY PAHs			
Acenaphthene	mg/kg	12	RISC WORKBENCH 4
Acenaphthylene	mg/kg	1	RISC WORKBENCH 4
Anthracene	mg/kg	3400	RISC WORKBENCH 4
Benzo(a)Anthracene	mg/kg	7.8	RISC WORKBENCH 4
Benzo(a)pyrene	mg/kg	1.4	RISC WORKBENCH 4
Benzo(b)fluoranthene	mg/kg	17	RISC WORKBENCH 4
Benzo(k)fluoranthene	mg/kg	17	RISC WORKBENCH 4
Benzo(g,h,i)perylene	mg/kg	2600	RISC WORKBENCH 4
Chrysene	mg/kg	170	RISC WORKBENCH 4
Di-benzo(a,h)anthracene	mg/kg	1.7	RISC WORKBENCH 4
Indeno(1,2,3-cd)pyrene	mg/kg	17	RISC WORKBENCH 4
Fluoranthene	mg/kg	103	RISC WORKBENCH 4
Fluorene	mg/kg	3400	RISC WORKBENCH 4
Naphthalene	mg/kg	5.6	RISC WORKBENCH 4
Phenanthrene	mg/kg	3400	RISC WORKBENCH 4
Pyrene	mg/kg	1700	RISC WORKBENCH 4
Phenolics			
Phenol	mg/kg	34,400	SGV Report 8

Determinand	Units	WYGE Soil Screening Value	Derivation Tool
TPH			
TPH Aliphatic >C5-6	mg/kg	14	RISC WORKBENCH 4
TPH Aliphatic >C6-8	mg/kg	35	RISC WORKBENCH 4
TPH Aliphatic >C8-10	mg/kg	8.2	RISC WORKBENCH 4
TPH Aliphatic >C10-12	mg/kg	42	RISC WORKBENCH 4
TPH Aliphatic >C12-16	mg/kg	6800	RISC WORKBENCH 4
TPH Aliphatic >C16-35	mg/kg	190,000	RISC WORKBENCH 4
TPH Aromatic >EC5-7	mg/kg	0.05	RISC WORKBENCH 4
TPH Aromatic >EC7-8	mg/kg	8	RISC WORKBENCH 4
TPH Aromatic >EC8-10	mg/kg	13	RISC WORKBENCH 4
TPH Aromatic >EC10-12	mg/kg	72	RISC WORKBENCH 4
TPH Aromatic >EC12-16	mg/kg	345	RISC WORKBENCH 4
TPH Aromatic >EC16-21	mg/kg	2800	RISC WORKBENCH 4
TPH Aromatic >EC21-35	mg/kg	2800	RISC WORKBENCH 4

[1] Criteria are based on phytotoxicity potential and do not represent human health risk criteria

All WYGE derived screening values calculated using a Fraction Organic Carbon (FOC) value of 1.45%, equivalent to a Soil Organic Matter (SOM) of 2.5%.

APPENDIX D:

CONTAMINATION ASSESSMENT CRITERIA: LEACHABILITY RESULTS (Level 1 Screening Values).

Determinand		Criterion
Arsenic	µg/l	10
Cadmium	µg/l	5
Chromium	µg/l	50
Lead	µg/l	25
Mercury	µg/l	1
Selenium	µg/l	10
Copper	µg/l	2000
Nickel	µg/l	20
Zinc	µg/l	5000
pH	-	5.5 – 9.5
Sulphate	mg/l	250
Ammoniacal nitrogen	mg NH_4 /l	0.5
Cyanide (total)	µg/l	50
Chloride	mg/l	250
PAHs: Benzo(a)pyrene	µg/l	0.010
PAHs: Sum of 4 specified	µg/l	0.1

All values derived from Water Supply (Water Quality) Regulations 2000

APPENDIX E:

CALIFORNIA BEARING RATIO TEST RESULTS

CMT (Testing) Limited

Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333 email: testing@cmt-ltd.co.uk
Fax: 01332 602607 www.cmt-ltd.co.uk

the obvious choice

Client: White Young Green Limited
Newstead Court
Little Oak Drive
Annesley, Nottingham
NG15 0DR

Date: 25th February 2008

Lab Ref: 33627

Order Ref: ENV10966-5104

Originator: Chris Arnott

Site: Land off Haughton Main
Business Park Roundabout
Grimethorpe

Requirements: To attend the above site on 22nd February 2008 and carry out 7 No. 150mm Diameter Plate Bearing Tests to evaluate the modulus of sub-grade reaction 'K' and estimate the equivalent CBR percentage.

Results: The individual result sheets are appended.

CMT (Testing) Limited

Signed: D E Spencer
Senior Technician

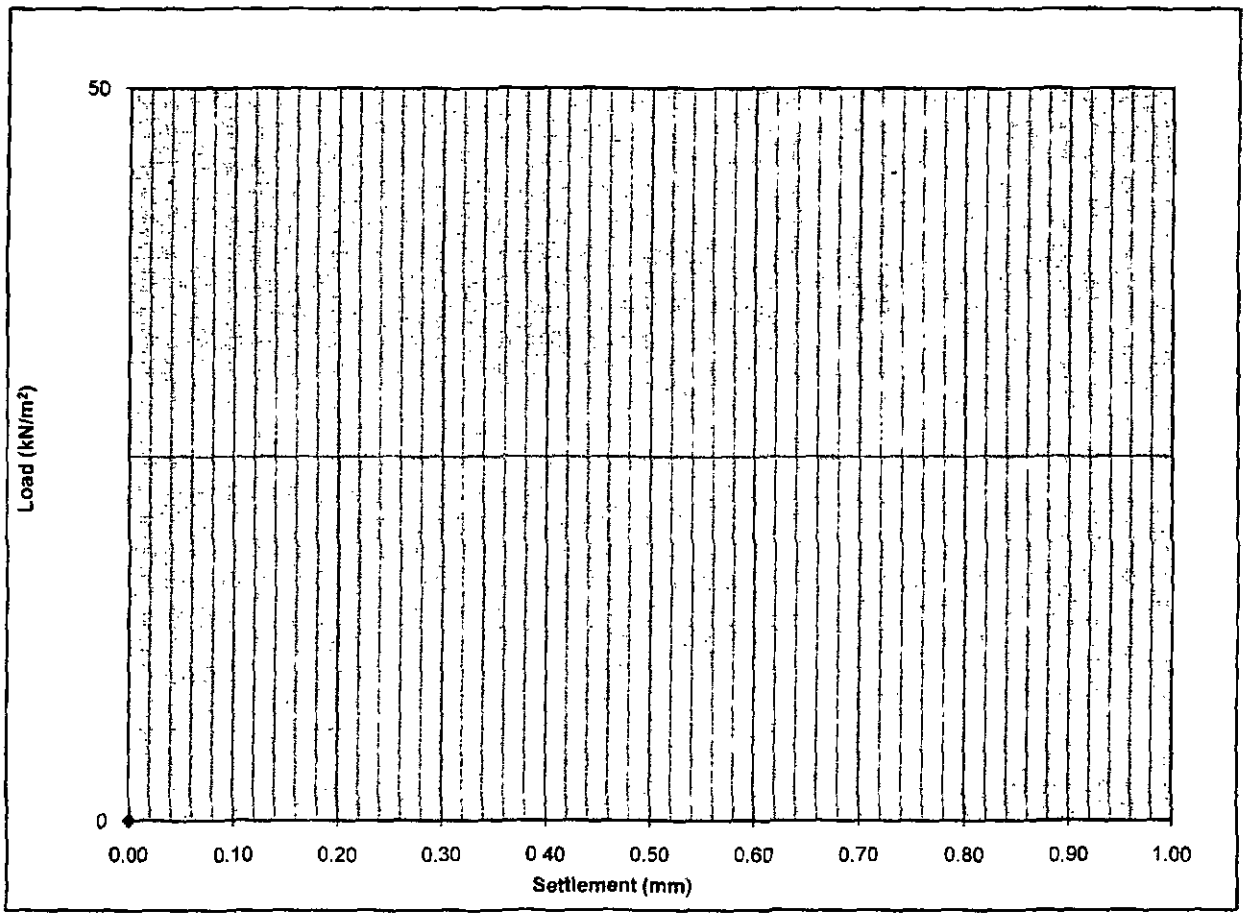
Checked and approved by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with mudstone
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	1
		Location:	1
Lab Ref.:	33627	**Date of Test:**	22-Feb-08

Load (kN/m²)	Settlement (mm)
0	0.00
-	-
-	-
-	-
0	-



Comments:

Modulus 'k' = N/A
Equivalent CBR %= N/A

Test abandoned due to water entering pit

Signed by: Scott James
Laboratory Supervisor

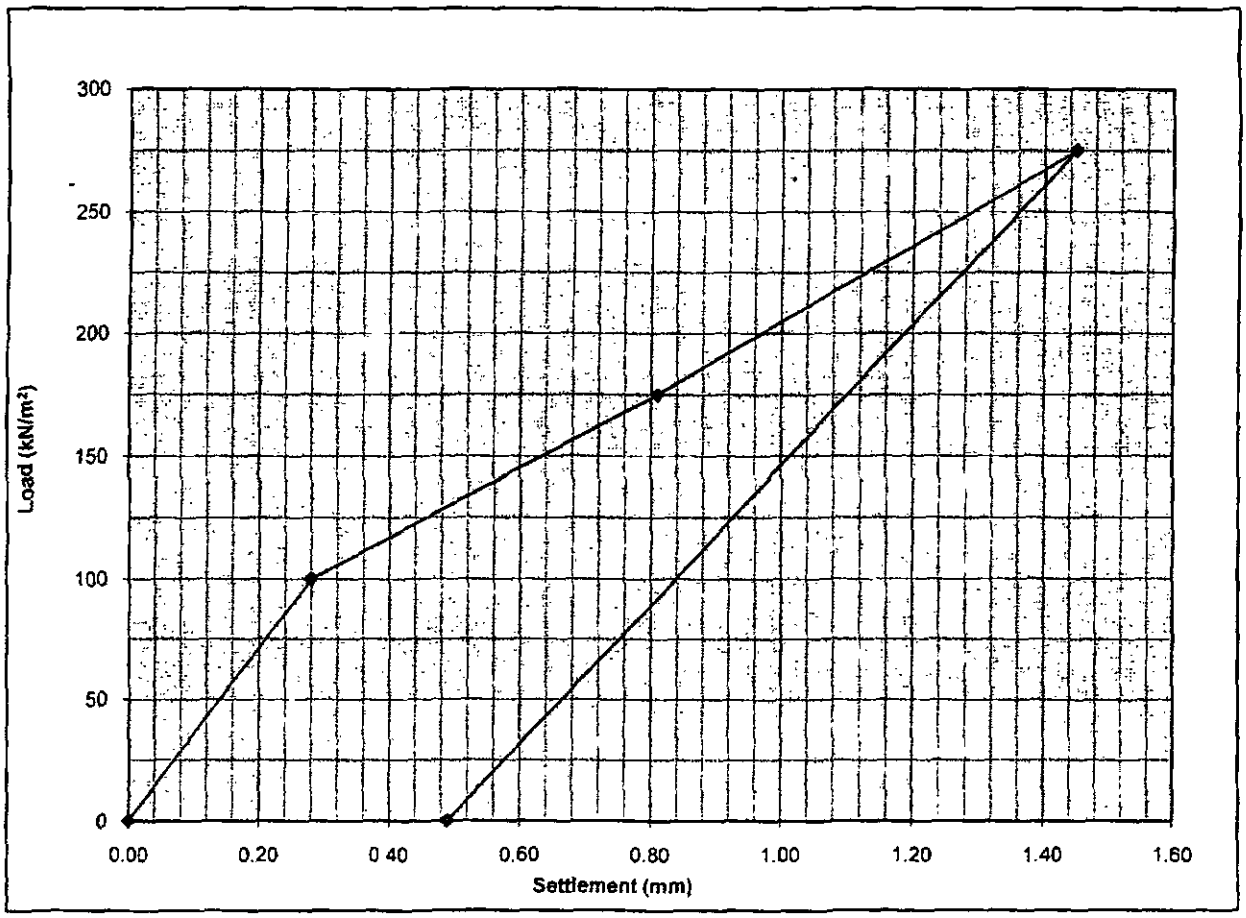
CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk

the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with sandstone fragments
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	2
		Location:	1A
Lab Ref.:	33844	**Date of Test:**	12-Mar-08

Load (kN/m²)	Settlement (mm)
0	0.00
100	0.28
175	0.81
275	1.45
0	0.49



Comments:

Modulus 'k' = 50820
Equivalent CBR %= 8.7

Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited

Prime Parkway, Prime Enterprise Park, Derby DE1 3QB

Tel: 01332 383333
Fax: 01332 602607

email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk

the obvious choice

150 mm Diameter Plate Test

Client: White Young Green Limited

Material Type: Light brown grey mottled CLAY with mudstone

Site: Land off Haughton Main Business Park Roundabout Grimethorpe

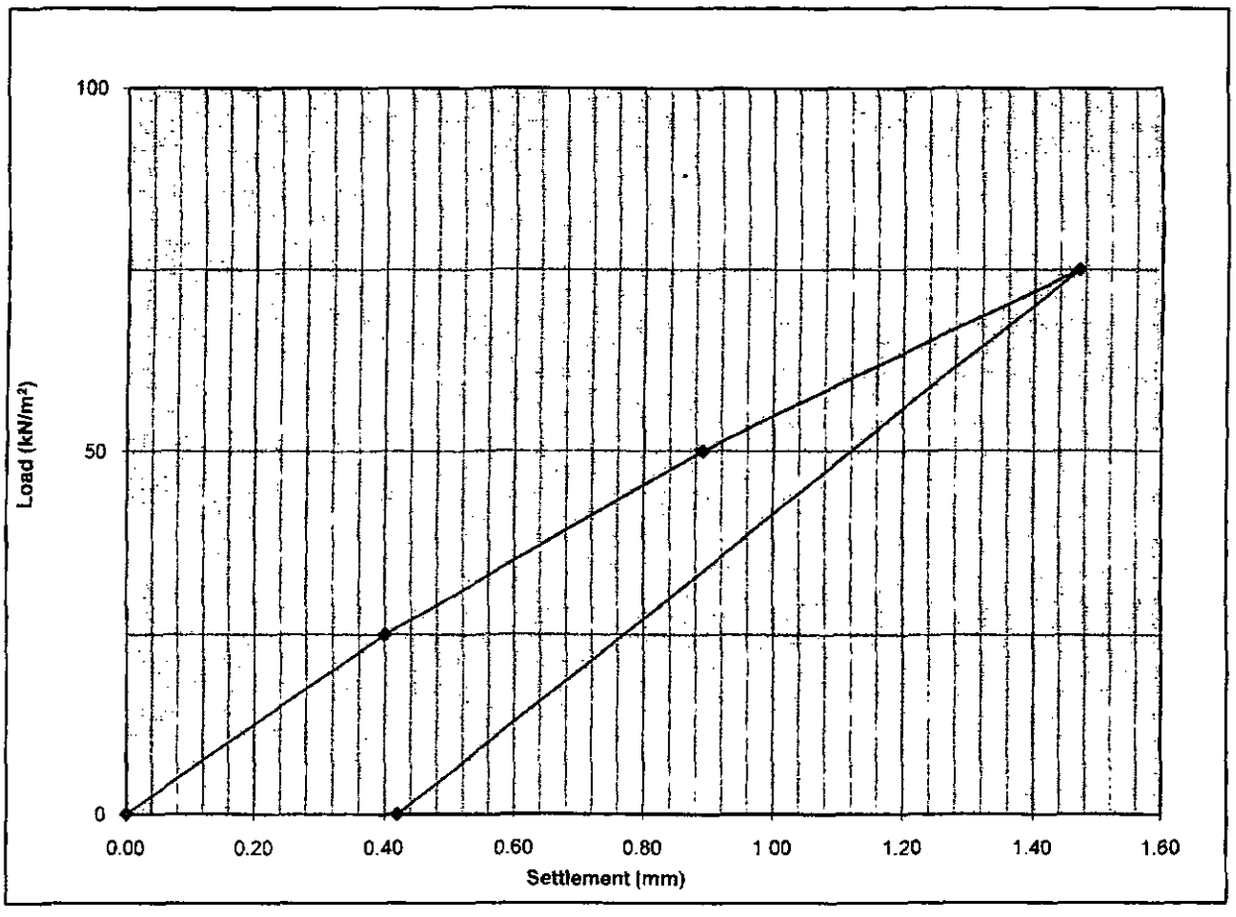
Test No.: 2

Location: 2

Lab Ref.: 33627

Date of Test: 22-Feb-08

Load (kN/m^2)	Settlement (mm)
0	0.00
25	0.40
50	0.89
75	1.47
0	0.42



Comments:

Modulus 'k' = 13746
Equivalent CBR %= 0.9

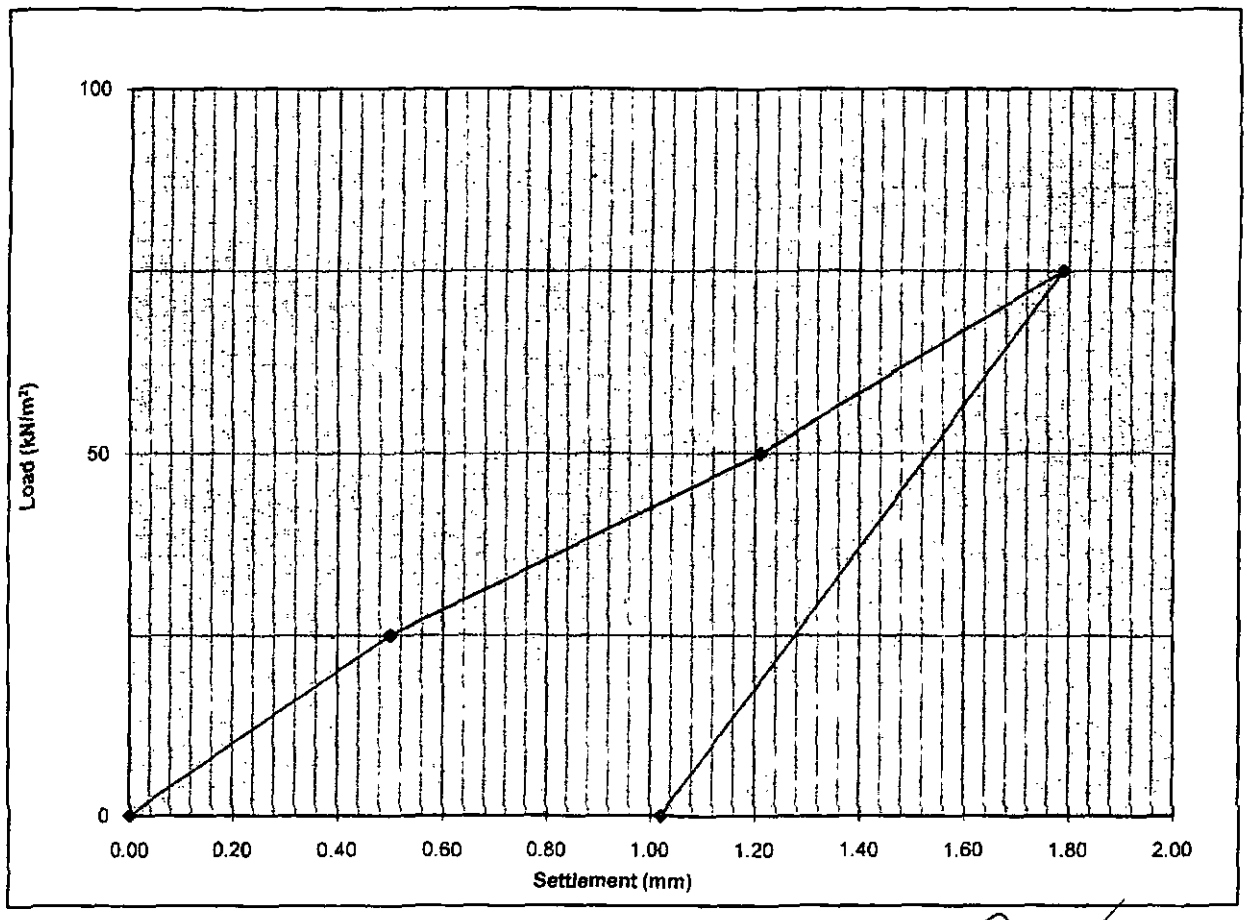
Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with mudstone
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	3
		Location:	3
Lab Ref.:	33627	**Date of Test:**	22-Feb-08

Load (kN/m^2)	Settlement (mm)
0	0.00
25	0.50
50	1.21
75	1.79
0	1.02



Comments:

Modulus 'k' = 10831
Equivalent CBR %= 0.6

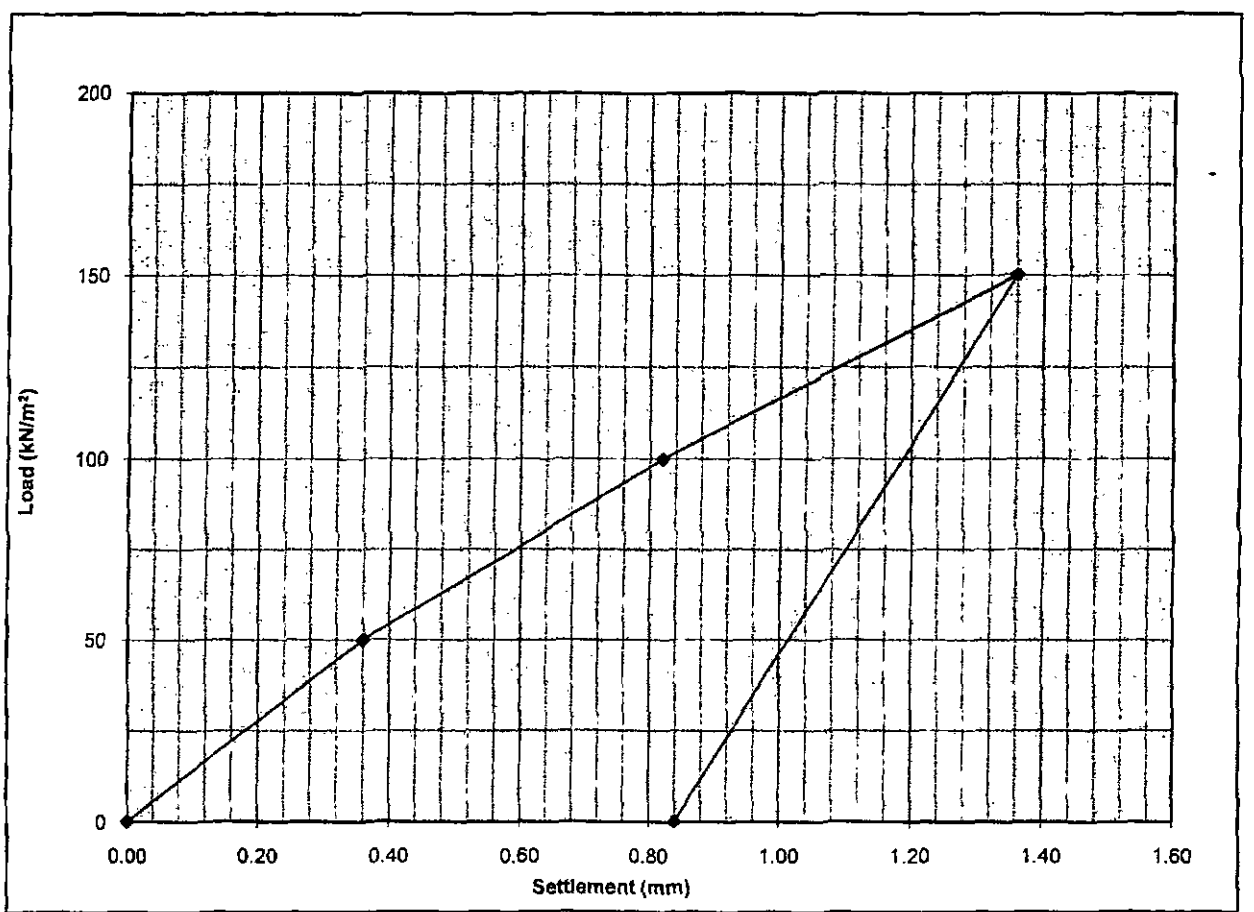
Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email. testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with mudstone
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	4
		Location:	4
Lab Ref.:	33627	**Date of Test:**	22-Feb-08

Load (kN/m²)	Settlement (mm)
0	0.00
50	0.36
100	0.82
150	1.36
0	0.84



Comments:

Modulus 'k' = 29159
Equivalent CBR %= 3.3

Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client: White Young Green Limited

Material Type: Crushed brick and concrete

Site: Land off Haughton Main Business Park Roundabout Grimethorpe

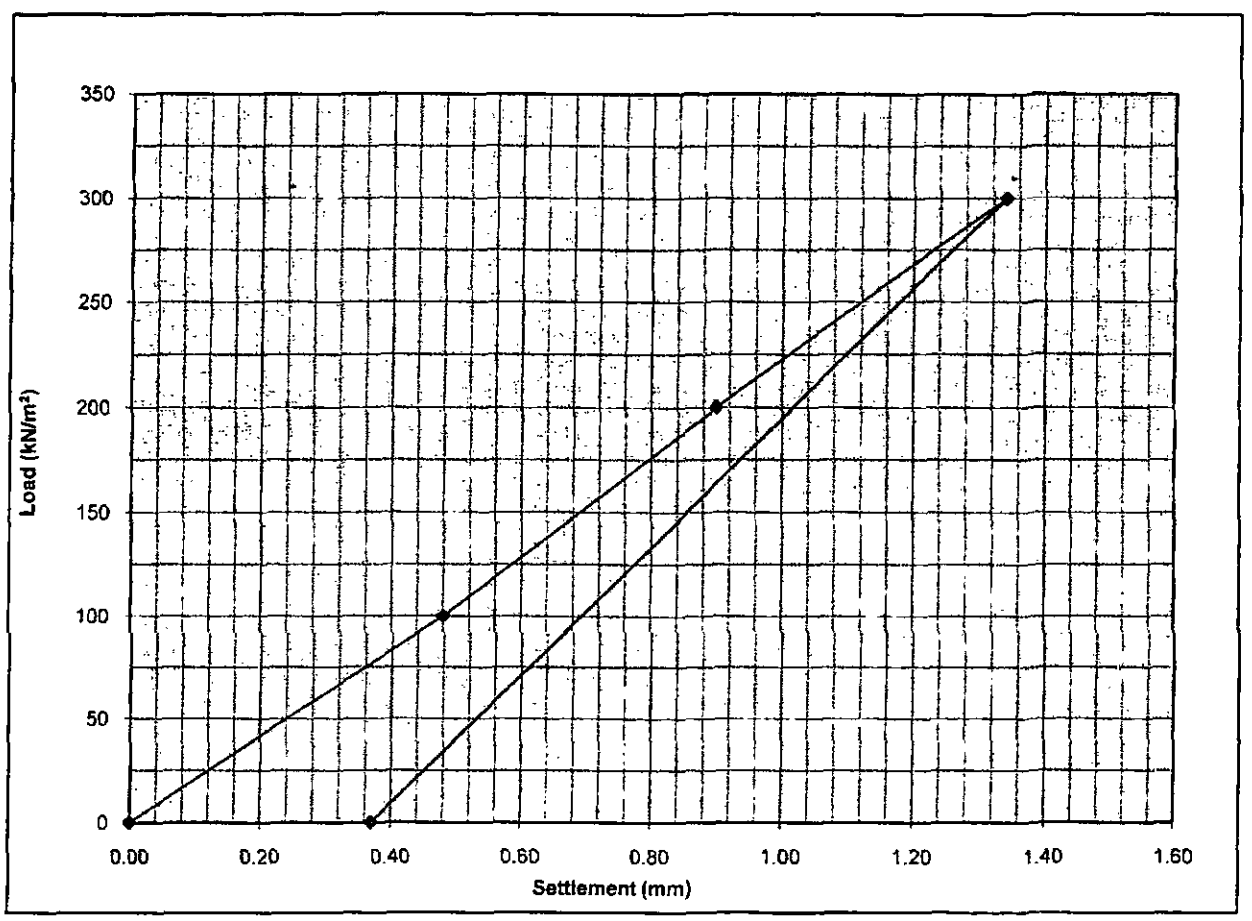
Test No.: 5

Location: 5

Lab Ref.: 33627

Date of Test: 22-Feb-08

Load (kN/m^2)	Settlement (mm)
0	0.00
100	0.48
200	0.90
300	1.34
0	0.37



Comments:

Modulus 'k' = 58318
Equivalent CBR %= 11.1

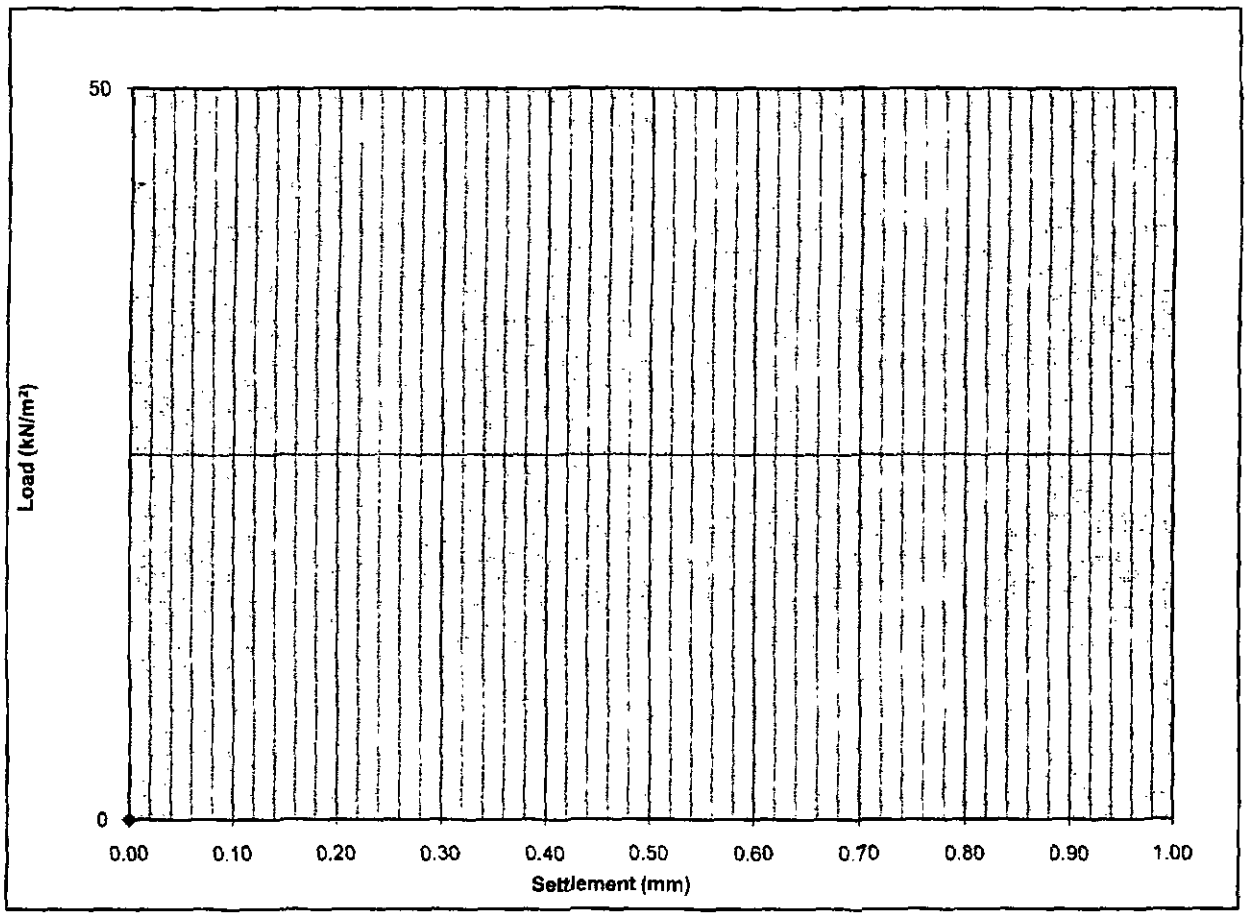
Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with mudstone
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	6
		Location:	6
Lab Ref.:	33627	**Date of Test:**	22-Feb-08

Load (kN/m^2)	Settlement (mm)
0	0.00
-	-
-	-
-	-
0	-



Comments:

Modulus 'k' = N/A
Equivalent CBR %= N/A

Test abandoned due to water entering pit

Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited

the obvious choice

Prime Parkway, Prime Enterprise Park, Derby DE1 3QB

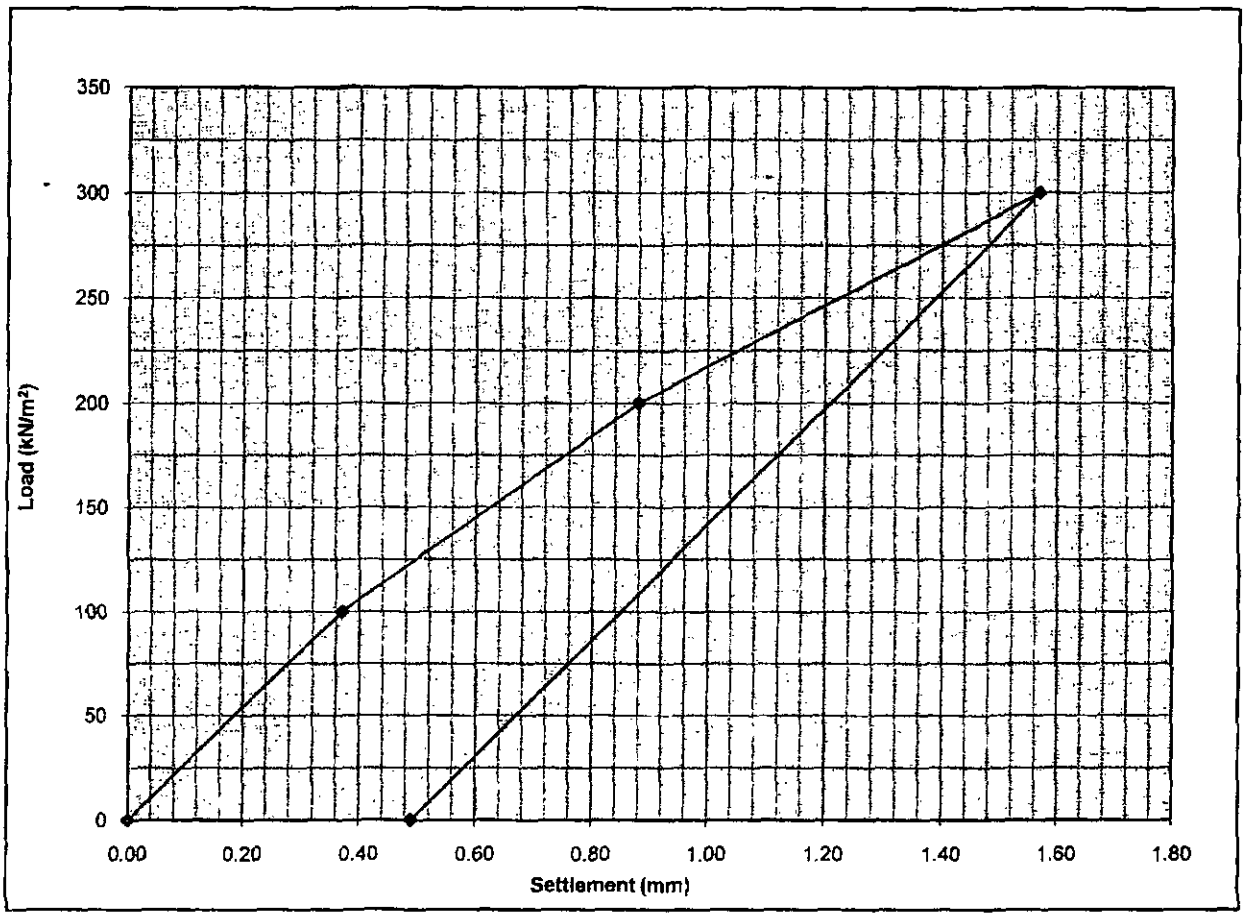
Tel: 01332 383333
Fax: 01332 602607

email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with sandstone fragments
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	3
		Location:	6A
Lab Ref.:	33844	**Date of Test:**	12-Mar-08

Load (kN/m^2)	Settlement (mm)
0	0.00
100	0.37
200	0.88
300	1.57
0	0.49



Comments:

Modulus 'k' = 52903
Equivalent CBR %= 9.4

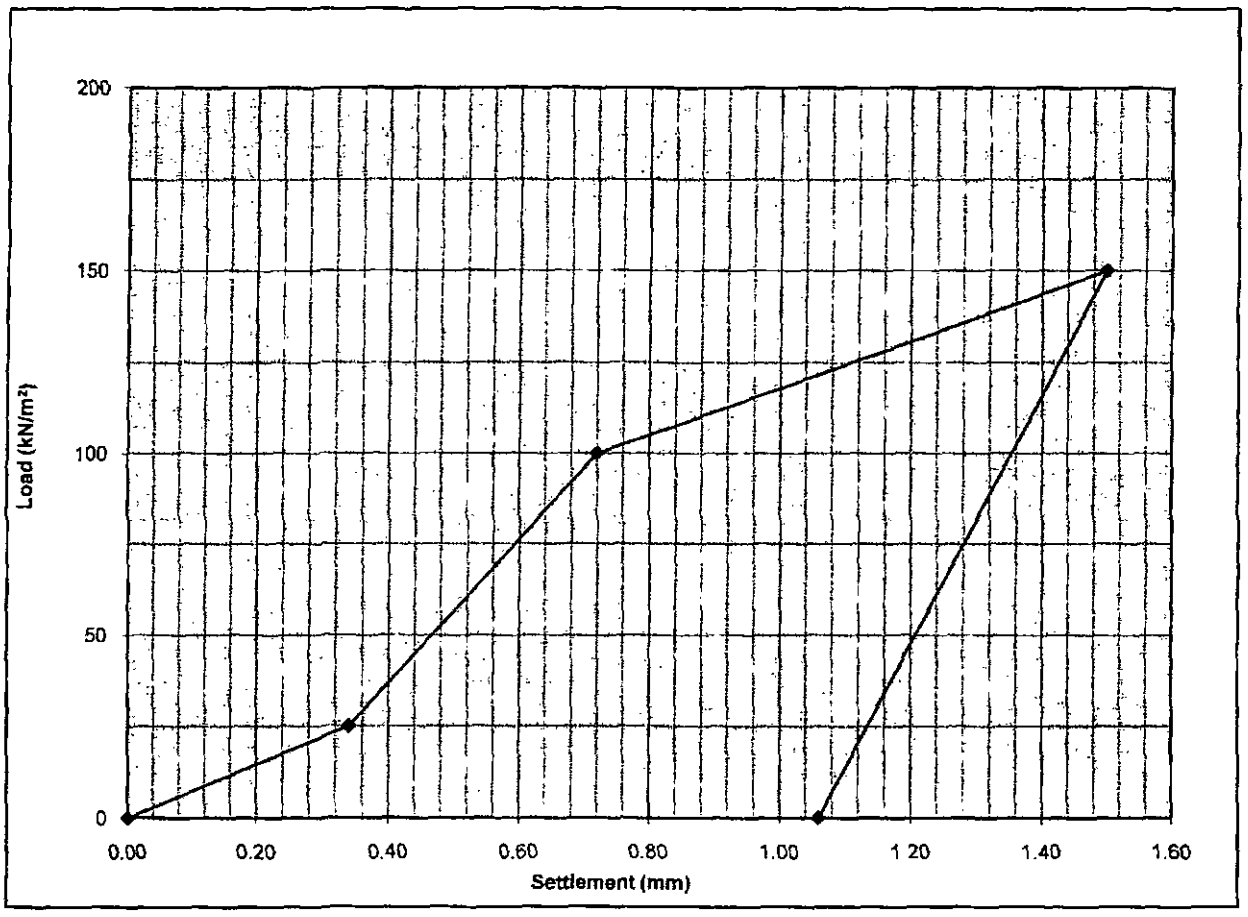
Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with mudstone
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	7
		Location:	7
Lab Ref.:	33627	**Date of Test:**	22-Feb-08

Load (kN/m²)	Settlement (mm)
0	0.00
25	0.34
100	0.72
150	1.50
0	1.06



Comments:

Modulus 'k' = 27910
Equivalent CBR %= 3.1

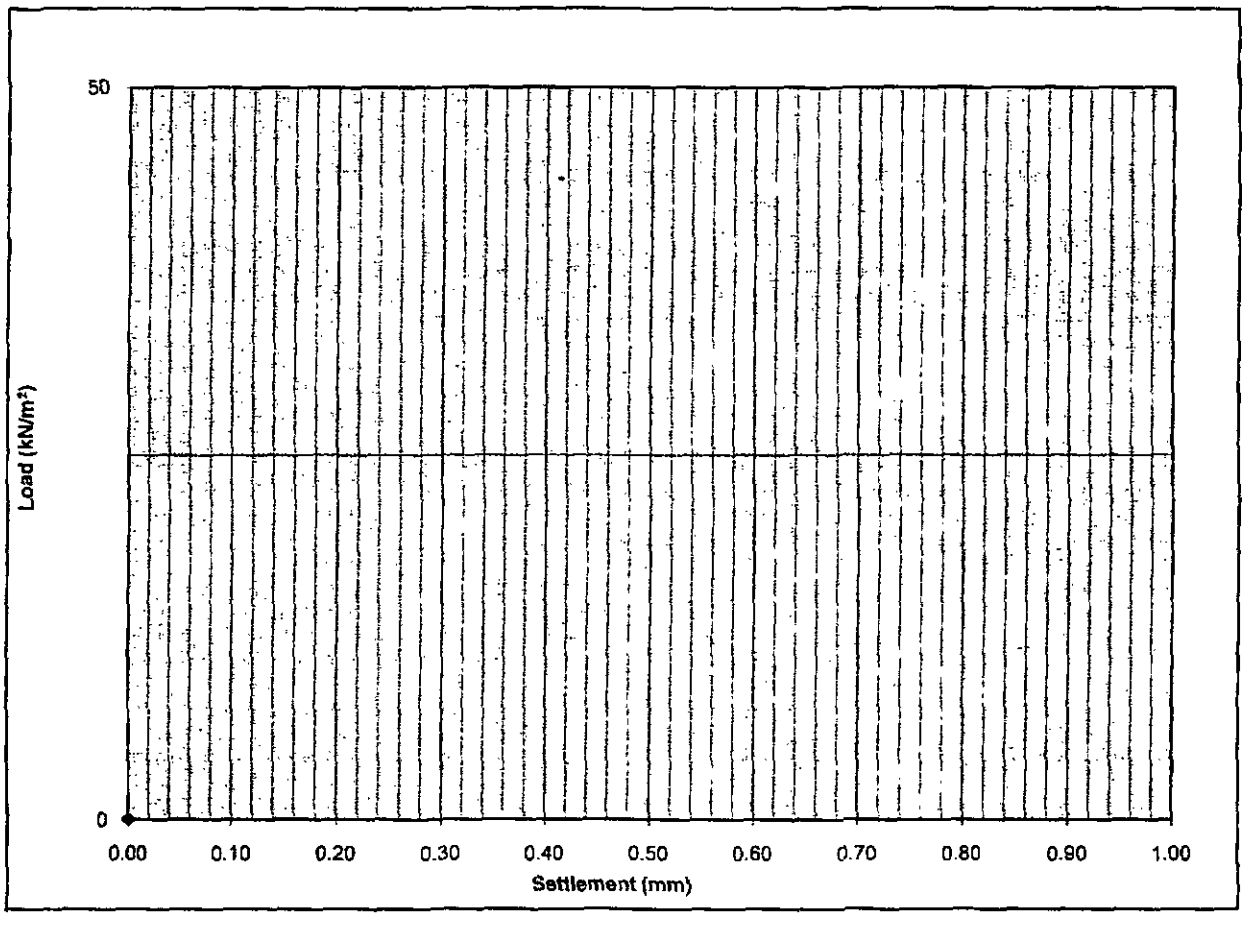
Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email. testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with mudstone
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	8
		Location:	8
Lab Ref.:	33627	**Date of Test:**	22-Feb-08

Load (kN/m^2)	Settlement (mm)
0	0.00
-	-
-	-
-	-
0	-



Comments:

Modulus 'k' = N/A
Equivalent CBR %= N/A

Test abandoned due to water entering pit

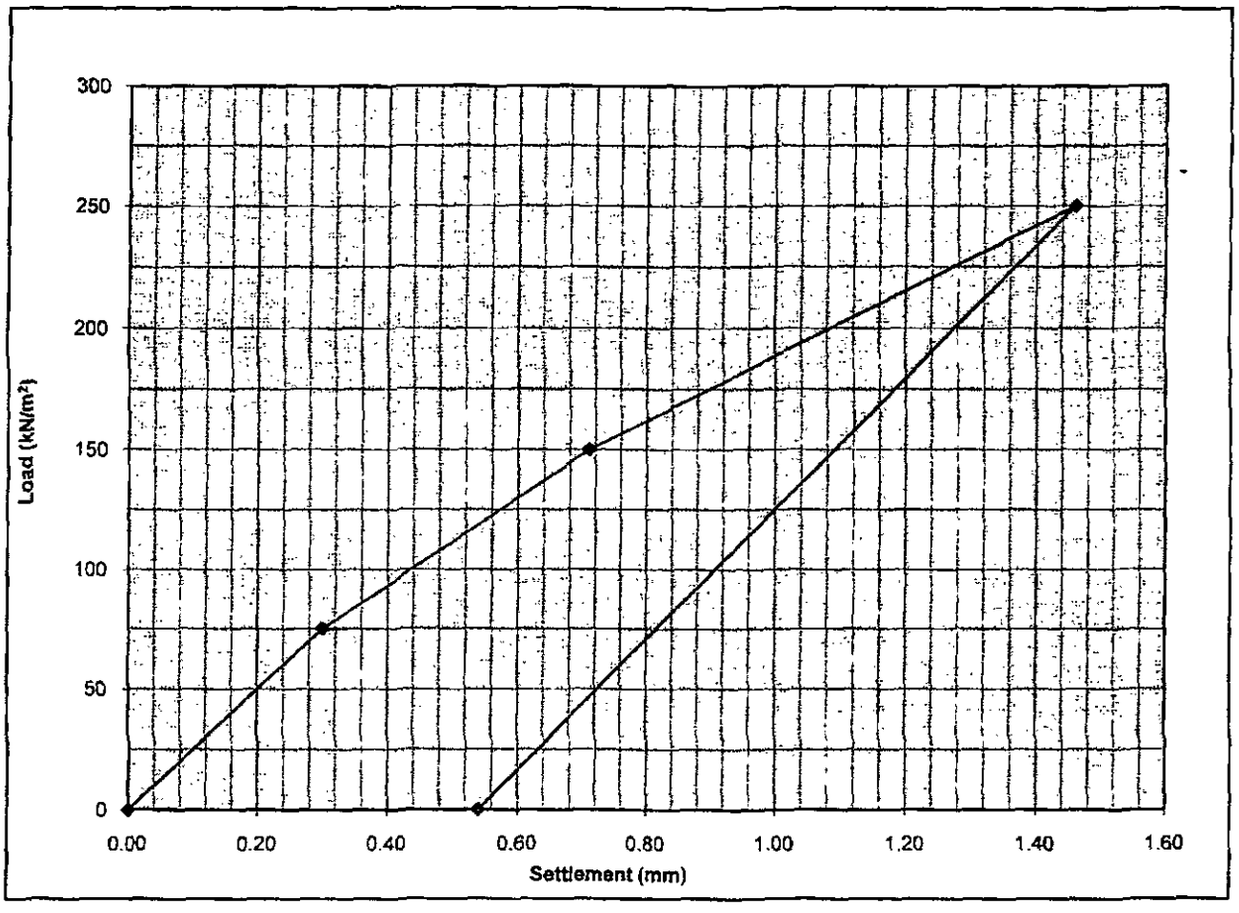
Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with sandstone fragments
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	1
		Location:	8A
Lab Ref.:	33844	**Date of Test:**	12-Mar-08

Load (kN/m^2)	Settlement (mm)
0	0.00
75	0.30
150	0.71
250	1.46
0	0.54



Comments:

Modulus 'k' = 46238
Equivalent CBR %= 7.4

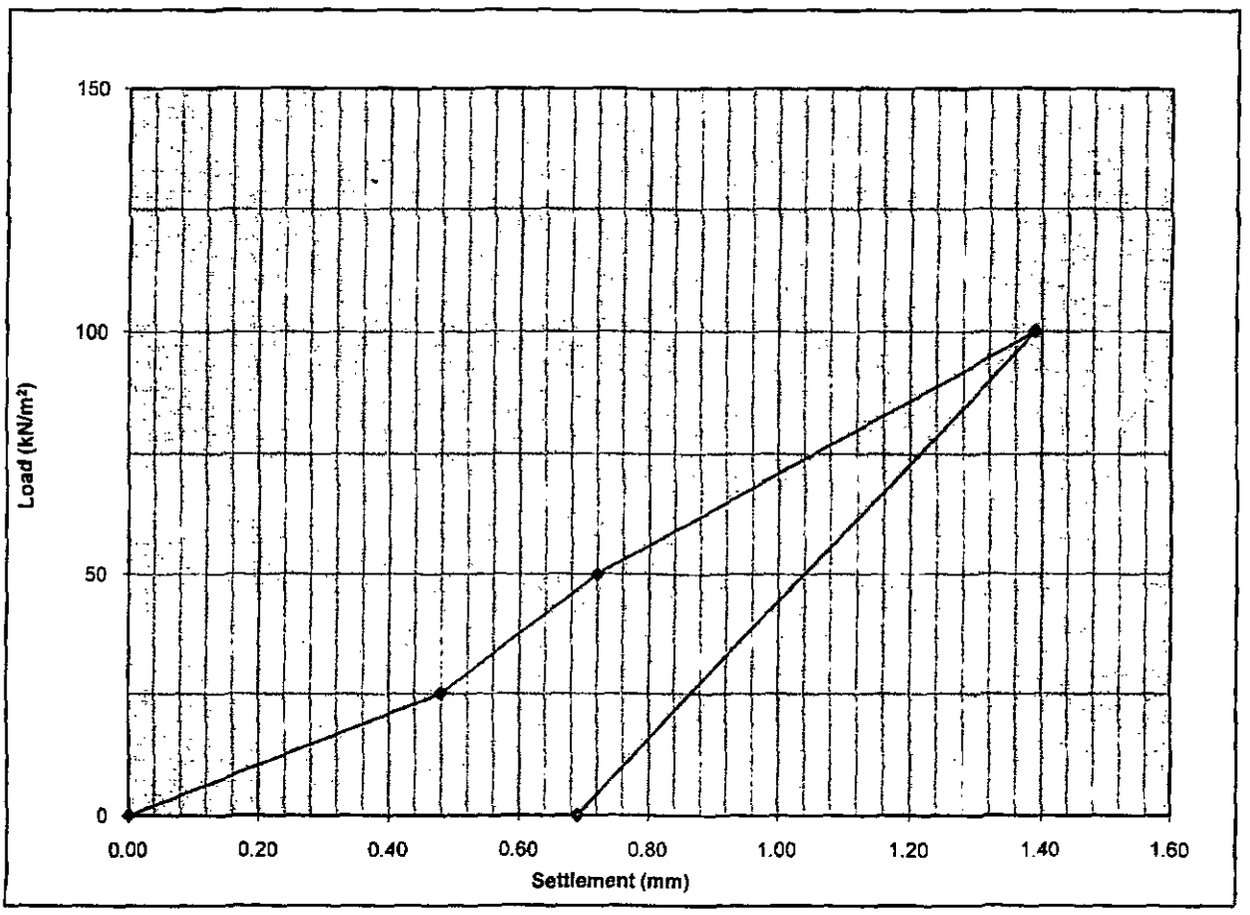
Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with mudstone
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	9
		Location:	9
Lab Ref.:	33627	**Date of Test:**	22-Feb-08

Load (kN/m²)	Settlement (mm)
0	0.00
25	0.48
50	0.72
100	1.39
0	0.69



Comments:

Modulus 'k' = 18745
Equivalent CBR %= 1.5

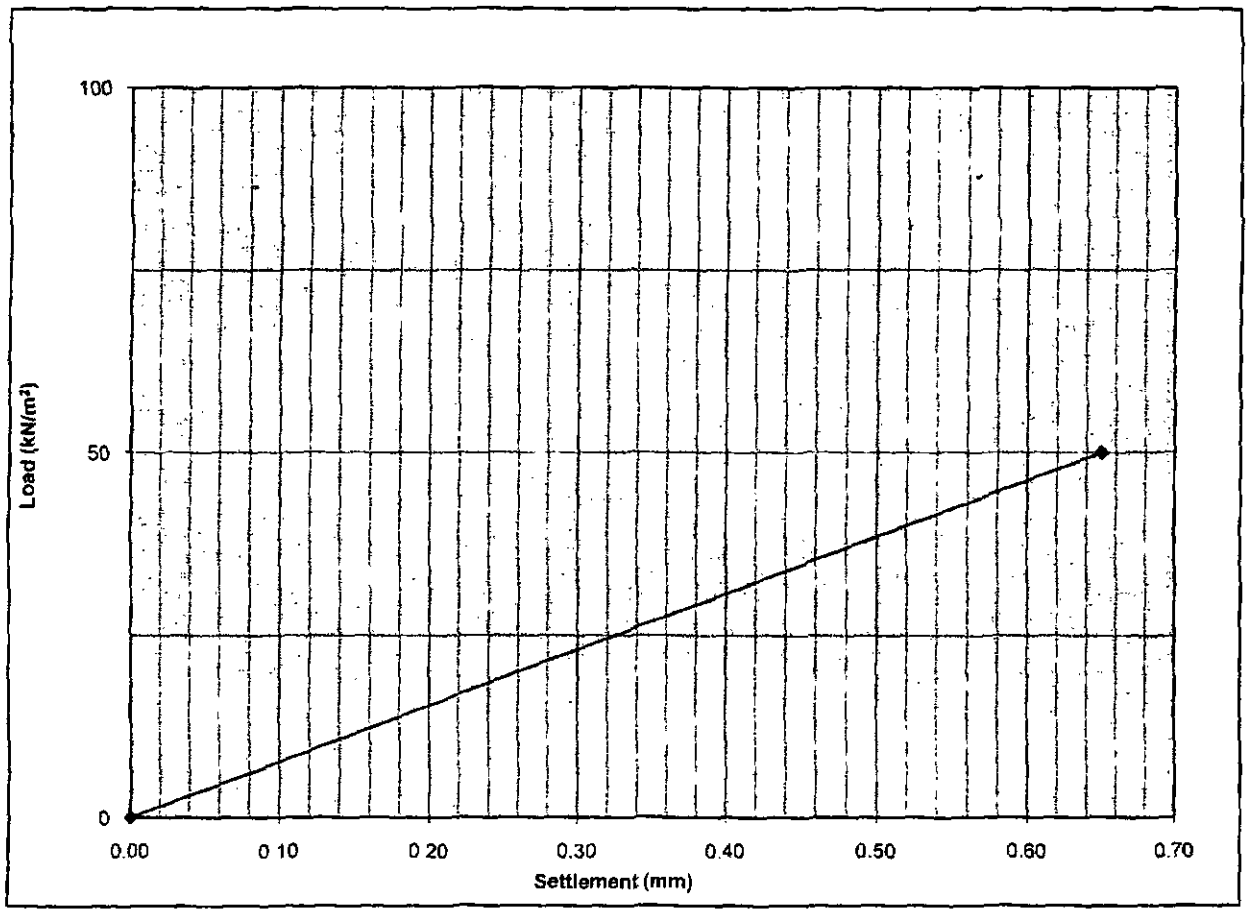
Signed by: Scott James
Laboratory Supervisor

CMT (Testing) Limited
Prime Parkway, Prime Enterprise Park, Derby DE1 3QB
Tel: 01332 383333
Fax: 01332 602607
email: testing@cmt-ltd.co.uk
www.cmt-ltd.co.uk
the obvious choice

150 mm Diameter Plate Test

Client:	White Young Green Limited	**Material Type:**	Light brown grey mottled CLAY with mudstone
Site:	Land off Haughton Main Business Park Roundabout Grimethorpe	**Test No.:**	10
		Location:	10
Lab Ref.:	33627	**Date of Test:**	22-Feb-08

Load (kN/m^2)	Settlement (mm)
0	0.00
50	0.65
-	-
-	-
0	-



Comments:

Modulus 'k' = N/A
Equivalent CBR %= N/A

Test abandoned due to water entering pit

Signed by: Scott James
Laboratory Supervisor

APPENDIX F:

GEOTECHNICAL LABORATORY REPORTS

RP09a 08/07/05

Summary of Geotechnical Laboratory results

WSP Environmental Laboratories

Sample Data					Classification BS 1377 Part 2											Compaction BS1377 Part 4			Rock ISRM		Strength & Compression testing BS 1377 Parts 5 & 7								
TP / BH No.	Other Id	Sampnum	Deppth from (m)	Depth to (m)	Moisture Content	Liquid Limit	Plastic Limit	Plasticity index	Plasticity category	Material passing 425um	Linear Shrinkage	Saturated Moisture content	Bulk Density	Dry Density	PSD / Sedimentation	Particle Density	CBR	MCV	Compaction	Point load Axial IS50	Point load Diametral IS50	Triaxial Type	Diameter	Cell Pressure	Corrected Deviator Stress	Undrained Shear Strength	Strain @ Failure	Mode of Failure	Hand Shear Vane *	One Dimensional Consolidation
					%	%	%	%		%	%	%	Mg/m^3	Mg/m^3		Mg/m^3				MPA	MPA		mm	kPa	kPa	CUkPa	%		kPa	
TP01	B	41126	1.2	1.4																										
TP01	B	41127	2.4	2.6																										
TP02	B	41128	0.2	0.4																										
TP02	B	41129	2.5	2.8																										
TP04	B	41130	0.2	0.4																										
TP04	B	41131	1.4	1.6	9.5										X															
TP04	B	41132	2.4	2.6	10								2.17	1.97																
TP05	B	41133	1.2	1.4	10								2.14	1.95																
TP07	B	41134	0.2	0.4		36	20	16	CI	92																				
TP07	B	41135	2.4	2.6											X															
TP13	B	41136	1.4	1.6		35	19	17	CI	80																				
TP13	B	41137	2.4	2.6	11								2.04	1.84																
TP14	B	41138	0.1	0.15	15										X															
TP14	B	41139	1.5	1.7											X															
TP16	B	41140	0.2	0.4	17	35	20	15	CI	100			2.11	1.8																
TP16	B	41141	2.1	2.3		33	17	16	CL	90																				
CP1	D	41142	0.5																											
CP1	D	41143	1			36	17	19	CI	90																				
CP1	D	41144	1.5		8.7																									
CP1	D	41145	2																											
CP1	B	41146	2.5		16								2.2	1.9																
CP1	D	41147	3		8.1																									
CP1	B	41148	3.5												X															
CP1	D	41149	4																											

RP09a 08/07/05

Summary of Geotechnical Laboratory results

WSP Environmental Laboratories

Sample Data					Classification BS 1377 Part 2											Compaction BS1377 Part 4			Rock ISRM		Strength & Compression testing BS 1377 Parts 5 & 7								
TP / BH No.	Other Id	Sampnum	Depth from (m)	Depth to (m)	Moisture Content	Liquid Limit	Plastic Limit	Plasticity index	Plasticity category	Material passing 425um	Linear Shrinkage	Saturated Moisture content	Bulk Density	Dry Density	PSD / Sedimentation	Particle Density	CBR	MCV	Compaction	Point load Axial IS50	Point load Diametral IS50	Triaxial Type	Diameter	Cell Pressure	Corrected Deviator Stress	Undrained Shear Strength	Strain @ Failure	Mode of Failure	Hand Shear Vane *	One Dimensional Consolidation
					%	%	%	%		%	%	%	Mg/m³	Mg/m³		Mg/m³				MPA	MPA		mm	kPa	kPa	CUkPa	%		kPa	
CP1	B	41150	5		19								2.09	1.76																
CP1	D	41151	5.7			40	28	13	MI	100																				
CP2	D	41152	0.5		20																									
CP2	D	41153	1																											
CP2	D	41154	1.5																											
CP2	D	41155	2			37	20	17	CI	85																				
CP2	B	41156	2.5		19								2.11	1.77																
CP2	D	41157	3		19																									
CP2	B	41158	3.5												X															
CP2	D	41159	4			38	19	19	CI	80																				
CP2	D	41160	5		13																									
CP2	B	41161	5.5		18								2.13	1.81																
CP3	D	41162	0.5			33	19	14	CL	92																				
CP3	D	41163	1		19																									
CP3	B	41164	1.5		12								2.13	1.9																
CP3	D	41165	2		14																									
CP3	D	41166	2.5			I/S	I/S	I/S	I/S	I/S																				
CP3	B	41167	2.5												X															
CP3	D	41168	3																											
CP3	D	41169	3.5																											
CP3	B	41170	3.5		18								2.11	1.79																
CP3	D	41171	4.5																											
CP3	B	41172	5.5												X															
CP4	D	41173	0.5		20																									

Summary of Geotechnical Laboratory results

WSP Environmental Laboratories

Sample Data					Classification BS 1377 Part 2											Compaction BS1377 Part 4			Rock ISRM		Strength & Compression testing BS 1377 Parts 5 & 7								
TP / BH No.	Other Id	Sampnum	Deppth from (m)	Depth to (m)	Moisture Content	Liquid Limit	Plastic Limit	Plasticity index	Plasticity category	Material passing 425um	Linear Shrinkage	Saturated Moisture content	Bulk Density	Dry Density	PSD / Sedimentation	Particle Density	CBR	MCV	Compaction	Point load Axial IS50	Point load Diametral IS50	Triaxial Type	Diameter	Cell Pressure	Corrected Deviator Stress	Undrained Shear Strength	Strain @ Failure	Mode of Failure	Hand Shear Vane *	One Dimensional Consolidation
					%	%	%	%		%	%	%	Mg/m³	Mg/m³		Mg/m³				MPA	MPA		mm	kPa	kPa	CUkPa	%		kPa	
CP4	D	41174	1			36	17	19	CI	90																				
CP4	B	41175	1.5												X															
CP4	D	41176	2		12																									
CP4	B	41177	2.5		14								2.16	1.89																
CP4	D	41178	3																											
CP4	D	41179	3.5			36	19	17	CI	88																				
CP4	D	41180	4																											
CP4	D	41181	4.5												X															
CP4	B	41182	5																											
CP4	B	41183	5.5		17								2.12	1.81																
CP4	D	41184	6																											
CP5	D	41185	0.5		16																									
CP5	D	41186	1			37	22	16	CI	88																				
CP5	B	41187	1		17								2.11	1.8																
CP5	D	41188	1.5		7																									
CP5	B	41189	1.5												X															
CP5	B	41190	2																											
CP5	B	41191	2.5		7.3								2.04	1.9																
CP5	D	41192	3																											
CP5	D	41193	3.5			I/S	I/S	I/S	I/S	I/S																				
CP5	D	41194	4																											
CP5	D	41196	5																											
CP5	B	41204	4.5												X															

RP09a 08/07/05

Summary of Geotechnical Laboratory results

WSP Environmental Laboratories

Sample Data					Chemical BS 1377 Part 3								Other Analyses																				
TP / BH No.	Other Id	Sampnum	Depth from (m)	Depth to (m)	Water Soluble Sulphate *	pH *	Acid Soluble Sulphate %	Water Soluble Chloride	Organic Matter	Loss on Ignition % **	Total Sulphur % ($)	matter >2mm %	Acid soluble sulphate $	Water soluble Sulphate $	Total Sulphur Solid $																			
					g/l	units	%	g/l	%	%	%	%																						
TP01	B	41126	1.2	1.4									0.12	0.08	0.06																		
TP01	B	41127	2.4	2.6									0.1		0.06																		
TP02	B	41128	0.2	0.4										0.02																			
TP02	B	41129	2.5	2.8										0.05																			
TP04	B	41130	0.2	0.4										0.26																			
TP04	B	41131	1.4	1.6																													
TP04	B	41132	2.4	2.6																													
TP05	B	41133	1.2	1.4																													
TP07	B	41134	0.2	0.4									0.11		0.04																		
TP07	B	41135	2.4	2.6																													
TP13	B	41136	1.4	1.6										0.13																			
TP13	B	41137	2.4	2.6																													
TP14	B	41138	0.1	0.15																													
TP14	B	41139	1.5	1.7									1.04		0.49																		
TP16	B	41140	0.2	0.4																													
TP16	B	41141	2.1	2.3										0.44																			
CP1	D	41142	0.5										0.14																				
CP1	D	41143	1																														
CP1	D	41144	1.5																														
CP1	D	41145	2											0.12																			
CP1	B	41146	2.5																														
CP1	D	41147	3										0.09																				
CP1	B	41148	3.5																														
CP1	D	41149	4												0.11																		

RP09a 08/07/05

Summary of Geotechnical Laboratory results

WSP Environmental Laboratories

Sample Data					Chemical BS 1377 Part 3								Other Analyses																					
TP / BH No.	Other Id	Sampnum	Depth from (m)	Depth to (m)	Water Soluble Sulphate *	pH *	Acid Soluble Sulphate %	Water Soluble Chloride	Organic Matter	Loss on Ignition % **	Total Sulphur % ($)	matter >2mm %	Acid soluble sulphate $	Water soluble Sulphate $	Total Sulphur Solid $																				
					g/l	units	%	g/l	%	%	%	%																								
CP1	B	41150	5																															
CP1	D	41151	5.7																															
CP2	D	41152	0.5										0.04																					
CP2	D	41153	1												0.38																			
CP2	D	41154	1.5											0.09																				
CP2	D	41155	2																															
CP2	B	41156	2.5																															
CP2	D	41157	3										0.07																					
CP2	B	41158	3.5																															
CP2	D	41159	4																															
CP2	D	41160	5												0.25																			
CP2	B	41161	5.5																															
CP3	D	41162	0.5																															
CP3	D	41163	1											0.07																				
CP3	B	41164	1.5																															
CP3	D	41165	2										0.03																					
CP3	D	41166	2.5																															
CP3	B	41167	2.5																															
CP3	D	41168	3											0.08																				
CP3	D	41169	3.5												0.29																			
CP3	B	41170	3.5																															
CP3	D	41171	4.5										0.03																					
CP3	B	41172	5.5																															
CP4	D	41173	0.5										0.08																					

WSP Environmental Laboratories

Summary of Geotechnical Laboratory results

Sample Data					Chemical BS 1377 Part 3								Other Analyses																					
TP / BH No. *	Other Id	Sampnum	Deppth from (m)	Depth to (m)	Water Soluble Sulphate *	pH *	Acid Soluble Sulphate %	Water Soluble Chloride	Organic Matter	Loss on Ignition % **	Total Sulphur % ($)	matter >2mm %	Acid soluble sulphate $	Water soluble Sulphate $	Total Sulphur Solid $																				
					g/l	units	%	g/l	%	%	%	%																							
CP4	D	41174	1																															
CP4	B	41175	1.5																															
CP4	D	41176	2											0.02																				
CP4	B	41177	2.5																															
CP4	D	41178	3												0.06																			
CP4	D	41179	3.5																															
CP4	D	41180	4										0.03																					
CP4	D	41181	4.5																															
CP4	B	41182	5											0.03																				
CP4	B	41183	5.5																															
CP4	D	41184	6												0.23																			
CP5	D	41185	0.5												0.02																			
CP5	D	41186	1																															
CP5	B	41187	1																															
CP5	D	41188	1.5										0.07																					
CP5	B	41189	1.5																															
CP5	B	41190	2											0.05																				
CP5	B	41191	2.5																															
CP5	D	41192	3												0.06																			
CP5	D	41193	3.5																															
CP5	D	41194	4										0.1																					
CP5	D	41196	5											0.05																				
CP5	B	41204	4.5																															

WSP Environmental Ltd, Unit 5 Centurian Business Centre Dabell Avenue, Bulwell, Nottingham NG6 8WA

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Environmental Laboratories

Summary of Geotechnical Laboratory results

BH/TP No.	Sampnum	Depth	Laboratory Description	Remarks
TP01	41126	1.2-1.4	Grey Clay / Mudstone	
TP01	41127	2.4-2.6	Grey Clay / Mudstone	
TP02	41128	0.2-0.4	Grey Clay / Mudstone	
TP02	41129	2.5-2.8	Grey Clay / Mudstone	
TP04	41130	0.2-0.4	Grey Clay / Mudstone	
TP04	41131	1.4-1.6	Grey Clay / Mudstone	
TP04	41132	2.4-2.6	Grey Clay / Mudstone	
TP05	41133	1.2-1.4	Grey Clay / Mudstone	
TP07	41134	0.2-0.4	Brown/Grey CLAY	
TP07	41135	2.4-2.6	Grey Clay / Mudstone	
TP13	41136	1.4-1.6	Grey CLAY very friable	
TP13	41137	2.4-2.6	Grey Clay / Mudstone	
TP14	41138	0.1-0.15	Grey Clay / Mudstone	
TP14	41139	1.5-1.7	Grey Clay / Mudstone	
TP16	41140	0.2-0.4	Light Brown CLAY	
TP16	41141	2.1-2.3	Grey Very Friable CLAY	
CP1	41142	0.5	Grey Clay / Mudstone	
CP1	41143	1	Grey Clay / Mudstone	
CP1	41144	1.5	Grey Clay / Mudstone	
CP1	41145	2	Grey Clay / Mudstone	
CP1	41146	2.5	Grey Clay / Mudstone	
CP1	41147	3	Grey Clay / Mudstone	
CP1	41148	3.5	Soft Grey CLAY / mudstone	
CP1	41149	4	Grey Clay / Mudstone	
CP1	41150	5	Grey Clay / Mudstone	
CP1	41151	5.7	Soft Grey CLAY	
CP2	41152	0.5	Grey Clay / Mudstone	
CP2	41153	1	Grey Clay / Mudstone	
CP2	41154	1.5	Grey Clay / Mudstone	

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Summary of Geotechnical Laboratory results

BH/TP No.	Sampnum	Depth	Laboratory Description	Remarks
CP2	41155	2	Firm Grey Slightly Gravelly CLAY	
CP2	41156	2.5	Grey Clay / Mudstone	
CP2	41157	3	Grey Clay / Mudstone	
CP2	41158	3.5	Grey Clay / Mudstone	
CP2	41159	4	Soft Grey Gravelly (Mudstone)CLAY	
CP2	41160	5	Grey Clay / Mudstone	
CP2	41161	5.5	Grey Clay / Mudstone	
CP3	41162	0.5	Firm Grey/Pale Brown, Slightly Sandy Gravelly CLAY	
CP3	41163	1	Grey Clay / Mudstone	
CP3	41164	1.5	Grey Clay / Mudstone	
CP3	41165	2	Grey Clay / Mudstone	
CP3	41166	2.5	Grey Clay / Mudstone	
CP3	41167	2.5	soft grey CLAY / SANDSTONE	
CP3	41168	3	Grey Clay / Mudstone	
CP3	41169	3.5	Grey Clay / Mudstone'	
CP3	41170	3.5	Grey Clay / Mudstone	
CP3	41171	4.5	Grey Clay / Mudstone	
CP3	41172	5.5	soft grey CLAY / SANDSTONE	
CP4	41173	0.5	Grey Clay / Mudstone	
CP4	41174	1	Grey CLAY with occ Gravel	
CP4	41175	1.5	soft grey CLAY / SANDSTONE	
CP4	41176	2	Grey Clay / Mudstone	
CP4	41177	2.5	Grey Clay / Mudstone	
CP4	41178	3	Grey Clay / Mudstone	
CP4	41179	3.5	Grey Clay / Mudstone	
CP4	41180	4	Grey Clay / Mudstone	
CP4	41181	4.5	soft-firm grey CLAY / SANDSTONE	
CP4	41182	5	Grey Clay / Mudstone	
CP4	41183	5.5	Grey Clay / Mudstone	

Summary of Geotechnical Laboratory results

BH/TP No.	Sampnum	Depth	Laboratory Description	Remarks
CP4	41184	6	Grey Clay / Mudstone	
CP5	41185	0.5	Grey Clay / Mudstone	
CP5	41186	1	Firm Grey/Black, occasional fine gravel CLAY	
CP5	41187	1	Grey Clay / Mudstone	
CP5	41188	1.5	Grey Clay / Mudstone	
CP5	41189	1.5	Grey Clay / Mudstone	
CP5	41190	2	Grey Clay / Mudstone	
CP5	41191	2.5	Grey Clay / Mudstone	
CP5	41192	3	Grey Clay / Mudstone	
CP5	41193	3.5	Grey Clay / Mudstone	
CP5	41194	4	Grey Clay / Mudstone	
CP5	41196	5	Grey Clay / Mudstone	
CP5	41204	4.5	Grey Clay / Mudstone	

PLASTICITY CHART from BS5930 : 2000

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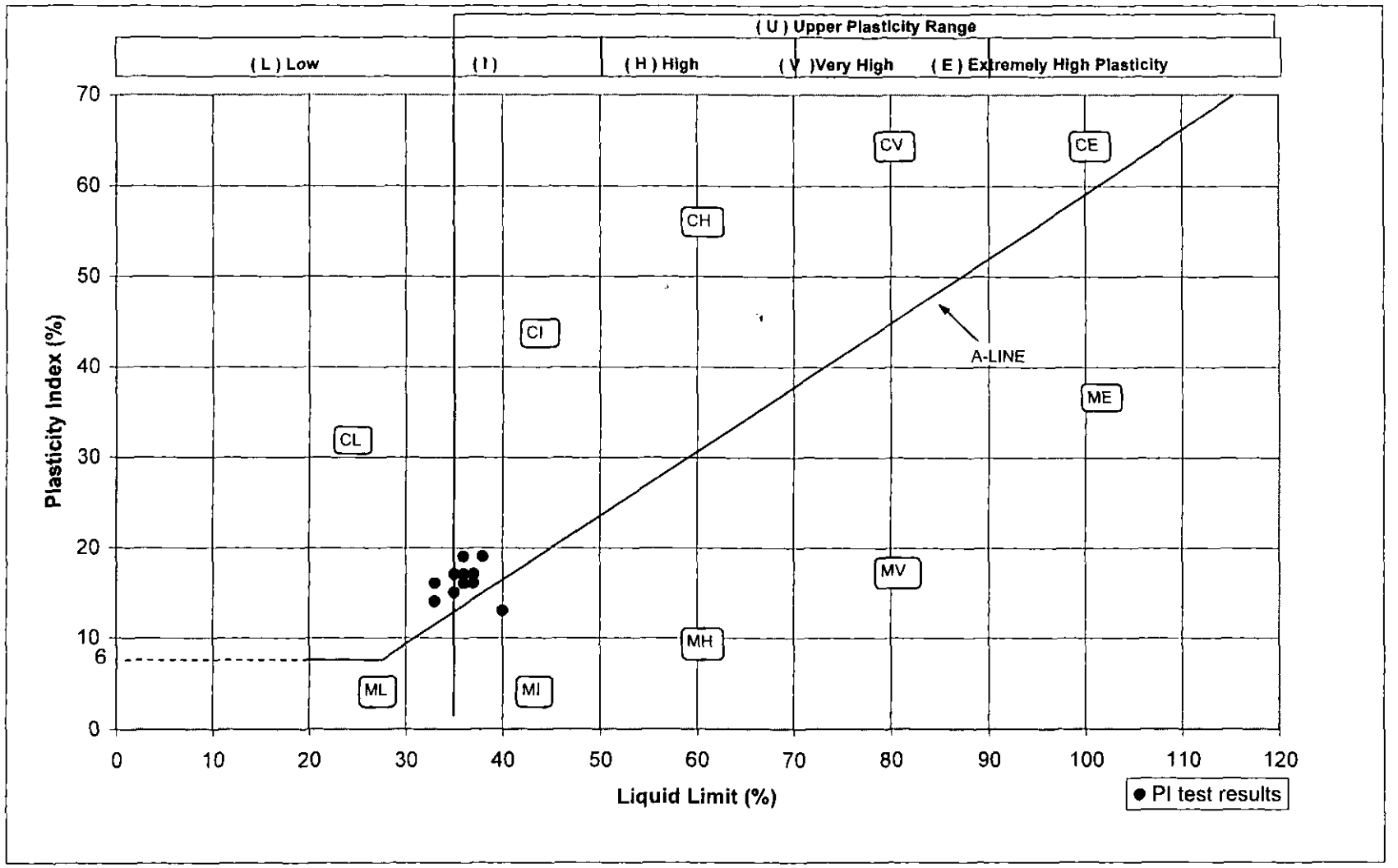
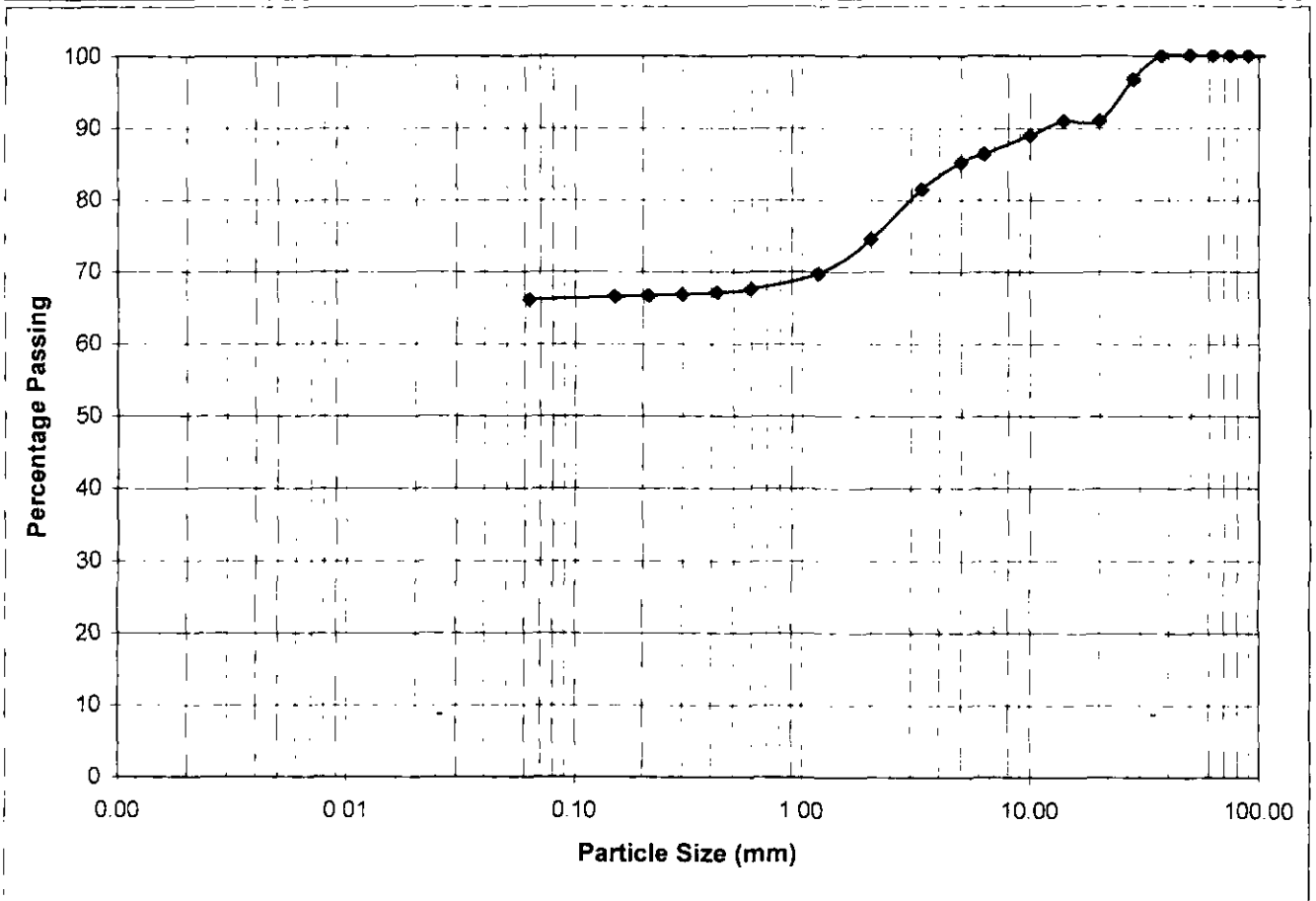
UKAS TESTING 0206



PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 1990

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	TP04 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	1 4-1.6	SAMPNUM	41131



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	96.73
20.00	91.03
14.00	91.03
10.00	88.96
6.300	86.43
5.000	85.22
3.350	81.49
2.000	74.54
1.180	69.82
0.600	67.55
0.425	67.17
0.300	66.92
0.212	66.76
0.150	66.59
0.063	66.16

PARTICLE DIAMETER (mm)	% PASSING
2.00	74.54
0.063	66.16

SOIL FRACTION	TOTAL %
GRAVEL	25.46
SAND	8.38
SILT OR CLAY	66.16

Tested by / date	DP 7/3/08

NOTES:

* SIZE PARTICLES ABOVE 60mm CLASSIFY AS COBBLES

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Nottingham, NG6 8WA

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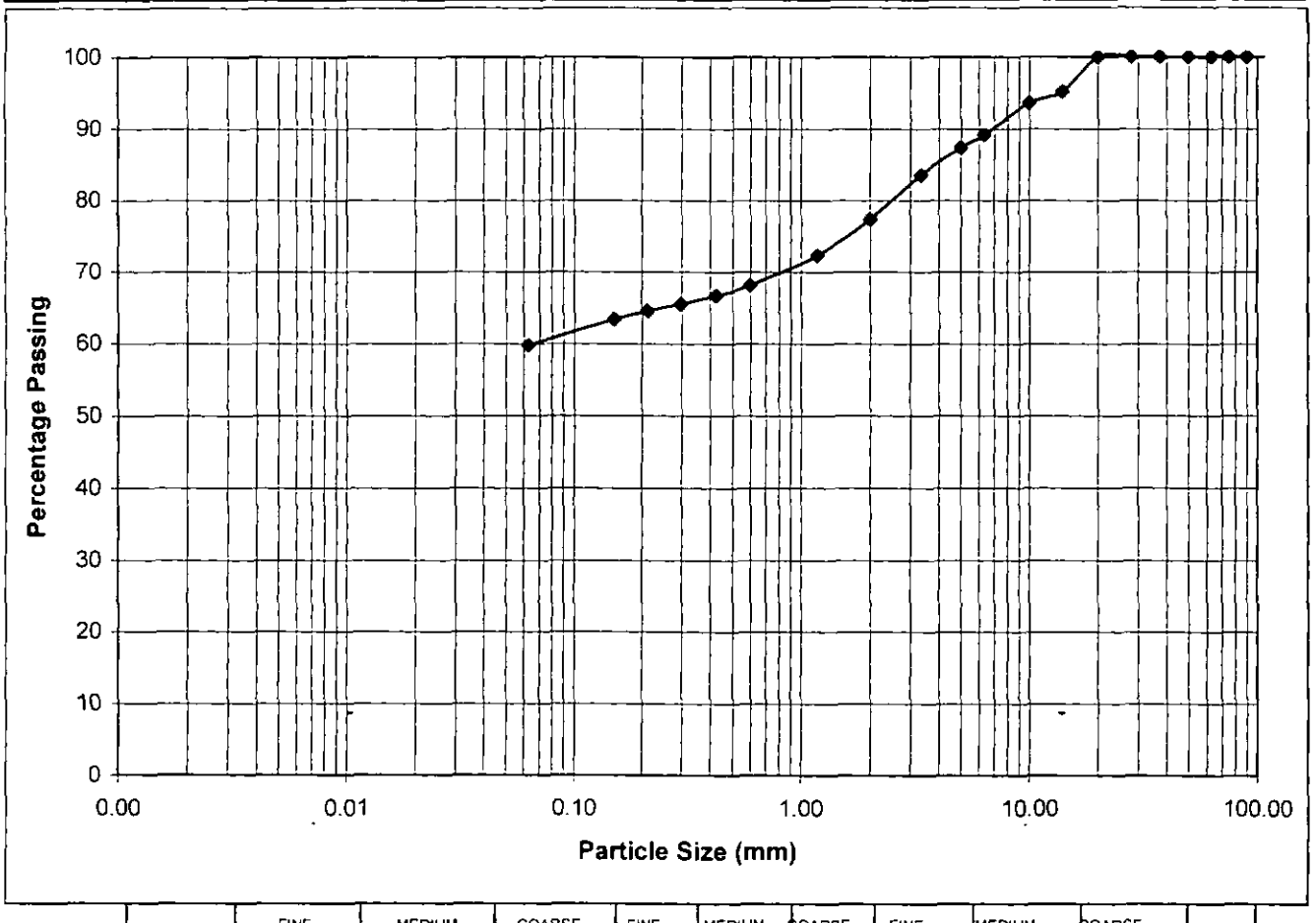
UKAS TESTING 0206

PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 1990

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	TP07 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	2.4-2.6	SAMPNUM	41135



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	100.00
20.00	100.00
14.00	95.15
10.00	93.55
6.300	89.13
5.000	87.35
3.350	83.55
2.000	77.33
1.180	72.34
0.600	68.16
0.425	66.76
0.300	65.57
0.212	64.62
0.150	63.45
0.063	59.80

PARTICLE DIAMETER (mm)	% PASSING
2.00	77.33
0.063	59.80

SOIL FRACTION	TOTAL %
GRAVEL	22.67
SAND	17.53
SILT OR CLAY	59.80

Tested by / date	DP 7/3/08

NOTES:

*** SIZE PARTICLES ABOVE 60mm CLASSIFY AS COBBLES**

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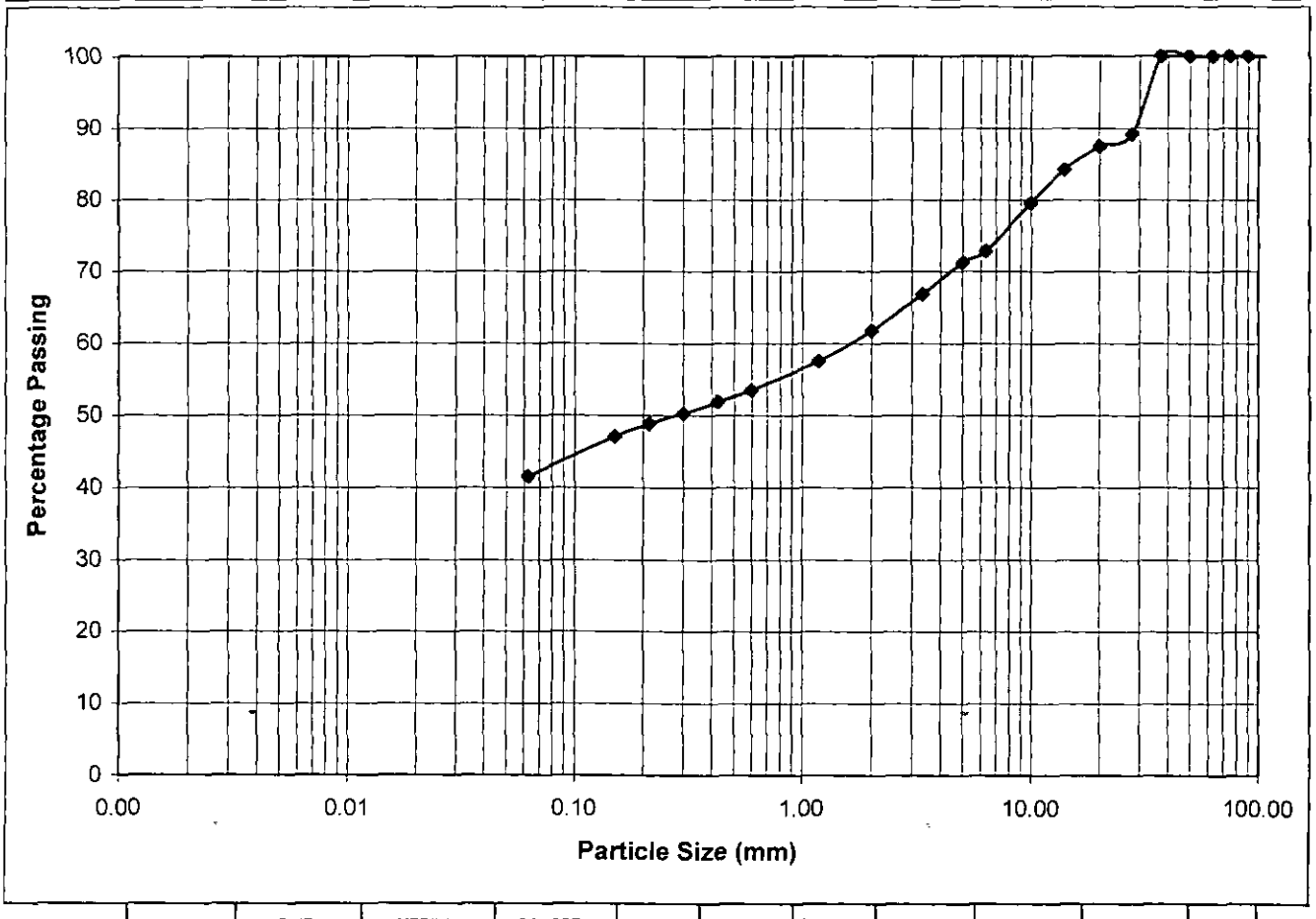
WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	TP14 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	0.1-0.15	SAMPNUM	41138



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	89.12
20.00	87.47
14.00	84.18
10.00	79.55
6.300	72.86
5.000	71.19
3.350	66.91
2.000	61.76
1.180	57.52
0.600	53.50
0.425	51.86
0.300	50.29
0.212	48.84
0.150	47.02
0.063	41.49

PARTICLE DIAMETER (mm)	% PASSING
2.00	61.76
0.063	41.49

SOIL FRACTION	TOTAL %
GRAVEL	38.24
SAND	20.27
SILT OR CLAY	41.49

Tested by / date	DP 7/3/08

NOTES:

* SIZE PARTICLES ABOVE 60mm CLASSIFY AS COBBLES

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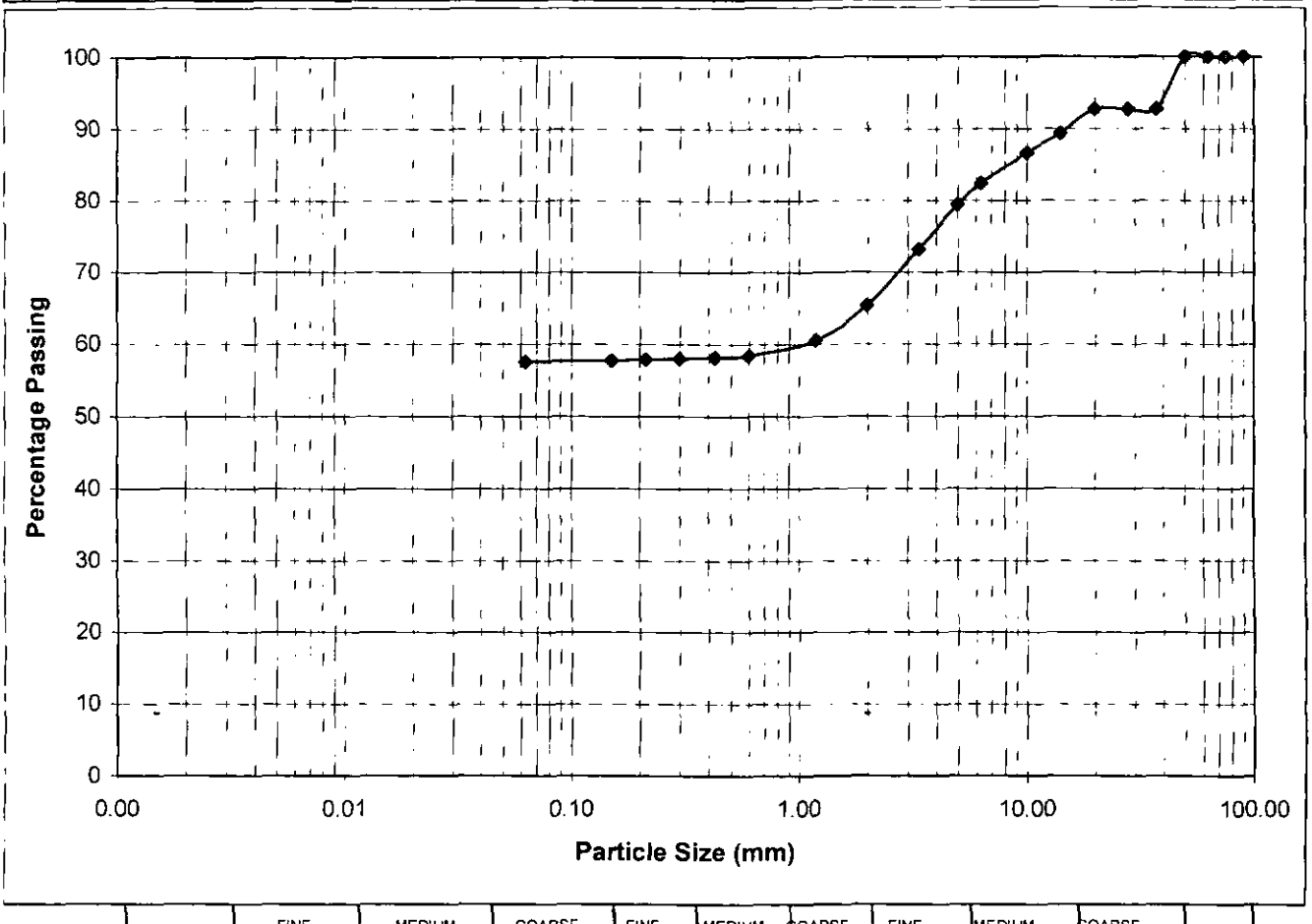
WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	TP14 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	1.5-1.7	SAMPNUM	41139



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	92.68
28.00	92.68
20.00	92.68
14.00	89.29
10.00	86.61
6.300	82.36
5.000	79.36
3.350	73.20
2.000	65.36
1.180	60.53
0.600	58.44
0.425	58.15
0.300	57.96
0.212	57.87
0.150	57.76
0.063	57.60

PARTICLE DIAMETER (mm)	% PASSING
2.00	65.36
0.063	57.60

SOIL FRACTION	TOTAL %
GRAVEL	34.64
SAND	7.76
SILT OR CLAY	57.60

Tested by / date	DP 7/3/08

NOTES:

* SIZE PARTICLES ABOVE 60mm CLASSIFY AS COBBLES

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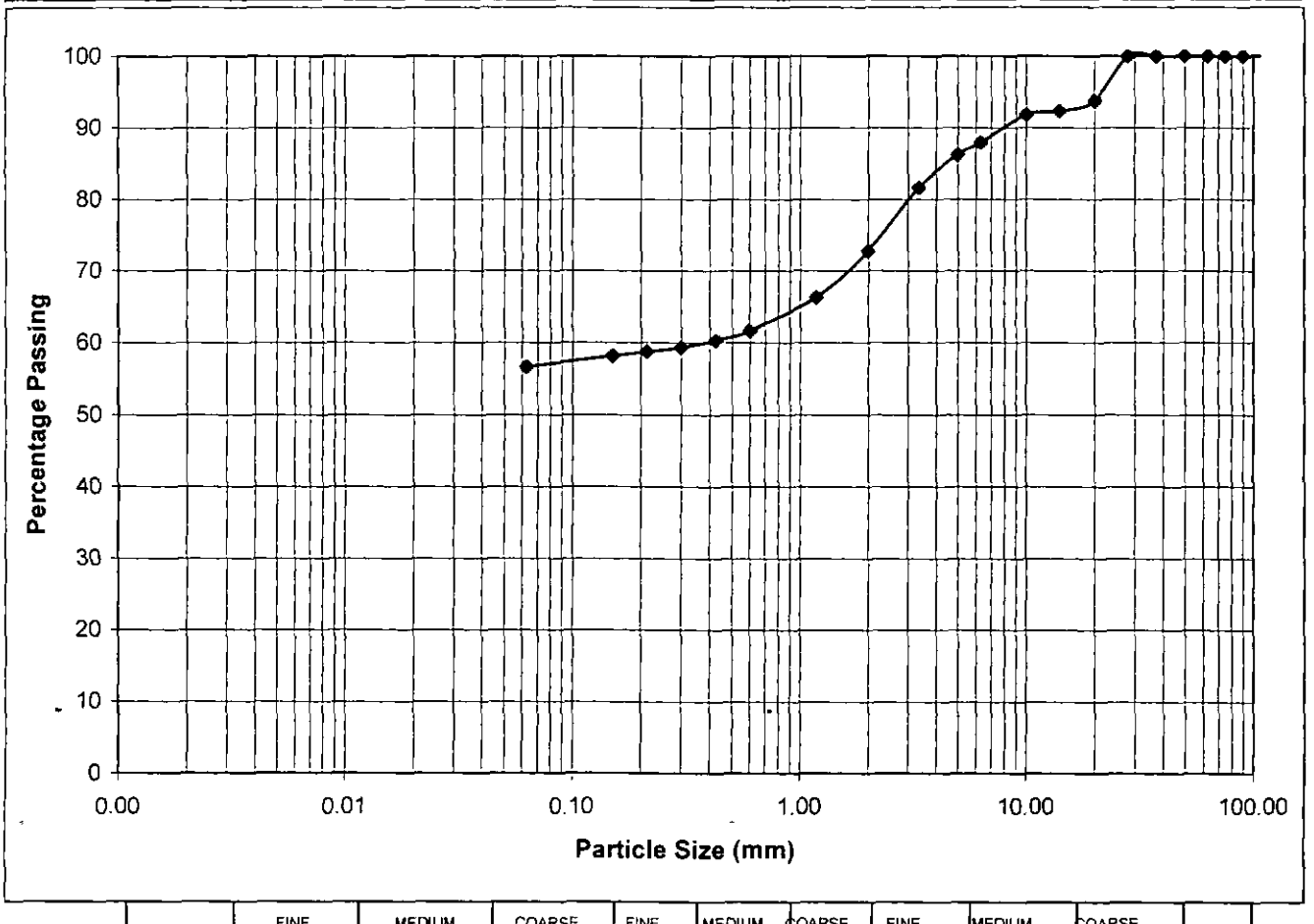
PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 1990

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	CP1 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	3.5	SAMPNUM	41148



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	100.00
20.00	93.69
14.00	92.25
10.00	91.80
6.300	87.83
5.000	86.17
3.350	81.61
2.000	72.75
1.180	66.28
0.600	61.60
0.425	60.25
0.300	59.31
0.212	58.72
0.150	58.17
0.063	56.64

PARTICLE DIAMETER (mm)	% PASSING
2.00	72.75
0.063	56.64

SOIL FRACTION	TOTAL %
GRAVEL	27.25
SAND	16.11
SILT OR CLAY	56.64

Tested by / date	DP 7/3/08

NOTES:

* SIZE PARTICLES ABOVE 60mm CLASSIFY AS COBBLES

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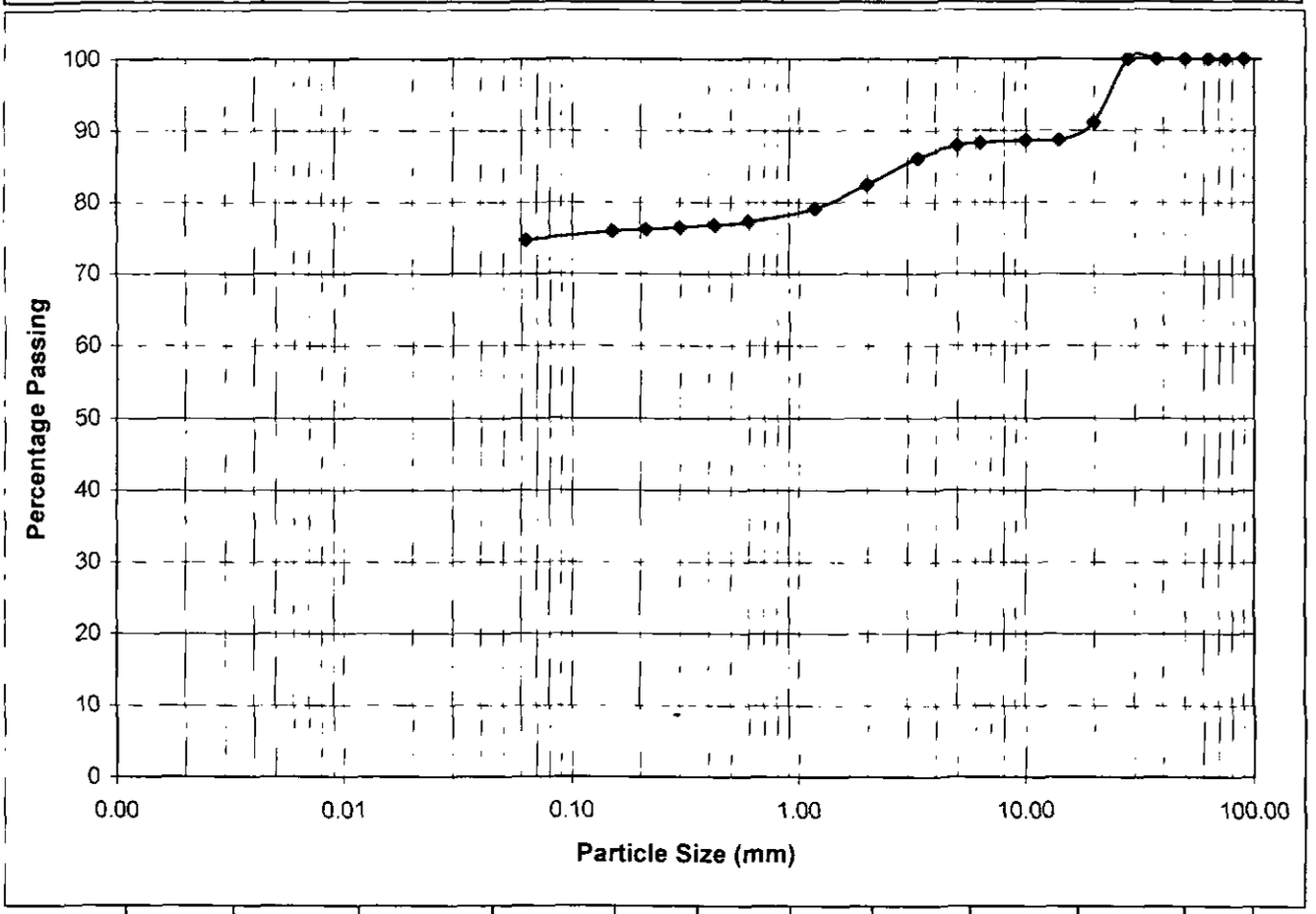
UKAS TESTING 0206

PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 1990

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	CP2 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	3.5	SAMPNUM	41158



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	100.00
20.00	91.12
14.00	88.59
10.00	88.59
6.300	88.17
5.000	87.85
3.350	86 11
2.000	82 42
1.180	79.15
0.600	77.22
0.425	76.80
0.300	76.48
0.212	76.25
0.150	75.97
0.063	74.68

PARTICLE DIAMETER (mm)	% PASSING
2.00	82.42
0.063	74 68

SOIL FRACTION	TOTAL %
GRAVEL	17.58
SAND	7.74
SILT OR CLAY	74.68

Tested by / date	DP 7/3/08

NOTES:

* SIZE PARTICLES ABOVE 60mm CLASSIFY AS COBBLES

WSP Environmental Ltd
Unit 5, Centurion Business Park
Dabell Avenue, Bulwell
Nottingham, NG6 8WA

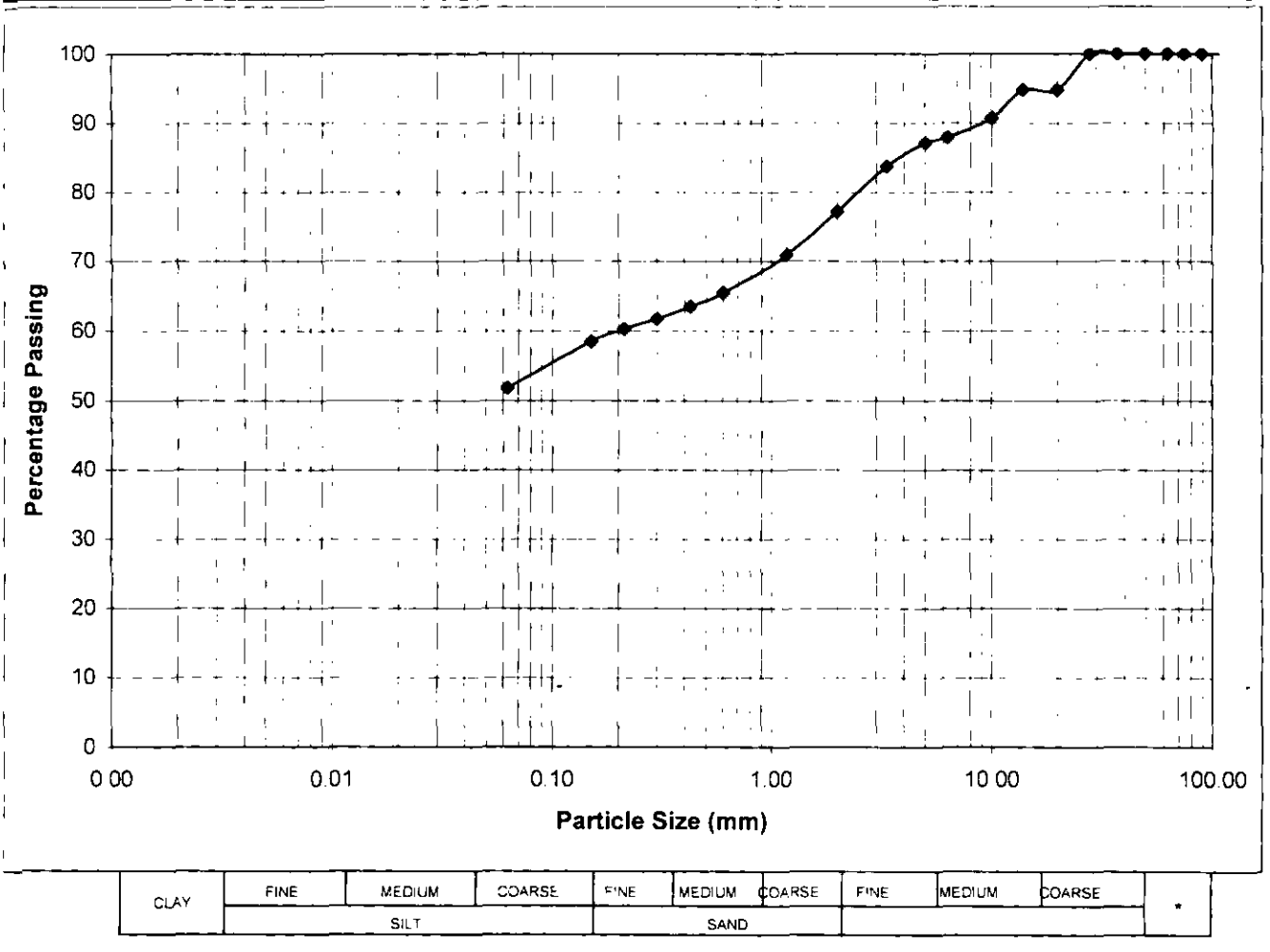
ISSUE 1 REV 1 RP05 30/08/05

UKAS TESTING 0206

PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 1990

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	CP3 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	2.5	SAMPNUM	41167



SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	100.00
20.00	94.72
14.00	94.72
10.00	90.66
6.300	87.89
5.000	87.11
3.350	83.73
2.000	77.19
1.180	70.92
0.600	65.44
0.425	63.49
0.300	61.72
0.212	60.31
0.150	58.45
0.063	51.80

PARTICLE DIAMETER (mm)	% PASSING
2.00	77.19
0.063	51.80

SOIL FRACTION	TOTAL %
GRAVEL	22.81
SAND	25.39
SILT OR CLAY	51.80

Tested by / date	DP 7/3/08

NOTES:

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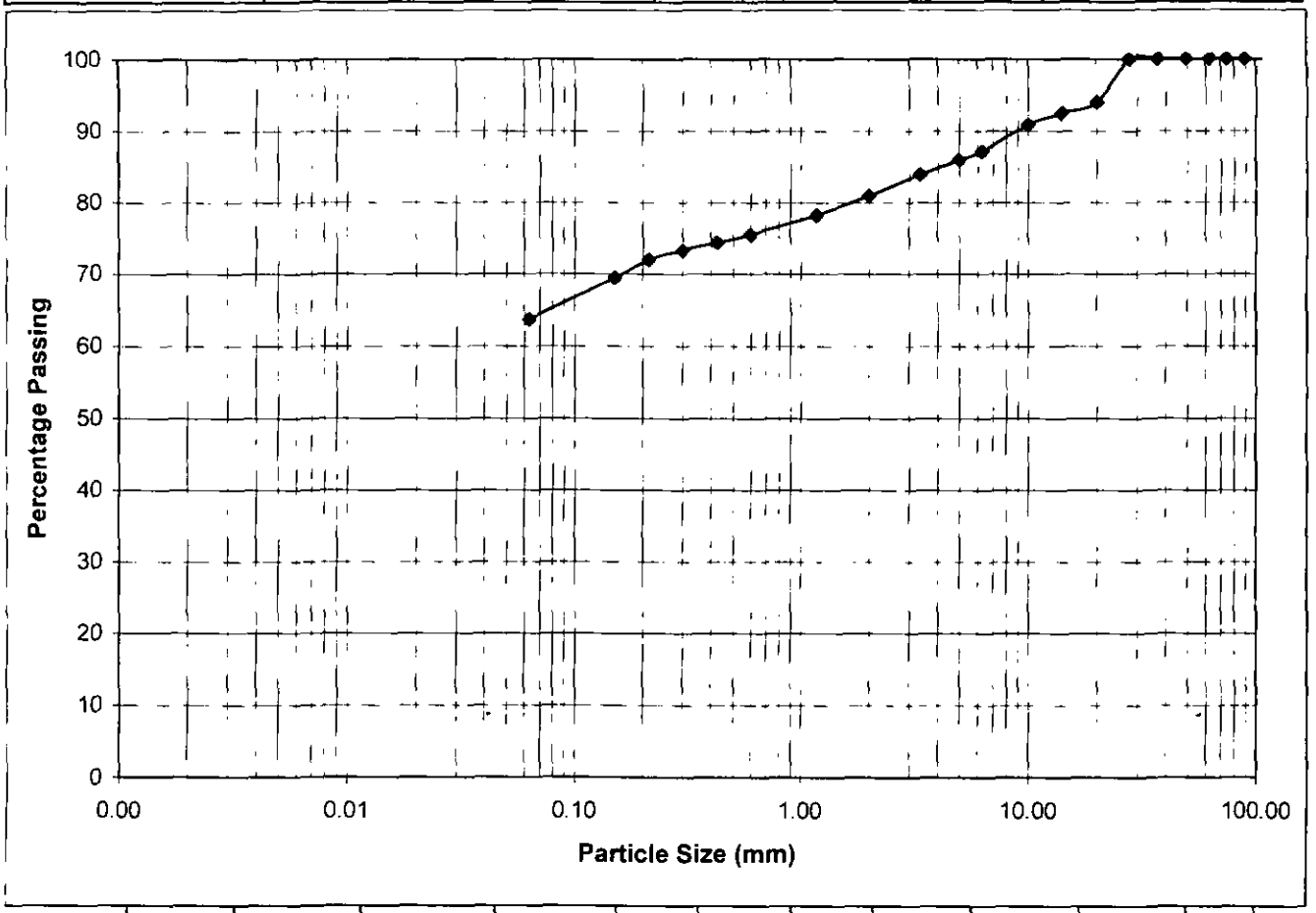
PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 1990

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	CP3 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	5.5	SAMPNUM	41172



SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	100.00
20.00	93.97
14.00	92.43
10.00	90.83
6.300	87.08
5.000	85.89
3.350	83.91
2.000	80.90
1.180	78.21
0.600	75.50
0.425	74.38
0.300	73.29
0.212	71.95
0.150	69.42
0.063	63.63

PARTICLE DIAMETER (mm)	% PASSING
2.00	80.90
0.063	63.63

SOIL FRACTION	TOTAL %
GRAVEL	19.10
SAND	17.27
SILT OR CLAY	63.63

Tested by / date	DP 7/3/08

NOTES:

* SIZE PARTICLES ABOVE 60mm CLASSIFY AS COBBLES

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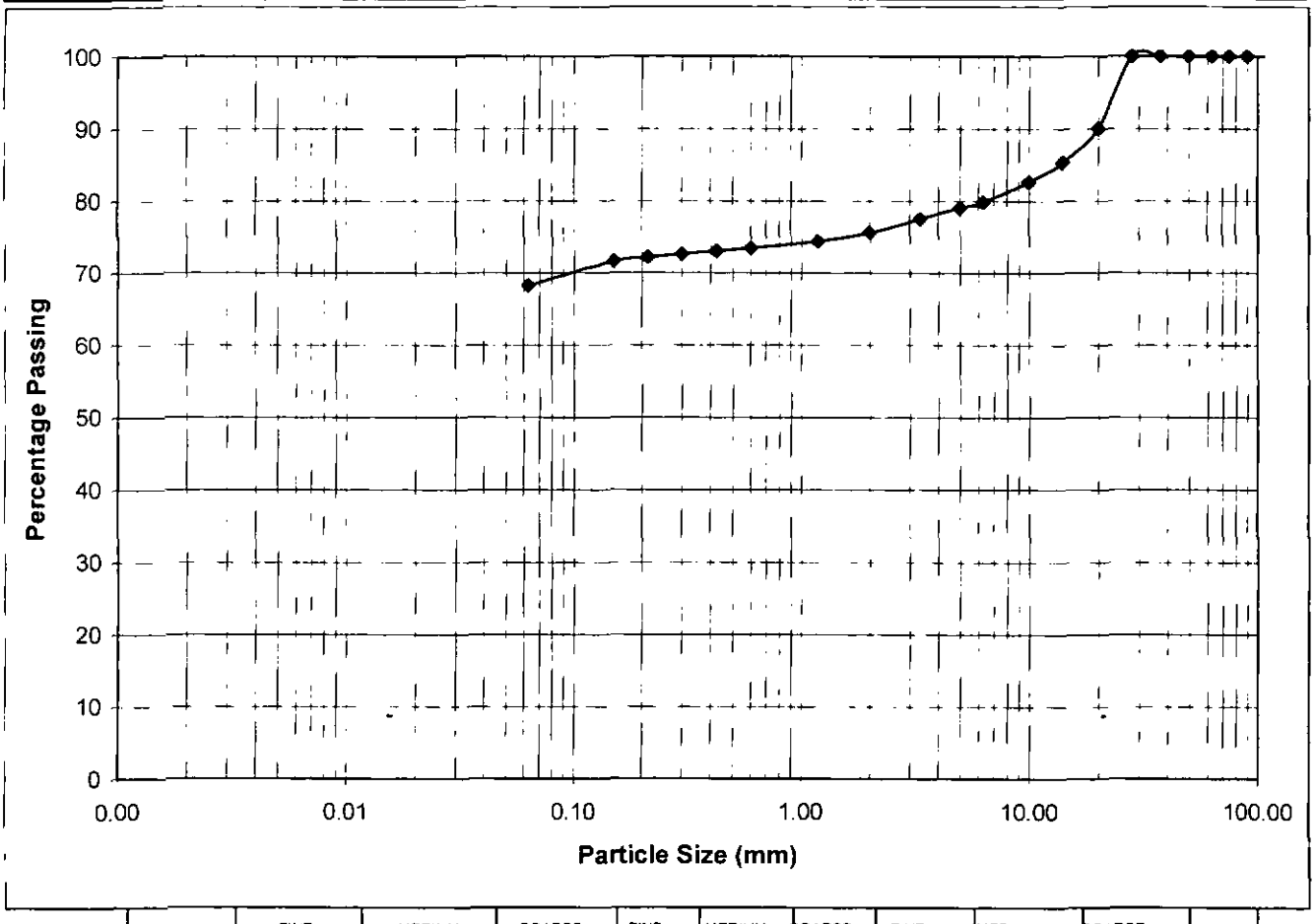
UKAS TESTING 0208

PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 1990

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	CP4 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	1.5	SAMPNUM	41175



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	100.00
20.00	89.94
14.00	85.31
10.00	82.56
6.300	79.82
5.000	79.07
3.350	77.52
2.000	75.59
1.180	74.39
0.600	73.40
0.425	73.01
0.300	72.59
0.212	72.19
0.150	71.62
0.063	68.27

PARTICLE DIAMETER (mm)	% PASSING
2.00	75.59
0.063	68.27

SOIL FRACTION	TOTAL %
GRAVEL	24.41
SAND	7.32
SILT OR CLAY	68.27

Tested by / date	DP 7/3/08

NOTES:

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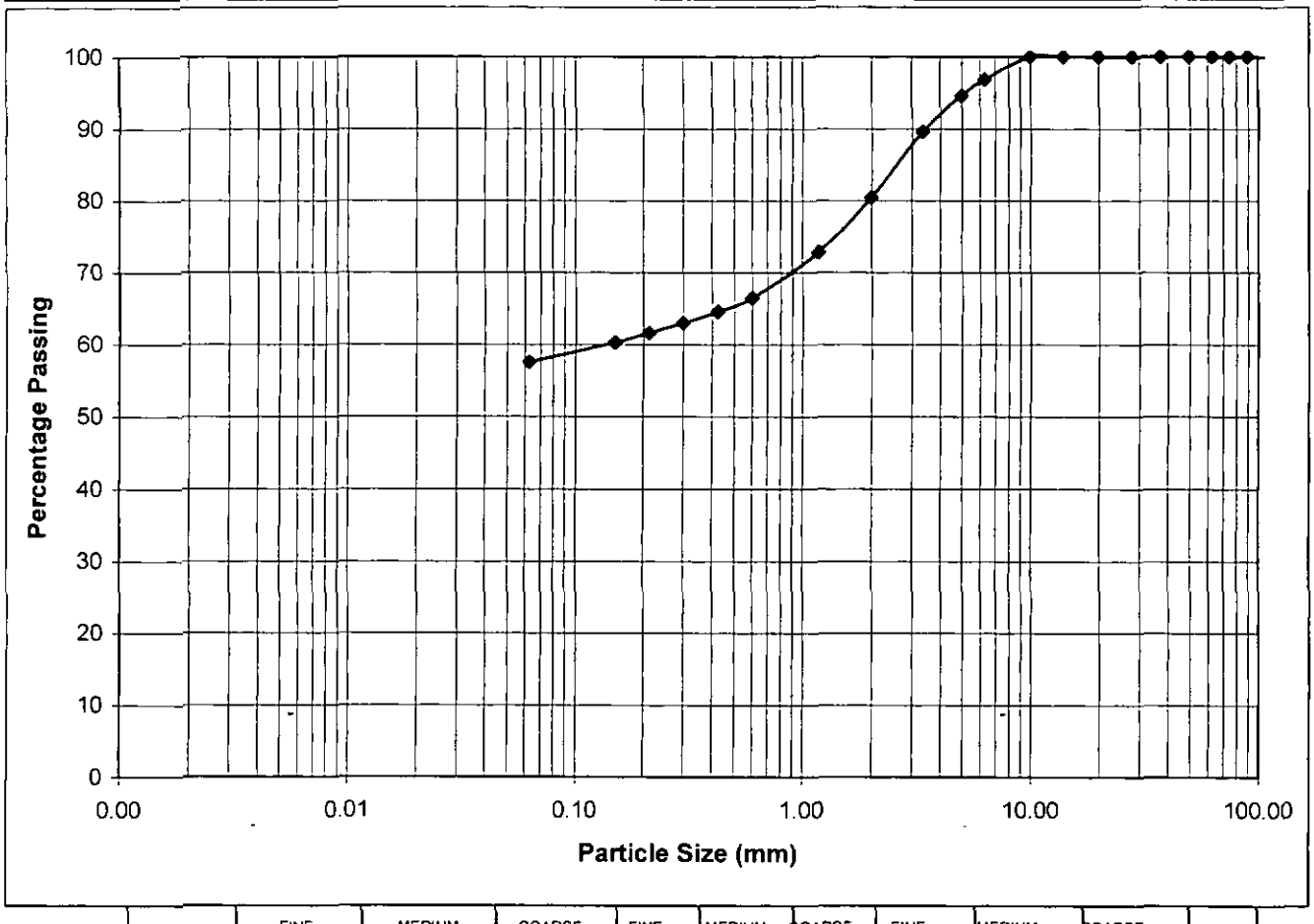
UKAS TESTING 0206

PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2 : CL9.2 199

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	CP4 D	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	4.5	SAMPNUM	41181



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	100.00
20.00	100.00
14.00	100.00
10.00	100.00
6.300	96.83
5.000	94.60
3.350	89.54
2.000	80.36
1.180	72.81
0.600	66.47
0.425	64.58
0.300	62.95
0.212	61.66
0.150	60.29
0.063	57.55

PARTICLE DIAMETER (mm)	% PASSING
2.00	80.36
0.063	57.55

SOIL FRACTION	TOTAL %
GRAVEL	19.64
SAND	22.81
SILT OR CLAY	57.55

Tested by / date	DP 7/3/08

NOTES:

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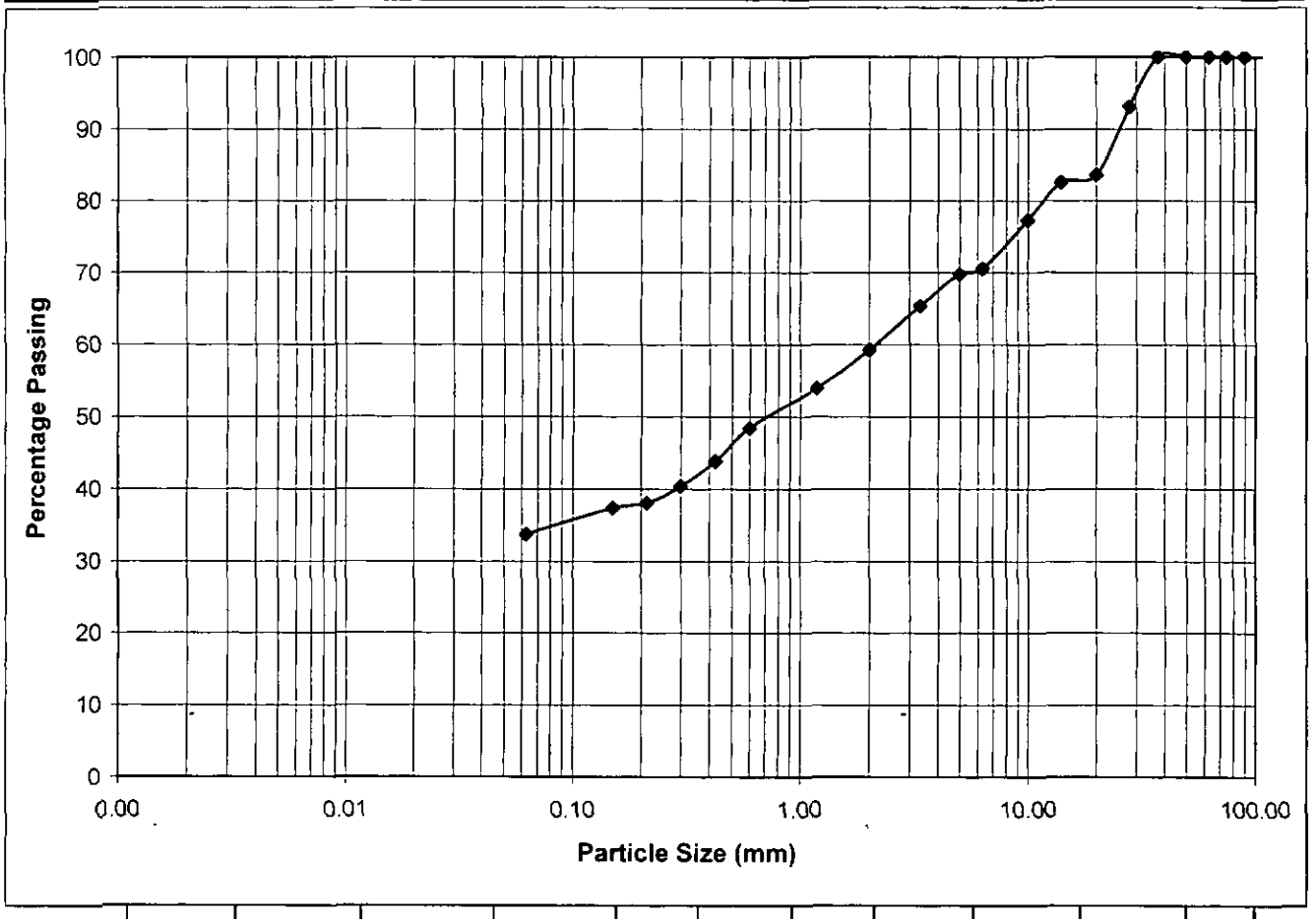
PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 :199(

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	CP5 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	1.5	SAMPNUM	41189



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	93.07
20.00	83.51
14.00	82.55
10.00	77.24
6.300	70.55
5.000	69.75
3.350	65.33
2.000	59.26
1.180	53.87
0.600	48.37
0.425	43.83
0.300	40.32
0.212	38.07
0.150	37.36
0.063	33.74

PARTICLE DIAMETER (mm)	% PASSING
2.00	59.26
0.063	33.74

SOIL FRACTION	TOTAL %
GRAVEL	40.74
SAND	25.52
SILT OR CLAY	33.74

Tested by / date	DP 7/3/08

NOTES:

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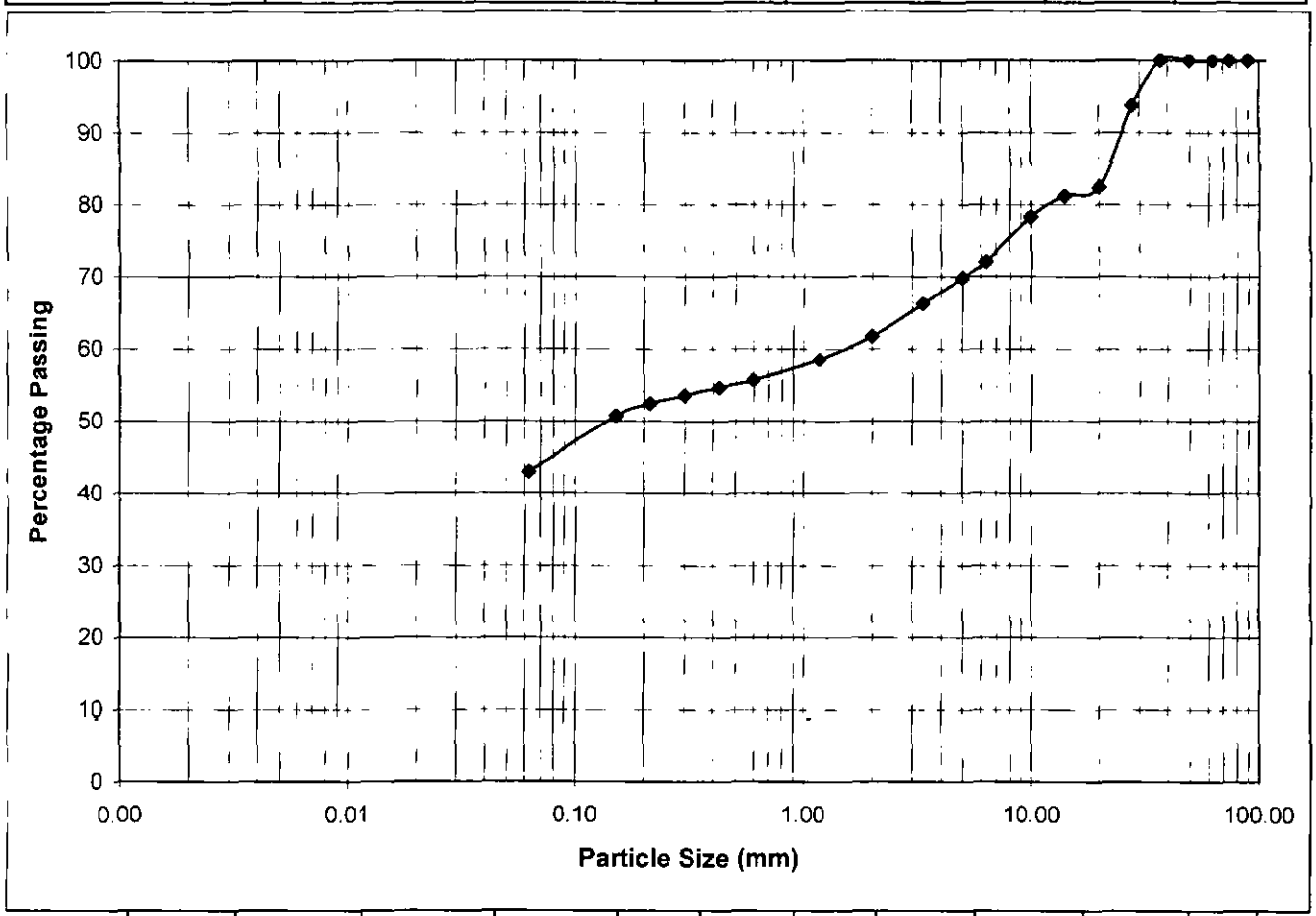
PARTICLE SIZE DISTRIBUTION TEST : BS1377 : PART 2: CL9.2 199

WSP Environmental Laboratories

PROJECT	Grimethorpe	SAMPLE	CP5 B	JOB NO	08-02961
PROJECT NUMBER	12191056 001	DEPTH(m)	4.5	SAMPNUM	41204



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	*
	SILT			SAND						

SIEVE SIZE	% PASSING
125.00	100.00
90.00	100.00
75.00	100.00
63.00	100.00
50.00	100.00
37.50	100.00
28.00	93.70
20.00	82.34
14.00	81.12
10.00	78.23
6.300	71.99
5.000	69.81
3.350	66.18
2.000	61.75
1.180	58.46
0.600	55.57
0.425	54.56
0.300	53.52
0.212	52.41
0.150	50.65
0.063	42.95

PARTICLE DIAMETER (mm)	% PASSING
2.00	61.75
0.063	42.95

SOIL FRACTION	TOTAL %
GRAVEL	38.25
SAND	18.79
SILT OR CLAY	42.95

Tested by / date	DP 7/3/08

NOTES:

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APPENDIX G:

CONCRETE CLASSIFICATION SUMMARY TABLE

	Acid Soluble Sulphate	Water Soluble Sulphate	Concrete Class	Total Sulphur Solid	Total potential sulfate	Concrete Class	oxidisable sulfides
	AS (% SO4)	WS (mg/l SO4)		TS (% S)	TPS % SO4 = 3 x TS(% S)		OS % SO4 = TPS % SO4 – AS %
	%	mg/l		%			
TOP 20% VALUES	1.04	440	DS-1	0.49			
	0.14	260	DS-1	0.38			
	0.12	130	DS-1	0.29			
MEAN OF TOP 20%	0.43	276.67	DS-1	0.39	1.15	DS-3	0.726666667

APPENDIX H:

APEX GEOSERVICES (UK) LTD GEOPHYSICAL SURVEY REPORT

DRAFT REPORT ON PHASE III OF A GEOPHYSICAL SURVEY

AT

HOUGHTON MAIN BUSINESS PARK

NEAR

GREAT HOUGHTON, SOUTH YORKSHIRE

FOR

WHITE YOUNG GREEN ENVIRONMENTAL

APEX Geoservices (UK) Limited
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PRIVATE AND CONFIDENTIAL

THE FINDINGS OF THIS REPORT ARE THE RESULT OF A GEOPHYSICAL SURVEY USING NON-INVASIVE SURVEY TECHNIQUES CARRIED OUT AT THE GROUND SURFACE. INTERPRETATIONS CONTAINED IN THIS REPORT ARE DERIVED FROM A KNOWLEDGE OF THE GROUND CONDITIONS, THE GEOPHYSICAL RESPONSES OF GROUND MATERIALS AND THE EXPERIENCE OF THE AUTHOR. APEX GEOSERVICES LTD. HAS PREPARED THIS REPORT IN LINE WITH BEST CURRENT PRACTICE AND WITH ALL REASONABLE SKILL, CARE AND DILIGENCE IN CONSIDERATION OF THE LIMITS IMPOSED BY THE SURVEY TECHNIQUES USED AND THE RESOURCES DEVOTED TO IT BY AGREEMENT WITH THE CLIENT. THE INTERPRETATIVE BASIS OF THE CONCLUSIONS CONTAINED IN THIS REPORT SHOULD BE TAKEN INTO ACCOUNT IN ANY FUTURE USE OF THIS REPORT.

AUTHOR	CHECKED	REPORT STATUS	DATE
DAVID CARPENTER BA, CGEOL, FGS	PETER JACKSON BSC	DRAFT	MAY 2008

TABLE OF CONTENTS

1. INTRODUCTION

APEX Geoservices (UK) Ltd. was requested by White Young Green Environmental Ltd to investigate a landfilled former opencast coal site which is to be redeveloped as a business park. Field work was carried out between the 14th and 15th February 2008.

Additional work was carried out at the site on 3rd April 2008, and a third phase on the 29th April 2008.

Survey References: Phase I - AGLUK08001; Phase II – AGLUK08014.; Phase III – AGLUK08021.

1.1 Survey Objectives

The objective of the survey was:

- To map the highwall of a former opencast pit.

1.1 Survey Methodology

Phase I: 4 (No) Geophysical Sections (A – D)
Phase II: 3 (No) Geophysical Sections (E – G)
Phase III: 4 (No) Geophysical Sections (H – K, plus repeat of C)

comprising a total of:

- 11 (No) Seismic Refraction Profiles
- 12 (No) 2D Resistivity Imaging Profiles

1.3 Site Background

The site is located adjacent to the A6195, Park Spring Road approximately 1.0km to the west of Great Houghton, near Barnsley, South Yorkshire. Grid Ref: SE 417 064.

Originally part of Houghton Main colliery, the site was subsequently opencast mined, and backfilled with spoil, and is to be redeveloped as a business park.

The BGS 1:50,000 map covering the site (Sheet 87, Barnsley S&D) describes the solid geology of the site as Upper Carboniferous Coal Measures. The Mexborough Rock (sandstone) lies to the west of the site, and the Ackworth Rock (sandstone) lies to the east of the site. Overlying the bedrock within the western edges of the site are alluvial deposits associated with the nearby River Dearne.

1.4 Report Outline

- The survey results are interpreted in Section 2.
- Summary and Recommendations are contained in Section 3.
- The Geophysical Survey Locations and Interpretation are shown on Map 1.
- The Interpreted Resistivity Imaging Profiles with the Seismic Refraction results are shown in Figures 1 - 10.
- Details of the methodology used are given in Appendix I.

2. RESULTS

The range of resistivities observed on site was 10 – 1416 ohm m.

The range of seismic P-wave velocities observed on site was 244 – 1957 m/s.

The geophysical data were interpreted using the following criteria:

Seismic P-wave velocity (m/s)	Resistivity range (ohm m)	Interpretation
250 - 500	10 - 60	Soil / loose fill
500 - 1100	*10 - 80*	*Fill of Coal Measures Spoil*
> 1400	80 – 250	In-situ Coal Measures

For Phase I, initially, four 2D Resistivity Imaging profiles were planned, with four corresponding seismic refraction profiles. However, it was decided on-site that a fifth profile was required in order to extend the coverage of Geophysical Section C to ensure that the highwall had been crossed. Resistivity Profile 2 showed a clear indication of the location of the highwall, and was thus used as a bench-mark for the interpretation.

Geophysical Section A comprised 2D Resistivity Imaging Profile R1 and Seismic Refraction Profile S3.
Geophysical Section B comprised 2D Resistivity Imaging Profile R2 and Seismic Refraction Profile S2.
Geophysical Section C comprised 2D Resistivity Imaging Profiles R3 & R5 and Seismic Refraction Profile S1.
Geophysical Section D comprised 2D Resistivity Imaging Profile R4 and Seismic Refraction Profile S4.

Phase II comprised a further three geophysical sections of one seismic refraction and one 2D Resistivity Imaging profile each.

Geophysical Section E comprised 2D Resistivity Imaging Profile R6 and Seismic Refraction Profile S5.
Geophysical Section F comprised 2D Resistivity Imaging Profile R7 and Seismic Refraction Profile S6.
Geophysical Section G comprised 2D Resistivity Imaging Profile R8 and Seismic Refraction Profile S7.

Phase III comprised three additional geophysical sections and an overlapping continuation of Section C extending the coverage to the banks of the River Deame. Each of the four geophysical sections included a 2D Resistivity Imaging profile, and a seismic refraction profile. A 4m electrode spacing was employed for the resistivity profiles in order to increase the coverage, and investigate deeper.

Geophysical Section C (extended) comprised 2D Resistivity Imaging Profile R9 and Seismic Refraction Profile S8.
Geophysical Section H comprised 2D Resistivity Imaging Profile R10 and Seismic Refraction Profile S9.
Geophysical Section J comprised 2D Resistivity Imaging Profile R11 and Seismic Refraction Profile S10.

Geophysical Section K comprised 2D Resistivity Imaging Profile R12 and Seismic Refraction Profile S11.

Geophysical Section A

This section was located in the central and northern part of the site and crossed a bund between the edge of the site and a disused railway.

The observed resistivities (2D Resistivity Profile R1) were generally in the range of 10 – 80 ohm m (interpreted as backfill material), but higher resistivities (> 80 ohm m) were observed near the base of the profile towards the edge of the backfilled opencast area.

Seismic Refraction Profile S3 indicated a four-layer model with a low velocity surface layer (441 m/s) interpreted as soil or loose fill, over the bund, and extending to approximately 2m over the leveled part of the site. The underlying seismic layers indicated a gradual increase in velocity from 1050 – 1200 m/s as might be expected from compacted landfill. The seismic layers indicated an upward gradient towards the edge of the backfilled area which was coincident with the higher resistivity zone.

The higher resistivity zone (> 80 ohm m) and the upward gradient of the seismic layers has been interpreted as the location of the highwall in this area.

Geophysical Section B

This section was located in the north-west of the site, and was over flat ground.

An obvious increase in resistivity was seen towards the edge of the backfilled area and at the base of 2D Resistivity Profile 2. This has been interpreted as the boundary between backfill and in-situ coal measures, and was therefore used to interpret the other resistivity profiles.

Seismic Refraction profile S2 indicated a three layer model with soil/loose fill within an apparent surface depression on the edge of the backfilled area (561 m/s), and compacted material towards the centre of the site (871 m/s). An increase in velocity to 1957 m/s towards the edge of the backfilled area and at a depth of approximately 14m correlates well with the higher resistivity zone on Resistivity Profile R2.

Geophysical Section C

This section was located in the south-western part of the site over gently sloping ground.

Initially, 2D Resistivity Imaging Profile R3 was acquired and indicated resistivities in the range of 10 – 70 ohm m, which were interpreted as backfill material. It was therefore decided to acquire an additional Profile (R5) to ensure that the highwall had been crossed. Profile R5 indicated an increase in resistivity (>80 ohm m) away from the backfilled area and has been interpreted as indicating the location of the highwall.

A third 2D Resistivity Imaging Profile (R9) was subsequently acquired with a 4m electrode spacing in order to increase the depth of investigation in this area. The profile was also located as close to the River Dearne as possible in order to optimise the length of profile above the highwall. The resistivity profile indicated an increase in resistivity (>80 ohm m) 24.5 m from the western end which was interpreted as the location of the highwall. This position is coincident with the position marked on the abandonment plan.

A four layer model was constructed from Seismic Refraction Profiles S1 and S8 which indicated a gradual increase in P-wave velocity similar to Profile S3 of Geophysical Section A, and has been

interpreted as compacted fill. A refracting horizon with a velocity of 1592 m/s was observed close to the interpreted base of the former open pit. This horizon has been interpreted as stiffly compacted fill material or fractured bedrock.

Geophysical Section D

This section was located in the north-eastern part of the site and crossed the bund.

2D Resistivity Profile R4 indicated resistivities in the range of 10 – 60 ohm m over the bund and towards the central part of the site over the backfilled area. An increase in resistivities (> 80 ohm m) away from the backfilled area was interpreted as the location of the highwall.

Seismic refraction profile S4 indicated a two layer model with a thin (1 - 2m) layer with a velocity of 244 m/s indicative of soil or loose fill, over a layer of velocity 1093 m/s which has been interpreted as homogeneous backfilled material.

Geophysical Section E

This section was located in the north-eastern part of the site and crossed the bund between and parallel to Geophysical Sections A and D, closer to Geophysical Section A.

2D Resistivity Profile R6 indicated resistivities in the range of 10 – 60 ohm m from beneath the bund and towards the central part of the site over the backfilled area which has been interpreted as the backfill material. Towards the edge of the site (to the NW), the resistivities increase slightly, but do not reach 80 ohm m until about 6m from the end of the profile where the depth of investigation is minimal. However, the character of the profile is similar to Geophysical Section F (see below) where the high wall has been fairly confidently interpreted, and thus the character of Section F was used to refine the interpretation of the highwall on Section E. An increase in resistivities (>80 ohm m) at depth of between 6 – 14m beneath the central area of the resistivity profile has been interpreted as evidence of a ridge of bedrock running along the openpit floor.

Seismic refraction profile S5 indicated a three layer model with a thin (2 - 3m) layer with a velocity of 556 m/s indicative of soil or loose fill, over a layer of velocity 862 m/s interpreted as more compact fill material showing a similar increase in compaction of the fill as seen in Sections A and C. A third layer of P-wave velocity 1596 m/s correlating with the 70 ohm m resistivity contour, and giving further credence to an interpretation of a ridge of bedrock running along the former openpit floor.

Geophysical Section F

This section was located in the north-eastern part of the site and crossed the bund between and parallel to Geophysical Sections A and D, closer to Geophysical Section D.

2D Resistivity Profile R7 indicated resistivities in the range of 10 – 60 ohm m over the bund and towards the central part of the site over the backfilled area. An increase in resistivities (> 80 ohm m) away from the backfilled area was interpreted as the location of the highwall. At depth to the NW of the profile a localised increase in resistivities (> 80 ohm m) has been tentatively interpreted as an indication of a bench.

Seismic refraction profile S6 indicated a three layer model with a thin (1 - 3m) layer with a velocity of 613 m/s indicative of soil or loose fill, over successive layers of 746 m/s and 871 m/s interpreted as homogeneous backfilled material with compaction increasing with depth.

Geophysical Section G

This section was located in the western part of the site between Geophysical Sections A and D, parallel to Geophysical Section A.

2D Resistivity Profile R8 is similar in character to the neighbouring Profile R2, and again indicated resistivities in the range of 10 – 60 ohm m over the bund and towards the central part of the site over the backfilled area. An increase in resistivities (> 80 ohm m) away from the backfilled area was confidently interpreted as the location of the highwall, but the absence of an increase in resistivity along the base of the profile suggests that the original openpit floor may be deeper in this area.

Seismic refraction profile S7 indicated a three layer model with a thin (1m) layer with a velocity of 542 m/s indicative of soil or loose fill, over successive layers of 782 m/s and 922 m/s interpreted as homogeneous backfilled material with compaction increasing with depth.

Geophysical Section H

This section was located in the south-western part of the site parallel to and some 60m from Geophysical Section C.

The 2D resistivity imaging profile (R10) exhibits an obvious zone of higher resistivities (>80 ohm m) 38 m from the western end which was interpreted as the location of the highwall. This position is approximately 5m further away from the River Dearne than the position marked on the abandonment plan. A refracting horizon of 1965 m/s has been interpreted as indicating the base of the landfill.

Geophysical Section J

This section was located in the western part of the site parallel to and some 36m from Geophysical Section B.

The 2D resistivity imaging profile (R11) is similar in character to profile R10 of Geophysical Section H, with an obvious zone of higher resistivities (>80 ohm m) 58.5 m from the western end which was interpreted as the location of the highwall. This position is approximatey 3m further away from the River Dearne than the position marked on the abandonment plan. A refracting horizon of 1948 m/s has been interpreted as indicating the base of the landfill.

Geophysical Section K

This section was located in the northern part of the site sub-parallel to and approximately 45 m from Geophysical Section D.

The 2D resistivity imaging profile (R12) is similar in character to the profiles on the southern boundaries of the site, with an obvious zone of higher resistivities (>80 ohm m) 59 m from the northern end and is coincident with the position marked on the abandonment plan. A second zone of higher resistivities (>80 ohm m) is also apparent approximately 13 m further along the profile, and extending for 18 m. This zone has resistivities similar to those interpreted as in-situ Coal Measures, but has a P-wave velocity of 586 m/s, which is consistent with loose fill material. The feature is therefore interpreted as a zone of higher resistivity fill material, possibly backfilled sandstone. A refracting horizon of 1837 m/s has been interpreted as indicating the base of the landfill.

3.0 SUMMARY & RECOMMENDATIONS

- A programme of 11 seismic refraction profiles and 12 2D resistivity imaging profiles was acquired at the site at ten locations (10 Geophysical Sections).

- Geophysical Section B (Resistivity Profile R2 and Seismic Refraction Profile S2) from Phase I of the investigation displayed a clear indication of the location of the in-situ coal measures material, and was thus used as a bench-mark for the interpretation of all the geophysical data from the site.

- Geophysical Section G (Resistivity Profile R8 and Seismic Refraction Profile S7) was similar in character to Geophysical Section B giving further support to the use of Section B as the correlating section for the site dataset.

- After discussion of the results of Phases I and II of the investigation, and further analysis of old mining records, it became apparent that the abandonment plans may be incomplete, and that an old railway cutting may be buried beneath the backfilled material. A third phase of geophysical investigation with a follow-up invasive investigation programme was commissioned.

- The resistivity profiles from Phase III showed clear indications of the highwall location in the southern and south-western parts of the site.

- The location of the highwall has been interpreted from the geophysical data with a reasonable degree of certainty. In the case of Geophysical Sections B, C, G, H and J, the certainty is high. Clear indications of the highwall are also evident in Geophysical Sections A, D, & F, but the highwall within Sections A, C, & G does not appear to be vertical.

- Geophysical Section K displayed a clear indication of the highwall which was coincident with the abandonment plan location. However, a secondary zone of higher resistivity material was observed which has been interpreted as resistive fill material due to its low seismic P-wave velocity.

- The least confident interpretation of the highwall location is seen on Section E, although the similar character of the adjacent Section F was used to aid the interpretation of resistivity profile.

- Indications of benching within the openpit were seen on Sections C & F, and a possible ridge of bedrock was seen on Section E.

- A programme of invasive investigations is to be carried out to confirm and consolidate the geophysical results.

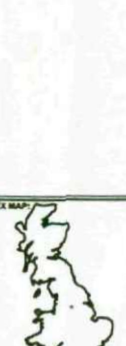
LEGEND:

0m S1 Seismic refraction profile with start location

0m R1 2D resistivity profile with start location

Interpreted location of highwall

INDEX MAP:



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	Houghton Main Business Park
DRAWING No.:	Map 1: Survey Locations & Interpretation (Part 1)
DATE:	April 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:1000 @A3

Version No.	Date:	Drawn By: Initials	Checked: Initials
1	21 / 02 / 2008	DC	
2	07 / 04 / 2008	DC	
3	30 / 04 / 2008	DC	

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www.apexgeoservices.co.uk

INDEX MAP:

LEGEND:

0m S1 — Seismic refraction profile with start location

0m R1 — 2D resistivity profile with start location

Interpreted location of highwall

Houghton Main Business Park

Ground(s) No.: Map 2: Survey Locations & Interpretation (Part 2)

DATE: April 2008

CLIENT: White Young Green Environmental Ltd.

SCALE: 1:1000 @A3

No.	Date	Drawn Ref. Initials	Checked Initials
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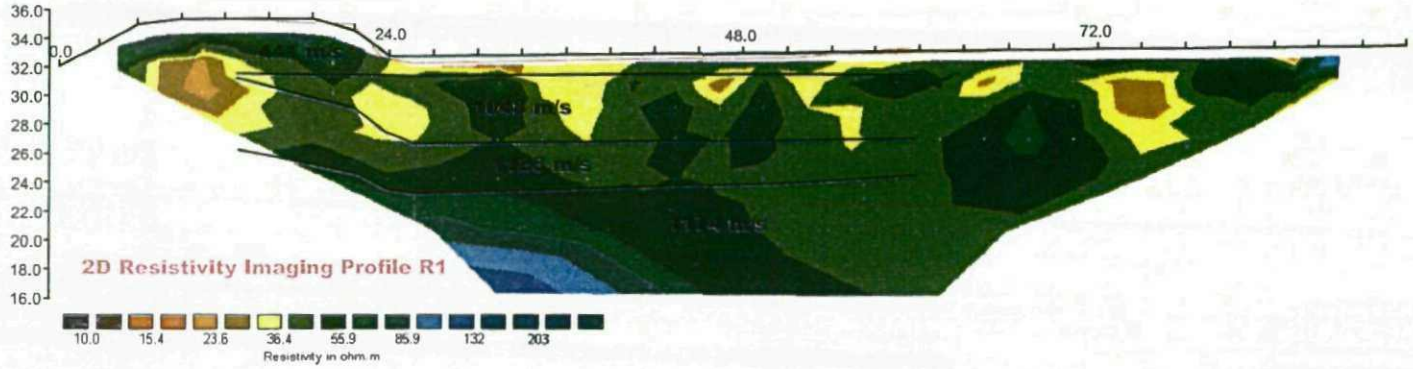
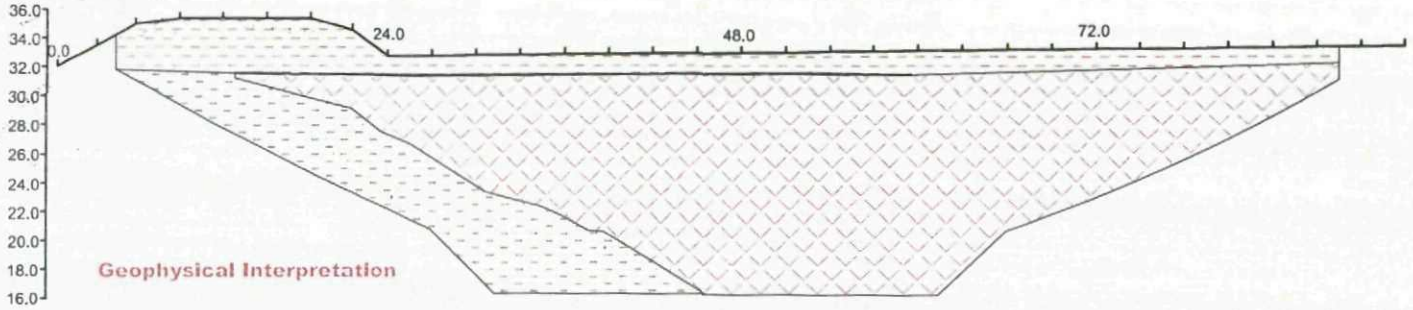
2	07 / 04 / 2008	DC	
3	30 / 04 / 2008	DC	

Geophysical Section A

NW **SE**

Seismic Refraction Profile S3





LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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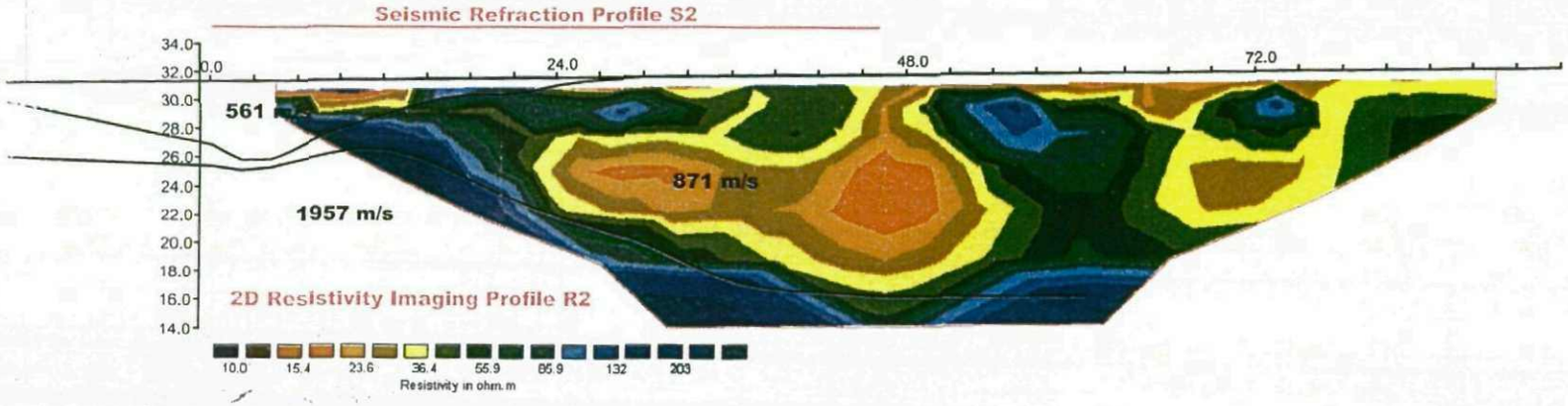
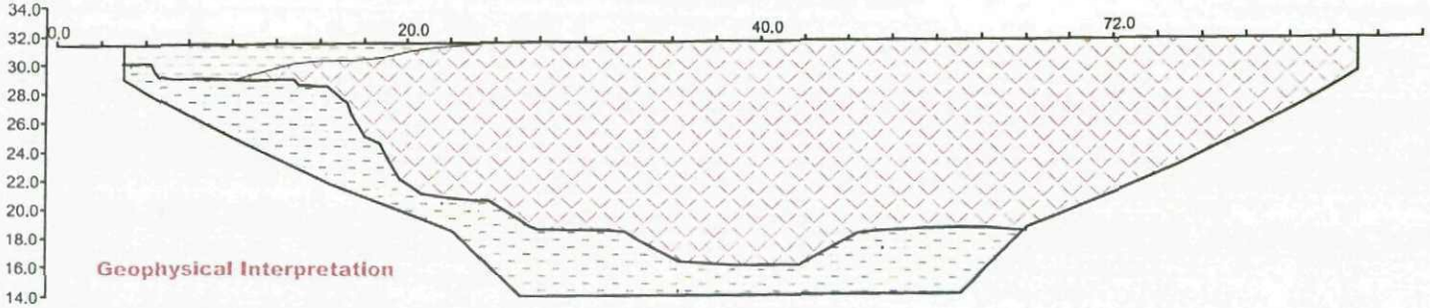
PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section A
DATE:	February 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:500 @A4

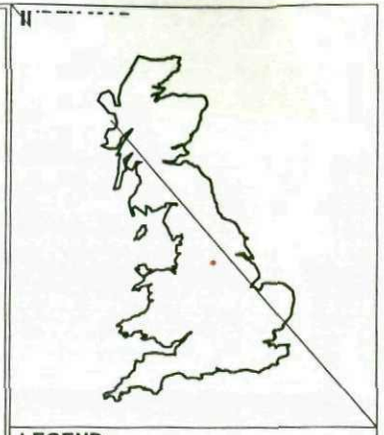
Version: No.	Date:	Drawn By: Initials	Checked: Initials
1	21/02/2008	DC	

Geophysical Section B

W E







LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section B
DATE:	February 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:500 @A4

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No.	Initials	Initials	Initials
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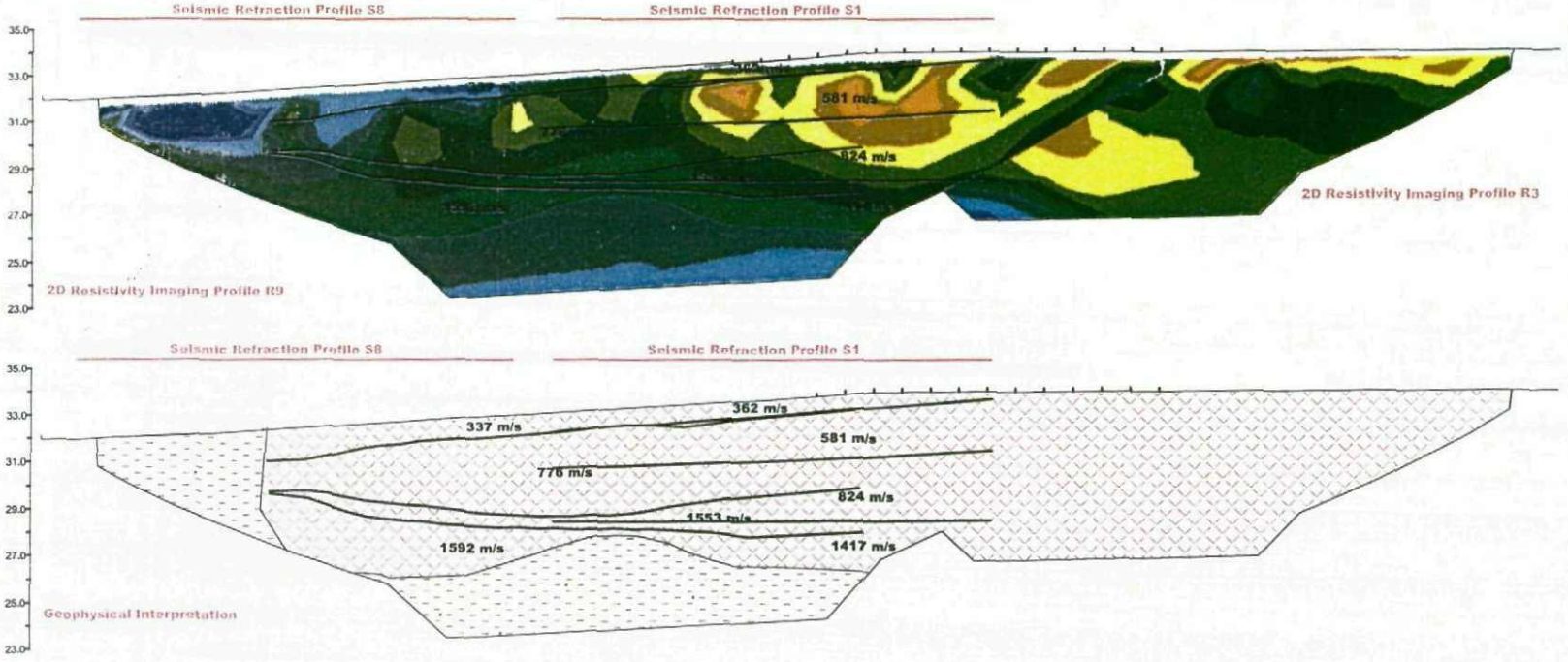
Geophysical Section C

SW NE



INDEX MAP:

LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section C
DATE:	February 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:750 @A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
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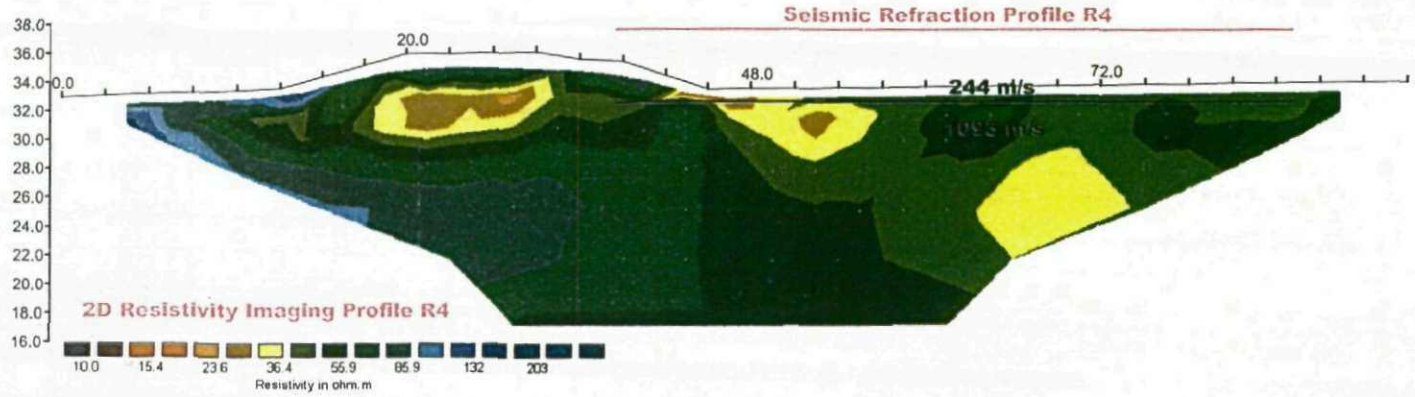
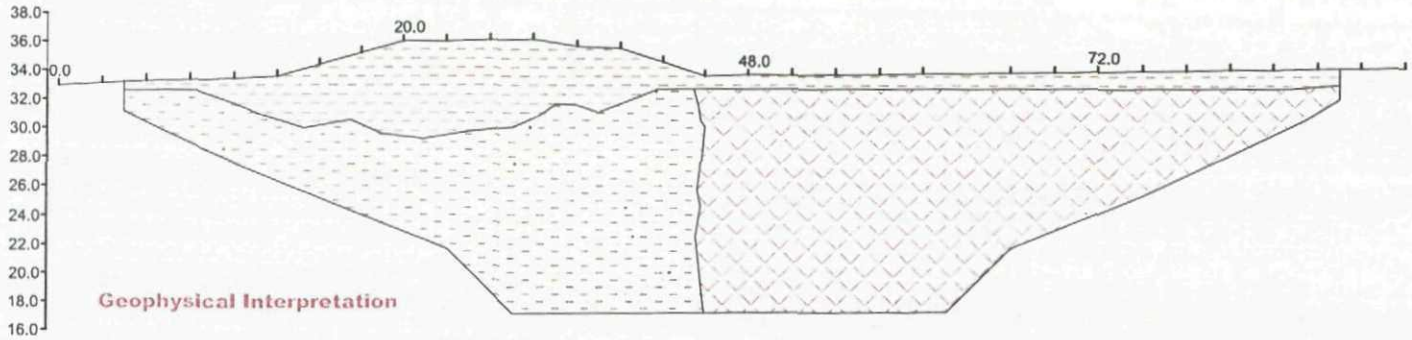
2	30/04/2008	DC	

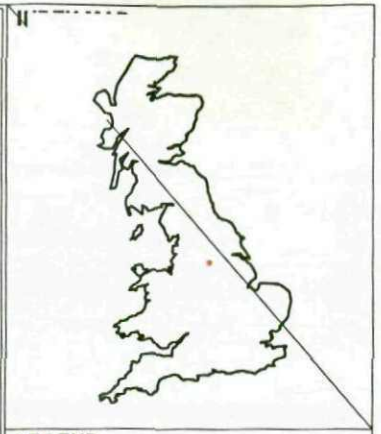
Geophysical Section D

NW

SE







LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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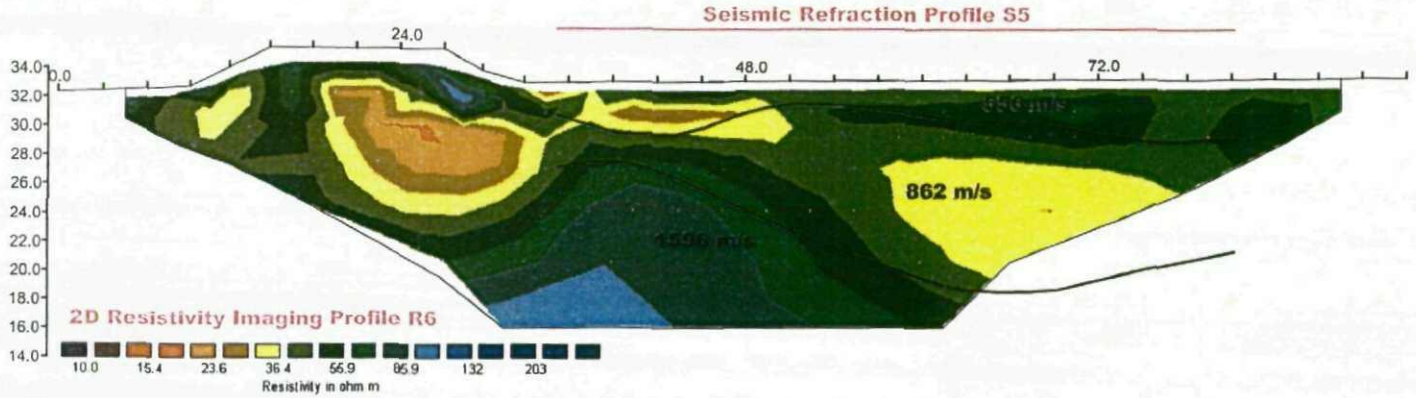
www.apexgeoservices.co.uk

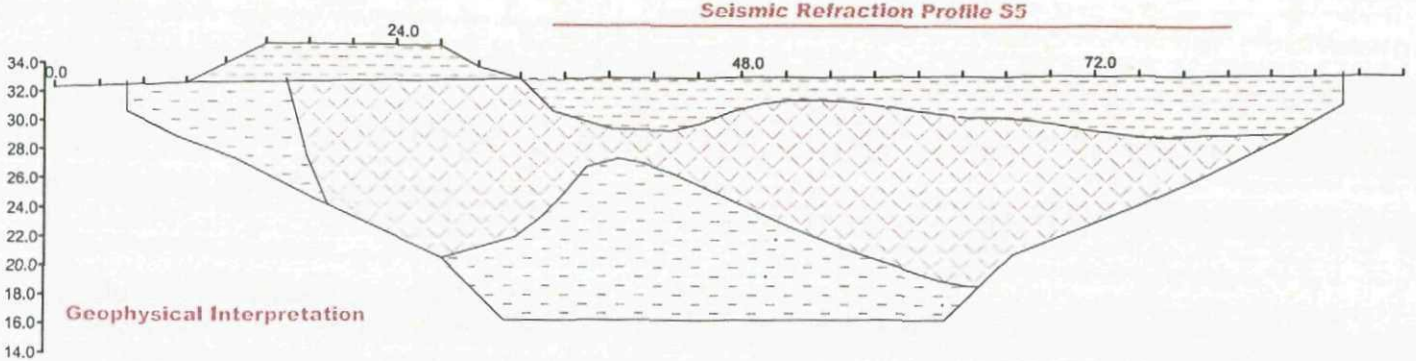
PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section D
DATE:	February 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:500 @A4

Version: No.	Date: Initials	Drawn By: Initials	Checked: Initials
1	21/02/2008	DC	

Geophysical Section E

NW **SE**





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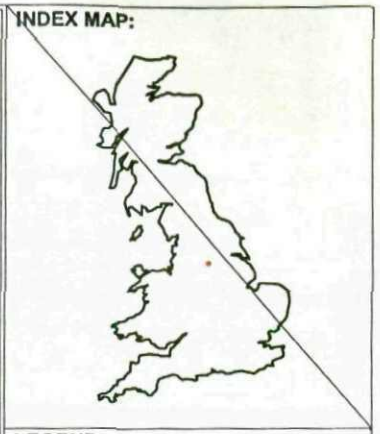

LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section E
DATE:	April 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:500 @A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
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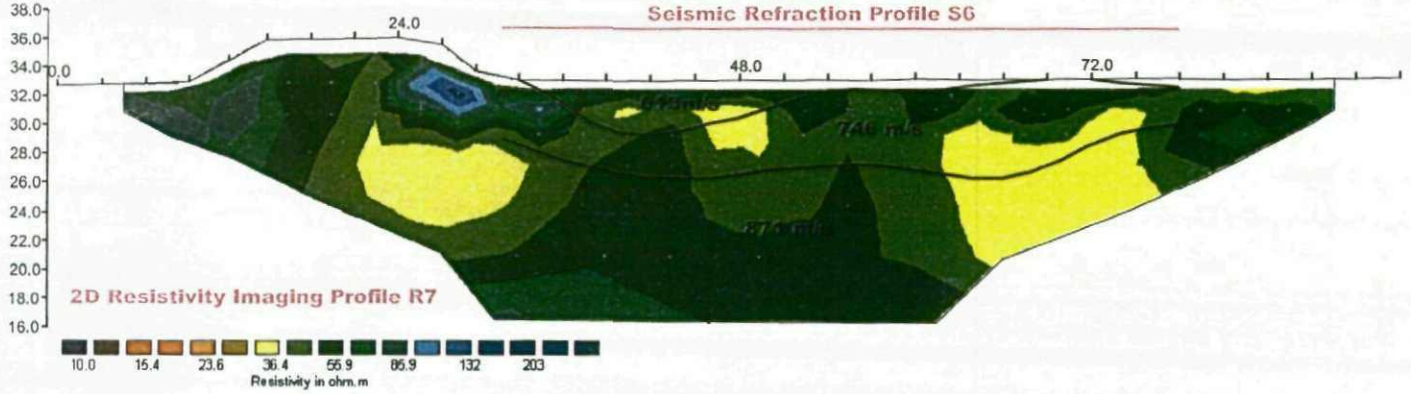
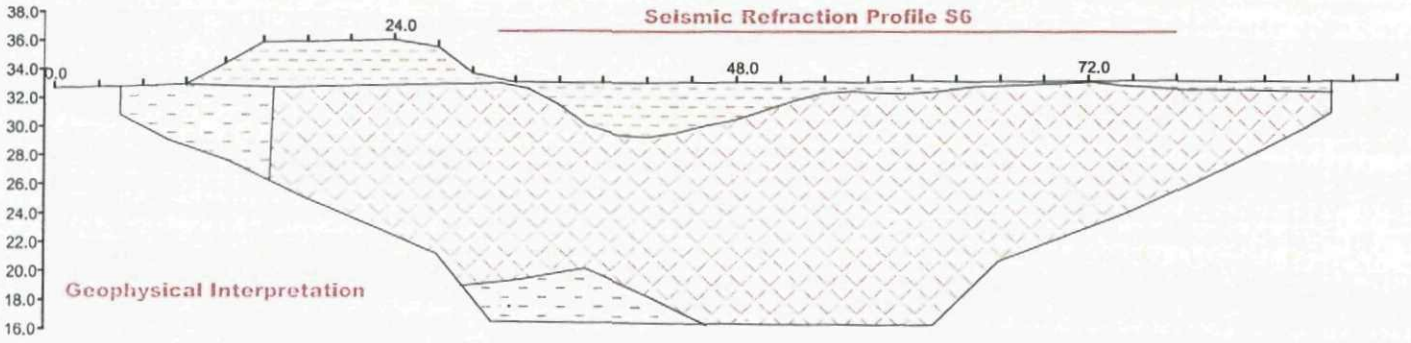
Geophysical Section F

NW **SE**





INDEX MAP:

LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section F
DATE:	April 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:500 @A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
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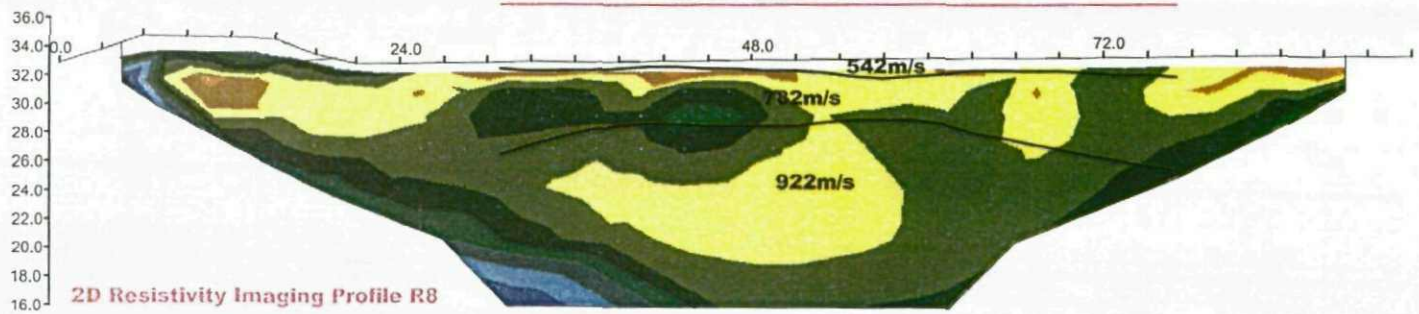
Geophysical Section G

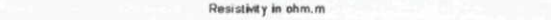
NW

SE

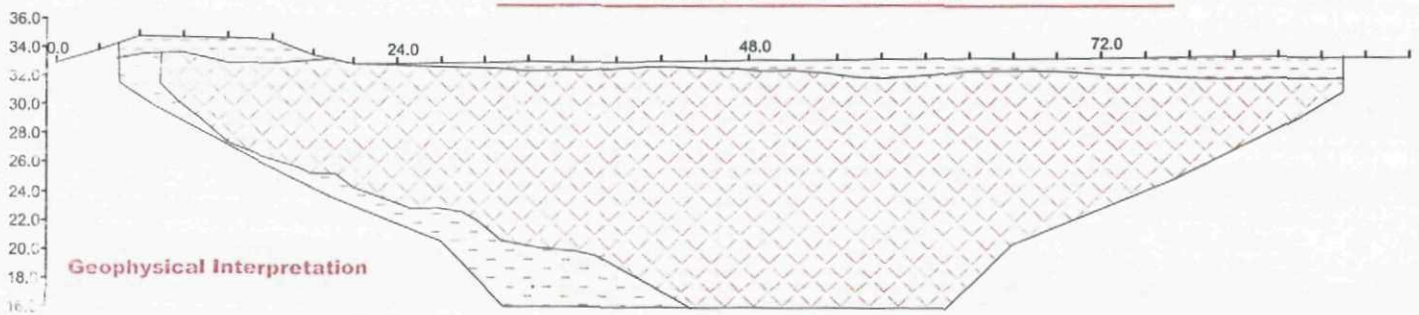
Seismic Refraction Profile S7



2D Resistivity Imaging Profile R8



Seismic Refraction Profile S7



Geophysical Interpretation

INDEX MAP:

LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section G
DATE:	April 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:500 @A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
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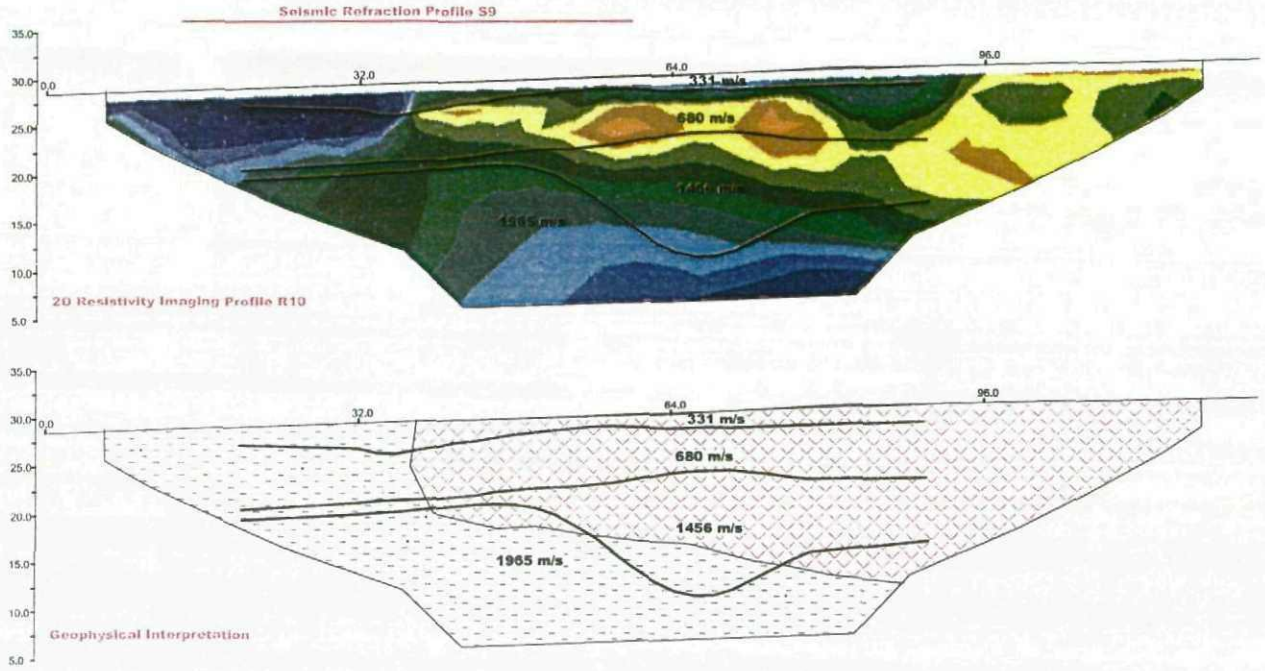
Geophysical Section H

SW NE



INDEX MAP:

LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section H
DATE:	April 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:750 @A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
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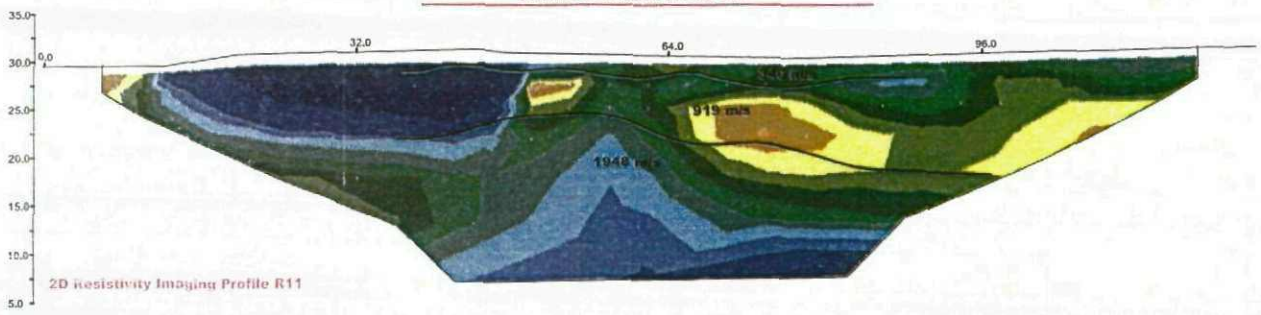
Geophysical Section J

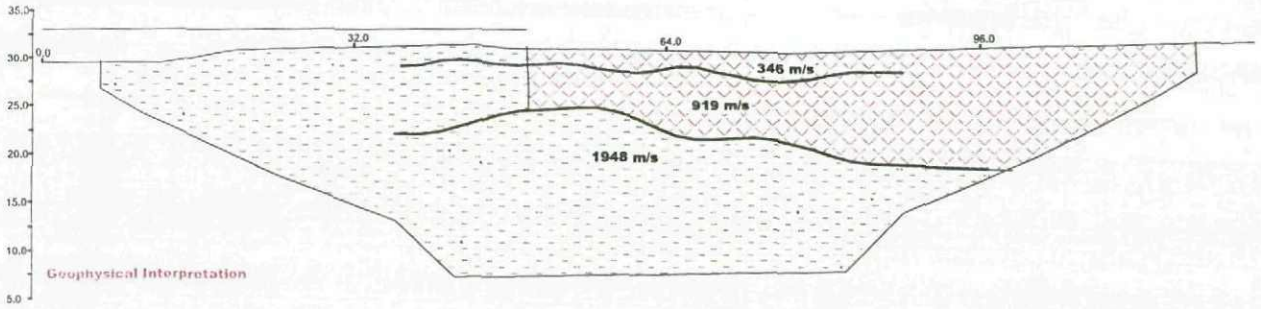
W

E

Seismic Refraction Profile S10

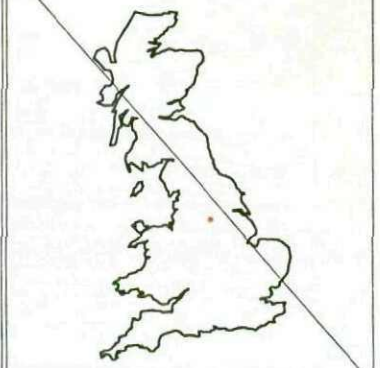


2D Resistivity Imaging Profile R11



Geophysical Interpretation

INDEX MAP:



LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section J
DATE:	April 2008
CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:500 @A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
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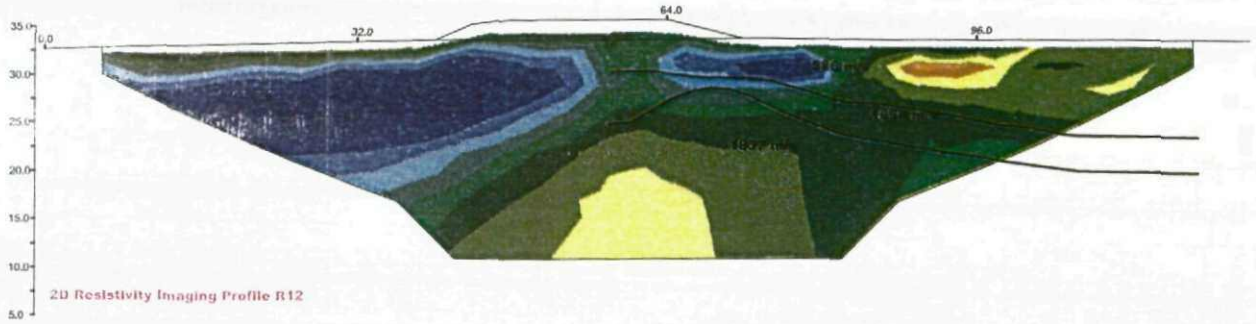
Geophysical Section K

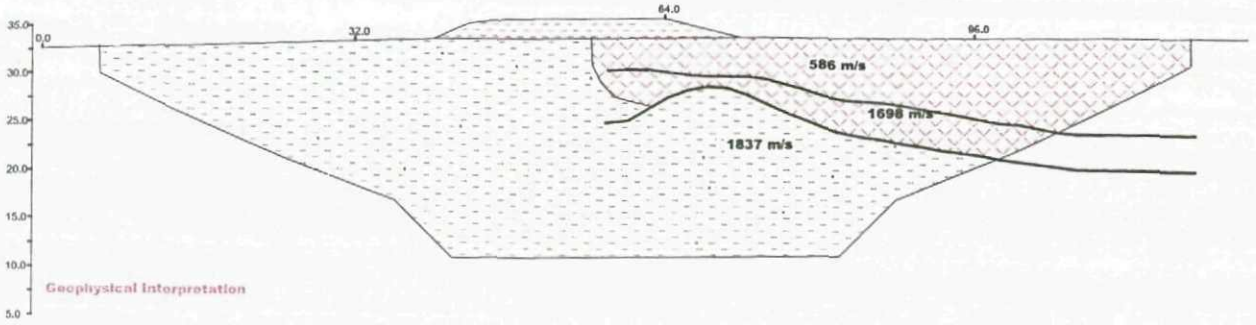
NW

SE

Seismic Refraction Profile S11



2D Resistivity Imaging Profile R12



Geophysical Interpretation

INDEX MAP:

LEGEND:

- Soil/loose fill
- In-situ coal measures
- Backfilled open pit

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PROJECT:	Houghton Main Business Park
DRAWING No.:	Geophysical Section K
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CLIENT:	White Young Green Environmental Ltd.
SCALE:	1:500 @A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
1	30/04/2008	DC	

APPENDIX I GEOPHYSICAL METHODOLOGY

M1. Methods Used

1.1 Seismic Refraction Profiling

1.2 2D Resistivity Imaging

M2. Equipment Used

2.1 Seismic Refraction Profiling

2.2 2D Resistivity Imaging

M3. Field Procedure

3.1 Seismic Refraction Profiling

3.2 2D Resistivity Imaging

M4. Data Processing

4.1 Seismic Refraction Profiling

4.2 2D Resistivity Imaging

M1. Methods Used

1.1 Seismic Refraction Profiling

This method measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities. Readings are taken using geophones connected via multi-core cable to a seismograph.

1.2 2D Resistivity Imaging

This surveying technique makes use of the Wenner resistivity array. The 2D-resistivity profiling method records a large number of resistivity readings in order to map lateral and vertical changes in material types. The 2D-resistivity profiling method involves the use of up to 64 electrodes connected to a resistivity meter, using computer software to control the process of data collection and storage.

M2. Equipment Used

2.1 Seismic Refraction Profiling

The equipment used was a Geometrics Geode seismograph, a 24 geophone array, and sledgehammer and plate source.

2.2 2D-Resistivity Profiling

The equipment used was a Campus Tigre resistivity meter, imaging software, a 32 takeout multicore cable and 32 stainless steel electrodes. The recorded data was processed and viewed immediately after the survey.

M3. Field Procedure

3.1 Seismic Refraction Profiling

Each seismic spread consisted of 24 collinear geophones. Records from up to seven different positions were taken on each spread (2 x off-end, 2 x end, 3 x within the geophone array) to ensure optimum coverage of all refractors. Ongoing estimation of refractor velocities was carried out to monitor refractor type and depth.

Each of the profiles had the following recording parameters:

Profile	Geophones	Spacing	Length	Azimuth
No.	No.	(m)	(m)	
S1	24	2	46	SW - NE
S2	24	2	46	W - E
S3	24	2	46	NW - SE
S4	24	2	46	NW - SE
S5	24	2	46	NW - SE
S6	24	2	46	NW - SE
S7	24	2	46	NW - SE
S8	24	2	46	SW - NE
S9	24	2	46	SW - NE
S10	24	2	46	W - E
S11	24	2	46	NW - SE

3.2 2D-Resistivity Imaging Profiles

The 2D-Resistivity profiles have the following recording parameters:

Profile	Electrodes	Spacing	Length	Depth of Investigation	Azimuth
No.	No.	(m)	(m)	(m)	
R1	32	3	93	17	NW - SE
R2	32	3	93	17	W - E
R3	32	3	93	17	SW - NE
R4	32	3	93	17	NW - SE
R5	32	3	93	17	SW - NE
R6	32	3	93	17	NW - SE
R7	32	3	93	17	NW - SE
R8	32	3	93	17	NW - SE
R9	32	4	124	25	SW - NE
R10	32	4	124	25	SW - NE
R11	32	4	124	25	W - E
R12	32	4	124	25	NW - SE

M4. Data Processing

4.1 2D Resistivity Imaging

The field readings were stored in computer files and inverted using the RES2DINV package (Campus Geophysical Instruments, 1997) with up to 5 iterations of the measured data carried out for each profile to obtain a 2D-Depth model of the resistivities.

The inverted 2D-Resistivity models and corresponding interpreted geology are displayed as Profile 6. The chainage is indicated along the horizontal axis of the profile and the elevation in m is indicated on the vertical axis. All profiles have been contoured using the same contour intervals and colour codes.

It is important to note that the data displayed on the 2D-Resistivity profiles is real physical data however interpretation of the geophysical results is required to transform the resistivities directly into geological layers.

4.2 Seismic Refraction Profiling

First break picking in digital format was carried out using PICKWIN for input into PLOTREFA software.. The thickness estimates were plotted at the relevant locations on the Geophysical Sections.

APPENDIX I:

GAS AND GROUNDWATER MONITORING DATA

WHITE YOUNG GREEN ENVIRONMENTAL

Newstead Court, Little Oak Drive,
Sherwood Business Park, Annesley,
Nottingham, NG15 0DR

GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	William Saunders Partnership LLP	**Job No.:**	A042741	**Instruments Used:**	Infra Red gas analyser and Dip Meter
Project:	Grimethorpe	**Date:**	07.03.08	**Monitored By:**	
Weather:					

Installation No.	Elevation of cover (mAOD)	Peak [1]		Steady [2]			Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Water Level (mAOD)	Remarks
		CH_4 (% vol)	CO_2 (% vol)	CH_4 (% vol)	CO_2 (% vol)	O_2 (% vol)						
CP01	31.77	0.0	0.1	0.0	0.1	20.4	0.0	1006	4.88		26.89	
CP02	33.49	0.0	0.0	0.0	0.0	20.6	0.0	1008	5.79		27.70	
CP03	33.29	-	-	-	-	-	-	-	-			No gas reading due to suraice water which drained when bung pulled
CP04	33.56	0.0	0.0	0.0	0.1	20.5	0.0	1008	6.37		27.19	
CP05	33.72	0.0	0.0	0.0	0.0	20.6	0.0	1007	5.50		28.22	

Background Gas Levels:

	CH_4 (%)	CO_2 (%)	O_2 (%)	Atmos (mbar)
Before Monitoring	0.0	0.0	20.5	1009
After Monitoring	0.0	0.0	20.6	1008

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

WHITE YOUNG GREEN ENVIRONMENTAL

Newstead Court, Little Oak Drive,
Sherwood Business Park, Annesley,
Nottingham, NG15 0DR

GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	William Saunders Partnership LLP	**Job No.:**	A042741	**Instruments Used:**	Infra Red gas analyser and Dip Meter
Project:	Grimsthorpe	**Date:**	12.03.2008	**Monitored By:**	Chris Arnott
Weather:	Very Windy, Dry and bright				

Installation No.	Elevation of cover (mAOD)	Peak [1]		Steady [2]			Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Water Level (mAOD)	Remarks
		CH_4 (% vol)	CO_2 (% vol)	CH_4 (% vol)	CO_2 (% vol)	O_2 (% vol)						
CP01	31.77	-	-	-	-	-	-	-	-	-		Hole vandalised, tap removed and bung forced down into standpipe
CP02	33.49	0.0	0.0	0.0	0.0	20.6	0.0	994	5.84		27.65	
CP03	33.29	-	-	-	-	-	-	-	-	-		Hole completely submerged in large pool of surface water, borehole draining pond when bung pulled
CP04	33.56	0.0	0.1	0.0	0.1	20.8	0.0	994	6.40		27.16	
CP05	33.72	0.0	0.0	0.0	0.0	20.9	0.0	993	5.53		28.19	

Background Gas Levels:

	CH_4 (%)	CO_2 (%)	O_2 (%)	Atmos (mbar)
Before Monitoring	0.0	0.1	20.9	994
After Monitoring	0.0	0.0	20.6	995

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute

WHITE YOUNG GREEN ENVIRONMENTAL

Newstead Court, Little Oak Drive,
Sherwood Business Park, Annesley,
Nottingham, NG15 0DR

GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	William Saunders Partnership LLP	**Job No.:** A042741	**Instruments Used:** Infra Red gas analyser and Dip Meter
Project:	Grimethorpe	**Date:** 17.03.08	**Monitored By:** Chris Arnott
Weather:	sunny and windy		

Installation No.	Elevation of cover (mAOD)	Peak [1] CH_4 (% vol)	Peak [1] CO_2 (% vol)	Steady [2] CH_4 (% vol)	Steady [2] CO_2 (% vol)	Steady [2] O_2 (% vol)	Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Water Level (mAOD)	Remarks
CP01	31.77	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			Hole vandalised, tap removed and bung forced down into standpipe
CP02	33.49	0.0	0.2	0.0	0.2	20.7	0.0	1023	6.85		26.6	
CP03	33.29	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4.88		28.4	Some surface water still draining into borehole
CP04	33.56	0.0	0.1	0.0	0.1	20.8	0.0	1023	6.38		27.2	
CP05	33.72	0.0	0.2	0.0	0.2	20.5	0.0	1022	5.49		28.2	

Background Gas Levels:

	CH_4 (%)	CO_2 (%)	O_2 (%)	Atmos (mbar)
Before Monitoring	0.0	0.1	20.8	1024
After Monitoring	0.0	0.1	20.7	1022

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

WHITE YOUNG GREEN ENVIRONMENTAL

Newstead Court, Little Oak Drive,
Sherwood Business Park, Annesley,
Nottingham, NG15 0DR

GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	William Saunders Partnership LLP	**Job No.:**	A042741	**Instruments Used:**	Infra Red gas analyser and Dip Meter
Project:	Grimethorpe	**Date:**	09.05.08	**Monitored By:**	AN
Weather:	sunny and dry				

Installation No.	Elevation of cover (mAOD)	Peak [1] CH_4 (% vol)	Peak [1] CO_2 (% vol)	Steady [2] CH_4 (% vol)	Steady [2] CO_2 (% vol)	Steady [2] O_2 (% vol)	Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Water Level (mAOD)	Remarks
CP01	31.77	0.0	10.8	0.0	10.8	7.7	0.4	1012	2.97		28.80	
CP02	33.49	0.0	4.4	0.0	4.4	7.1	0.2	1012	7.13		26.36	
CP03	33.29	0.1	8.5	0.0	8.5	5.6	0.1	1011	5.83		27.46	
CP04	33.56	0.0	3.5	0.0	3.5	12.5	0.1	1012	7.16		26.40	
CP05	33.72	0.0	7.9	0.0	7.9	8.3	0.7	1011	5.65		28.07	

Background Gas Levels:

	CH_4 (%)	CO_2 (%)	O_2 (%)	Atmos (mbar)
Before Monitoring	0.0	0.0	20.6	1012
After Monitoring	0.0	0.0	20.4	1011

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

WHITE YOUNG GREEN ENVIRONMENTAL

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Nottingham, NG15 0DR

GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	William Saunders Partnership LLP	**Job No.:**	A042741	**Instruments Used:**	Infra Red gas analyser and Dip Meter
Project:	Grimethorpe	**Date:**	21.05.08	**Monitored By:**	AN
Weather:	sunny and dry; windy				

Installation No.	Elevation of cover (mAOD)	Peak [1]		Steady [2]			Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Water Level (mAOD)	Remarks
		CH_4 (% vol)	CO_2 (% vol)	CH_4 (% vol)	CO_2 (% vol)	O_2 (% vol)						
CP01	31.77	0.0	4.3	0.0	4.3	12.3	0.4	1012	3.00		28.77	
CP02	33.49	0.0	0.6	0.0	0.6	13.2	0.6	1011	7.07		26.42	
CP03	33.29	0.0	3.3	0.0	3.3	12.1	0.1	1012	5.97		27.32	
CP04	33.56	0.0	1.0	0.0	1.0	14.9	0.1	1011	7.26		26.30	
CP05	33.72	0.0	5.9	0.0	5.9	11.3	0.0	1011	5.83		27.89	

Background Gas Levels:

	CH_4 (%)	CO_2 (%)	O_2 (%)	Atmos (mbar)
Before Monitoring	0.0	0.0	20.9	1012
After Monitoring	0.0	0.0	20.9	1011

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

WHITE YOUNG GREEN ENVIRONMENTAL

Newstead Court, Little Oak Drive,
Sherwood Business Park, Annesley,
Nottingham, NG15 0DR

GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	William Saunders Partnership LLP	**Job No.:**	A042741	**Instruments Used:**	Infra Red gas analyser and Dip Meter
Project:	Grimethorpe	**Date:**	03.06.08	**Monitored By:**	AN
Weather:	Rainy and overcast				

Installation No.	Elevation of cover (mAOD)	Peak [1]		Steady [2]			Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Water Level (mAOD)	Remarks
		CH_4 (% vol)	CO_2 (% vol)	CH_4 (% vol)	CO_2 (% vol)	O_2 (% vol)						
CP01	31.77	0.0	4.3	0.0	4.1	12.0	0.1	1007	2.80		28.97	
CP02	33.49	0.0	0.7	0.0	0.7	15.7	0.9	1007	5.80		27.69	
CP03	33.29	0.0	0.7	0.0	0.7	6.0	8.2	1007	3.59		29.70	
CP04	33.56	0.0	0.5	0.0	0.5	8.5	0.3	1007	7.33		26.23	
CP05	33.72	0.0	5.9	0.0	5.9	12.5	0.1	1006	4.21		29.51	

Background Gas Levels:

	CH_4 (%)	CO_2 (%)	O_2 (%)	Atmos (mbar)
Before Monitoring	0.0	0.0	20.9	1007
After Monitoring	0.0	0.0	20.9	1007

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.