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Executive Summary of Phase 2 Ground Investigation at Moor End Academy, Crosland Moor, Huddersfield HD4 5JA

Introduction

SGM Structural Design Ltd have been appointed to provide an executive summary of the Phase 2 Intrusive Ground Investigation following on from the recommendations provided within the previously completed Phase 1 Desk Study, in order to assess and comment on the ground conditions found during intrusive investigation together with soils testing to identify if contaminants are present.

The intrusive ground investigation was completed by Rogers Geotechnical Services Ltd of which the results are included with this executive summary.

This summary should be read in conjunction with Rogers Geotechnical Services 'Geotechnical Environmental Investigation Report' reference J2680/15/E dated 2nd November 2015.

The Site

The site is located off Dryclough Road and comprises of the sports & playing fields attached to the academy, hard and soft landscaped areas including car parking surrounding the academy together with the Muhammad Ali Sports & Community Centre evident as a cricket ground. The site area is approximately 12 hectares and is bounded on all sides by residential properties.

Fieldworks

The fieldworks conducted by Rogers Geotechnical Services Ltd were completed during the period from 19th to the 21st of September 2015. This consisted of the following operations:-

- **30No. Windowless Samples** – These boreholes were sunk using a drive in windowless sampler.
- **34No. Dynamic Probes** – Dynamic penetration tests were undertaken adjacent to the windowless sample boreholes.
- **10No**. **Machine Dug Trial Pits** – Eight of which were used for soakaway tests and excavated using a JCB 3CX back acting excavator.
- **17No**. **Hand Dug Pits** – Dug using a narrow trenching tool & trowel to recover soil samples for geo-environmental testing.
- **Ground Water & Gas Monitoring Standpipes** – Ground water & gas monitoring stand pipes were installed to twelve of the windowless sample boreholes.

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Strata Conditions

In accordance with the expected geology of the area, the findings of the windowless borehole samples and trial pit excavations showed the following.

Depth (m)	Strata Type	Boreholes Strata was revealed in	Groundwater strikes (m)
0.10 – 0.60	Topsoil	ALL	None
0.30 – +3.00	Made Ground	WS01, WS03, WS04, WS05, WS07, WS09, WS11, WS12, WS13, WS16, WS17, WS19, WS23, WS26, WS27, WS29, TP01a, TP01b and TP08	None
+0.30 - +1.55	Weathered Rough Rock	WS01, WS02, WS03, WS04, WS06, WS08, WS10, WS13, WS14, WS15, WS17, WS18, WS20, WS21, WS22, WS23, WS24, WS25, WS26, WS28, WS30, TP02, TP03, TP04, TP05, TP06 and TP09	None

'+' Denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

Generally the site is capped by a 100mm to 600mm thick layer of topsoil. This overlies Made Ground to varying depths. In line with the expected geology the underlying strata was found to be a material typical of Weathered Rough Rock.

No ground water was encountered during the investigation. However the normal rate of boring does not allow equilibrium conditions to be reached and the levels of ground water are subject to change dependant on seasonal variation of drainage conditions.

Insitu Testing

Dynamic Penetration tests were undertaken adjacent to the locations of the windowless samples.

Gas and Water level monitoring standpipes were installed at the same time as completing the borehole exercise and were monitored between 28th September 2015 and 26th October 2015. As a result of a faulty measuring instrument, some gas results are deemed unreliable and not included in the ground gas assessment. However, further monitoring is to be carried out after the writing of this executive summary.

Carbon Dioxide levels have been recorded as high as 5.8% with slightly low oxygen levels recorded as 16.0%.

The soakaway testing completed to this site is characterised as marginally good to good with an infiltration rate in the order of $5.6x10^{-6}$ to $1.6x10^{-4}$.

Laboratory Testing – Geotechnical

Moisture Content, Index Property, Particle Size Distribution, California Bearing Ratio, Determination of Permeability and sulphate content & pH Values tests were all undertaken.

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Results from the index testing show that the Made Ground can be classified as low plasticity and these soils exhibit low shrinkage potential although this is not of concern as the proposed foundation depth will be below this material on to the Rough Rock formation. Although this may have an impact on the depth of ventilated spaces below suspended floors.

Sulphate testing revealed levels ranging between 0.01% and 0.27%, with a pH value between 4.1 and 8.4.

CBR testing measured values ranging between 25% and 50% at moisture contents of 11%.

Determination of permeability was undertaken on two samples which recorded permeability's of $2.75x10^{-8}$m/sec indicating poor drainage characteristics.

Laboratory Testing – Environmental

A suite of chemical testing was conducted on samples across the site to screen for contaminants to include Metals, Semi & Non-Metals, PAH's, TPH's and Others (pH, organic content & total/soluble SO_4^{2-}.

Discussion of Ground Conditions – Environmental

As the proposed scheme is for the development of the school, the site is deemed to be classified as being residential without plant (home grown) uptake.

Of the soil samples taken the laboratory tests indicate that there are levels of Polycyclic Aromatic Hydrocarbons (PAH's) of varying forms across the whole site along with Petroleum Hydrocarbons (TPH's) evident within WS14, TP1a, GE13 and GE14, Lead within TP1a and Arsenic within GE14. Detectable levels of other contaminants were recorded but were all below the associated ATRISK soil screening values.

From these results it is considered that the site is contaminated with PAH's across the site with TPH's, Lead and Arsenic in localised areas.

No asbestos fibres were found within the soil samples tested, thus it is proven that asbestos is not present within the made ground or topsoil at the site.

From the gas monitoring samples completed thus far the results show that there is negligible levels of methane present. There are however concentrations of carbon Dioxide as high as 5.8%. This is above the limit of 5% as stated by CIRIA and therefore 'Characteristic Situation Level 2' should be adopted. It should be noted however that the gas monitoring is still ongoing and will have an additional report to follow once complete.

Radon protection measure are not necessary.

Site Specific Risk Assessment

From the results of the chemical testing undertaken, the Site Specific Risk Assessment has been updated from the previously completed form within the Phase 1 desk Study. For the full Risk Assessment refer to Rogers Geotechnical Services Ltd full report.

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Due to the presence of the contaminants, PAH's, TPH's, Lead, Arsenic and the high levels of Carbon Dioxide encountered the risk rating to site operatives and the end user is **MODERATE** to **HIGH** and therefore it is considered that the site will require remediation.

Remediation Strategy ~ To protect the site end user, construction operatives and the buildings will require the following :-

Ground Works

1. Site operatives to be made aware of hazards and encouraged to use hygiene facilities where necessary. Dust masks to be provided in dry weather.
2. Site should be dampened down in dry weather to avoid dust. Stockpiles of contaminated soil to be sheeted over.
3. Vehicles transporting contaminated soil off site should be covered, and in wet weather, vehicle and wheel washing facilities provided.
4. Workers entering confined spaces or excavations to take precautions due to elevated levels of carbon dioxide & slightly depleted oxygen levels.

Construction

1. Clean, inert granular sub-base should be employed beneath buildings, pavements and hard standings.
2. Provide solid ground floor construction with either 1200g DPM or 2000g vapour resistant membrane for reinforced concrete (suspended or raft) and precast concrete floor system respectively.
3. Redundant services to be decommissioned and sealed.
4. Plastic services should be surrounded in a clean, inert material.
5. The sulphate design class for buried concrete is DS-1.

Landscaped Areas

1. Provide 500mm capping layer to existing site with a granular capillary break of approximately 100mm to provide a root barrier. It is optional to remove 600mm off site depending on excavation costs.

Note: If the made ground is completely removed from site, this negates the necessity of a vapour resistant membranes, however the rock would need to undergo further testing to ensure it is not itself contaminated.

Construction Recommendations

Foundations

It is recommended to found new foundations on the Rough Rock at depths of between 1.2m to 1.5m. This rock can be assumed to possess an allowable ground bearing pressure of 200kN/m². This depth would suit traditional 'spread' foundations such as pad bases and strip or trench footings.

The side stability of any trenches cannot be guaranteed due to the loose fill material. Temporary support should be provided to any excavations unless trench fill is intended for use. Under no circumstances should operatives enter unsupported trenches.

A disused historical quarry occupied the north western part of the site which has been infilled at some time in the past. A piled foundation solution would need to be considered in this location should buildings be constructed in this location.

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Ground Floor Construction

Due to the presence and variable thicknesses and condition of the made ground beneath the site, it is recommended that the use of fully suspended ground floors be adopted such as beam & block flooring or precast concrete floor planks.

Access Roads & Hardstanding's

It is recommended that access roads, car parking and hardstanding areas be constructed employing traditional pavement design based on a design CBR value of no more than 25%. Proof rolling must be undertaken to establish the suitability of the underlying soils.

Consideration to be given to the possible re-use of the Rough Rock material on site for construction of access roads/hardstanding.

Soakaways

The rock is considered to have a marginally good to good infiltration rate with the exception of two locations (TP08 and TP09) which are not suitable for the use of soakaways. An infiltration rate of $5.6x10^{-6}$ should be employed in the soakaway design.

The surrounding material is silty or clayey and the rock may weather with time meaning any soakaway may foul over time. Adequate filtering media will be necessary around the soakaway and allowances made for reductions in permeability due to silting.

Effect of Sulphates

Compacted buried concrete to be designed in accordance with Class DS-1 and an aggressive chemical environment for concrete (ACEC) classification of AC-1. Therefore, concrete design class DC-1 is recommended.

I trust the above recommendations meet with your present requirements, in the mean time should you have any further queries please do not hesitate to contact me.

Yours faithfully,

Stuart

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REPORT

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GEOTECHNICAL ENVIRONMENTAL

REPORT ON A GEO-ENVIRONMENTAL INVESTIGATION

at

MOOR END ACADEMY, DRYCLOUGH ROAD,
HUDDERSFIELD, HD4 5JA.

for

CLIENT: AHR BUILDING CONSULTANCY LTD
ON BEHALF OF KIRKLEES COUNCIL

CONSULTANTS: SGM STRUCTURAL DESIGN LTD.

Report No J2680/15/E

October 2015

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Report No J2680/15/E **October 2015**

1. SYNOPSIS

This investigation has demonstrated that below a capping of topsoil and made ground, extending to between 0.3m and +3.0m depth below ground level. Weathered sandstone of the Rough Rock Formation was encountered to the full depths investigated. As a consequence, it is considered that the structures proposed at the site could be founded on strip and spread footings located within the weathered Rough Rock at about 1.2m to1.5m depth.

In addition, chemical testing has revealed that a range of contaminants are present within the soils at the site. Moreover, monitoring of the standpipes installed has indicated that there are significant concentrations of carbon dioxide present. In light of this, careful consideration of the geo-environmental discussion will be necessary.

2. INTRODUCTION

It is understood that AHR Building Consultancy Ltd plan to develop part of the existing school grounds of Moor End Academy on the behalf of Kirklees Council. The development is to include a new educational facility surrounded by car parking areas, playing fields and soft landscaping. At the time of the investigation, the site comprised the sports and playing fields attached to the Academy; the recreational facilities used by the Muhammad Ali Sports and Community Centre; the academy and all the hard and soft landscaped areas surrounding the school, including all car parking areas. Thus this combined site forms a generally east-west orientated

rectangular shaped area approximately 12 hectares in size that is bounded by residential properties on all four sides.

The academy is located in the western part of the site, with adjacent sports and playing fields falling away down slope to the east. There is evidence that some form of earthwork has been undertaken in the past to create terraced playing fields at the Muhammad Ali Sports and Community Centre and sports areas within the academy grounds. It is also noted that the north western part of the site is occupied by a historic disused quarry, which has been in filled at some time in the past.

Information obtained from a Phase 1 Desk Study undertaken by Rogers Geotechnical Services Ltd, report number J2680/14/EDS dated the February 2014, indicates that there are potential sources of contamination on site and in the surrounding area. In view of the above, it was recommended that an intrusive investigation be undertaken to obtain both geotechnical and geo-environmental data in accordance with the sampling strategies given in BS10175:2011 and CLR4:1994.

Consequently, a site investigation has been undertaken in accordance with the client's instruction. This work was required in order to determine the nature of the underlying soils, to assess their engineering properties and to assist in the design of safe and economical foundations for the proposed development. Additionally, contamination testing of the made ground has been undertaken to enable an assessment of the levels of contamination at this site.

This report presents the data obtained and discusses the ground conditions in relation to the proposed development.

3. LIMITATIONS

The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of the laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between borehole positions, these are for guidance only and no liability can be accepted for their accuracy.

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue.

4. DESK STUDY

A Phase 1 Desk Study has been undertaken by Rogers Geotechnical Services Ltd and the results were presented as report number J2680/14/EDS in February 2014. The study identified the presence of an in-filled historic quarry in the northwestern part of the site; the potential for on-site contamination and gas generation associated with made ground; the potential for asbestos being present in the made ground given the age of the construction of the school. The study has been used extensively during the current intrusive investigation.

5. FIELDWORKS

The fieldworks were undertaken during the period from the 19th September to the 21st September 2015 and included the following:

- Thirty windowless sample boreholes.
- Thirty four dynamic probes.
- Ten machine dug trialpits (eight being used for soakaway tests).
- Seventeen hand dug pits to recover soil samples for geo-environmental testing.
- Twelve ground water and gas monitoring standpipes.

The investigatory locations are shown on the site plan, which is presented in Appendix 1 to this report.

5.1 Windowless Sample Boreholes

These boreholes were sunk using a drive-in windowless sampler until refusal. The cores were undertaken in 1m lengths and reduced in diameter from 90mm for the first 1m through 80mm, 70mm and 60mm for subsequent 1m increments. The recovered cores were sealed and returned to the laboratory for logging and subsequent testing. The chemical test specimens were retained in an appropriate air tight container within cool boxes, for onward transition to the chemical laboratory.

The soils were described in general accordance with BS5930: 1999, as amended in 2010, and full descriptions are given on the window sample records which are presented in Appendix 2. Also included on these records are the sample depths, any ground water levels and the percentages of core recovered.

5.2 Dynamic Penetration Tests

Dynamic penetration tests were undertaken adjacent to the windowless sample boreholes in accordance with the procedure given in BS1377: 1990: Part 9, using the super heavy penetrometer (DPSH). This probe consists of a 63.5kg mass falling

through 750mm onto an anvil, which drives a 50mm diameter cone into the ground. The number of blows required to drive the cone through successive 100mm increments are recorded as the N_{100} values. The results of the dynamic penetration tests are tabulated and presented as bar charts of N_{100} values versus depth in Appendix 3.

5.3 Machine Dug Trialpits/Soakaways

Two trialpits (TP01a and TP01b) were excavated to depths of between 1.60m and 1.70m bgl using a mini-digger to expose the location of the historical quarry, in the north-western part of the site, at positions shown on the attached site plan. The exposed soils were sampled and logged on site in general accordance with BS5930: 1999, as amended in 2010, and full descriptions are given on the trialpit records, which are presented in Appendix 4. Samples were taken from the trialpits for testing, where deemed necessary.

A further eight trialpits (TP02 to TP09) were excavated between depths of 0.65m and 1.45m below ground level (bgl) in order to reveal the nature of the near surface soils and to undertake soakaway tests, using a JCB 3CX back acting excavator, at positions shown on the attached site plan. The exposed soils were sampled and logged on site in general accordance with BS5930: 1999, as amended in 2010, and full descriptions are given on the trialpit records, which are presented in Appendix 4. Samples were taken from the trialpits for testing, where deemed necessary. In order to undertake the soakaway test, the pit sides and base were cleaned and squared as much as practicable. The pit was then filled with water and the level measured relative to a reference bar at set timed intervals.

5.4 Hand Dug Sampling Pits

Seventeen shallow hand dug sampling pits were excavated within the upper surface of made ground across the site, in order to recover near surface soils for chemical testing. The tests were undertaken to establish potential levels of contamination across the whole site and were conducted in accordance with the sampling strategies given in BS10175:2011 and CLR4:1994.

The site is approximately 12 hectares in size and according to the sampling strategies given in BS10175:2011 and CLR4:1994, 48 representative chemical sampling points are required for the geo-environment assessment.

The sampling regime was devised in such a way as to ensure that the whole site, including the sports facility at the Muhammad Ali Sports and Community Centre, was covered by representative sampling points. This entailed the use of an arbitrary grid of approximately 50m by 50m centres being outlined on a plan of the site and ensuring the most practicable locations were selected within each grid square to ensure an even spread of sample points across the site. The position of each sampling point is shown on the attached site plan.

The depth and location of each soil sample was recorded at the time of sampling, each sample being taken between 0.2m and 0.6m blg, depending on the depth of topsoil and made ground at each location, using a narrow trenching tool and trowel. Given the sensitivity of the site and to reduce the amount of visual and physical disturbance to the playing fields and soft landscaped areas, at each location a small piece of turf and topsoil was carefully lifted with a trenching tool to sample the soil beneath and then carefully reinstated to ensure little trace of the sampling activity was left behind.

The exposed soils were sampled and logged on site in general accordance with BS5930: 1999, as amended in 2010, and full descriptions are given on the trialpit records, which are presented in Appendix 5. The chemical test specimens were retained in an appropriate air tight container within cool boxes, for onward transition to the chemical laboratory.

5.5 Monitoring Ground Water and Gas Standpipes

Monitoring standpipes were installed in twelve of the windowless sample boreholes, namely WS01, WS03, WS05, WS11, WS12, WS16, WS17, WS19, WS22, WS27, WS29 and WS30, respectively. The detail of each installation is shown on the appropriate borehole record. The standpipes consisted of a perforated pipe from the base to depths ranging between 0.2m to 0.9m below ground level, with a non-perforated pipe to ground level. The response zone was filled with pea gravel, with a bentonite seal at the base and above and the installation, which was capped with a stop box cover in a concrete surround.

It must be appreciated that installations were only possible where conditions allowed. Installations were not possible either due to their location (for example, their proximity to sports fields where the metal coverings may form a tripping hazard or become injurious during a fall), or because the windowless sample holes were too shallow to allow sufficient slotted pipe to be installed within the thin cover of made ground.

6. GEOLOGY

The available published geological data for the site has been examined and the following table presents the anticipated geology.

Table 1: *Geological Data for the Site*

Strata Type	Strata Name[1]	Previous Name[2]	Description[2]
Superficial Geology	-	-	None recorded. .
Solid Geology	Rough Rock	Rough Rock Formation	Coarse-grained feldspathic sandstone, crossbedded.

A northwest to southeast trending fault with down-throw to the north-east is shown approximately 150m east of the site.

Although no superficial deposits are recorded on the published geological map, in-filled ground is indicated to be present in the north-western corner of the site, associated with the historic Dry Clough Quarry.

7. STRATA CONDITIONS

In accordance with the geology of the area, the succession has been shown to include the following:

Table 2: *Generalised strata profile*

Depth (m)	Strata type	Positions present	Groundwater strikes (m)
0.10 – 0.60	Topsoil	WS01-WS30 and TP01a-TP09	None
0.30 – +3.00	Made Ground	WS01, WS03, WS04, WS05, WS07, WS09, WS11, WS12, WS13, WS16, WS17, WS19, WS23, WS26, WS27, WS29, TP01a, TP01b and TP08	None
+0.30 – +1.55	Weathered Rough Rock	WS01, WS02, WS03, WS04, WS06, WS08, WS10, WS13, WS14, WS15, WS17, WS18, WS20, WS21, WS22, WS23, WS24, WS25, WS26, WS28, WS30, TP02, TP03, TP04, TP05, TP06 and TP09	None

'+' Denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

This profile is considered in more detail below.

7.1 Topsoil

At the locations of all windowless sampling (WS01 to WS30) and trialpits (TP01a to TP09), the site was found to be capped by a 100mm to 600mm thick layer of generally black, occasionally grey and brown, silty gravelly sand with abundant

[1] Sources: British Geological Survey (NERC) Map Sheets 77; Huddersfield; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[2] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

rootlets and occasional cobbles of sandstone and rare brick. Gravel is sub-angular to sub-rounded, fine to coarse of fine-, medium- and coarse-grained sandstone.

However, at the positions of WS12, WS13, TP01a and TP01b in the north-western corner of the site, topsoil was revealed as dark grey and light to medium brown silty occasionally gravelly fine sand with rootlets.

A 200mm thick layer of brown silty gravelly sand with occasional rootlets was encountered at 1.00m bgl within WS16, below a horizon of made ground and, as such, it is considered to represent relict topsoil.

7.2 Made Ground

Beneath the cover of topsoil, granular material variably described as very loose, loose to medium dense and rarely dense orange, brown mottled orange, dark orangish brown, locally clayey or silty, gravelly sand with cobbles was revealed within WS01, WS03, WS05, WS07, WS09, WS11, WS12, WS17, WS19, WS23, WS26, WS27, WS29 and TP08 between depths of 0.45m and +2.60m bgl. Gravel is commonly angular, sub-angular to sub-rounded, fine to coarse sandstone. Cobbles are sub-angular to sub-rounded sandstone. However, within WS12 gravel is angular to sub-rounded fine to coarse, medium and coarse grained sandstone and rare brick and clinker interbedded with horizons of ash.

In contrast, loose and medium dense orange, purplish grey fine and medium sand with rare gravel ranging between depths of 0.15m and +1.00m was encountered within WS04, WS19, WS23 and WS26.

However, below the topsoil in WS13 a 0.28m thick layer of loose dark brown mottled red slightly clayey sandy gravel was revealed to a depth of 0.45m bgl. In addition, dark brown to black, locally mottled light brown, slightly silty very sandy medium gravel with many cobbles and boulders of brick, concrete sandstone and ceramics was encountered beneath the topsoil within TP01a and TP01b to depths of 0.75m and 0.70m bgl, respectively. Gravel is angular to sub-rounded, fine to coarse of sandstone, brick, clinker, ash, glass, plastic, metal and plastic.

Cohesive material described as dark brown to black slightly silty, very sandy, gravelly clay with boulders was encountered beneath the gravel within TP01a and TP01b to depths of +1.70m and +1.60m, respectively. Gravel is angular to sub-rounded, fine to coarse of brick, sandstone, coal, siltstone, mudstone, concrete, glass, ceramics, paper, plastic, ash and clinker with occasional cobbles and boulders of tabular dressed sandstone. These trialpits are located in the vicinity of the historic quarry and both granular and cohesive soils are considered to represent infill comprising demolition rubble.

Soft dark brown sandy clay with cobbles of coarse-grained sandstone was revealed below the topsoil in WS16 to a depth of 1.00m bgl. However, a 200mm thick layer of brown silty gravelly sand with occasional rootlets was encountered beneath this

stratum and is considered to represent relict topsoil, which lies above the weathered surface of the Rough Rock.

The above materials are considered to represent made ground or infill, which has been either placed at the site or reworked on-site.

7.3 Weathered Rough Rock

On penetrating the topsoil and made ground variable thicknesses (ranging from 0.05m to 0.95m thick) of granular material comprising gravelly coarse sand with cobbles and sandy gravel were revealed to termination in exploratory holes WS01, WS02, WS03, WS04, WS06, WS08, WS10, WS13, WS14, WS15, WS17, WS18, WS20, WS21, WS22, WS23, WS24, WS25, WS26, WS28, WS30, TP02, TP03, TP04, TP05, TP06 and TP09. These soils were encountered within the above exploratory holes to depths of between +0.3m and +1.55m bgl.

These soils have been generally described as follows:

- medium dense to dense, orangish brown to yellowish light brown, gravelly coarse sand with cobbles. Gravel is angular to sub-angular fine to coarse of coarse-grained sandstone. Cobbles are angular to sub-angular of coarse-grained sandstone

- medium dense, sandy sub-angular fine to coarse gravel

- medium dense, light brown coarse sand

- very loose becoming medium dense, orangish cream to yellowish light brown, gravelly coarse sand with cobbles. Gravel is angular to sub-angular fine to coarse of coarse-grained sandstone

- medium dense, becoming dense, purplish grey, gravelly coarse sand. Gravel is angular to sub-angular medium of coarse-grained sandstone

- medium dense, orangish brown medium to coarse sandy gravelly cobbles. Gravel is angular to sub-rounded fine to coarse of coarse-grained sandstone. Cobbles are angular to sub-angular frequently tabular of coarse-grained sandstone.

With respect to the published geological data, the above strata are considered to represent variably weathered Rough Rock recovered as granular material.

7.4 Groundwater

The normal rate of boring does not permit the recording of an equilibrium water level for any one strike. Moreover, groundwater levels are subject to seasonal variation or changes on local drainage conditions. Notwithstanding this, no groundwater was encountered within any of the exploratory holes.

8. IN SITU TESTING

8.1 Soakaway Tests

Soakaway tests were undertaken within eight machine dug trialpits located at various positions across the site. The results obtained from the soakaway tests are presented in Appendix 5 and are summarised below:

Table 3: *Soakaway Test Results*

TP	Depth (m)	Soakage Area Dimensions (average)	Soil Description (Base and side of trialpit within zone of test)	Infiltration Rate (m/sec)	Drainage Characteristics
TP02 SA02a	0.90m	2.20m x 0.70m	Sandy gravelly COBBLES of sandstone	2.2×10^{-5}	Good
TP02 SA02b	0.90m	2.20m x 0.70m	Sandy gravelly COBBLES of sandstone	1.7×10^{-5}	Good
TP03 SA03	0.90m	1.75m x 0.60m	Sandy gravelly COBBLES of sandstone	9.5×10^{-6}	Marginally Good
TP04 SA04	1.45m	1.80m x 0.70m	Sandy gravelly COBBLES of sandstone	2.2×10^{-4}	Good
TP05 SA05a	1.20m	1.58m x 0.70m	Sandy gravelly COBBLES of sandstone	1.6×10^{-4}	Good
TP05 SA05b	1.20m	1.58m x 0.70m	Sandy gravelly COBBLES of sandstone	1.1×10^{-4}	Good
TP06 SA06	0.90m	2.00m x 0.70m	Sandy gravelly COBBLES of sandstone	2.2×10^{-5}	Good
TP07 SA07	0.65m	1.90m x 0.70m	Sandy gravelly COBBLES of sandstone	5.6×10^{-6}	Marginally Good
TP08 SA08	1.45m	1.80m x 0.60m	Clayey gravelly SAND with cobbles	None Recorded*	Practicably Impermeable
TP09 SA09	0.90m	1.50m x 0.60m	Clayey gravelly SAND with cobbles	None Recorded*	Practicably Impermeable

* *N.B. Unable to obtain infiltration rate as 25% effective depth could not be achieved.*

During the soakaway tests, the water level did not achieve a fall from 75% to 25% of the effective depth of the storage volume in TP08 and TP09. Indeed, very little movement of water was noted, indicating that the underlying materials at the test depths were practically impermeable.

8.2 Dynamic Penetration Tests

Dynamic penetration tests were conducted adjacent to the windowless sample boreholes.

The results demonstrate that resistances to penetration ranging from zero to 7blows/100mm were encountered at all probe locations (DP01 to DP30) within the topsoil to depths of between 0.1m and 0.6m bgl. Typical values ranged from 1 to 3blows/100mm and the low recorded values indicate the weak and variable nature of topsoil underlying the site.

In addition, the resistance to penetration was noted to typically range between zero and 7 blows/100mm, occasionally up to 12blows/100mm in the underlying made ground to depths of between 0.5m and 2.6m bgl. Where made ground was encountered at greater thicknesses in the vicinity of the historical quarry, the resistance to penetration was noted to typically range between 1 and 3 blows/100mm, locally up to 14blows/100mm within DP01Q, DP02Q, DP03Q, DP04Q andPD12 before increasing in blow count and terminating with effective refusals[3] at depths of 12.0m, 13.6m, 2.6m, 4.70 and 11.6m bgl, respectively. Accordingly, it is considered that DP01Q, DP02Q andPD12 are located within the old in-filled quarry, whilst DP03Q and DP04Q appear to be outside the main quarried area. The depths achieved within the quarry area are also comparable to the expected depth to the base of the quarry from borehole logs (i.e.10.6m) presented in the desk study (J2680/14/EDS).

At all other locations, a marked increase the strength with increasing depth was noted, with effective refusal[3] or dead stop, being revealed at depths of between 0.40m to 3.10m bgl across the site, presumably within weak to moderately strong strata of the underlying Rough Rock.

8.3 Gas and Water Level Monitoring

The installed standpipes were monitored between the 28th September and 26th October 2015. The results of the gas monitoring undertaken to date are tabulated below.

Table 4: ***Gas and water monitoring***

Borehole No	Date	CH_4 (%)	CO_2 (%)	O_2 (%)	Flow	Barometric Pressure (mb)	Water Level (m)	Standpipe Depth (m)
WS01	28/09/15	0.0	3.4	19.1	0.0	1019	-	1.41
	05/10/15	0.0	1.5	20.5	0.1	984	-	
	12/10/15	0.0	3.5	19.7	0.0	1005	-	
	19/10/15*	0.0	1.8	-	0.0	1009	-	
	26/10/15	0.0	2.0	18.8	0.2	994	-	
WS03	28/09/15	0.0	3.6	18.2	0.0	1019	-	2.00
	05/10/15	0.0	3.2	18.5	0.0	984	-	
	12/10/15	0.0	4.9	16.0	0.0	1005	-	
	19/10/15*	0.0	1.5	-	0.1	1008	-	
	26/10/15	0.0	5.8	11.2	0.0	994	-	
WS05	28/09/15	0.0	4.2	18.3	0.2	1020	-	1.63
	05/10/15	0.0	3.4	19.1	0.0	984	-	
	12/10/15	0.0	4.6	18.3	0.0	1005	-	
	19/10/15*	0.0	3.8	-	0.0	1009	-	
	26/10/15	0.0	3.5	17.1	0.0	995	-	
WS11	28/09/15	0.0	3.9	18.7	0.2	1018	-	0.93
	05/10/15	0.0	3.5	18.9	0.1	982	-	
	12/10/15	0.0	4.1	17.7	0.0	1004	-	
	19/10/15*	0.0	4.5	-	0.0	1007	-	
	26/10/15	0.0	3.7	16.6	0.0	993	-	
WS12	28/09/15	0.0	1.7	20.5	0.1	1018	-	2.29
	05/10/15	0.0	2.9	19.6	0.0	982	-	
	12/10/15	0.0	2.0	19.5	0.0	1003	-	
	19/10/15*	0.0	2.4	-	0.0	1007	-	
	26/10/15	0.0	1.1	19.6	0.0	992	-	
WS16	28/09/15	0.0	2.9	19.2	0.2	1021	-	1.30
	05/10/15	0.0	2.6	19.9	0.1	984	-	
	12/10/15	0.0	2.6	19.5	0.2	1005	-	
	19/10/15*	0.0	2.1	-	0.1	1010	-	
	26/10/15	0.0	2.1	18.7	0.0	996	-	
WS17	28/09/15	0.0	2.2	19.7	0.2	1020	-	1.54
	05/10/15	0.0	2.2	19.8	0.1	984	-	
	12/10/15	0.0	2.4	19.4	0.1	1005	-	
	19/10/15*	0.0	1.7	-	0.0	1009	-	
	26/10/15	0.0	1.3	19.0	0.0	995	-	
WS19	28/09/15	0.0	2.0	20.0	0.0	1022	-	0.98
	05/10/15	0.0	2.1	20.1	0.2	984	-	
	12/10/15	0.2	2.5	19.1	0.1	1005	-	
	19/10/15*	0.0	2.4	-	0.1	1010	-	
	26/10/15	0.0	1.2	19.2	0.0	996	-	
WS22	28/09/15	0.0	1.3	20.2	0.2	1021	-	0.94
	05/10/15	0.0	1.2	20.5	0.1	984	-	
	12/10/15	0.0	1.7	20.0	0.0	1004	-	
	19/10/15*	0.0	2.4	-	0.0	1010	-	
	26/10/15	0.0	0.7	19.7	0.0	996	-	
WS27	28/09/15	0.0	1.4	20.6	0.0	1021	-	1.93
	05/10/15	0.0	1.2	20.1	0.1	982	-	
	12/10/15	0.0	1.6	20.3	0.1	1004	-	
	19/10/15*	0.0	1.0	-	0.0	1008	-	
	26/10/15	0.0	0.5	19.9	0.0	995	-	

WS29	28/09/15	0.0	1.2	20.5	0.0	1022	-	1.89
	05/10/15	0.0	1.2	20.3	0.1	982	-	
	12/10/15	0.0	1.6	19.9	0.0	1004	-	
	19/10/15*	0.0	1.2	-	0.3	1009	-	
	26/10/15	0.0	0.1	20.0	0.0	995	-	
WS30	28/09/15	0.0	-	-	-	-	-	0.89
	05/10/15	0.0	-	-	-	-	-	
	12/10/15	0.0	2.6	19.4	0.0	1003	-	
	19/10/15*	0.0	1.7	-	0.0	1008	-	
	26/10/15	0.0	1.3	19.3	0.0	995	-	

**Oxygen sensor malfunction. Gas monitor replaced for subsequent readings.*

This work was initially undertaken using a Geotechnical Instruments (UK) Ltd. GA2000+ (serial No GA08272), which was last calibrated on the 2nd April 2015. During the visit dated the 19th October, it was noted that initial measurements of the concentrations of oxygen were significantly below the expected levels and that the concentrations steadily increased during subsequent readings. The gas monitor was later checked and found to be faulty. The oxygen results from that visit are thus deemed unreliable and will not be included in any ground gas assessment.

As a result, a further visit was undertaken on the 26th October using a Gas Data Ltd. GFM435 (serial No 10793), which was last calibrated on the 12th July 2015. In addition, the gas monitor installed within WS30 was tampered with so that no reliable reading could be taken during the first two visits. However, further testing will be undertaken of this installation and the results will be issued under separate cover.

9. LABORATORY TESTING - GEOTECHNICAL

A programme of laboratory testing has been undertaken in accordance with BS1377 unless stated otherwise and the results are presented in Appendix 6. Each type of test is briefly summarised below and the results have been used to assist in the formulation of the discussion of ground conditions.

9.1 Moisture Content Determinations (Part 2 : 1990 : 3)

Samples of the recovered soils have been subjected to moisture content determinations. The results indicate that the natural water content of the made ground was between 11% and 27%.

9.2 Index Property Tests (Part 2 : 1990 : 4, 5 and 6.5)

The liquid and plastic limits of the made ground were determined. The results of the tests yielded liquid limits ranging between 16% and 33%, plastic limits of between 12% and 21%, and respective consistency indices of 0.5 to 1.9.

These results demonstrate that the made ground may be generally classified as low plasticity clays and silts. The linear shrinkage tests conducted on samples of the made ground indicate that these soils exhibit a relatively low shrinkage potential.

Moreover, these results demonstrate that on the basis of the consistency index, these soils have a firm to very stiff consistency[3] however, the samples of the made ground contained gravel sized lithologies which would affect the moisture content phase relationship. In addition, the NHBC classification[4] indicates that the cohesive soils revealed at this site do not possess a volume change potential in the most onerous case.

9.3 Particle Size Distribution (Part 2: 1990: 9.2)

Six samples of made ground encountered by the boreholes across the site have been subjected to a sieve analysis in order to establish their particle size distribution.

The results indicate that the granular made ground predominantly comprises material that is classified as sandy gravel. However, made ground encountered within the quarry can be classified as slightly clayey, silty, sand and gravel with cobbles, whilst made ground encountered beneath the cricket pitch can be classified as gravelly coarse sand. In contrast, made ground encountered under the north east corner of the site can be classified as clayey, silty, very sandy gravel.

In addition to the above, eleven samples of natural granular material comprising the weathered fraction of the Rough Rock encountered by the boreholes across the site have been subjected to a sieve analysis in order to establish their particle size distribution.

The results indicate that the natural granular material predominantly comprises soil that is classified as sandy gravel, occasionally with cobbles. However, some of the weathered bedrock can be classified as clayey silty gravelly sand, with subordinate layers that can be classified as gravelly sand.

It can be seen that there is a close similarity between the particle size distribution results of the natural and made ground, with the exception of the results of made ground from the quarry area. It is considered that this relationship is partly due to the fact that made ground across the majority of the site comprises reworked or disturbed natural weathered Rough Rock.

9.4 California Bearing Ratio Tests (Part 4: 1990: 7)

The California Bearing Ratio of a bulk sample comprising representative samples of the natural granular soil revealed at shallow depth at the site was determined. This

[3] BS EN ISO 14688-2, Table 6 – Consistency index of silts and clays
[4] NHBC Standards, Chapter 4.2, *Building near trees*, Table 1 – *Volume change potential*

sample was dynamically re-compacted in the laboratory at natural water content using the 2.5kg rammer. With a surcharge weight of 2kg, the measured CBR values varied between 25% and 50% were recorded at moisture contents of 11%.

It may be noted the results indicate a difference between the test undertaken on the top and bottom of each sample. This is considered to be a result of high pore water pressures developing in the sample base during compaction.

9.5 Determination of Permeability - Falling Head Test

Two disturbed samples of the natural granular soil (weathered fraction of the Rough Rock) revealed at shallow depth were subjected to permeability testing, using the falling head test method as described in the Manual of Soil Laboratory Testing, Volume 2. The samples were prepared from a bulk sample used for the CBR test, first being compacted to the required density in the test cylinder and then lowered into a water bath for 24 hours to ensure full saturation before each test. The results of the tests recorded permeabilities of 2.75×10^{-8} m/sec for both samples, which indicates a poor drainage characteristic. It is possible that the permeability was affected by potential pulverisation of the larger weaker fragments during the compaction stage, hence increasing the percentage of finer material within the samples. Furthermore, the coarse-grained sandstone of the Rough Rock is susceptible to the formation of fine soils (clays) due to its mineralogical composition (feldspathic) and weathering characteristics.

9.6 Sulphate Content and pH Values

Sulphate content and pH values of selected samples of made ground and topsoil were determined and the results are presented on the chemical test results sheet. Total sulphate contents ranging between <0.01% and 0.27% and soluble sulphate contents of <10mg/l to 88mg/l were recorded for samples of made ground, these being associated with pH values of between 4.1 and 8.4.

10. LABORATORY TESTING - ENVIRONMENTAL

A suite of testing was conducted on samples from across the site and the following regime was undertaken.

- Metals – Cd, Cr^{VI}, Cu, Hg, Ni, Pb, V and Zn.
- Semi and Non-Metals - As, Se, Free CN^- and Phenols.
- Polycyclic aromatic hydrocarbons (PAHs).
- Petroleum hydrocarbons (TPHs).
- Others – pH, organic content and total/soluble SO_4^{2-}.

This testing was undertaken by Chemtest Ltd and the results of all of the chemical testing are presented in Appendix 7 of this report.

11. DISCUSSION OF GROUND CONDITIONS – GEOTECHNICAL

It is understood that AHR Building Consultancy Ltd are proposing to develop a new school building within the existing academy grounds following the construction of temporary access roads and temporary pre-fabricated buildings. At the time of writing this report the layout and building types have not been finalised, thus the discussion below is of a generalised nature. However, it is understood that one favoured option is to construct the school on the playing field immediately to the south of the Muhammad Ali Sports and Community Centre and immediately to the east of the all weather pitch and running track, with associated car parking areas and access roads.

It cannot be recommended that foundations be constructed directly within the made ground revealed at this site. These soils are present in a weak and variable condition such that excessive total and or differential settlement could occur under moderately light surface loading. In broad terms, therefore, it is considered that the foundation solutions could include the provision of strip and spread footings, placed within competent natural ground revealed at shallow depth across the site. Additionally, it should be appreciated that any relict underground structures should be removed as these could form 'hard-spots' under the new structures. Similarly, the foundation design and location of any proposed building will need to be carefully considered if being built close to or over existing services.

11.1 Strip and Spread Foundations

It is considered that the underlying weathered Rough Rock will provide a suitable bearing stratum, provided that the foundations are placed within granular soil generally described as being present in a medium dense to dense insitu condition or directly onto competent sandstone bedrock. It is considered that strip or spread foundations constructed within this material at a minimum depth of say between 1.2m and 1.5m could be designed assuming an allowable increase in stress of at least 200kN/m^2 (for medium dense sand and gravel), with a factor of safety against general shear failure of in excess of 3. Settlements at these loading intensities should remain within tolerable limits for the type of structure proposed provided that the underlying soils are carefully inspected immediately final trimming has taken place. It should be appreciated that higher allowable bearing capacity can be achieved with deeper foundations.

To reduce the potential of differential settlement it is recommended that very loose, cohesive or weak material encountered during construction be locally removed and replaced with lean-mix concrete or well-compacted granular soil. In areas of soft or weak ground, a thickening of the sub-base may be employed to improve the strength of the structure In addition, should the excavations be required to stand open for any period of time then a blinding layer of lean-mix concrete should be

placed in the excavation bases. This expedient will reduce loosening of the sub-grade due to the ingress of surface water.

The stability of excavation faces cannot be guaranteed thus temporary support to the excavation faces may become necessary unless the foundations are constructed using trench-fill techniques. In this method the foundation trenches should be excavated, inspected and backfilled with concrete as a continuous operation. Under no circumstances should operatives be allowed to enter unsupported excavations.

Should the excavations be required to stand open, it is considered that a blinding layer of lean-mixed concrete be placed over the sub-grade This expedient will reduce loosening or softening of the underling soil due to both physical disturbance and the ingress of surface water.

Should seepage of groundwater be encountered it is considered that it could be dealt with using a simple form of de-watering. Such a system could include the excavation of sumps from which the water could be pumped.

11.2 Ground Floor Slab

In view of the presence of variable thicknesses and condition of cohesive and granular made ground revealed beneath the site, it is recommended that consideration is given to the use of fully suspended ground floor slabs.

11.3 Soil Volume Change Potential

In light of the vegetation observed during the investigation, particularly the presence of trees on site, it should be appreciated the cohesive soils beneath the site have not been found to possess significant volume change potential under the guidance of the NHBC standards. Furthermore, both natural and made ground predominantly comprise granular soils and it is considered that it will therefore not be necessary to design the foundations placed within the weathered Rough Rock, which was found to have a minimal volume change potential in the most onerous case, in accordance with the Chapter 4.2 of the standards[5].

11.4 Access Roads and Hardstanding

It is considered that the access roads, car parking and hardstanding surrounding the new educational facility could be constructed employing traditional pavement design. On the basis of the soils exposed in this investigation a design CBR value of no more than 25% should be taken in design.

It is recommended that proof rolling be undertaken to establish the suitability of the soils, expose any soft or weak ground and ensure the sub-grade is well compacted

[5] NHBC Standards, Chapter 4.2, *Building near trees*

prior to construction. In areas of soft or weak ground, a thickening of the pavement sub-base may be employed to improve the strength of the structure. Alternatively, weak material could be locally removed and replaced with compacted granular soil.

Given the nature of the underlying weathered Rough Rock and the results of the laboratory CBR test, consideration should be given to the possible use of this onsite material for the construction of access roads and hardstanding areas.

11.5 Soakaways

During the soakaway tests, the water level did not in TP08 and TP09. Indeed, very little movement of water was noted, indicating that the underlying materials at the test depths were practically impermeable.

Whilst undertaking the soakaway tests within TP08/SA08 and TP09/SA09, the water introduced into the trialpit remained relatively static and did not achieve a fall from 75% to 25% of the effective depth of the storage volume, indicating that the soil at that location and depth was not suitable for storm soakaway drainage.

However, on the basis of the soakaway tests undertaken within the remaining six trialpits excavated to reveal the weathered Rough Rock at depths of between 0.65m and 1.45m bgl, it can be seen that even in the most onerous case, the drainage characteristics of this strata were marginally good to good with estimated infiltration rates in the order of $5.6x10^{-6}$ to $1.6x10^{-4}$ m/s.

Therefore, it is considered that soakaways could be employed at the site provided the base of the soakaway is located within the material tested. It is recommended that the lower infiltration rate obtained from TP07 ($5.6x10^{-6}$) is employed in soakaway design.

Notwithstanding the above, it should be appreciated that clays, silts and fine sands caused by the weathering of the sandstone host rock are likely to be present at the sides of the soakaway. These materials are likely to cause fouling of the soakaway , reducing permeability over time and careful consideration of a filtering media around the side of the soakaway will be required. Furthermore, as the silty gravelly sand and sandy gravelly cobbles would be used for the soakaway base, it should be appreciated that this soil type tends to weather to variably silty and clayey sand so some siltation is possible, again reducing the permeability over time. It is therefore recommended that this is taken into account in the soakaway design. It should be appreciated that coarse-grained feldspathic sandstones of the Rough Rock are susceptible to the formation of fine soils (clays), due to its mineralogical composition and weathering characteristics.

11.6 Effect of Sulphates

In view of the nature of the underlying soils it is considered that the design sulphate class be assessed with reference to Table C2[6], which is provided in BRE Special Digest 1, *Concrete in aggressive ground*: Part C. On the basis of this table and considering the soluble sulphate contents recorded, it can be shown that well compacted buried concrete should be designed in accordance with Class DS-1 requirements. Assuming static groundwater, the table also indicates that the aggressive chemical environment for concrete (ACEC) classification is AC-1s.

In order to evaluate the design chemical (DC) class for the buried concrete at this site reference should be made to Table D1[7], which can be found in Part D, *Specifying concrete for general cast-in-situ use,* of BRE Special Digest 1. From this table it may be shown that for an intended working life of at least 50 years the concrete design class DC-1 is required.

12. DISCUSSION OF GROUND CONDITIONS – ENVIRONMENTAL

12.1 Discussion of Test Results

It is understood that the development is to include the construction of a new primary school, which is likely to be surrounded by soft and hard paved areas, multi-use sports areas and soft landscaping. As such, given its potential sensitivity, it is considered that the site may be classified as being residential without plant (home-grown) uptake.

12.1.1 Soil Samples

The results of the chemical testing undertaken on soil samples obtained during this investigation have been compared to the ATRISK soil screening values (SSVs) as compiled by WS Atkins plc. These values have been derived in such a way as to adhere to the principles within the revised CLEA model and include the most current release of the SGVs. A list of subscribers is provided within the website[8] and these include many local authorities.

A comparison of the results of the testing, together with the data given above, can be found within Appendix 7. These results indicate the following:

[6] Table C2, *Aggressive Chemical Environment for Concrete (ACEC) classification for brown field sites*
[7] Table D1, *Selection of the DC Class and the number of APMs for concrete elements where the hydraulic gradient due to groundwater is 5 or less: for general in-situ use of concrete.*
[8] http://www.atrisksoil.co.uk/pages/general/subscribers.asp

Table 5: ***Summary of contaminated areas.***

Borehole Location	Contaminants found to be exceeding SSVs (Residential without Plant Uptake)
WS01	PAH [Benzo(a)pyrene, dibenzoa,h)anthracene, indeno(1,2,3-c,d)pyrene, benzo(g,h,i)perylene].
WS04	PAH [Dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene, benzo(g,h,i)perylene].
WS05	PAH [Chrysene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene, benzo(g,h,i)perylene].
WS06	PAH [Dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, benzo(g,h,i)perylene].
WS10	PAH [Benzo(a)pyrene].
WS12	PAH [Pyrene, benzo(a)anthracene, chrysene, benzo(b,k)flouranthene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene]
WS13	PAH [Benzo(a)pyrene].
WS14	TPH [aliphatic TPH [C12-C16]].
WS17	PAH [Indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
WS18	PAH [Benzo(a)pyrene].
WS24	PAH [Benzo(a)pyrene].
WS29	PAH [Chrysene, benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
TP1a	Lead, PAH [Anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b,k)flouranthene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene], aromatic TPH [C21-C35].
GE1	PAH [Benzo(a)pyrene].
GE2	PAH [Benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
GE3	PAH [Dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
GE4	PAH [Dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
GE6	PAH [Benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
GE11	PAH [Chrysene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
GE13	PAH [Chrysene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene], aromatic TPH [C21-C35].
GE14	Arsenic, PAH [Chrysene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene], aromatic TPH [C21-C35].
GE17	PAH [Chrysene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene],

Concentrations of chromium^{VI}, phenols and some petroleum hydrocarbons (aromatic and aliphatic C5 - C8) were below the detection limits for the tests. Detectable levels of all other contaminants were recorded, but these fell below the associated Atrisk Soil Screening Values.

It should be appreciated that the soil screening values for the PAHs represents vapour saturation limits. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the combined assessment criterion[9]. In view of this, the ATRISK soil SSVs notes that the users may wish to consider using a combined assessment criterion given by CLEA if free product is not observed, the values for which are also provided on the summary of contamination analysis. As these products are formed by the incomplete combustion of organic materials it is probable that they are associated with ash products within the made ground and as such will not be present as free product. It is therefore considered that the CLEA criteria should be adopted for the PAHs at this site. The results of the contaminants found to exceed these screening values are tabulated below:

.

Table 6: *Summary of PAHs exceeding CLEA SGVs.*

Borehole Location	Contaminants found to be exceeding CLEA Criterion (Residential without Plant Uptake)
WS01	PAH [Benzo(a)pyrene].
WS04	PAH [Dibenz(a,h)anthracene].
WS05	PAH [Benzo(a)pyrene].
WS06	PAH [Dibenz(a,h)anthracene].
WS10	PAH [Benzo(a)pyrene].
WS12	PAH [Benzo(a)anthracene, benzo(b)flouranthene, benzo(a)pyrene, dibenz(a,h)anthracene]
WS13	PAH [Benzo(a)pyrene].
WS14	None.
WS17	None.
WS18	PAH [Benzo(a)pyrene].
WS24	PAH [Benzo(a)pyrene].
WS29	PAH [Benzo(a)pyrene].
TP1a	PAH [Benzo(a)anthracene, benzo(b)flouranthene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene].
GE1	PAH [Benzo(a)pyrene].
GE2	PAH [Benzo(a)pyrene].
GE3	None.
GE4	None.
GE6	PAH [Benzo(a)pyrene].

[9] Ref: ATRISK SSVs derived using CLEA for 6% SOM and sandy loam soil type, Residential without Plant Uptake, March 2011.

GE11	PAH [Benzo(a)pyrene].
GE13	PAH [Benzo(a)pyrene].
GE14	PAH [Benzo(a)pyrene].
GE17	PAH [Benzo(a)pyrene].

In view of the sampling strategy at the site, together with the above comments, it is considered that the shallow soils are contaminated by arsenic, lead, PAH [benzo(a)anthracene, chrysene, benzo(b)flouranthene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene] and TPH aliphatic C12-C16 and aromatic C21-C35, with respect to the proposed end use.

12.1.2 Asbestos Identification

In addition to the chemical tests, forty eight representative samples of made ground/topsoil were subjected to inspection for the presence of asbestos fibres. No asbestos fibres were found within the soils submitted for testing, thus it is proven that asbestos is not present within the made ground/topsoil at this site.

12.1.3 Gas Concentrations

With respect to ground gas, the results of the monitoring visits indicated a maximum gas concentration of 0.2% methane, with concentrations of carbon dioxide ranging between 0.1% and 5.8%, in association with oxygen levels of between 16.0% and 20.6%. It should be appreciated that on non contaminated sites there is generally about 20% by volume of oxygen, associated with low levels of carbon dioxide. In addition, a maximum flow rate of 0.2 litres per hour was recorded and will be employed in any calculations.

The principal driving force for initiating the movement of gas in the ground is a change in barometric pressure. The most onerous gas condition on a site is usually observed on days of low or falling barometric pressure, preferably below 1000mb. It has been noted that measurements undertaken solely during high pressure conditions may be of lesser value. At this site the readings undertaken to date were at atmospheric pressures of between 982mb and 1022mb.

For preliminary design and in order to establish the gas screening value (GSV) for carbon dioxide or methane, the maximum gas concentration (expressed as a decimal) is multiplied by the borehole flow rate (l/hr). In this case 0.2% (0.002) methane was recorded, along with 5.8% (0.058) carbon dioxide, in association with a maximum flow rate of 0.2l/hr. This results in a GSV of 0.0004 l/hr for methane and a GSV of 0.0116 l/hr for carbon dioxide.

In accordance with Table 8.5, *Modified Wilson and Card classification* of the CIRIA report C665, *Assessing risks posed by ground gasses to building,* the site may be

characterised as *Characteristic Situation Level 1*. However, as the level of carbon dioxide is over 5%, this should be upgraded to Characteristic Situation Level 2. Therefore it is considered that there is a low risk of harm to end user and site operatives, and some precautionary measures are required.

Reference is made to Tables 5.5a and 5.5b of CIRIA report C665 (2007). Accepting that the proposed development is of high sensitivity (residential without plant uptake) and that the generation potential is very low to low, these tables suggest that between 6 and 9 readings could be undertaken over a period of 3 to 6 months. However, C665 notes that not all sites will require gas monitoring for the period and frequency indicated in Tables 5.5a and 5.5b.

In this case a total of 5[10] monitoring visits were undertaken over a five week time period, at which point monitoring was terminated because it was decided to assume a Characteristic Situation level 2 for the site. The sufficiency of gas monitoring data is considered in BS 8576: 2013: Guidance on investigations for ground gas – Permanent gasses and Volatile Organic Compounds (VOC's). In this standard Table F3, *Assessing sufficiency of data* has been employed to justify the curtailment of monitoring.

In this context it should be noted that the gas screening value threshold for Characteristic Situation Level 2 is <0.7 l/hr. Assuming the flow rate remains constant at 0.2l/hr the gas concentration would need to exceed 100% to move into the next risk band, which is not possible. Moreover, by keeping the concentration constant, the flow rate would need to increase to 12.06 l/hr to move into the next band, which is a sixty fold increase. We consider that these increases are not feasible as the fill is not deleterious, thus the site is not a generating source.

In view of the above it is considered that the site is fully characterised, as Characteristic Situation Level 2 has been employed.

It should be appreciated that the made ground is the most likely source for the carbon dioxide observed at the site. However, significant thicknesses of made ground were not revealed at every location where carbon dioxide was detected. Moreover, the greatest levels of carbon dioxide where noted be present in the north-eastern corner of the site, as evidenced by WS1 and WS7, concentrations of carbon dioxide generally being lower across the remainder of the site. In light of this, it is considered that the source of the carbon dioxide is located toward the north-eastern corner of the site; this could be an off-site source but could also be related to the filling of the quarry shown in the Phase 1 – Desk Study to be present in this area.

[10] The gas monitoring results taken during the 19th October being discounted due to a faulty monitor.

Radon

The desk study indicates that the property is not in a radon affected area, as less than 1% of properties are above the action level for Radon. Protection measures are therefore not necessary in the construction of new dwellings or extensions.

12.2 Site Specific Assessment

12.2.1 Chemical Contamination

The presence of contamination hazards and the risks associated with them should be assessed in accordance with industry practice and the 'suitable for use' approach. This has been conducted with reference to The Department for Environment, Food and Rural Affairs (DEFRA) and The Environment Agency[11] advice on the assessment of risks arising from the presence of contamination in soils and using the source-pathway-receptor approach.[12] This method dictates that there must be a risk of contaminant produced at a 'source' in sufficient concentration to cause harm and there must be a 'pathway' for the contaminant to reach an identifiable 'receptor' for the linkage to be proved and a contamination hazard to be considered present. Not all substances are contaminants and not all contaminants are considered to be a risk. Indeed DEFRA and The Environment Agency state that 'a contaminant is a substance which has the potential to cause harm, while a risk itself is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.'[13]

12.2.2 Conceptual Ground Model

Potential sources of contamination include the following:

On site – Made ground.

[11] R&D Publication CLR 8, 'Assessment of Risks to Human Health from Land Contamination: An overview of the Development of Soil Guideline Values and Related Research'.
[12] The pollution linkage approach was developed by 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990' which provides meanings for the terms contained in The Environmental Protection Act 1990 Part IIA, the primary legislation for addressing the issues of contaminated land.
[13] See 'Circular 2/2000 Contaminated Land: Implementation of Part II of The Environmental Protection Act 1990', appendix A.

Table 7: *Potential Harm to Humans and Animals (fauna)*

SOURCES: MADE GROUND CONTAMINATION:, LEAD, ARSENIC, TPH and PAH.		
Pathways	**Receptor**	**Linkage Present?**
Direct contact/dermal absorption/soil ingestion	Operative	Yes – Contamination present.
	End User	Yes – Contamination present.
	Neighbours	Yes – Contamination present.
Inhalation of Dust/Vapours	Operative	Yes – Contamination present.
	End User	Yes – Contamination present.
	Neighbours	Yes – Contamination present.
Ingestion of fruit/vegetables and/or waters	Operative	No – No fruits, vegetables or waters present on site currently.
	End User	No – No fruits, vegetables or waters present on site currently.
	Neighbours	No – No fruits, vegetables or waters present on site currently.
Migration of hazardous gases via permeable strata or shallow mining activity	Operative	Yes – Elevated levels of CO_2 recorded.
	End User	Yes – Elevated levels of CO_2 recorded.
	Neighbours	No– Site is not a generating source.

Table 8: *Potential Harm to Controlled Waters and Groundwater*

SOURCES: MADE GROUND CONTAMINATION: LEAD, ARSENIC, TPH and PAH.		
Pathways	**Receptor**	**Linkage Present?**
Spillage/loss/run off direct to receiving water	Controlled Waters	Yes – Contamination is present in granular and moderately permeable soils. Therefore off site mobility is possible.
Migration via permeable unsaturated strata	Controlled Waters	Yes – Contamination is present in granular and moderately permeable soils. Therefore off site mobility is possible.
Run off via drainage/sewers etc	Controlled Waters	Yes – Contamination is present in granular and moderately permeable soils. Therefore off site mobility is possible.

Table 9: *Potential Harm to Plants (flora)*

SOURCES: MADE GROUND CONTAMINATION: ASBESTOS, LEAD, ARSENIC, TPH and PAH.		
Pathways	**Receptor**	**Linkage Present?**
Direct contact with contaminated soils	Plants	Yes – Contamination present.
Uptake via root system	Plants	Yes – Contamination present.

Table 10: *Potential Harm to Buildings/Structures*

SOURCES: MADE GROUND CONTAMINATION: ASBESTOS, LEAD, ARSENIC, TPH and PAH.		
Pathways	**Receptor**	**Linkage Present?**
Direct contact with contaminated soils	Building Materials	Yes- Contamination present.
Direct contact with contaminated groundwater	Building Materials	Yes- Contamination present.

11.2.3 Risk Assessment

The site specific risk assessment has been evaluated with reference to the following ratings and definitions:

Low - A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence.

Moderate - The linkage exists but the likelihood of harm occurring is not considered to be significant although remedial action may be necessary

High - The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary.

Table 11: *Site Specific Risk Assessment*

SOURCES: MADE GROUND CONTAMINATION: ASBESTOS, LEAD, ARSENIC, TPH and PAH.			
Pathways	**Receptor**	**Risk Rating**	**Notes**
Direct contact/dermal absorption/soil ingestion	Operative	High	Contamination is present underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to break pathways.
	End User		
	Neighbours		
Inhalation of Dust/Vapours	Operative	High	Contamination is present underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to break pathways.
	End User		
	Neighbours		
Migration of hazardous gases via permeable strata or shallow mining activity	Operative	Moderate	The site is considered as *Characteristic Level 2,* as levels of over 5% CO_2 were recorded.
	End User		
Direct contact with contaminated soil	Plants	High	Contamination is present underlying the site. Precautionary measures will be required during the construction phase. Remediation will be required to break pathways.
Uptake via root system	Plants		
Direct contact with contaminated soils	Building Materials	Low (Concrete)	Test results show well compacted buried concrete should be designed in accordance with Class DS-1 requirements. Assuming static groundwater, the aggressive chemical environment for concrete (ACEC) classification is AC-1s.
		High (Plastic Services)	PAH contamination is present underlying the site. Protection of plastic services will be required.
Direct contact with contaminated groundwater	Building Materials	Low	No groundwater near surface or at depth.

12.3 Remediation Strategy

In view of the site specific risk assessment it is considered that remediation will be required at this site. Such a strategy should include the following main elements.

12.3.1 Remediation Objectives

Based on the site specific risk assessment the object of the remediation is likely to be as follows.

- To protect the site operatives during the construction process from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust and vapours.

- To protect the end user and neighbour from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust and vapours.

- To protect plants from contact with contaminated ground, uptake via root system.

- To protect buried plastic services from degradation due to the presence of PAH's in the soil.

12.3.2 Development Requirements

It is understood that the site it is to be developed by the construction of a school building. It is likely that the development will be surrounded by soft and hard paved areas together with outdoor playing fields, sports areas and soft landscaping. For preliminary design and costing the following remediation proposals are offered.

12.3.3 Strategy

In order to fulfil the objectives defined above it is likely that the following remedial strategy could be utilised. It is recommended that a pragmatic approach be undertaken, with observational techniques being employed at each stage of the work.

Ground-works

During the ground-works phase of the development, protection to the site operatives is required. The risk to site operatives is considered under the Health and Safety at Work Act 1974, together with regulations made under the act, which includes the Control of Substances Hazardous to Health (COSHH) regulations. Therefore the risks to site personnel must be considered under the Construction Design and Management (CDM) regulations at the planning stage and be included in the contractor's Health and Safety Plan and site specific Method Statements. These documents should include the following main elements.

- Site operatives at all levels should be made aware of the hazards of working with contaminated soils.
- Personal hygiene facilities, including washing and messing, must be provided and site operatives be encouraged to use them.
- Where work is undertaken in dry weather the site should be dampened down to avoid dust. In addition, dust masks must be provided to all site operatives for use in dry weather.
- Where vehicles are transferring soil to the landfill site they should be covered to prevent contamination of the surrounding area by dust.
- Any stockpiles of contaminated soil on site should be sheeted over to prevent excessive amounts of airborne dust.
- Where work is undertaken in wet weather, vehicle and wheel washing facilities are required to ensure that the vehicles leaving the site do not transfer contamination to surrounding areas.

- Ground gas monitoring indicates that elevated levels of carbon dioxide are present within the ground and oxygen levels are slightly depleted. Therefore, adequate precautions must be taken if workers are to enter confined spaces and excavations during construction.

On completion of the ground-works a careful site inspection of the sub-grade would be required. Should visual or olfactory evidence of contamination be revealed then further testing may become necessary.

It should be appreciated that any material removed from site should be considered as contaminated and be taken to landfills dealing with contaminated soils.

Construction

During the construction phase of the contract the following items are required to protect the end user from the potential contaminants revealed at this site.

- Beneath buildings, pavements and hard-standings clean inert granular sub-base should be employed.
- For buried concrete the results of the sulphate and pH testing indicate that the design sulphate class for the site should be DS-1.
- Any redundant services revealed at this site should be de-commissioned and piped services sealed. Any operational services should be carefully inspected to ensure that they are in good condition, of a suitable type in light of the contamination revealed in this investigation and there is no ingress of contaminated soils or groundwater.
- Plastic services should be constructed in a surround of clean inert material and further testing may be required as recommended in the United Kingdom Water Industry Research (UKWIR) website under Report Ref. No. 10/WM/03/21 - 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'. Note: The statutory water authority for the area in which site is located may require a risk assessment to be completed which allows these recommendations to be met and may affect the type of pipes used at the site.
- Due to the elevated levels of carbon dioxide, the recommendations given below should be followed.
  In accordance with Table 8.6 - Typical scope of gas protection measures, of CIRIA report C665, two levels of protection are considered necessary and should include either of the following:
    - Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM and underfloor venting.
    - Beam and block or pre cast concrete slab and 2000g DPM / reinforced gas membrane and underfloor venting

  Note: All joints and penetrations must be sealed.
- In light of the potential risks from volatile contamination it is recommended to upgrade the gas barrier to proprietary vapour resistant membrane.

Landscaped Areas

In view of the contamination at the site, it is considered that landscaped areas affected by contamination will require some remediation. This could include the provision of a capping layer of say 500mm of inert material, which will put the contaminated ground out of the end users' dig range. At the base of this layer a granular capillary break of say 100mm of free draining granular soil should be placed. This expedient should also provide a suitable root barrier to isolate the plants from the underlying contaminated ground.

It should be appreciated that this could be achieved by removing 600mm of the soil to a licensed landfill, replacing it with clean inert fill. Alternatively, the site level could be raised by the appropriate amount.

In any event it will be necessary to validate the thickness of the remedial works. This may be undertaken by the excavation of shallow hand auger boreholes through the topsoil and subsoil to the gravel capillary break. These should be undertaken on a random grid giving coverage of one borehole every 25m^2.

Imported Fill Material

It should also be appreciated that any fill material, either site-won or imported, to be employed at the site should be subjected to the following assessment to determine its suitability.

Fill materials should be initially screened, by a suitably qualified engineer, for the following.

- It is a suitable growing medium where is to be employed as such, including compliance with BS3883 (2007)
- It is free from obvious contamination i.e. visual or olfactory evidence
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants are suspected to be growing
- It is not a statutory nuisance, such as being odorous
- It is free from unsuitable material i.e. whole bricks, brick ties, timber or glass.

It should also be appreciated that any fill should be subjected to validation testing to assess its suitability. The following table has been taken from YAHPAC[14] documentation and may be used as a guide. Depending on the origin and nature of the material, not all fill will require the sampling frequency and testing indicated, although this should be in agreement with any regulatory bodies (such as the Local Authority).

[14] Sampling & Testing Matrix of Yorkshire and Humberside Pollution Advisory Council, 2013, *YAHPAC Technical Guidance for Developers, Landowners and Consultants – Verification Requirements for Cover Systems v2.1*, Appendix 1a.

Table 12: *Validation sampling and testing*

Fill Type	Frequency	Minimum Determinands
Virgin Quarried Material	1 or 2 depending on the type of stone (to confirm the inert nature of the material)	Standard metals/metalloids (As, Cd, Cr, Cr^{VI}, Cu, Hg, Ni, Pb, Se, Zn)
Crushed Hardcore, Stone, Brick	Minimum 1 per 1000m³	Standard metals/metalloids as above plus PAH (16 USEPA) and Asbestos
Greenfield/ Manufactured Soils	The greater of a minimum of 3 or 1 per 250m³	Standard metals/metalloids as above plus PAH (16 USEPA) and Asbestos
Brownfield/ Screened Soils	The greater of a minimum of 6 or 1 per 100m³	Standard metals/metalloids as above plus PAH (16 USEPA), TPH (CWG banded) and Asbestos Any additional analysis dependant on the history of the donor site.

The screening values for the above regime should also be agreed with any regulatory bodies; however, the following is recommended in the first instance.

Table 13: *Fill screening values*

Contaminant	Screening Value (Residential without plant uptake) (mg/kg)	Reference
As	35	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
Cd	83.6	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
Cr^{VI}	38.1	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
Cu	8370	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
Hg	1.0	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
Ni	130	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
Pb	235	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
V	353	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
Zn	46800	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
TPH CWG	See contamination analysis sheet	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter
PAH 16 USEPA	See contamination analysis sheet	$Atrisk^{SOIL}$ SSVs, 6% soil organic matter

The frequency of such testing should be sufficient to give statistical confidence for the validation results. For sub-soil the frequency should be 1 per $250m^3$ or a minimum of three samples, whichever is the greater. Testing should comply with UKAS and MCERTS, where applicable, and undertaken by an accredited laboratory.

Where the material has been derived from a commercial company, certificates or other industry quality protocol compliance i.e. WRAP should be obtained. However, it will be necessary to ensure that this documentation specifically related to the material being imported, it is no more than two months old and complies with the screening and frequency requirements given above.

Suitable fill materials should be either placed immediate or sufficiently quarantined to ensure they do not become mixed with other materials. If it is necessary, the quarantined material should be placed on appropriate sheeting and covered to prevent it becoming mixed with off-site contaminated soils or dust, or penetrated by mobile contaminants.

13. REFERENCES

- British Standards Institution (1990) BS1377: *British standard methods of test for soils for civil engineering purposes,* B.S.I., London.
  Part 9: 1990: *In situ tests*.

- British Standards Institution (1999) BS5930: *Code of practice for site investigations*, B.S.I., London.

- British Geological Survey (NERC) (2015), BGS, Keyworth.
  Geology of Britain Viewer:
  (*http://maps.bgs.ac.uk/geologyviewer_google/googleviewer.html)*
  Lexicon of Named Rock Units:
  (*http://www.bgs.ac.uk/lexicon/)*

- Building Research Establishment (BRE) Special Digest 1 (2005), Third Edition: Concrete in aggressive ground.
  Part C: *Assessing the aggressive chemical environment.*
  Part D: *Specifying concrete for general cast-in-situ use.*

- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – Final SC050021/SR2, *Human Health toxicological assessment of contaminants in soil*. Environment Agency, Bristol.

- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – SC050021/SR3, *Updated technical background to the CLEA model*. Environment Agency, Bristol.

For and on behalf of
Rogers Geotechnical Services Ltd,

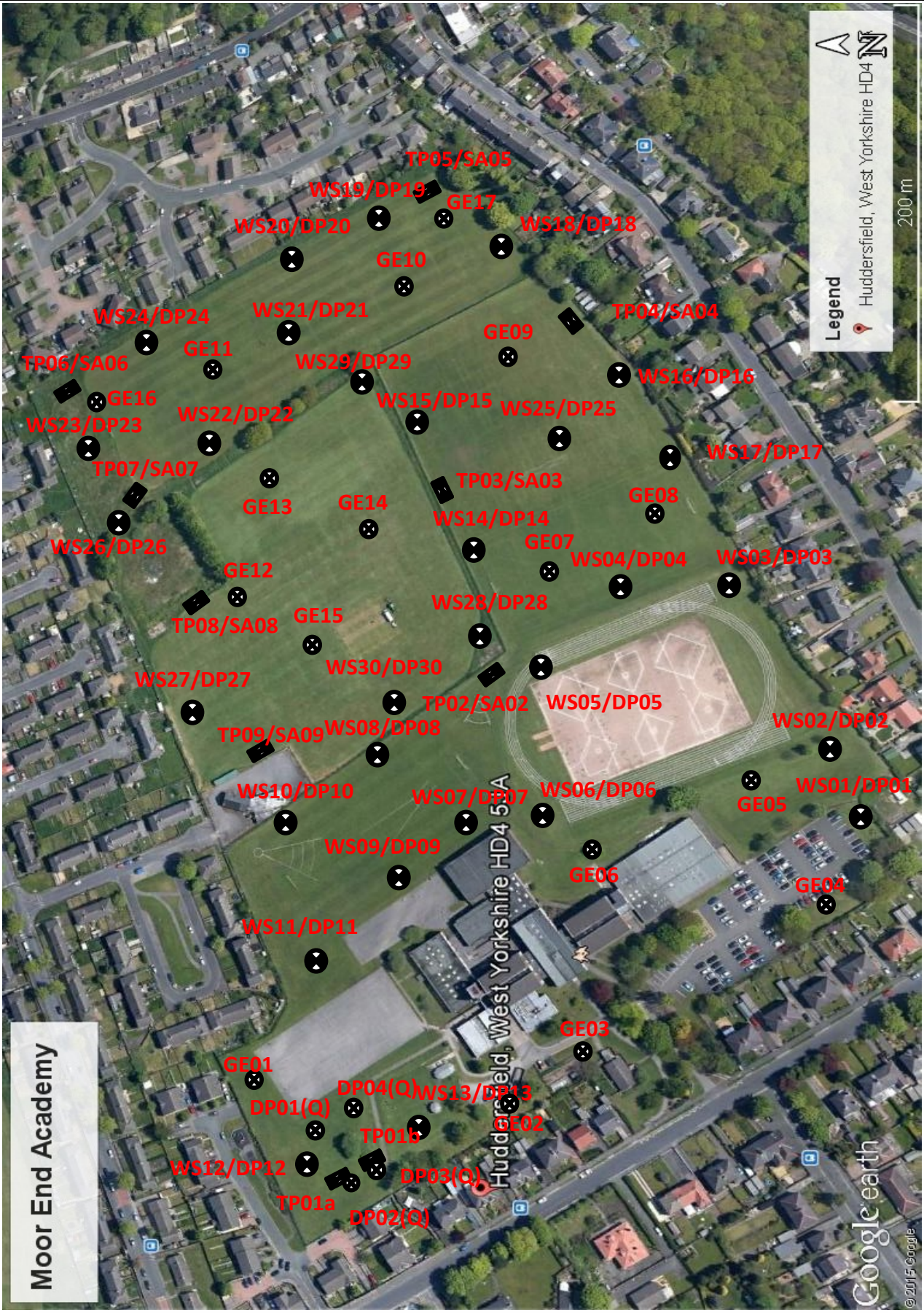
Gabriel Bobrowicz MSc, PhD, MCSM, FGS
Principal Geotechnical Engineer

S.P. Rogers CEng, CGeol, MICE, MCIHT, FGS
Technical Director

,

APPENDIX 1

SITE PLAN



Plan not to scale and investigation positions aproximated from site operative's notes.

Title: **Investigation Location Plan**

Rogers Geotechnical Services Ltd	Site Name: **Moor End Academy, Huddersfield, HD4 5JA**	Job No: **J2680/14/E**

APPENDIX 2

WINDOW SAMPLE BOREHOLE RECORDS

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: 412873E - 414868N	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C							TOPSOIL. (Black slightly clayey silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium rarely coarse sandstone. Frequent rootlets).
							0.60			MADE GROUND. (Very loose orange slightly gravelly SAND. Gravel is angular to sub-angular fine to coarse sandstone).
		1.00 - 1.50	C				1.19			Medium dense orangish brown to cream gravelly coarse SAND with cobbles. Gravel is angular to sub-angular fine to coarse of coarse grained sandstone. Cobbles are angular to sub-angular of coarse grained sandstone.
							1.50			End of Borehole at 1.50m

Remarks

Core recovery: 0-1m; 100%, 1-1.5m; 98%.

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: 412924E - 414879N	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.00 - 0.70	C				0.32			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							0.70			Medium dense to dense gravelly SAND with cobbles. Gravel is sub-angular to sub-rounded fine to coarse sandstone.
										End of Borehole at 0.70m

Remarks

Core recovery: 0-0.7m; 100%.

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.00 - 1.00	C				0.30			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine sandstone. Occasional rootlets).
		1.00 - 2.00	C							MADE GROUND. (Loose brown mottled orangish light brown clayey gravelly SAND with cobbles. Gravel is sub-angular to sub-rounded fine to coarse sandstone. Cobbles are sub-angular sandstone).
										Black silty slightly gravelly SAND. Gravel is sub-angular fine sandstone. (Relict topsoil).
							1.70			Medium dense yellowish light brown gravelly coarse SAND with cobbles. Gravel is sub-rounded to sub-angular fine to coarse of coarse grained sandstone. Cobbles are sub-angular coarse grained sandstone.
							2.00			End of Borehole at 2.00m

Remarks

Core recovery: 0-1m; 100%, 1-2m; 100%.

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.40	C				0.15 0.30 0.40			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets). MADE GROUND (Loose purplish grey fine to medium sand). Medium dense sandy sub-angular fine to coarse GRAVEL. End of Borehole at 0.40m

Remarks

Core recovery: 0-0.4m; 100%.

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.30			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine sandstone. Occasional rootlets).
		1.00 - 1.60	C							MADE GROUND (Medium dense becoming loose brown mottled orangish light brown clayey gravelly SAND with cobbles. Gravel is sub-angular to sub-rounded fine to coarse sandstone. Cobbles are sub-angular sandstone).
							1.60			End of Borehole at 1.60m

Remarks

Core recovery: 0-1m; 100%, 1-1.6m; 100%.

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.30	C				0.25 0.30			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets). Medium dense light brown coarse SAND. End of Borehole at 0.30m

Remarks

Core recovery: 0-0.3m; 100%.

Borehole Log

Borehole No. **WS07**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.20			Brownish black silty gravelly SAND. Gravel is angular to sub-angular fine to coarse, coarse grained sandstone. Occasional rootlets).
		1.00 - 1.60	C							MADE GROUND. (Very loose becoming medium dense orangish brown and brown slightly clayey gravelly SAND. Gravel is angular to sub-angular fine to coarse, coarse grained sandstone).
							1.60			*MADE GROUND. (Brown sub-rounded to rounded medium quartzite gravel).*
										End of Borehole at 1.60m

Remarks

Core recovery: 0-1m; 69%, 1-6m; 66%

Borehole Log

Borehole No. **WS08**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.80	C				0.20			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							0.80			Very loose becoming medium dense orangish cream gravelly coarse SAND with cobbles and boulders. Gravel is angular to sub-angular fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular of coarse grained sandstone.
										End of Borehole at 0.80m

Remarks

Core recovery: 0-0.8m: 55%.

Borehole Log

Borehole No. **WS09**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.00 - 1.00	C				0.39			TOPSOIL. (Black slightly clayey silty gravelly SAND. Gravel is sub-angular to sub-rounded fine sandstone. Frequent rootlets).
		1.00 - 1.90	C				1.90			MADE GROUND. (Loose to dense dark orangish brown slightly clayey gravelly SAND. Gravel is sub-angular to sub-rounded fine to coarse sandstone).
										End of Borehole at 1.90m

Remarks

Core recovery: 0-1m; 100%, 1-1.9m; 100%.

Borehole Log

Borehole No. **WS10**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.60	C				0.25			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							0.60			Medium dense to dense orangish brown to cream gravelly coarse SAND with cobbles and boulders. Gravel is angular to sub-angular fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular of coarse grained sandstone.
										End of Borehole at 0.60m

Remarks

Core recovery: 0-0.6m; 95%.

Borehole Log

Borehole No. **WS11**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.10			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							1.00			MADE GROUND. (Very loose orangish brown gravelly sand with cobbles. Gravel is subangular to sub-rounded fine to coarse sandstone. Cobbles are sub-angular).
										End of Borehole at 1.00m

Remarks

Core recovery: 0-1m; 38%.

Borehole Log

Borehole No. **WS12**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.18			TOPSOIL. (Dark grey grass topped silty fine SAND. Frequent rootlets).
		1.00 - 2.00	C							MADE GROUND (Loose to medium dense brown clayey gravelly SAND with cobbles. Gravel is angular to sub-rounded fine to coarse, medium and coarse grained sandstone and rare brick and clinker. Cobbles are sub-angular fine and coarse grained sandstone and brick).
		2.00 - 3.00	C							*ASH.*
										ASH.
							3.00			End of Borehole at 3.00m

Remarks

Core recovery: 0-1m; 97%, 1-2m; 57%, 2-3m; 67%.

Borehole Log

Borehole No. **WS13**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.80	C				0.17			TOPSOIL. (Dark grey sandy gravelly CLAY. Gravel is angular to sub-angular fine to medium of sandstone and ash. Occasional rootlets).
							0.45			MADE GROUND. (Loose dark brown mottled red slightly clayey sandy GRAVEL. Gravel is angular fine to coarse brick and sandstone).
							0.80			Medium dense yellowish cream gravelly coarse SAND with cobbles and boulders. Gravel is angular to sub-angular fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular of coarse grained sandstone.
										End of Borehole at 0.80m

Remarks

Core recovery: 0-0.8m; 100%.

Borehole Log

Borehole No.
WS14
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.00 - 0.45	C				0.25			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone and rare slag. Frequent rootlets).
							0.45			Medium dense orangish brown gravelly SAND. Gravel is sub-angular to sub-rounded fine to coarse sandstone.
										End of Borehole at 0.45m

Remarks
Core recovery: 0-0.45m; 70%.

Borehole Log

Borehole No. **WS15**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.70	C				0.20			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone and rare slag. Frequent rootlets).
							0.70			Medium dense becoming dense orangish brown gravelly SAND. Gravel is sub-angular to sub-rounded fine to coarse sandstone).
										End of Borehole at 0.70m

Remarks

Core recovery: 0-0.7m; 100%.

Borehole Log

Borehole No. **WS16**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.00 - 1.00	C				0.35			TOPSOIL. (Brown grass topped silty gravelly SAND with occasional cobbles. Gravel is sub-angular fine to medium sandstone. Cobbles are sub-angular coarse grained sandstone).
		1.00 - 1.30	C				1.00			MADE GROUND. (Soft dark brown sandy CLAY with cobbles. Cobbles are sub-angular coarse grained sandstone).
							1.20			MADE GROUND (Brown silty slightly gravelly SAND. Gravel is sub-rounded fine of sandstone. Occasional rootlets). (Relict TOPSOIL).
							1.30			MADE GROUND (Medium dense becoming dense purplish grey gravelly coarse SAND. Gravel is angular to sub angular medium, coarse grained sandstone).
										End of Borehole at 1.30m

Remarks

Core recovery: 0-1m; 100%, 1-1.30m; 100%.

Borehole Log

Borehole No. **WS17**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.17			TOPSOIL. (Dark brown grass topped silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
		1.00 - 1.55	C				0.80			MADE GROUND (Medium dense orangish brown clayey gravelly SAND. Gravel is angular to sub-round fine to coarse, coarse grained sandstone). *Black silty slightly gravelly fine to medium SAND. Gravel is fine sub-rounded sandstone.*
							1.55			Medium dense orangish brown medium to coarse sandy gravelly COBBLES. Gravel is angular to sub-rounded fine to coarse of coarse grained sandstone. Cobbles are angular to sub-angular frequently tabular coarse grained sandstone.
										End of Borehole at 1.55m

Remarks

Core recovery: 0-1m; 100%, 1-1.55m; 100%.

Borehole Log

Borehole No. **WS18**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.70	C				0.15			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							0.70			Medium dense orangish brown gravelly coarse SAND with cobbles. Gravel is angular to sub-angular fine to coarse of coarse grained sandstone. Cobbles are angular to sub-angular of coarse grained sandstone.
										End of Borehole at 0.70m

Remarks

Core recovery: 0-0.7m: 100%.

Borehole Log

Borehole No. **WS19**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.30			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							1.00			MADE GROUND. (Loose orange SAND with rare angular to sub-angular fine to coarse gravel of sandstone).
										End of Borehole at 1.00m

Remarks

Core recovery: 0-1m; 100%.

Borehole Log

Borehole No. **WS20**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
							0.30			TOPSOIL. (Black to dark grey silty gravelly SAND. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Abundant rootlets).
		1.00	C				0.90			Medium dense orangish brown gravelly SAND with cobbles . Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles are angular to sub-angular frequently tabular coarse grained sandstone. Occasional rootlets.
										End of Borehole at 0.90m

Remarks

Core recovery: 0-0.9m; 100%.

Borehole Log

Borehole No. **WS21**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.60	C				0.21			TOPSOIL. (Dark brown silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							0.60			Loose becoming medium dense orangish brown to cream gravelly coarse SAND with cobbles. Gravel is angular to sub-angular fine to coarse of coarse grained sandstone. Cobbles are angular to sub-angular of coarse grained sandstone.
										End of Borehole at 0.60m

Remarks

Core recovery: 0-0.6m; 100%.

Borehole Log

Borehole No. **WS22**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.16			TOPSOIL. (Dark brown grass topped silty slightly gravelly SAND with frequent rootlets. Gravel is angular fine to coarse sandstone).
							1.00			Medium dense yellowish brown slightly clayey gravelly SAND with cobbles. Gravel is angular to sub-angular fine to coarse; coarse gained sandstone. Cobbles are sub-angular coarse grained sandstone. Sand is coarse.
										End of Borehole at 1.00m

Remarks

Core recovery: 0-1m; 90%.

Borehole Log

Borehole No. **WS23**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.32			TOPSOIL. (Black grass topped slightly silty slightly gravelly SAND with frequent rootlets. Gravel is angular fine sandstone).
										0.2 to 0.25 Very thin horizon of purplish grey medium sand.
							0.71			MADE GROUND. (Loose orange fine to medium SAND with rare sub-angular cobbles).
							1.00			Medium dense yellowish brown gravelly SAND with cobbles. Gravel is angular to sub-angular fine to coarse; coarse gained sandstone. Cobbles are sub-angular coarse grained sandstone. Sand is coarse.
										End of Borehole at 1.00m

Remarks

Core recovery: 0-1m: 100%.

Borehole Log

Borehole No. **WS24**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.00 - 0.50	C				0.15 0.27 0.33 0.50			TOPSOIL. (Black grass topped slightly silty slightly gravelly SAND with frequent rootlets. Gravel is angular fine sandstone). Loose purplish grey fine to medium SAND. with cobble at base. Loose brown medium to coarse SAND. loose becoming medium dense yellowish brown gravelly SAND with cobbles. Gravel is angular to sub-angular fine to coarse; coarse gained sandstone. Cobbles are sub-angular coarse grained sandstone. Sand is coarse. End of Borehole at 0.50m

Remarks

Core recovery: 0-0.5; 100%.

Borehole Log

Borehole No. **WS25**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.40	C				0.20			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							0.40			Medium dense orangish light brown gravelly SAND with cobbles. Gravel is sub-angular to angular fine to coarse sandstone. Cobbles are sub-angular.
										End of Borehole at 0.40m

Remarks

Core recovery: 0-0.4m; 80%.

Borehole Log

Borehole No. **WS26**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.34			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine sandstone. Frequent rootlets).
							0.60			MADE GROUND. (Loose becoming medium dense fine SAND with rare rootlets).
							1.00			Medium dense orangish light brown gravelly coarse SAND with cobbles. Gravel is sub-angular to sub-rounded fine to coarse, coarse grained sandstone. Cobbles are sub-angular coarse grained sandstone.
										End of Borehole at 1.00m

Remarks

Core recovery: 0-1m; 98%.

Borehole Log

Borehole No. **WS27**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 21/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.28			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
		1.00 - 2.00	C							MADE GROUND. (Medium dense orangish light brown gravelly SAND with cobbles. Gravel is angular to sub-angular fine to coarse sandstone cobbles are sub-angular sandstone).
							2.00			End of Borehole at 2.00m

Remarks

Core recovery: 0-1m; 98%, 1-2m; 86%.

Borehole Log

Borehole No. **WS28**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 21/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results				
		0.00 - 0.40	C				0.20			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							0.40			MADE GROUND. (Loose becoming very dense orangish brown to cream gravelly sand with cobbles. Gravel is sub-angular to sub-rounded fine to coarse sandstone. Cobles are sub-angular).
										End of Borehole at 0.40m

Remarks

Core recovery. 0-0.4m; 100%.

Borehole Log

Borehole No. **WS29**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 21/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.30			TOPSOIL. (Black silty gravelly SAND with cobbles. Gravel is sub-angular to sub-rounded fine to medium sandstone. Cobbles are angular sandstone. Frequent rootlets and ash).
		1.00 - 2.00	C							MADE GROUND. (Very loose to loose dark brown and grey clayey gravelly SAND with cobbles. Gravel is angular to sub-angular fine to coarse sandstone. Cobbles are sub-rounded sandstone and concrete).
		2.00 - 2.60	C							
							2.60			End of Borehole at 2.60m

Remarks

Core recovery: 0-1m; 70%, 1-2m; 60%, 2-2.6; 80%.

Borehole Log

Borehole No. **WS30**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type WLS
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 21/09/2015	Logged By JDMI

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 1.00	C				0.37			TOPSOIL. (Black silty gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium sandstone. Frequent rootlets).
							1.00			Loose orangish brown gravelly coarse SAND with cobbles. Gravel is angular to sub-angular fine to coarse of coarse grained sandstone. Cobbles are angular to sub-angular of coarse grained sandstone.
										End of Borehole at 1.00m

Remarks

Core recovery: 0-1m; 100%.

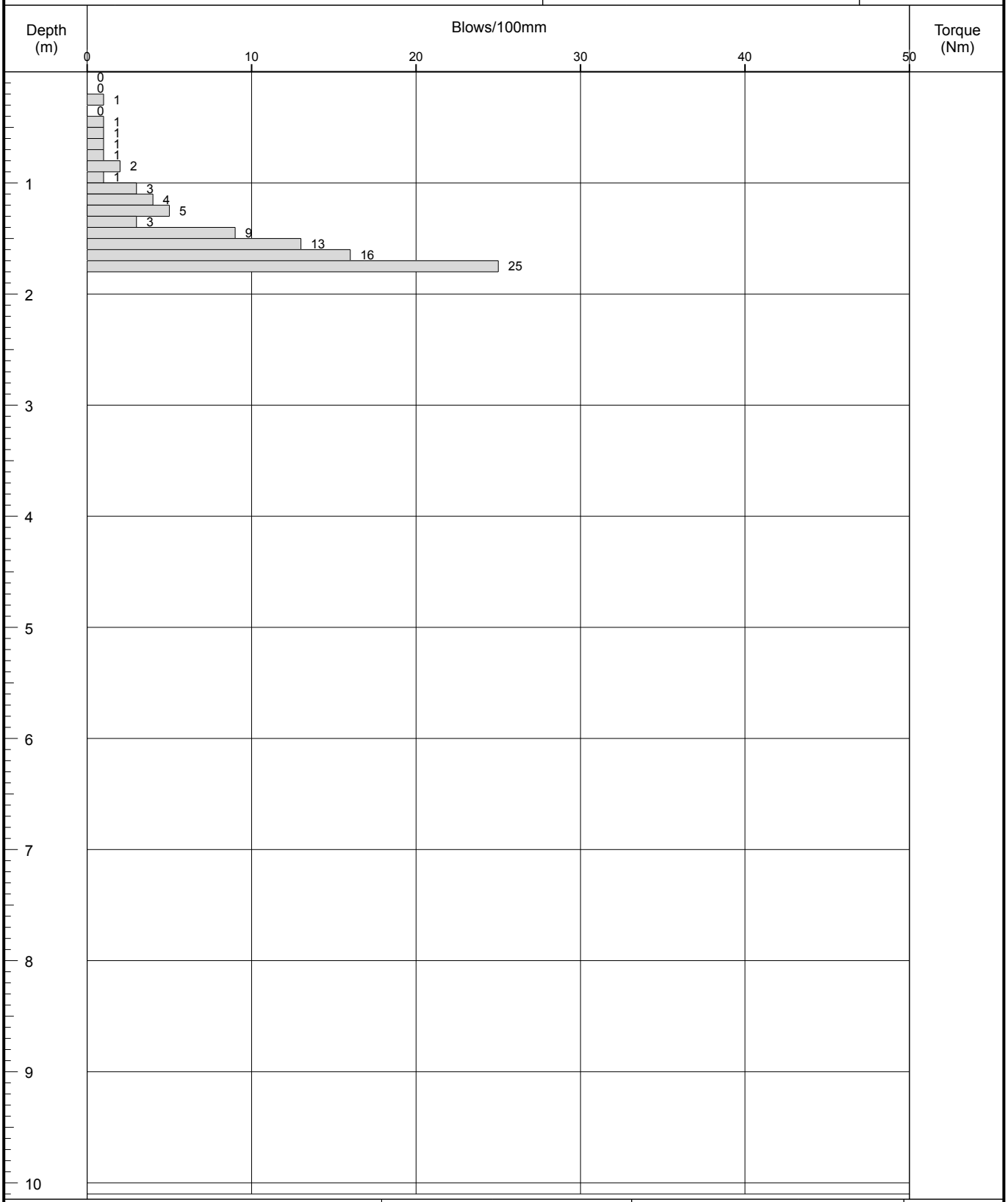
APPENDIX 3

DYNAMIC PROBES

Probe Log

Probe No.
DP01
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



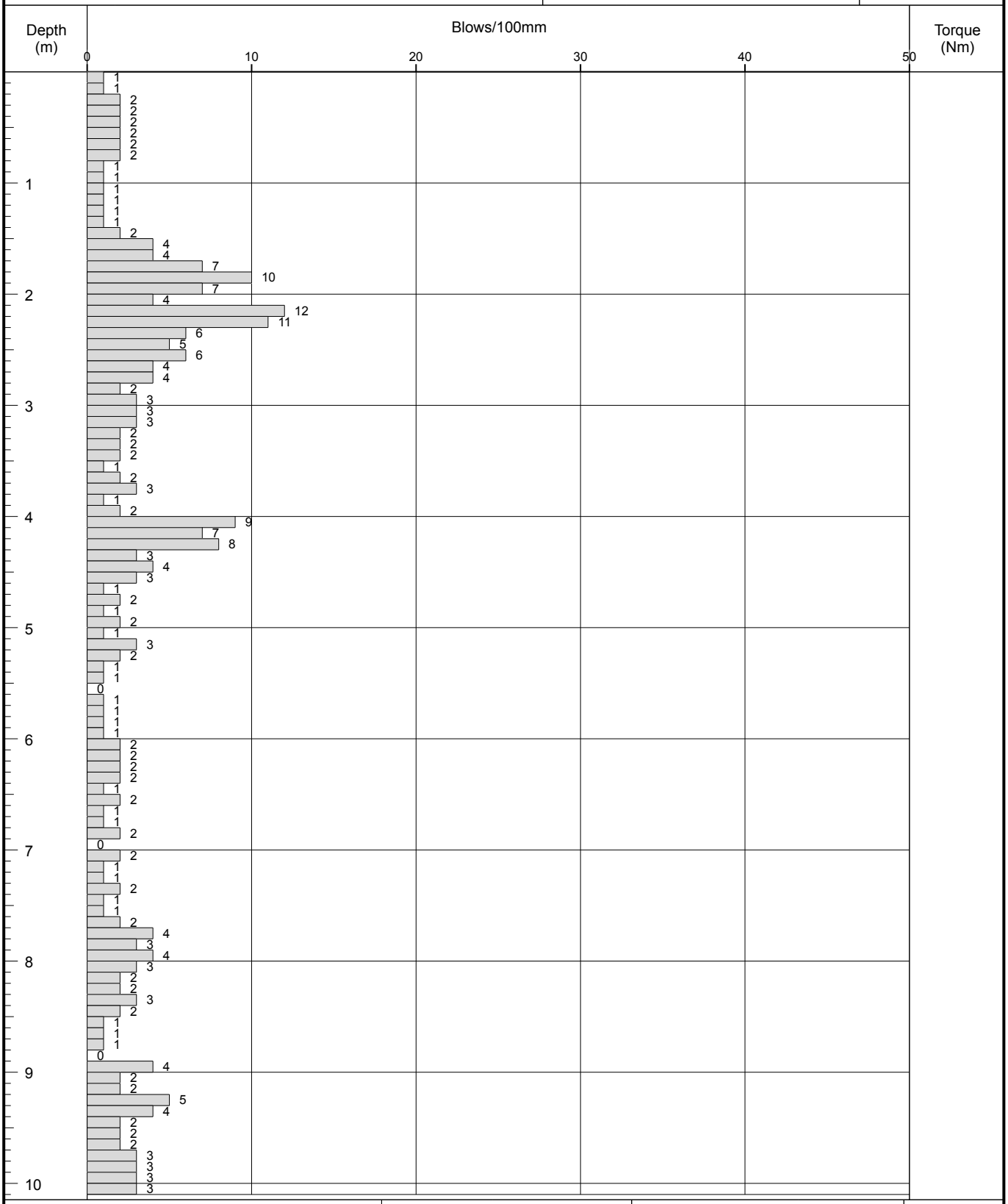
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.7m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP01 (Q)
Sheet 1 of 2

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



Remarks:

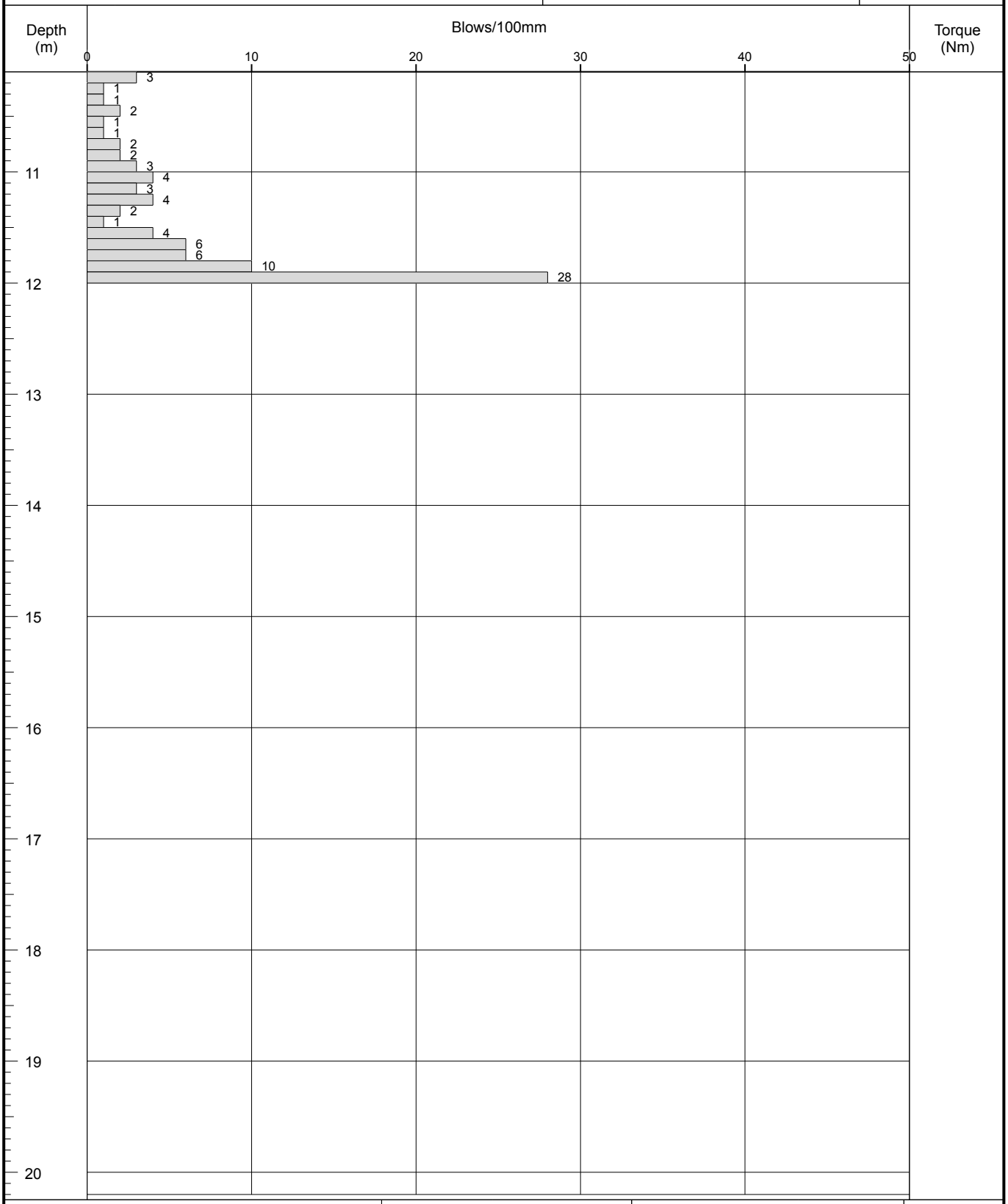
Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	11.9m
Probe Type	DPSH-B		

Probe Log

Probe No. **DP01 (Q)**

Sheet 2 of 2

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



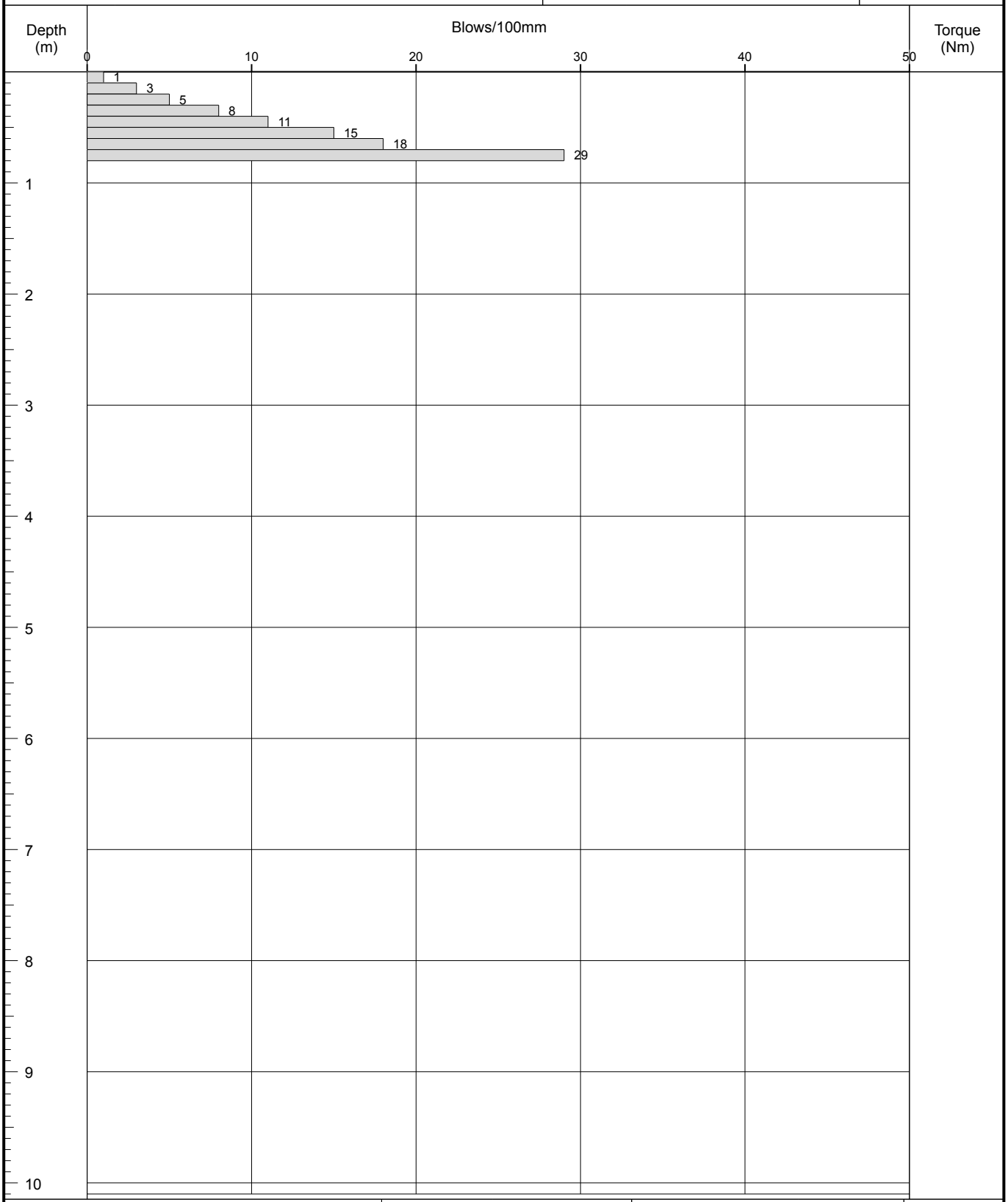
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	11.9m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP02
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



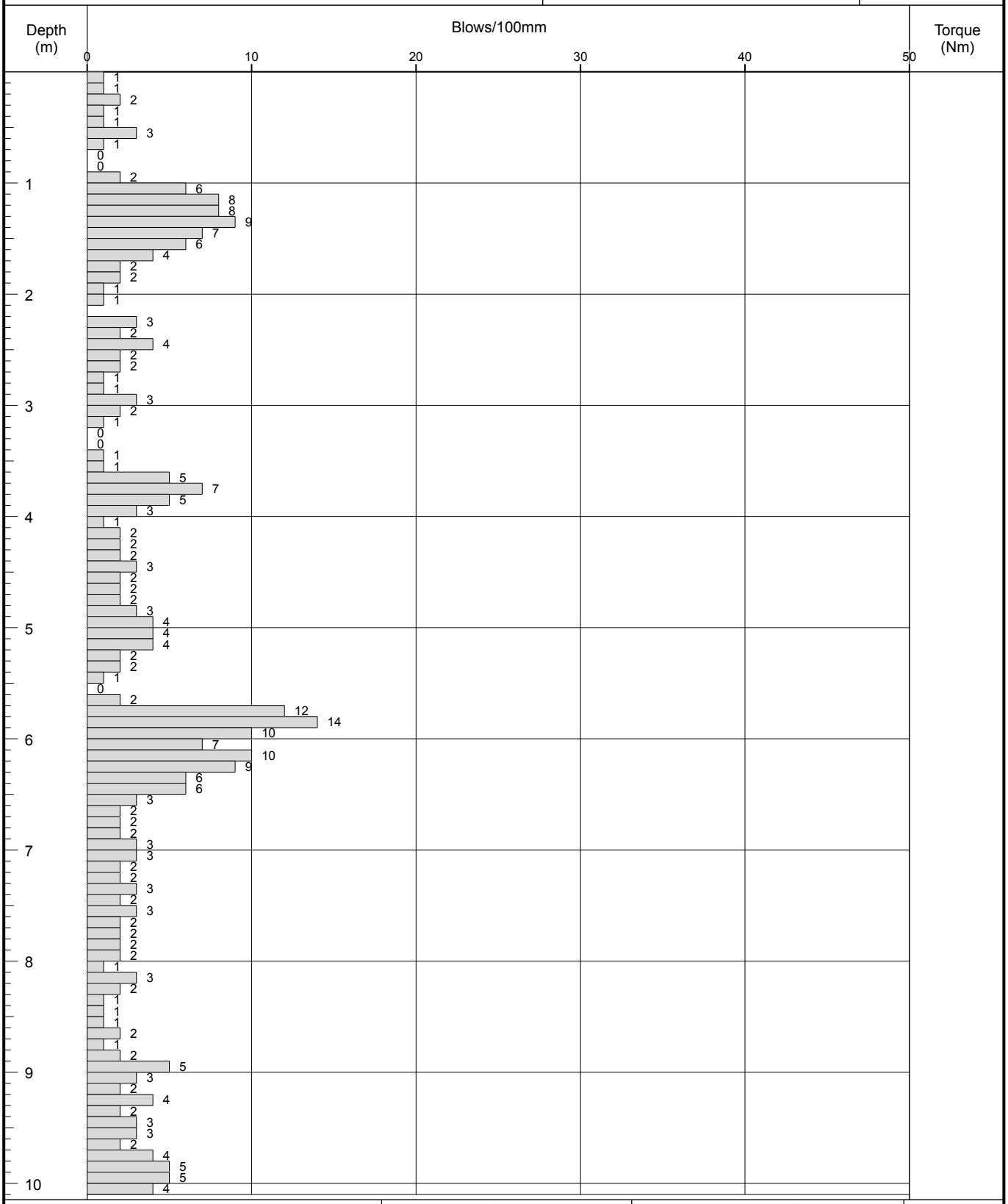
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	0.7m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP02 (Q)
Sheet 1 of 2

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



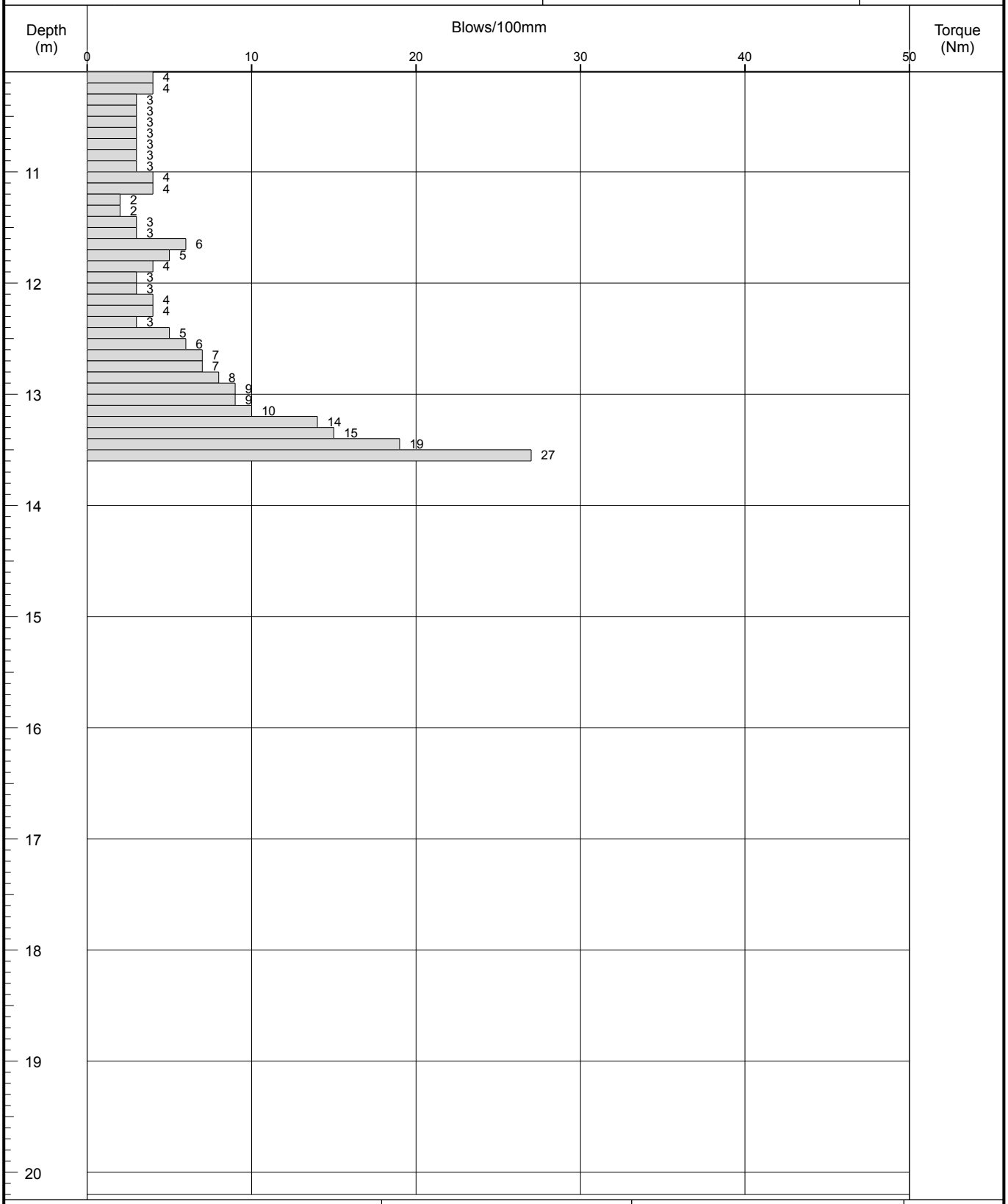
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	13.5m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP02 (Q)
Sheet 2 of 2

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



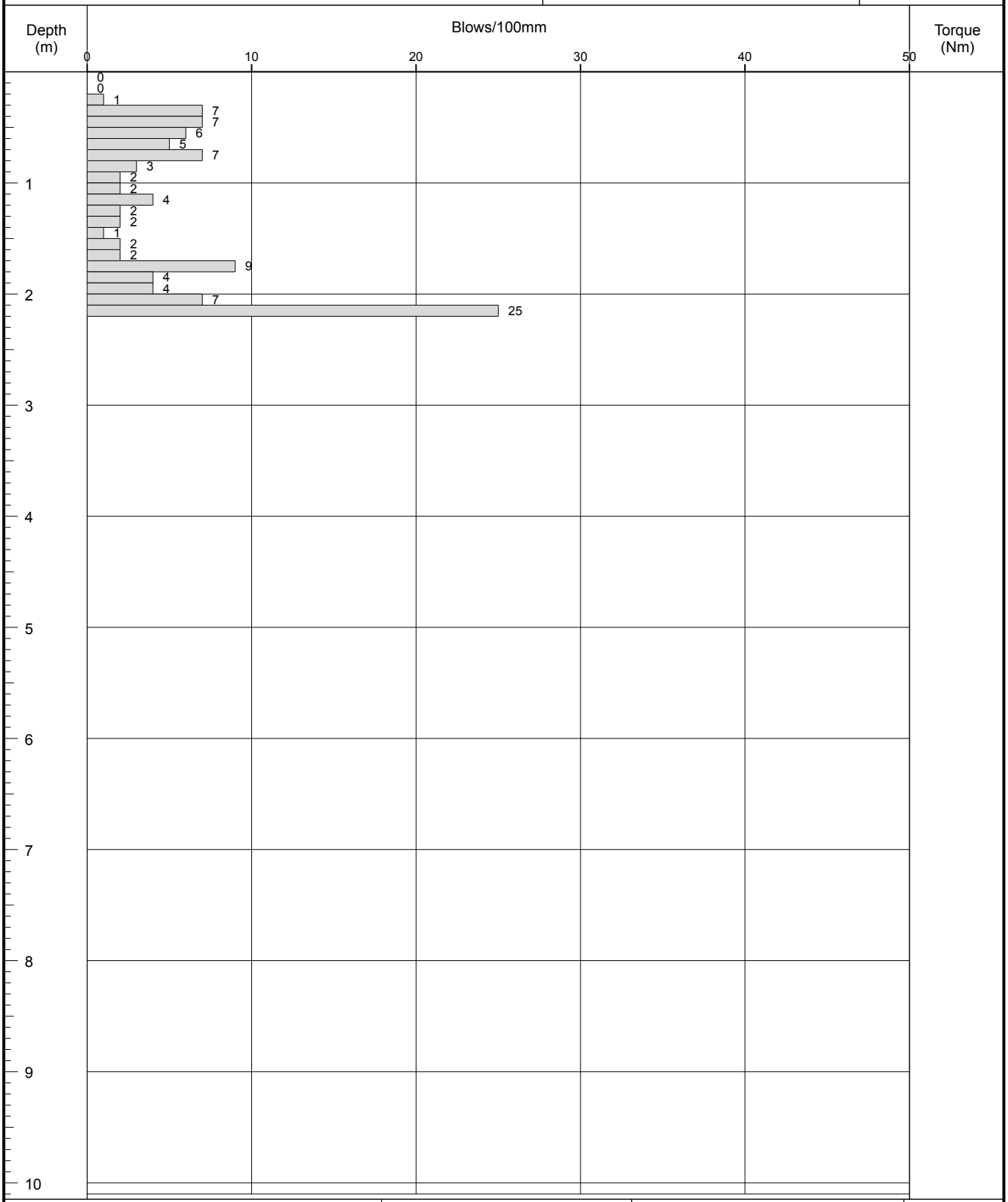
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	13.5m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP03
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



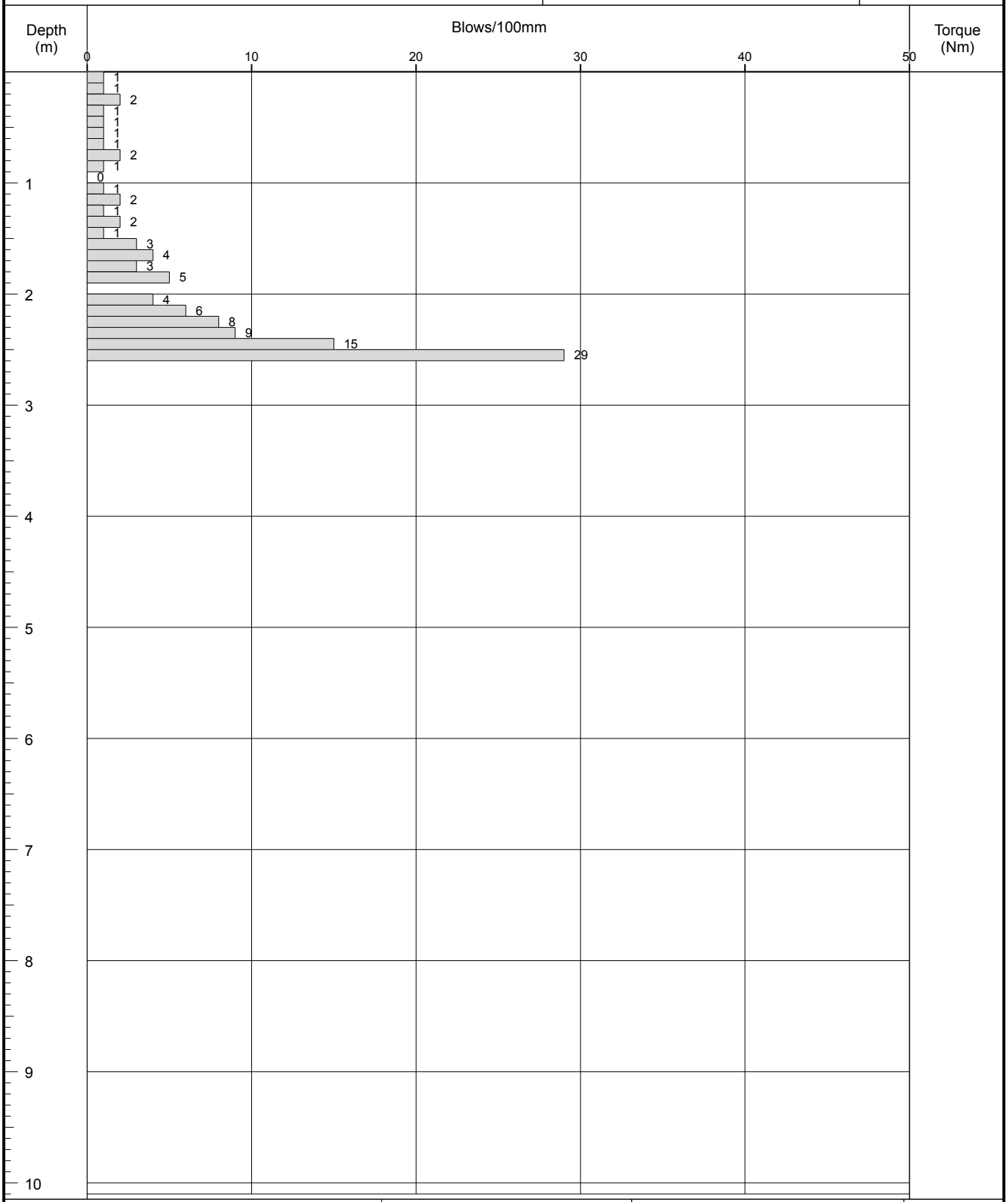
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	2.1m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP03 (Q)
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



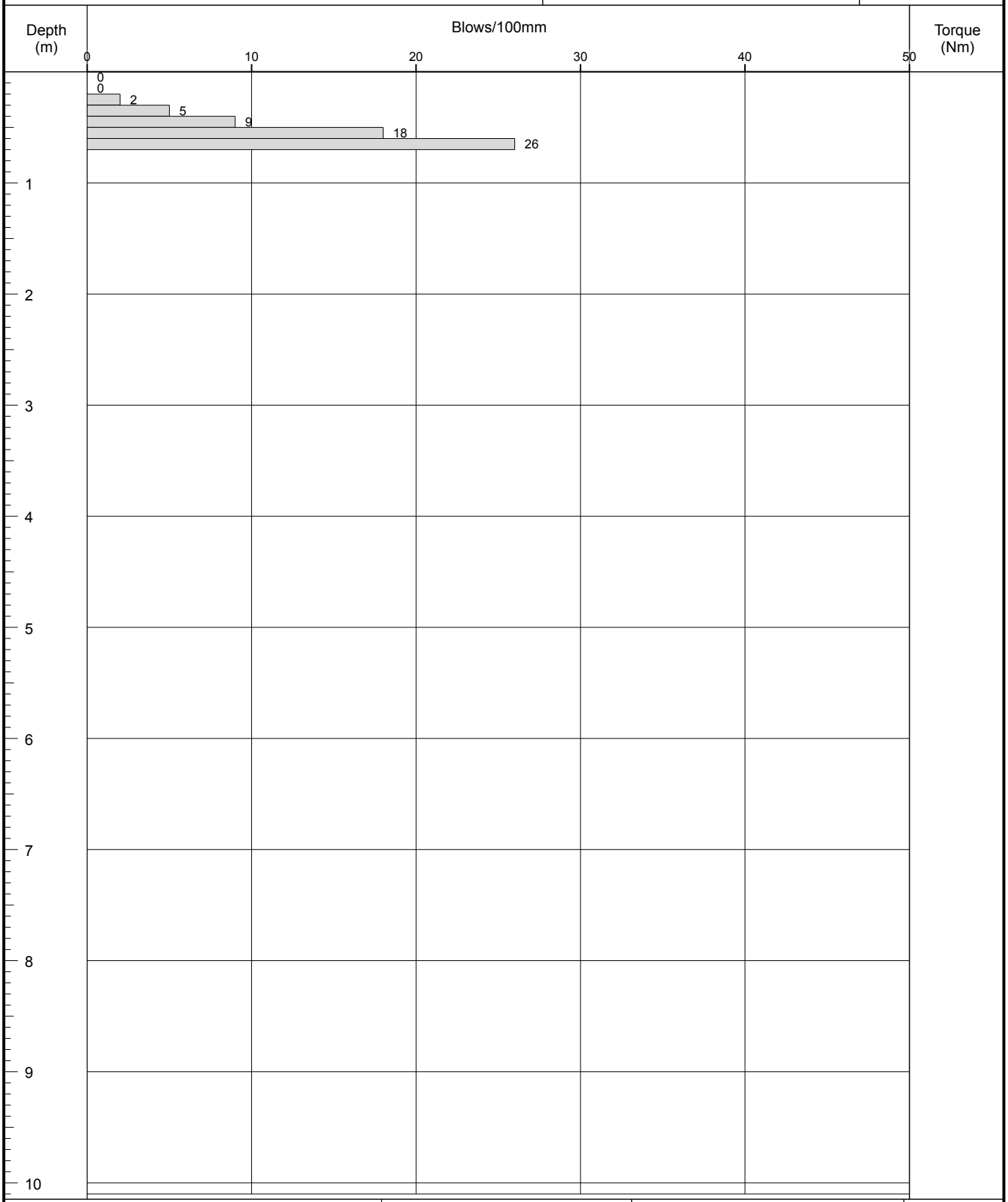
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	2.5m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP04
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



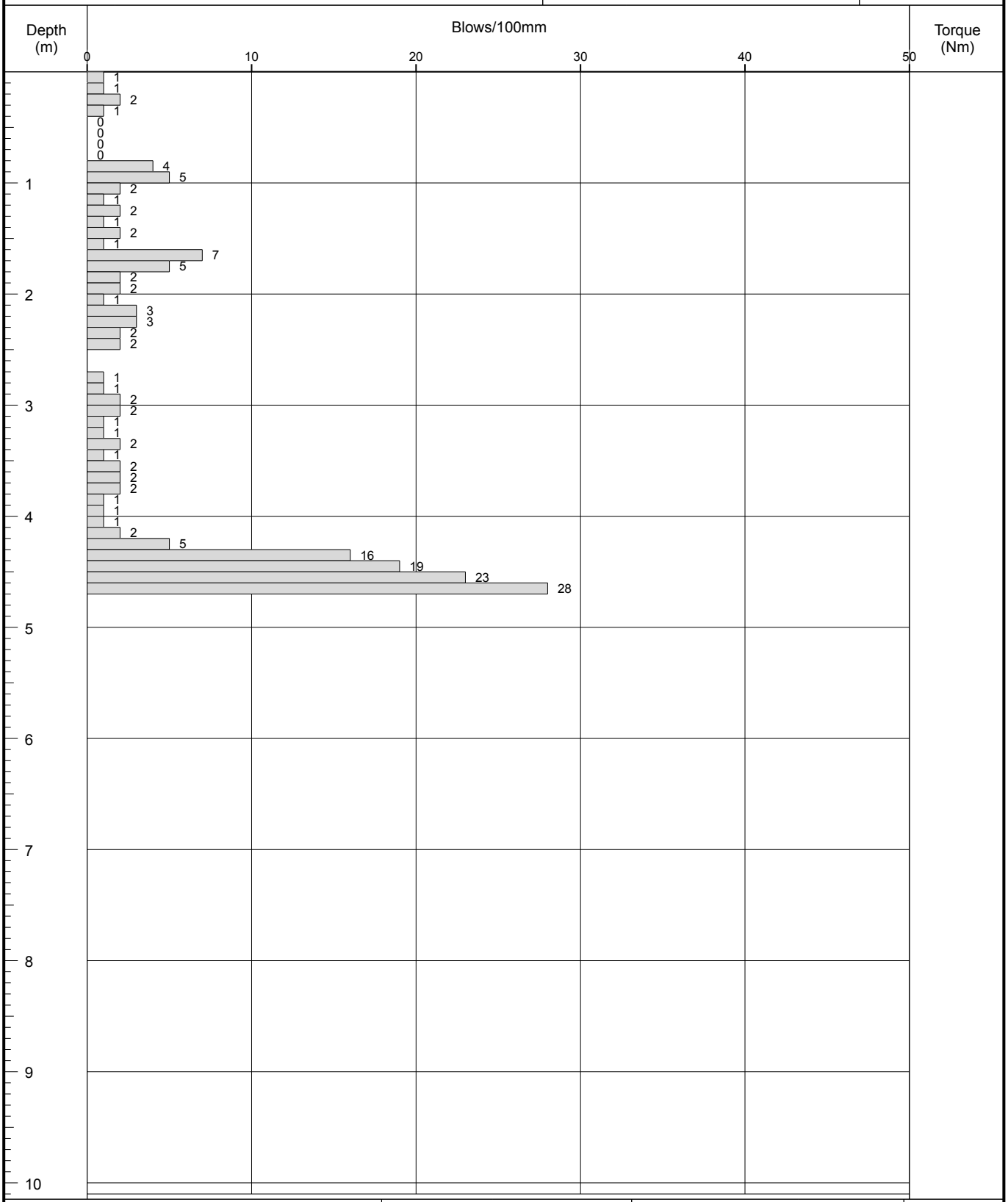
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	0.6m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP04 (Q)
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW

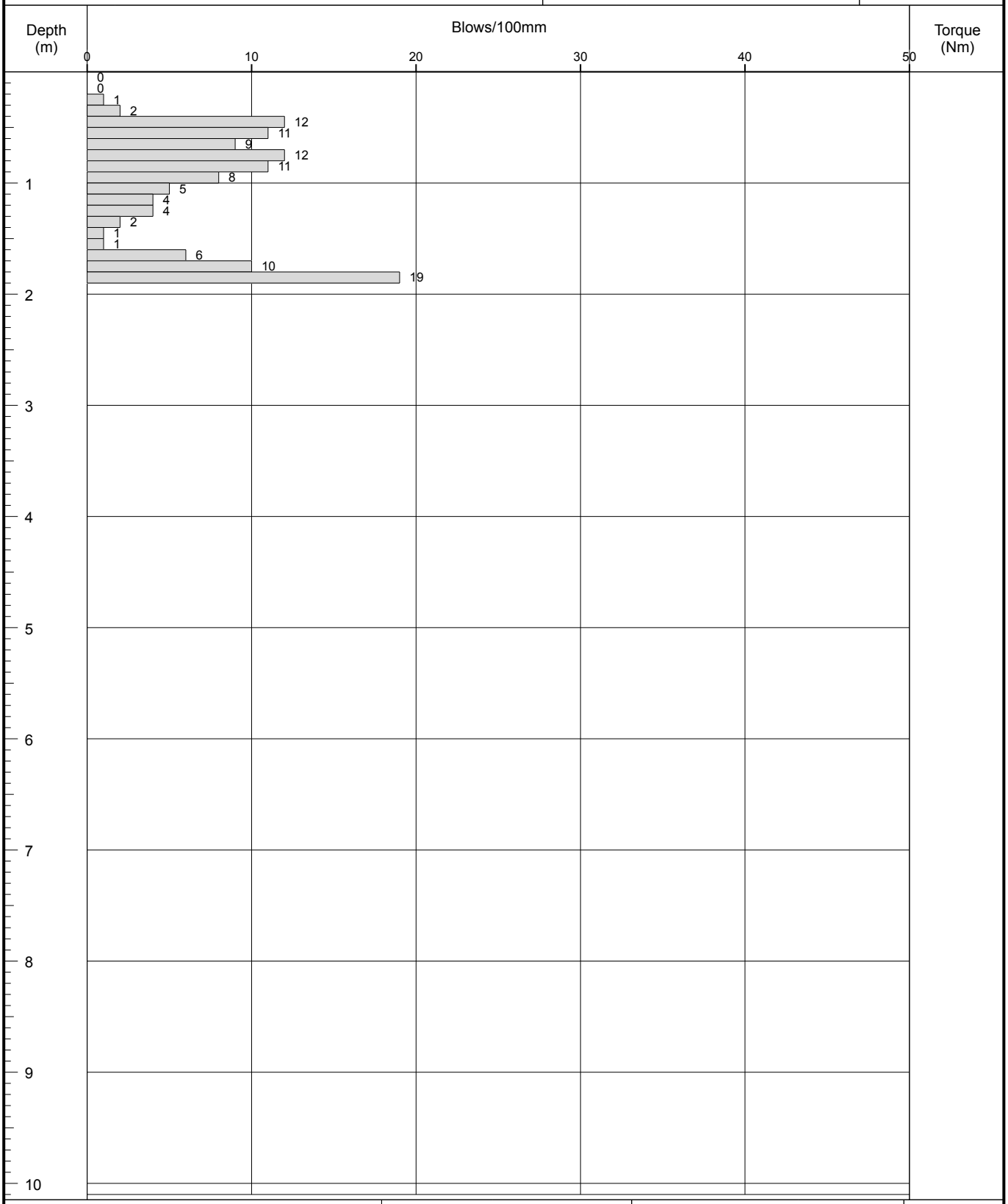


Remarks:				
	Fall Height	750mm	Cone Base Diameter	50.5mm
	Hammer Wt	63.5kg	Final Depth	4.6m
	Probe Type	DPSH-B		

Probe Log

Probe No.
DP05
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



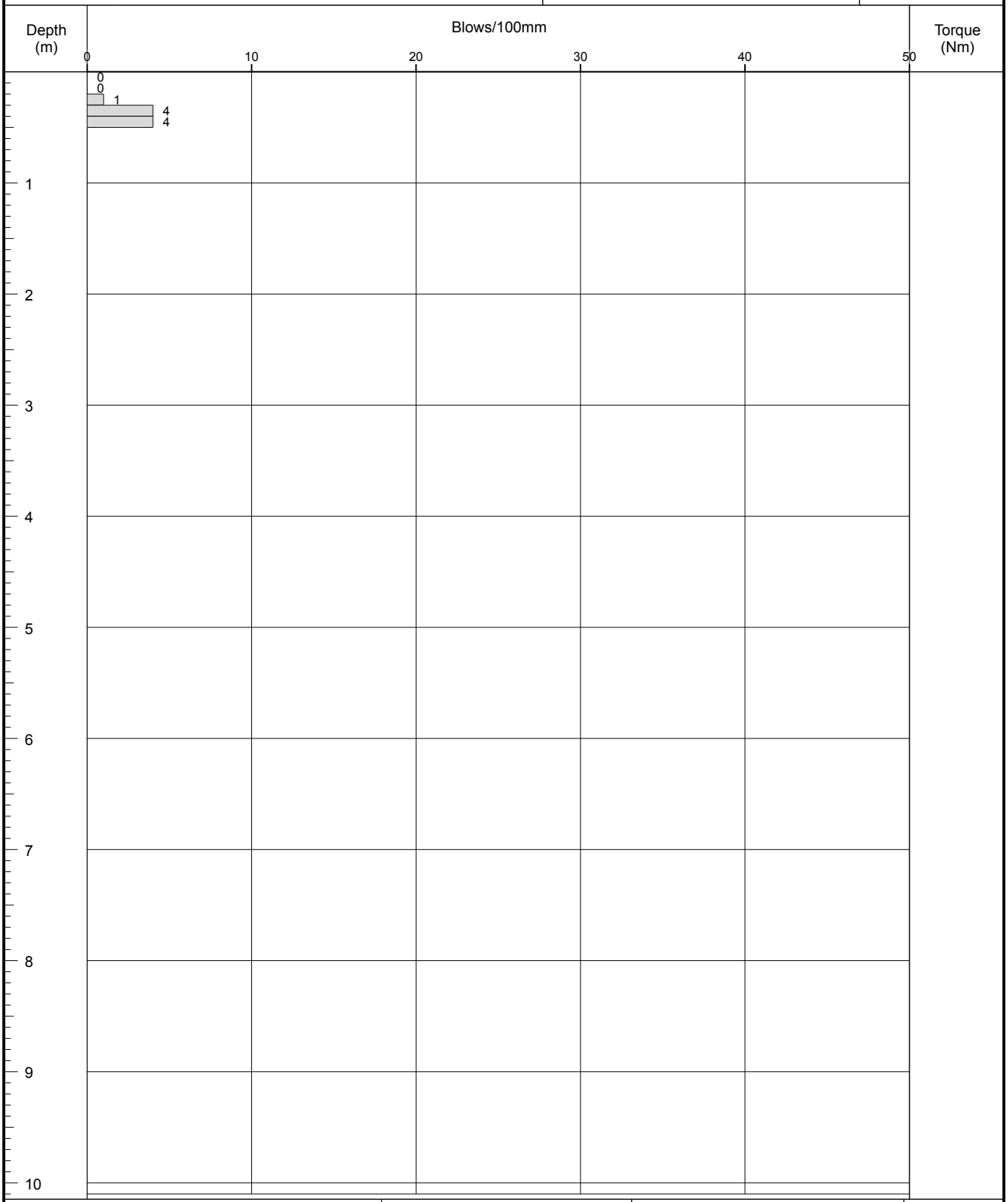
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.8m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP06
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



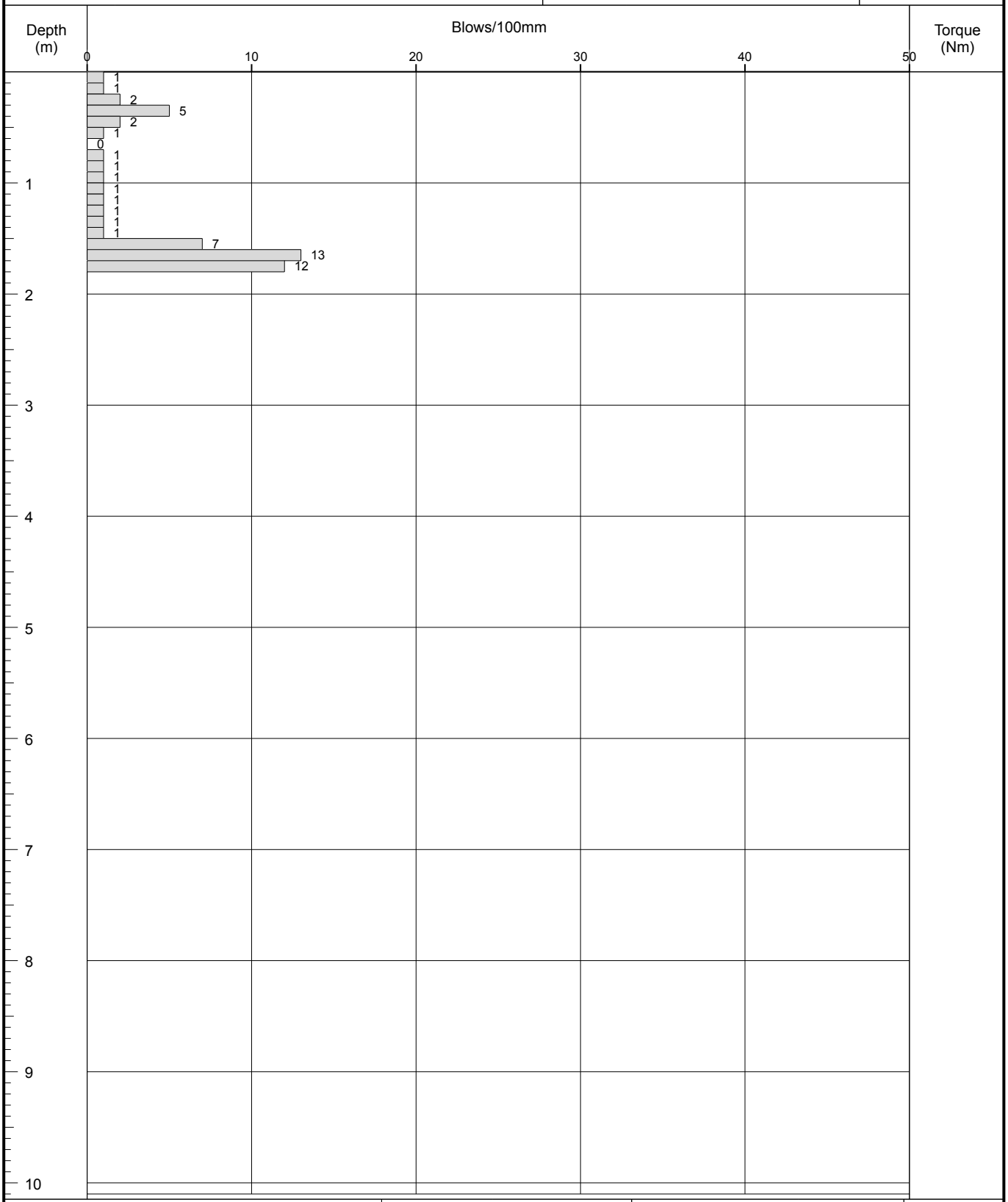
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	0.4m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP07
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



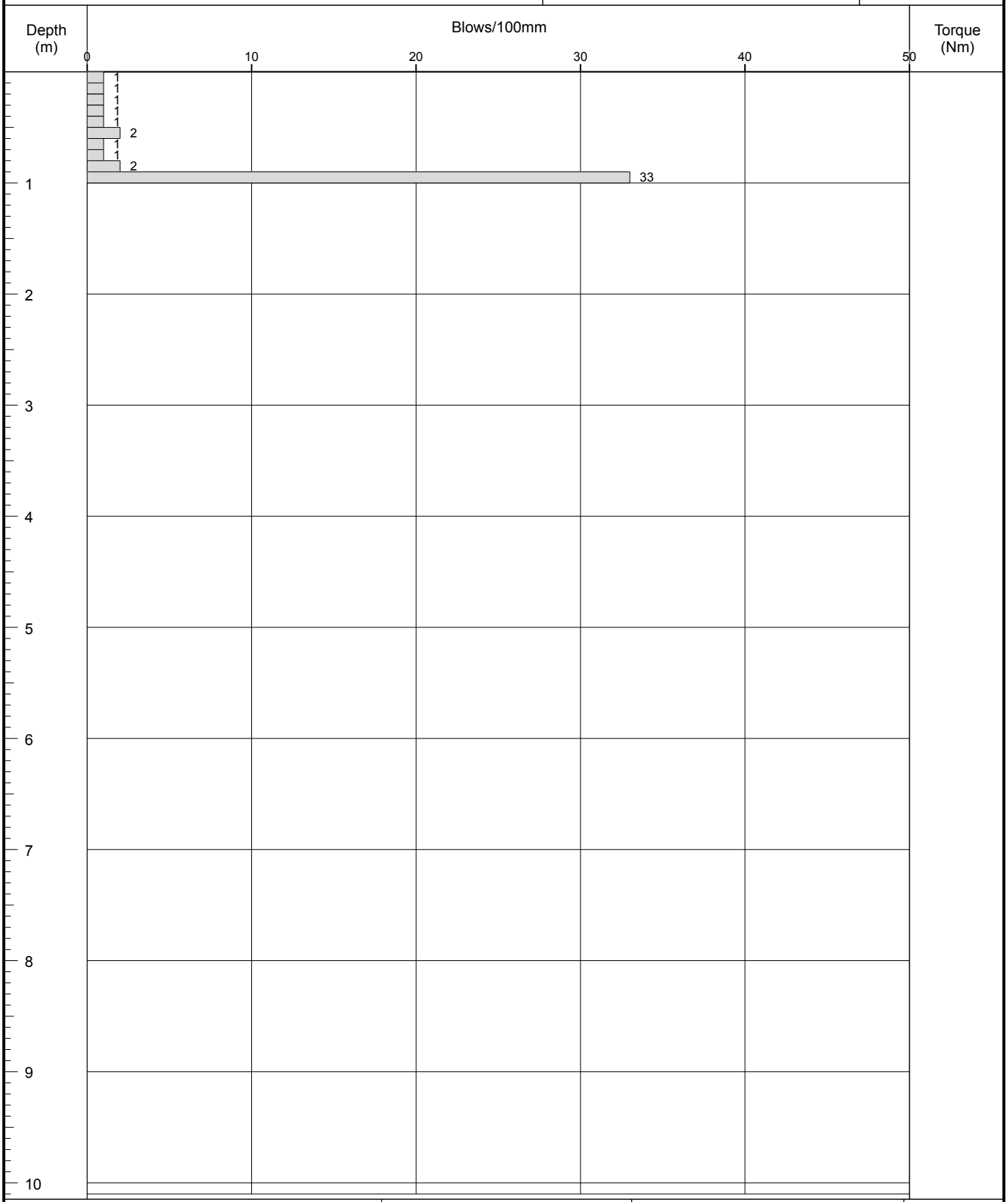
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.8m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP08
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



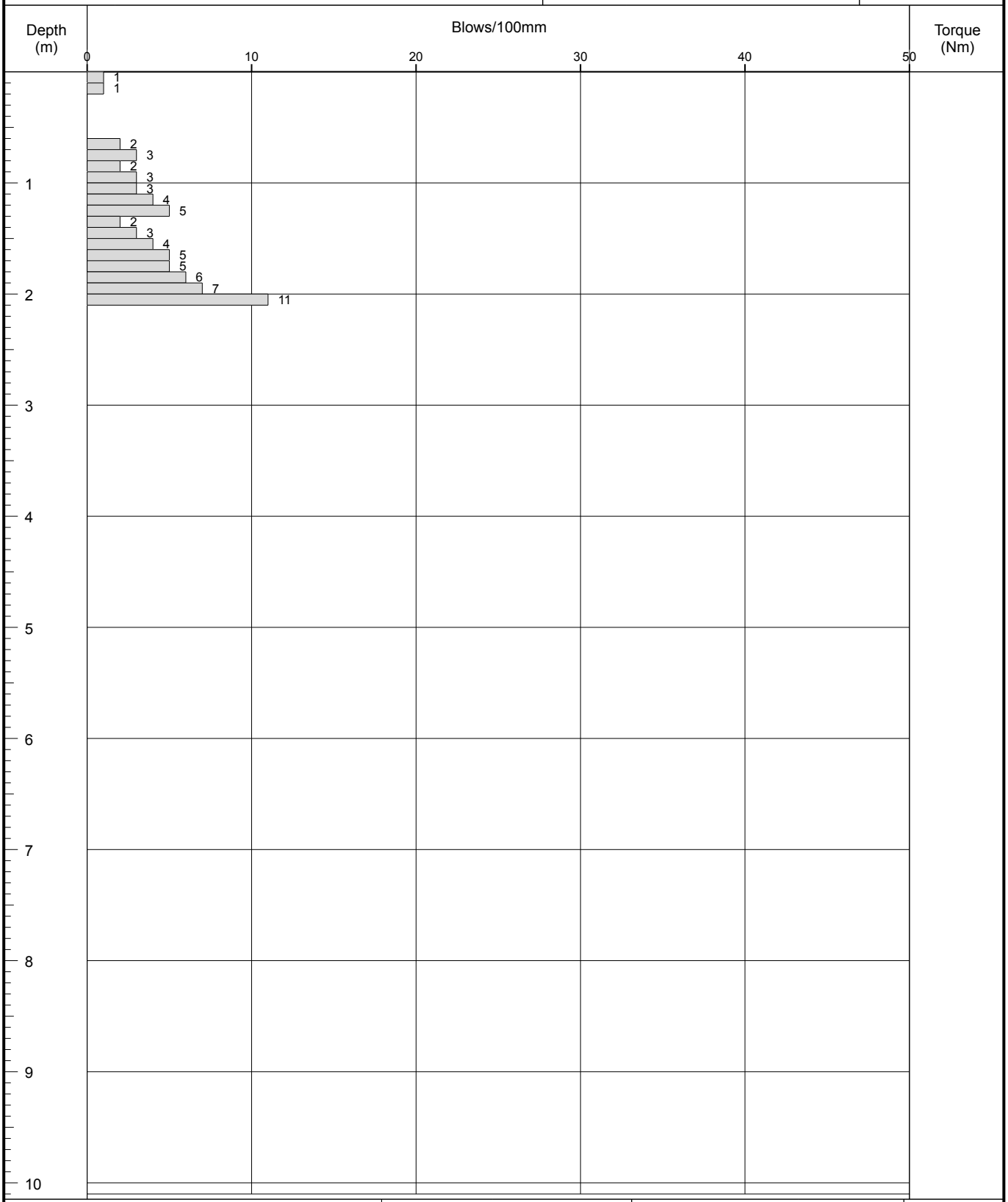
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	0.9m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP09
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



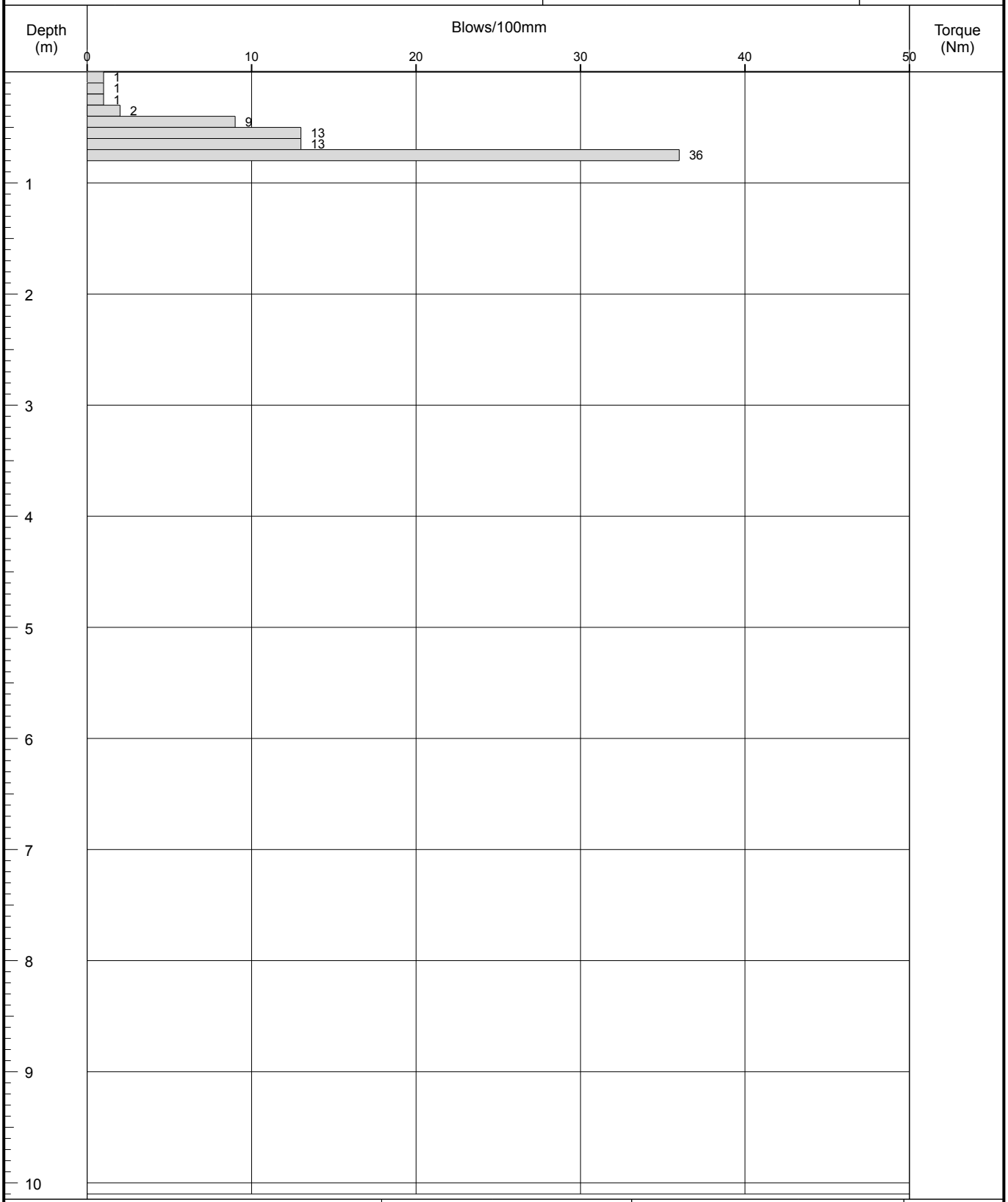
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	2.1m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP10
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW

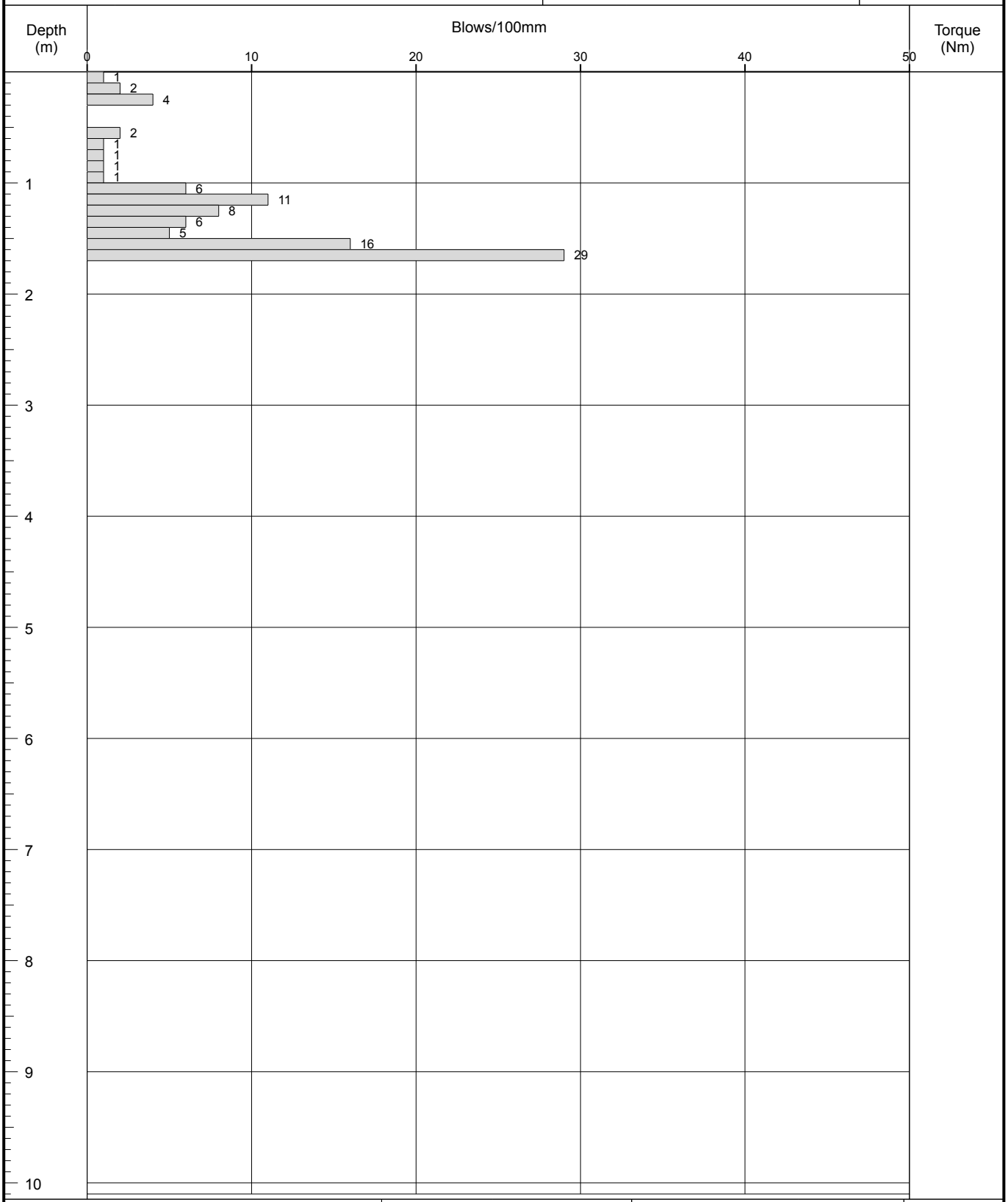


Remarks:				
	Fall Height	750mm	Cone Base Diameter	50.5mm
	Hammer Wt	63.5kg	Final Depth	0.7m
	Probe Type	DPSH-B		

Probe Log

Probe No.
DP11
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By KW



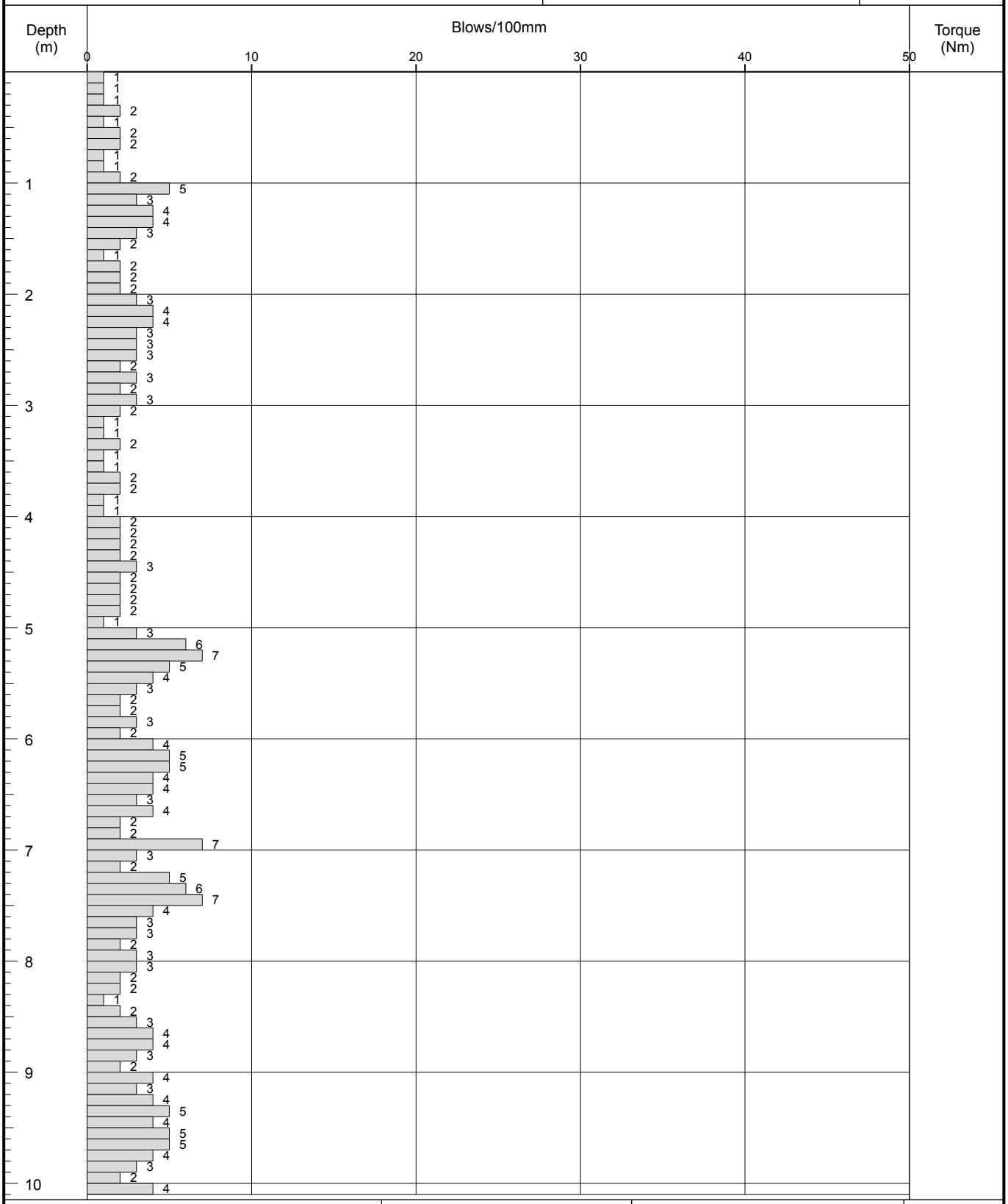
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.6m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP12
Sheet 1 of 2

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



Remarks:

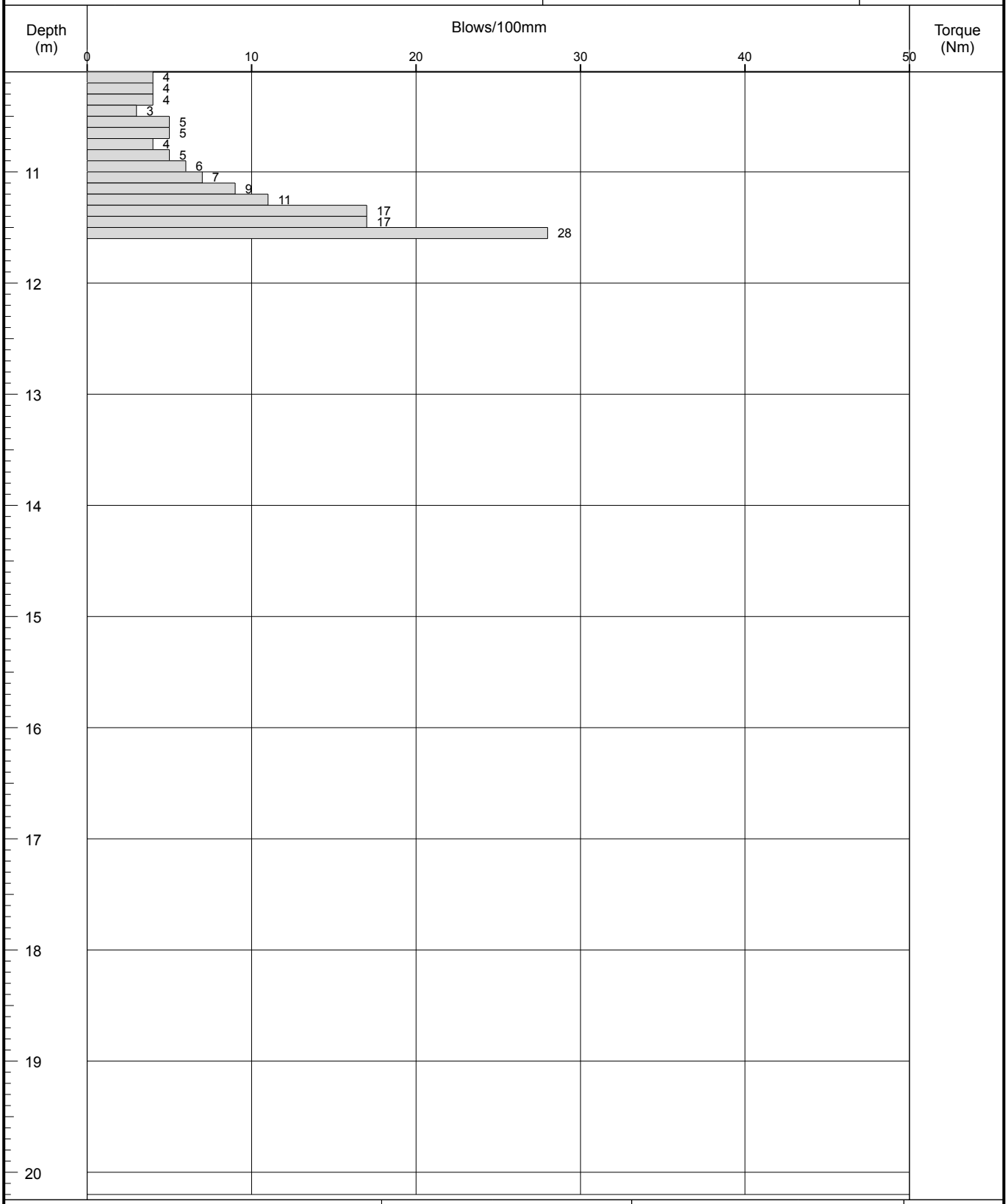
Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	11.5m
Probe Type	DPSH-B		

Probe Log

Probe No. **DP12**

Sheet 2 of 2

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



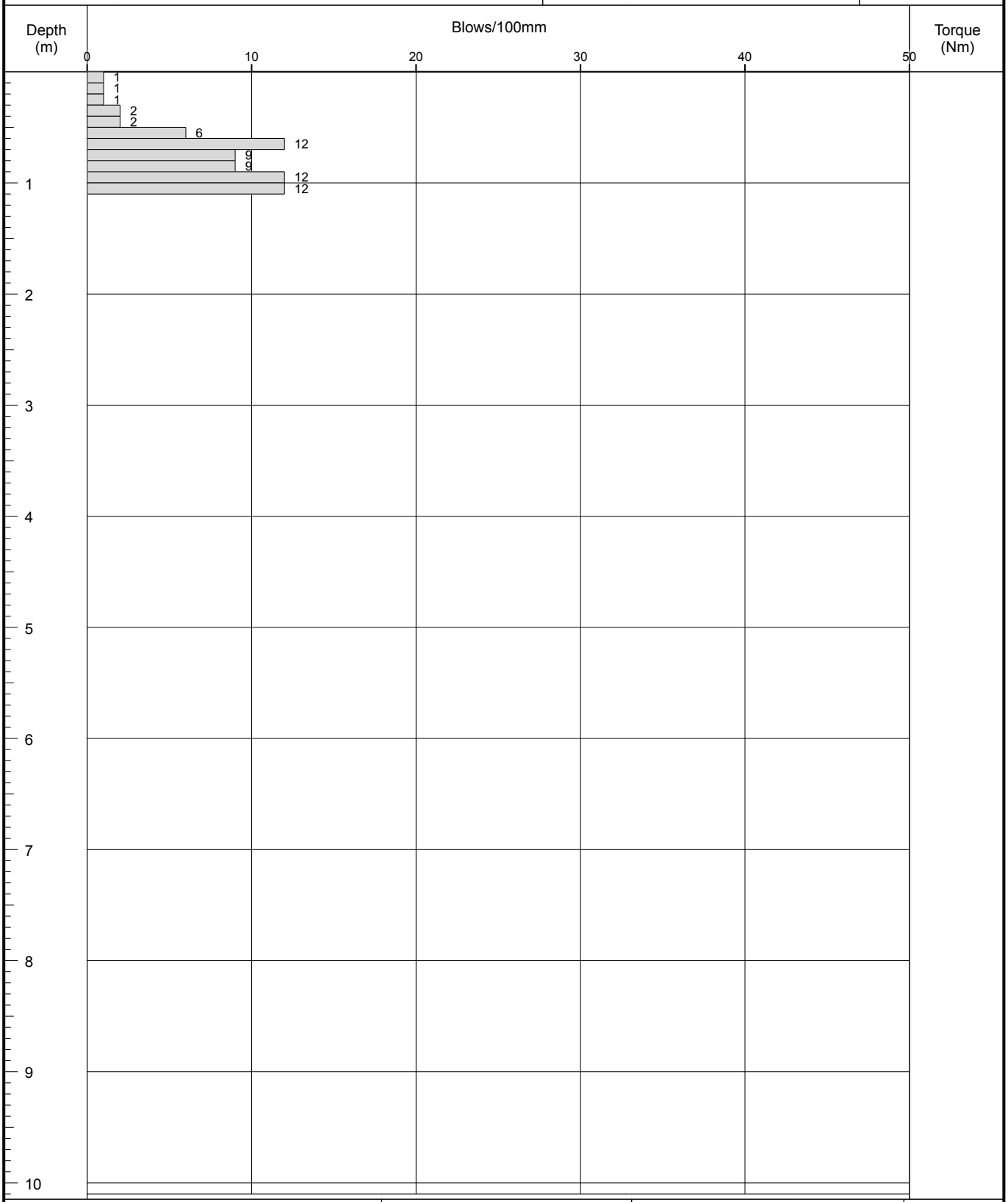
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	11.5m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP13
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



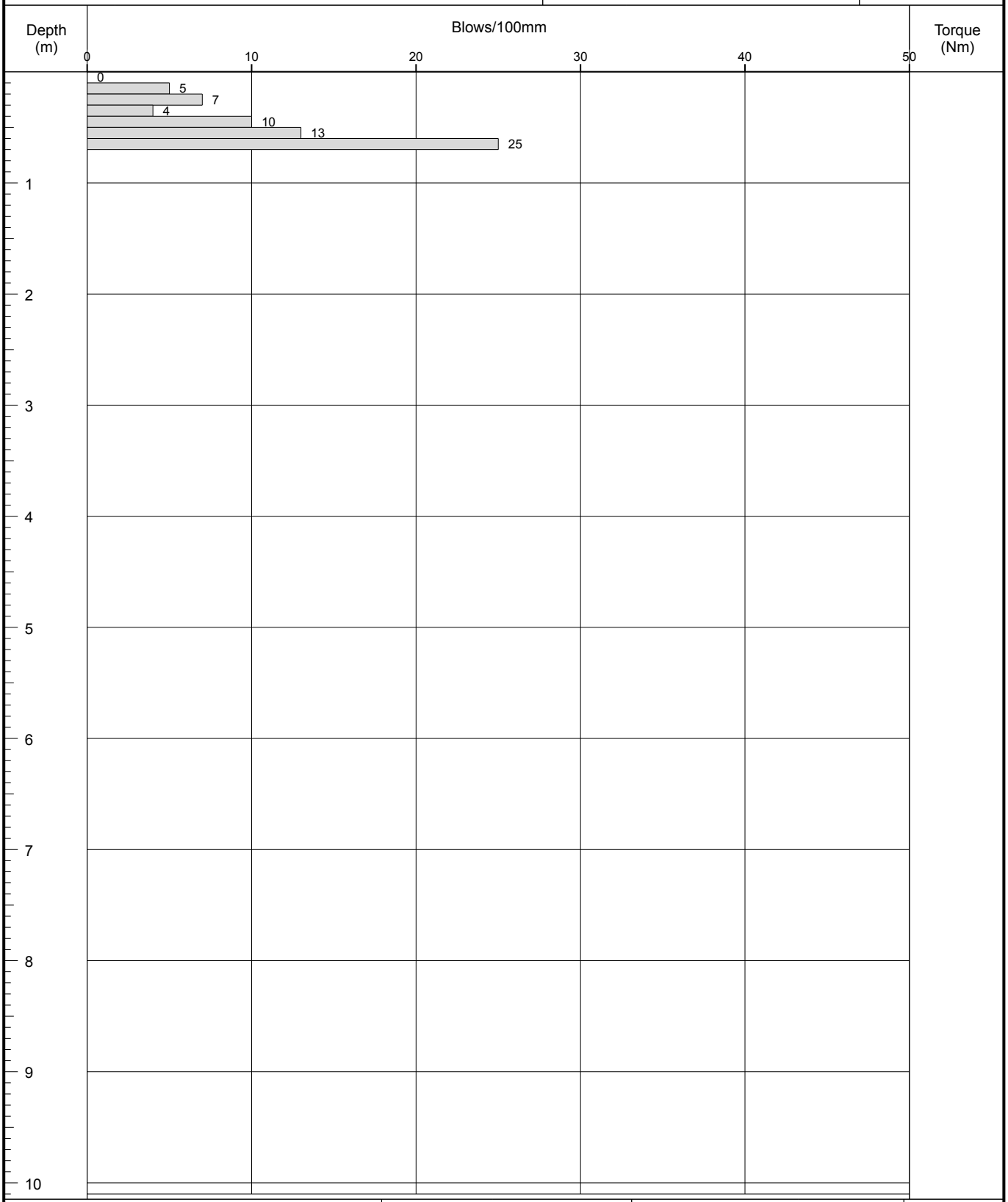
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP14
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM

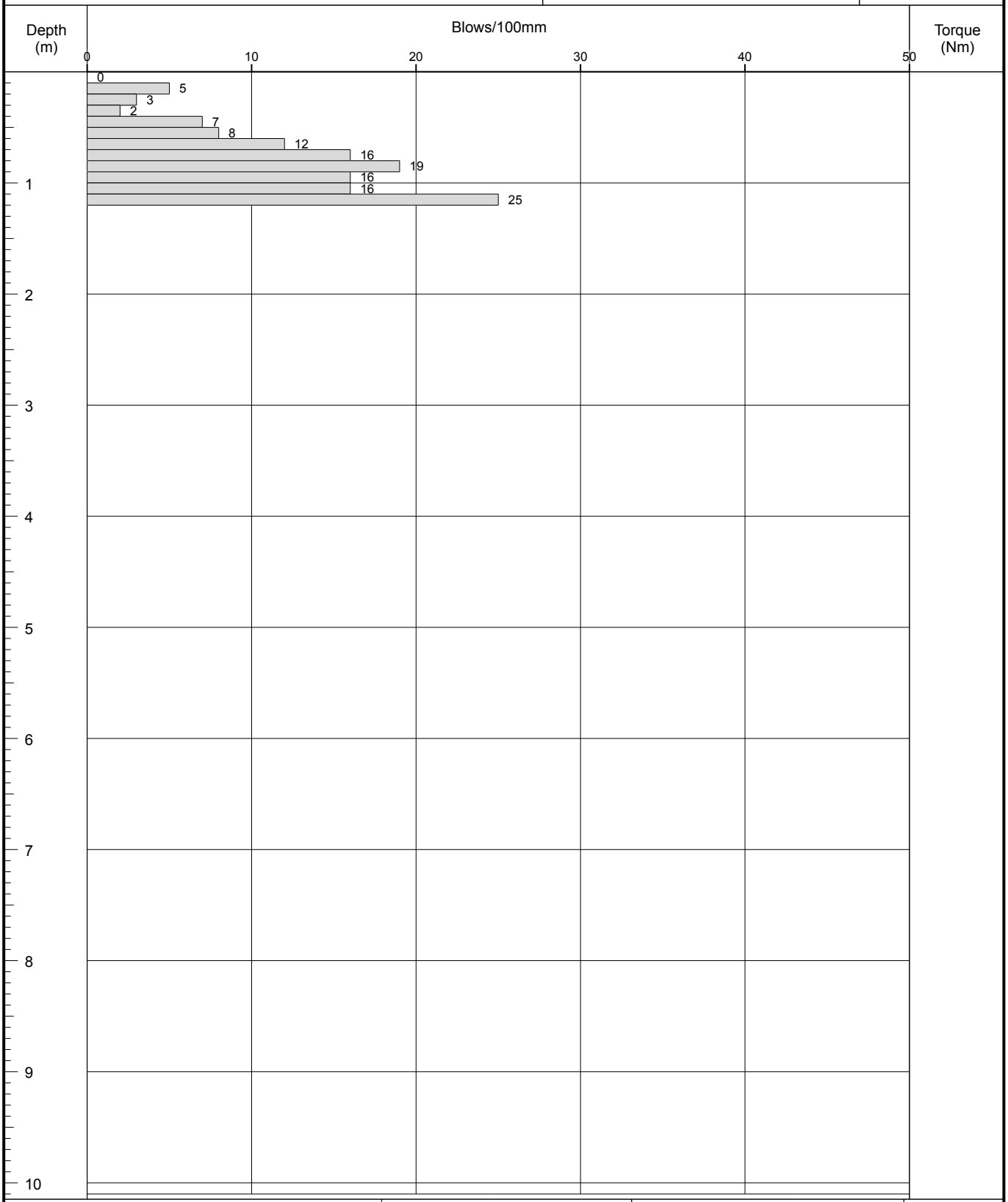


Remarks:				
	Fall Height	750mm	Cone Base Diameter	50.5mm
	Hammer Wt	63.5kg	Final Depth	0.6m
	Probe Type	DPSH-B		

Probe Log

Probe No.
DP15
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



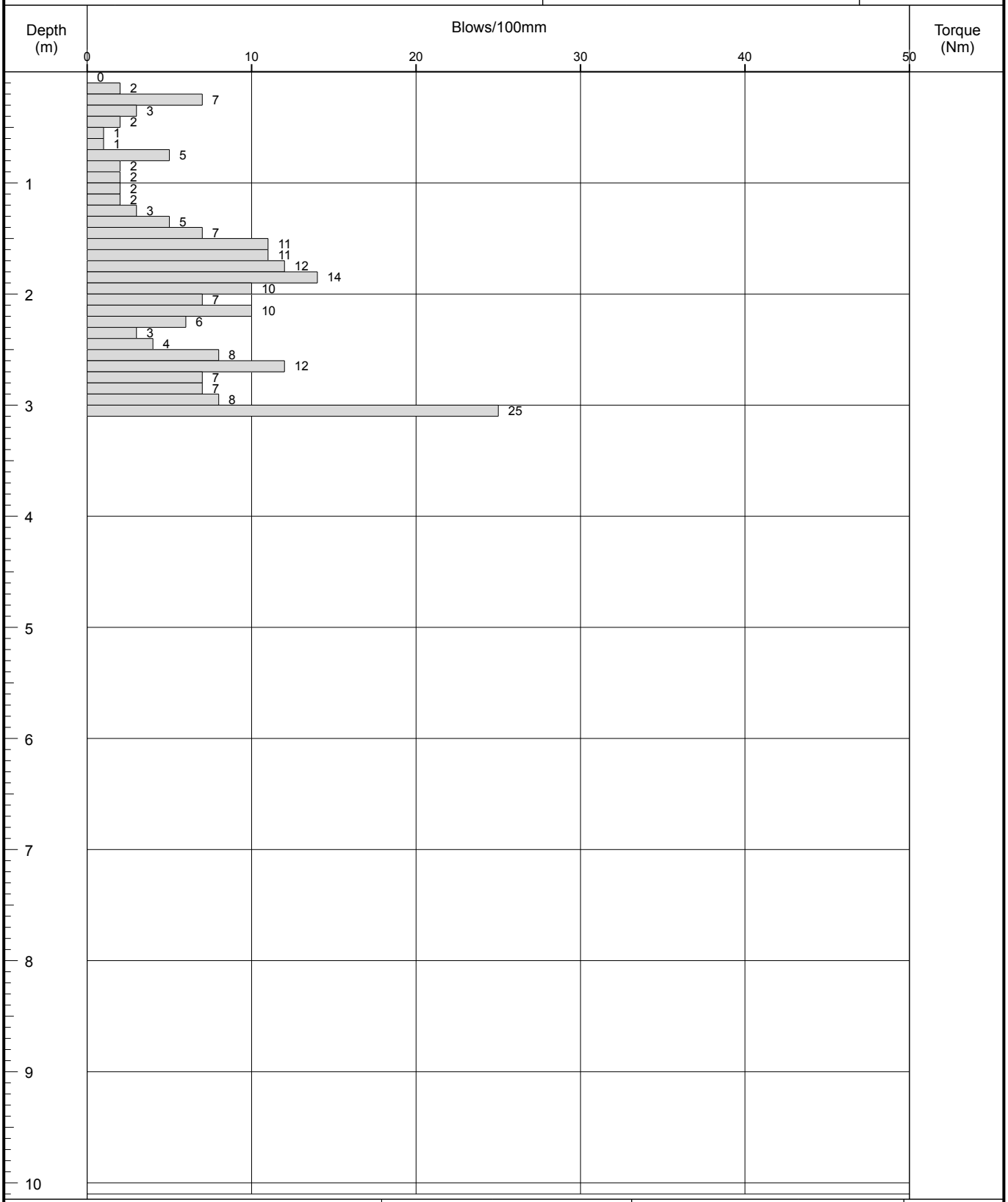
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.1m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP16
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



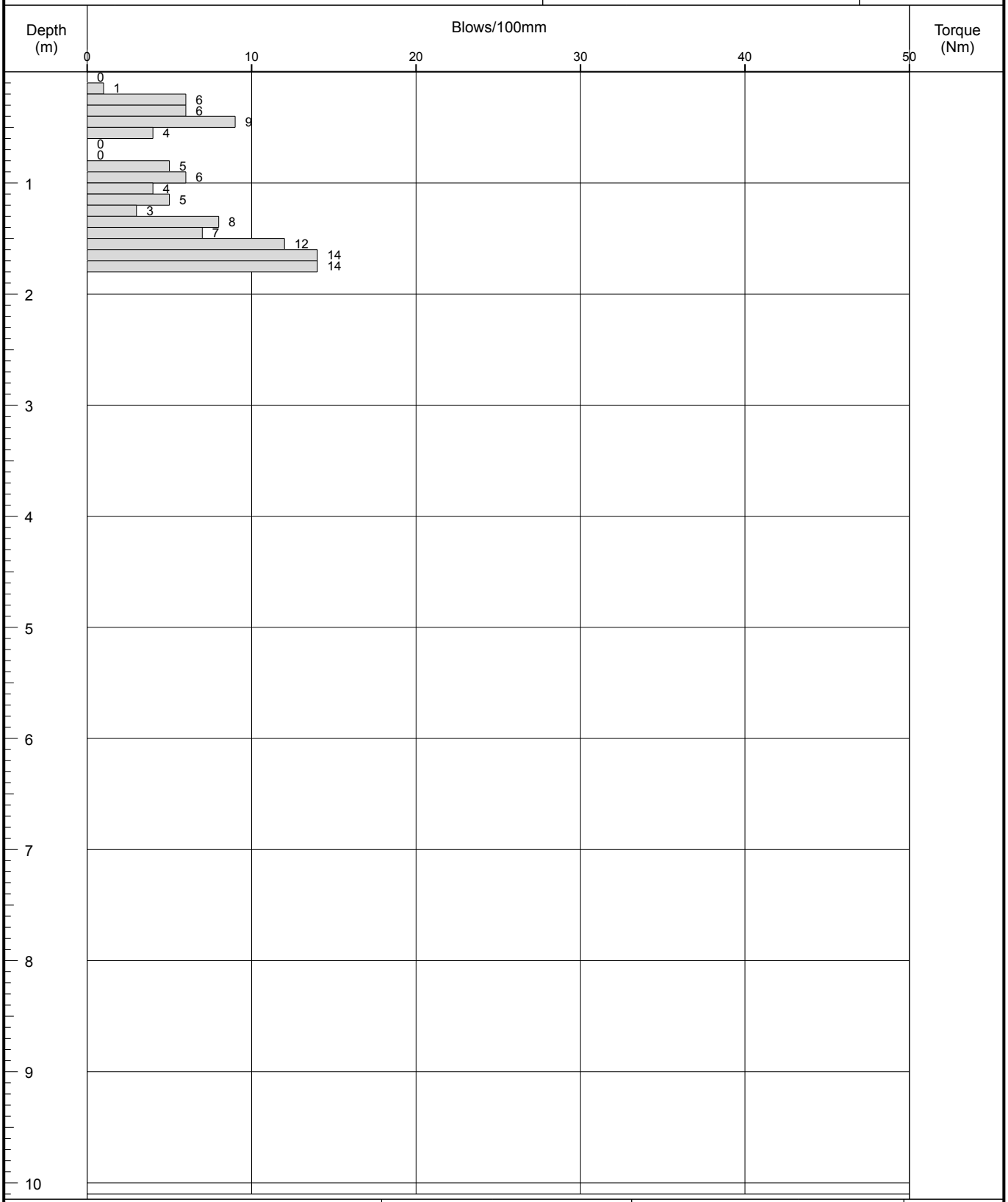
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	3m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP17
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By RM



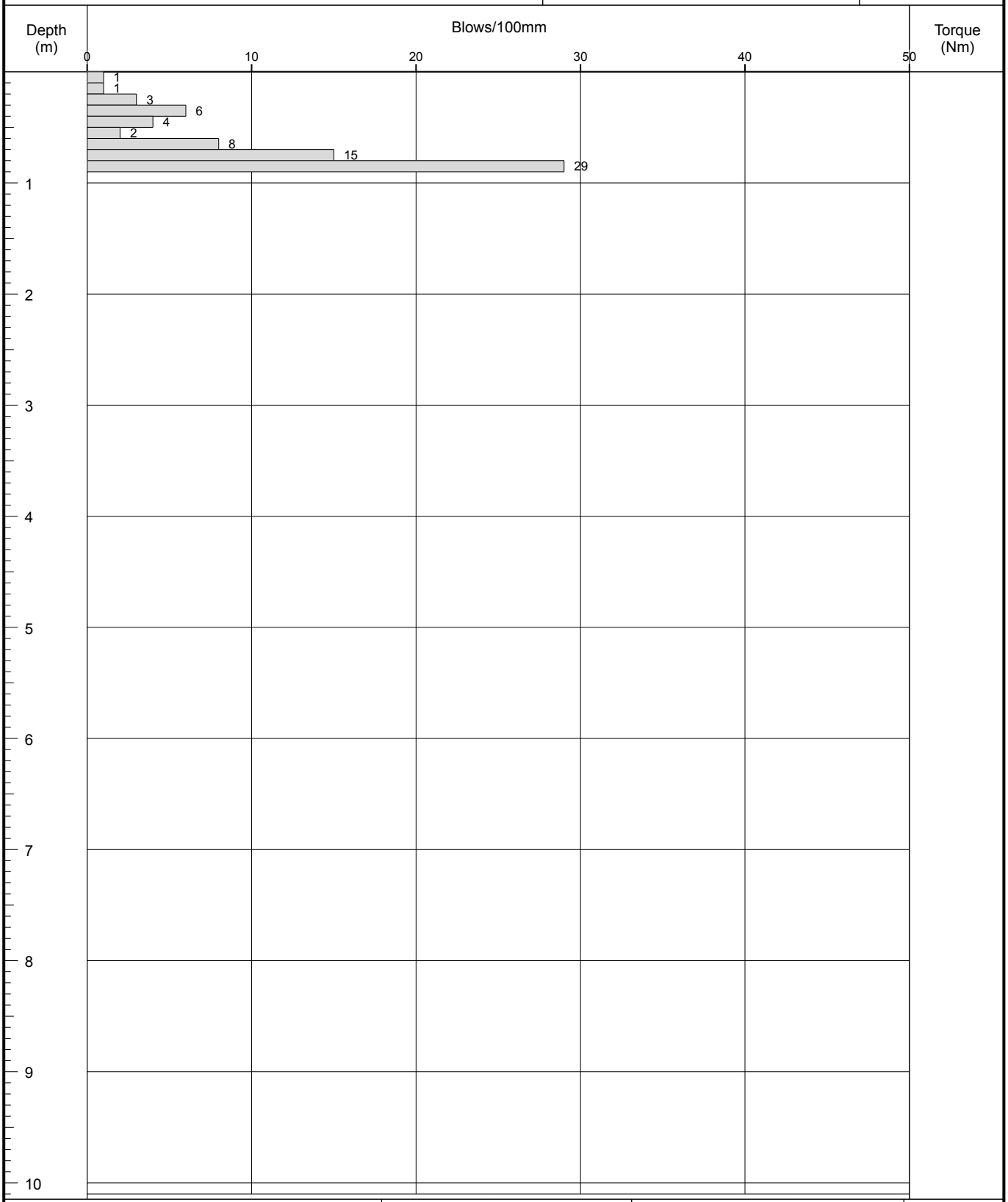
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.7m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP18
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 19/09/2015	Logged By KW



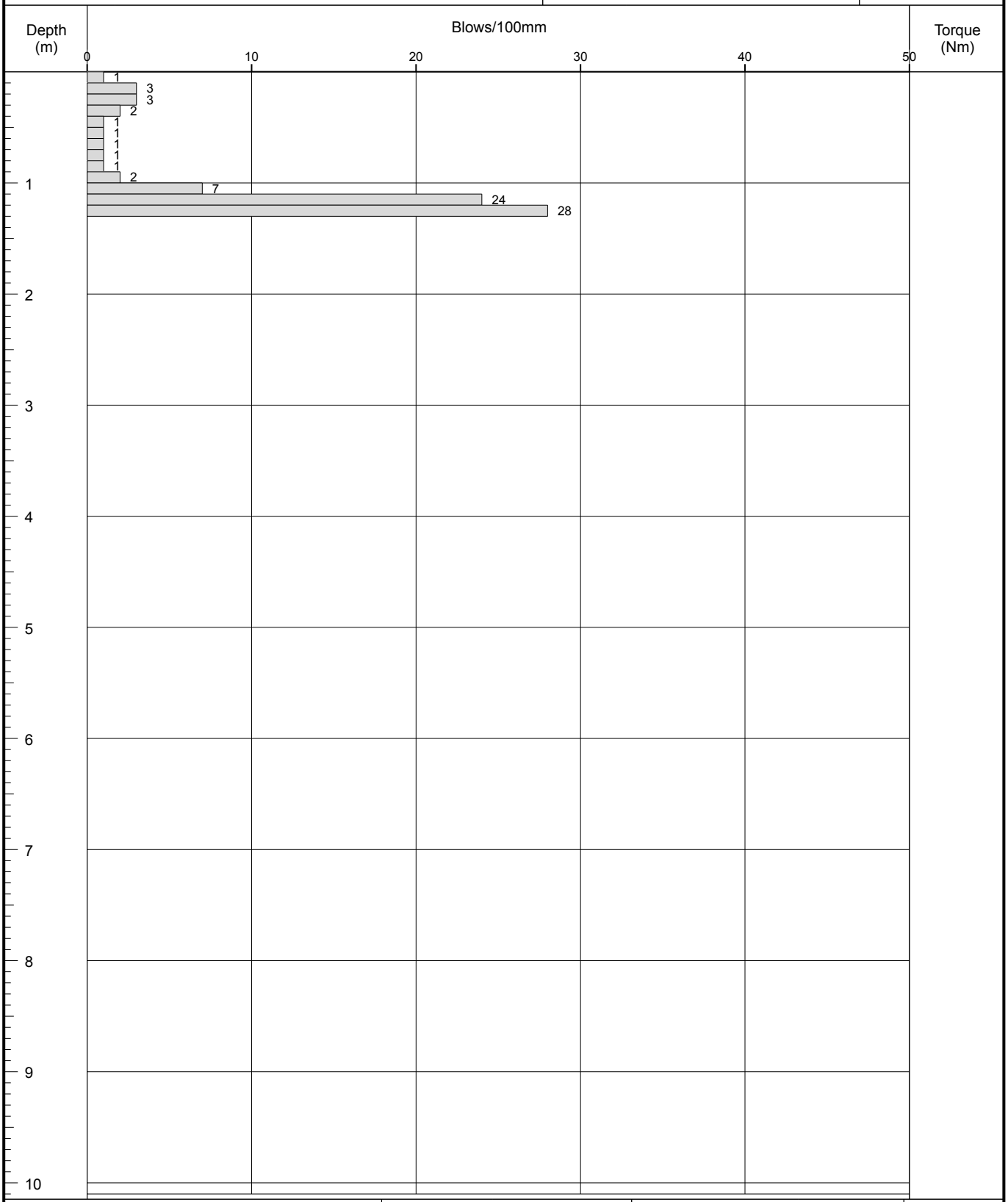
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	0.8m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP19
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By KW

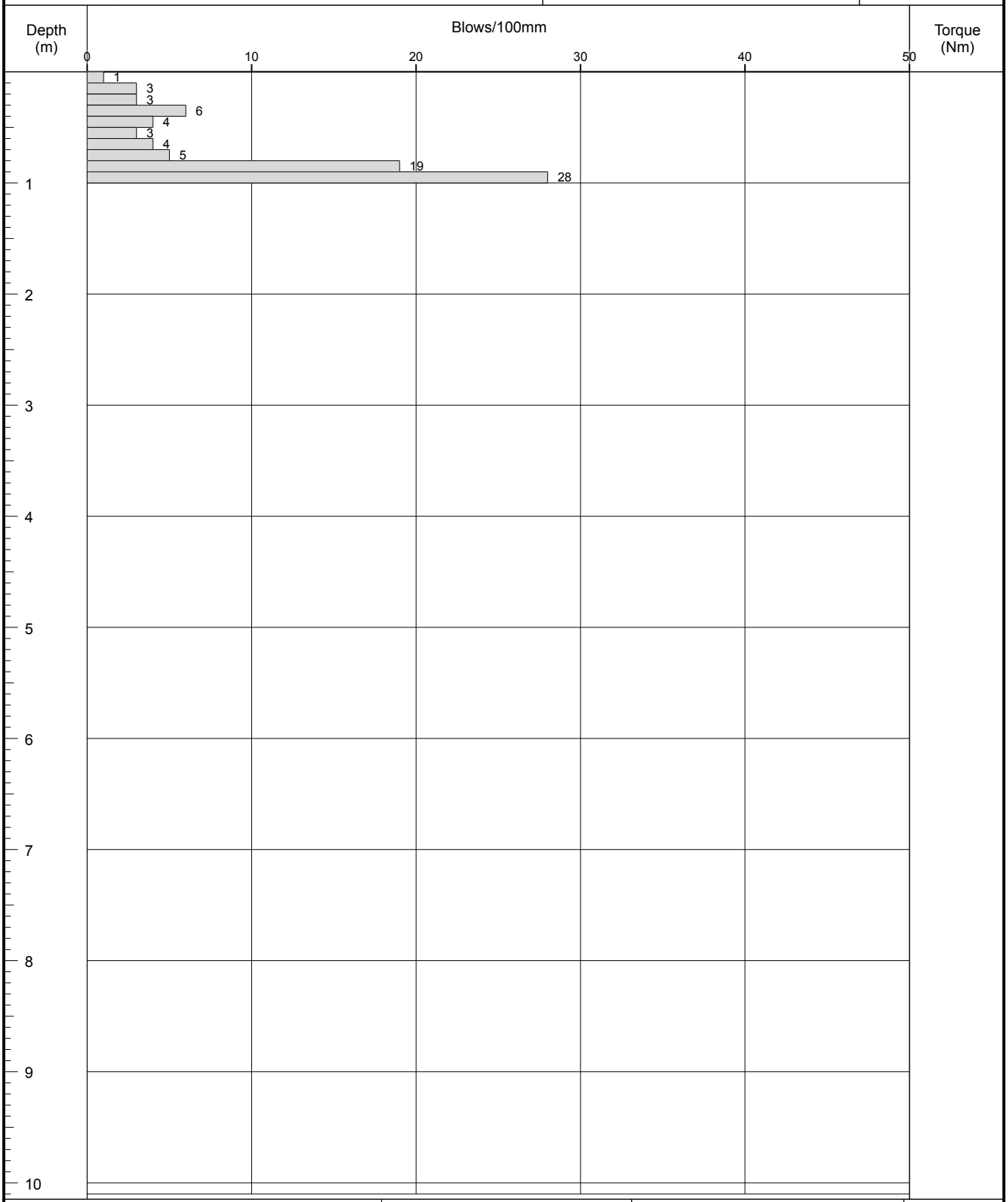


Remarks:				
	Fall Height	750mm	Cone Base Diameter	50.5mm
	Hammer Wt	63.5kg	Final Depth	1.2m
	Probe Type	DPSH-B		

Probe Log

Probe No.
DP20
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By KW



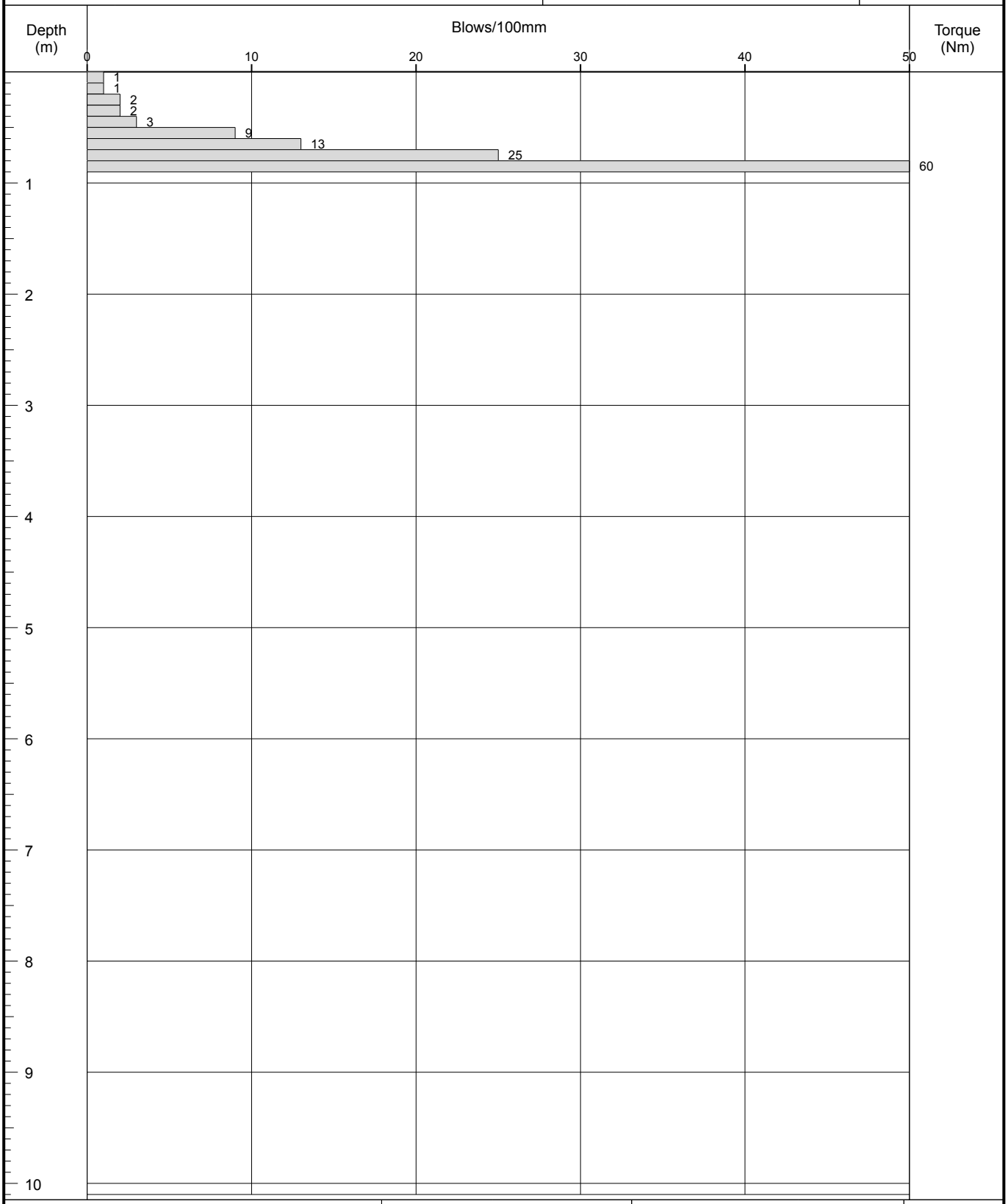
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	0.9m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP21
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By KW

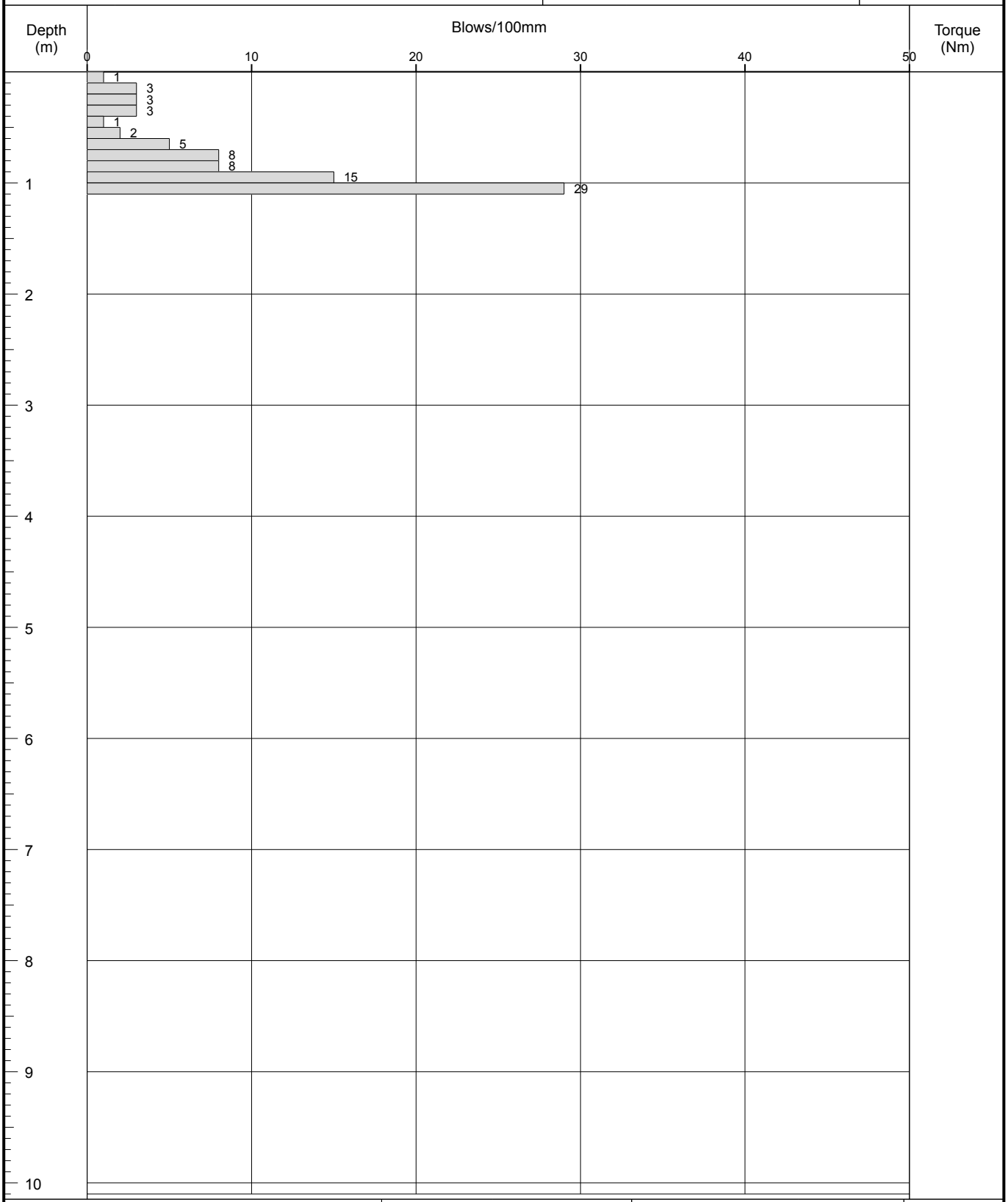


Remarks:				
	Fall Height	750mm	Cone Base Diameter	50.5mm
	Hammer Wt	63.5kg	Final Depth	0.8m
	Probe Type	DPSH-B		

Probe Log

Probe No.
DP22
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By KW



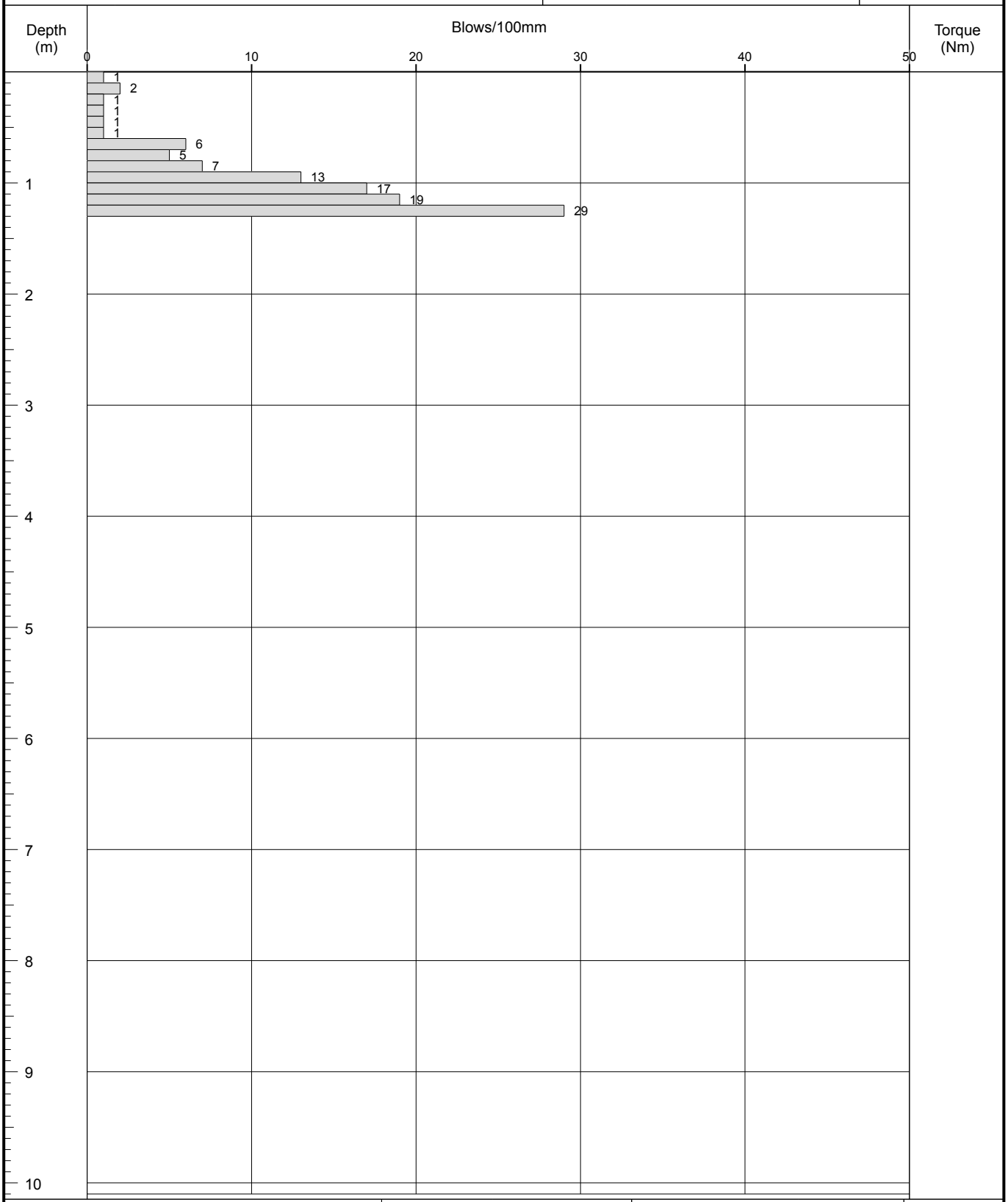
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP23
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By KW



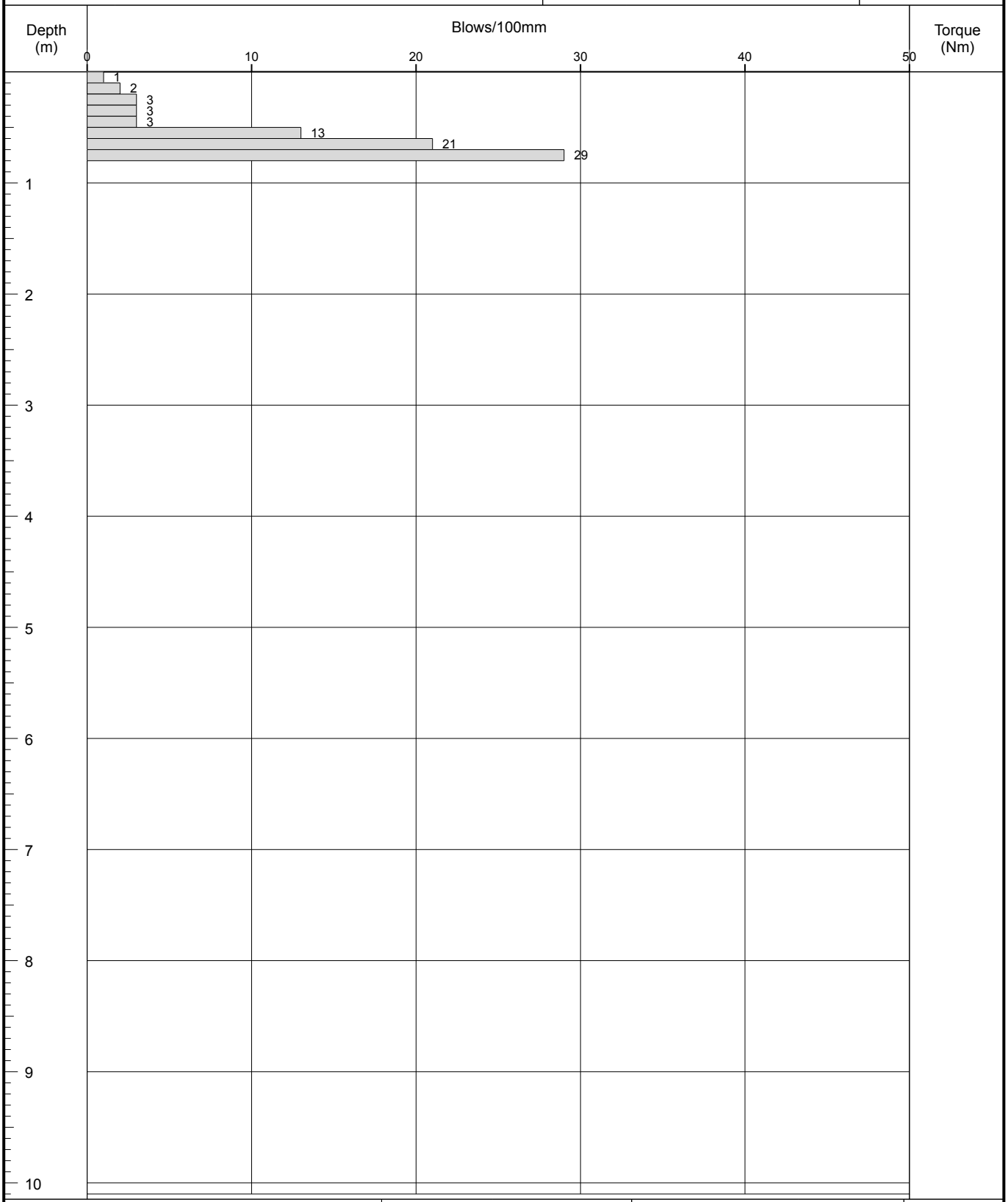
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.2m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP24
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By KW



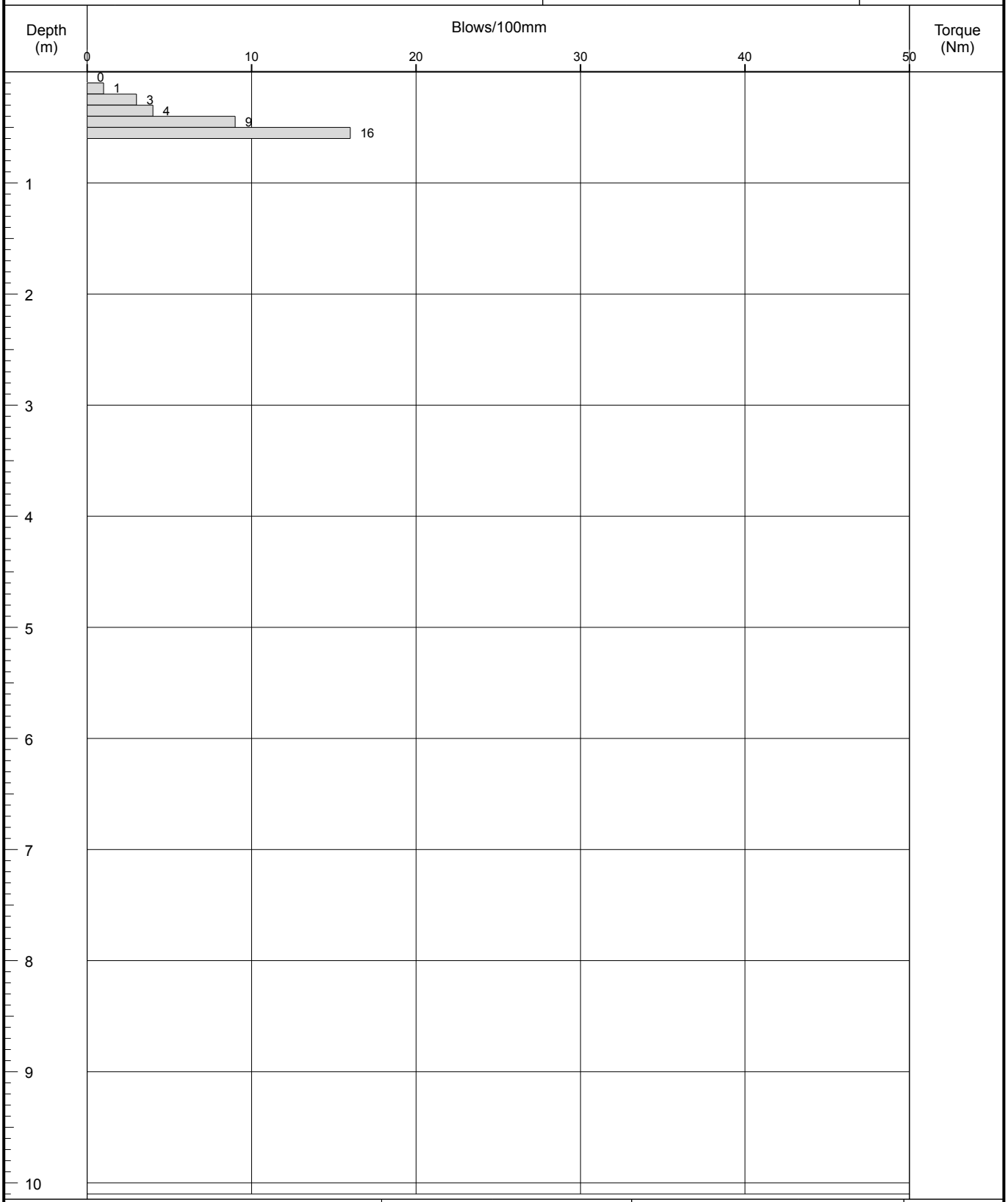
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	0.7m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP25
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By RM



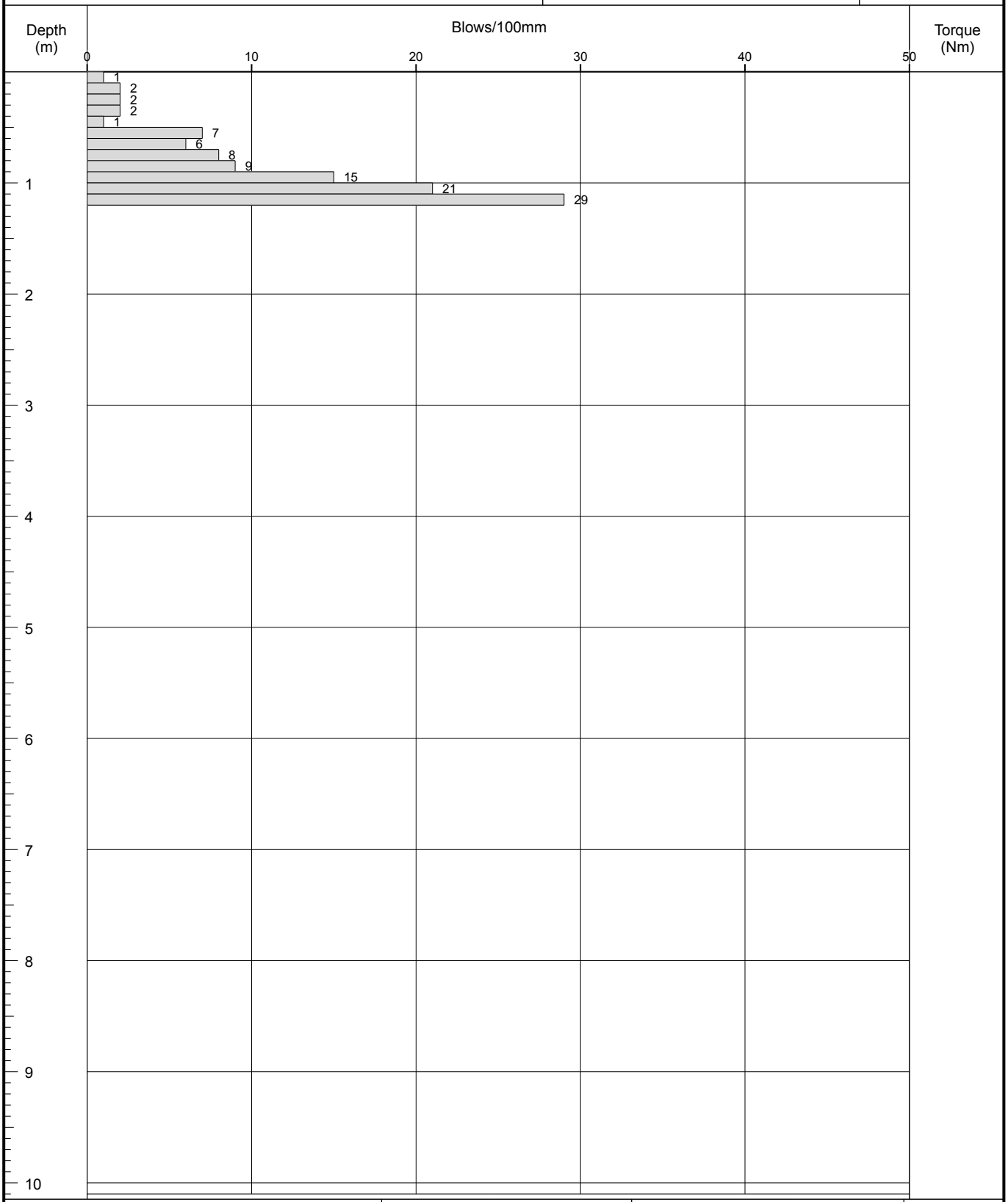
Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	0.5m
Probe Type	DPSH-B		

Probe Log

Probe No.
DP26
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 20/09/2015	Logged By KW

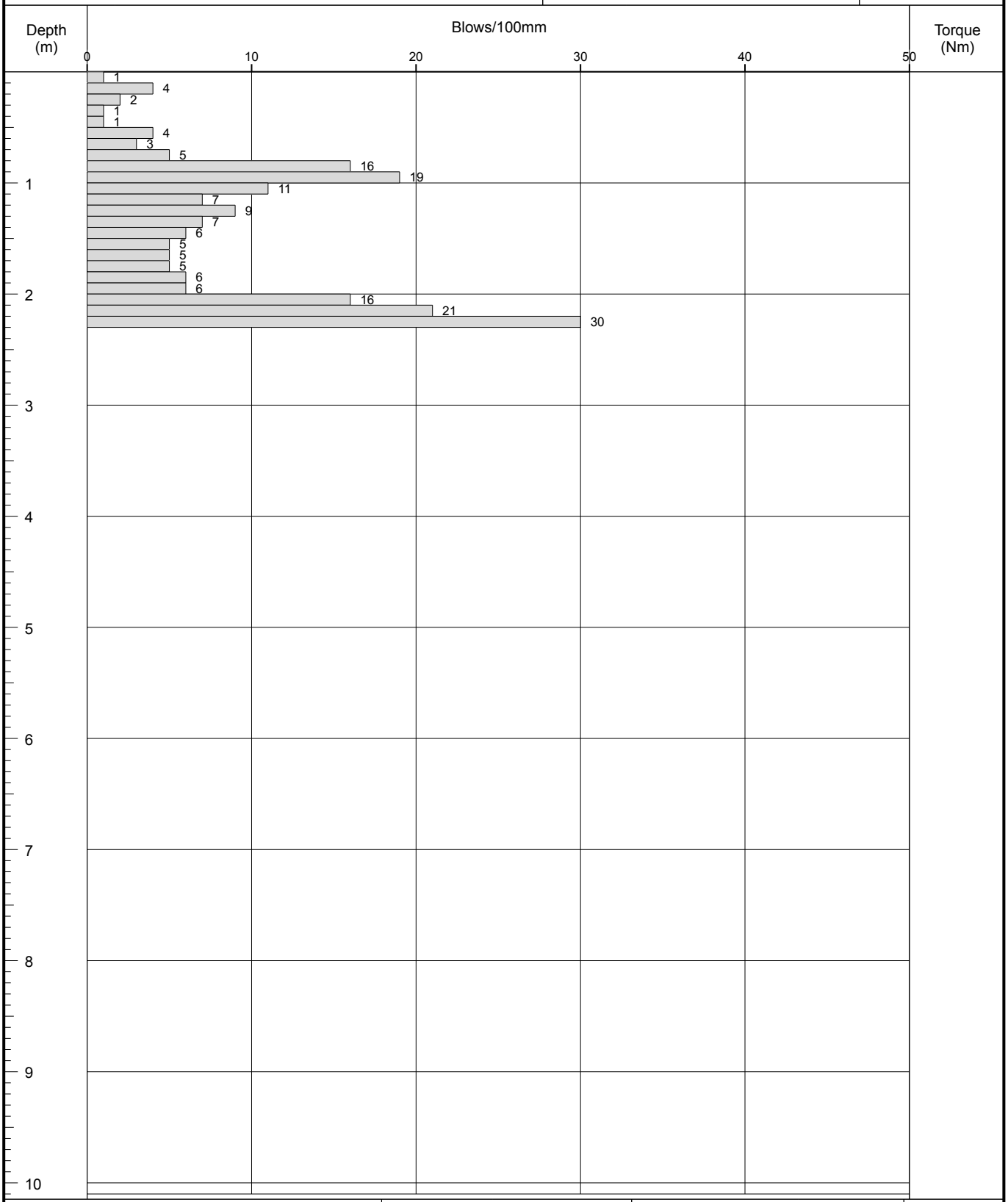


Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.1m
Probe Type	DPSH-B		

Probe Log

			Probe No. **DP27** Sheet 1 of 1
Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 21/09/2015	Logged By KW

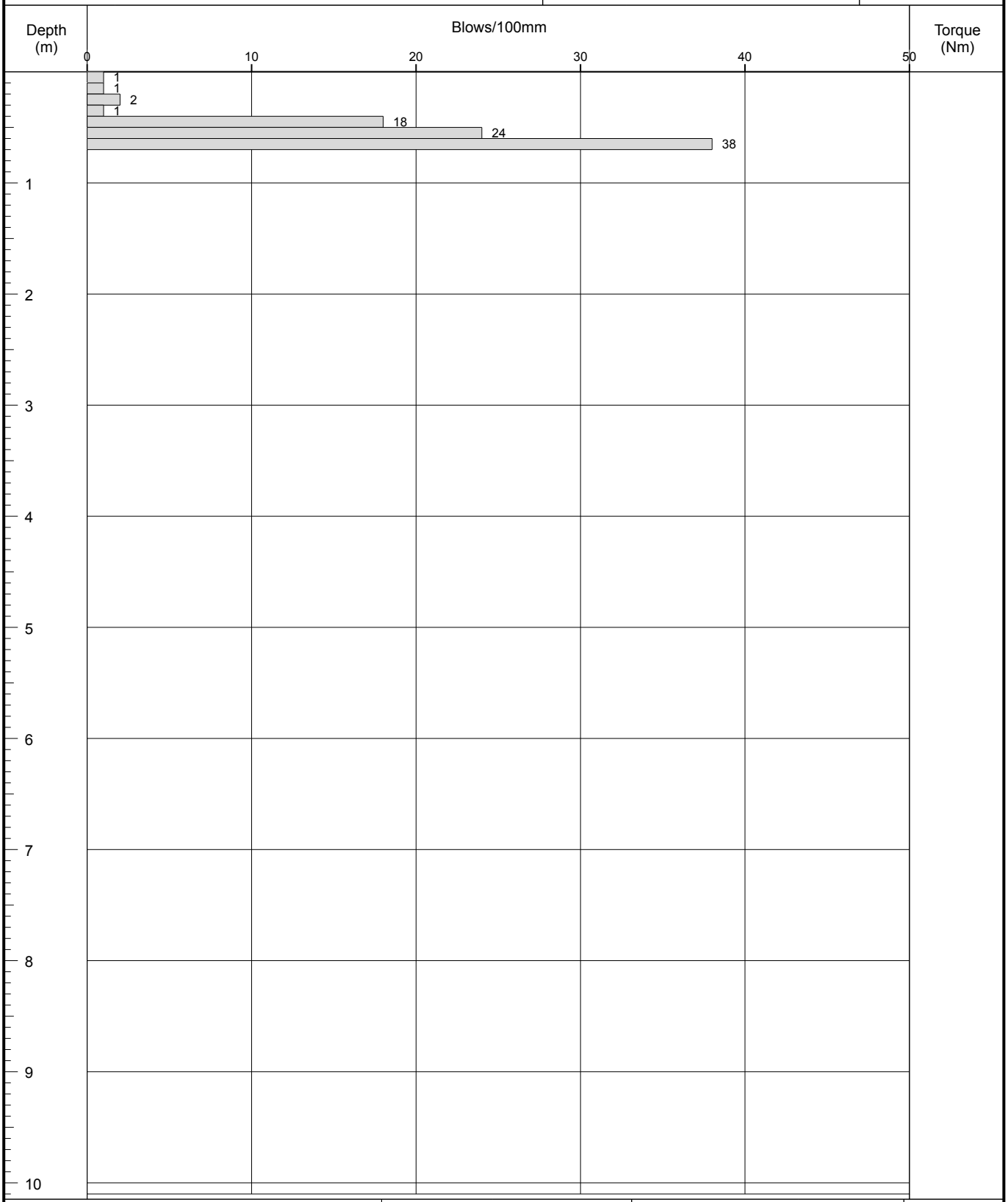


Remarks:				
	Fall Height	750mm	Cone Base Diameter	50.5mm
	Hammer Wt	63.5kg	Final Depth	2.2m
	Probe Type	DPSH-B		

Probe Log

Probe No.
DP28
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 21/09/2015	Logged By KW

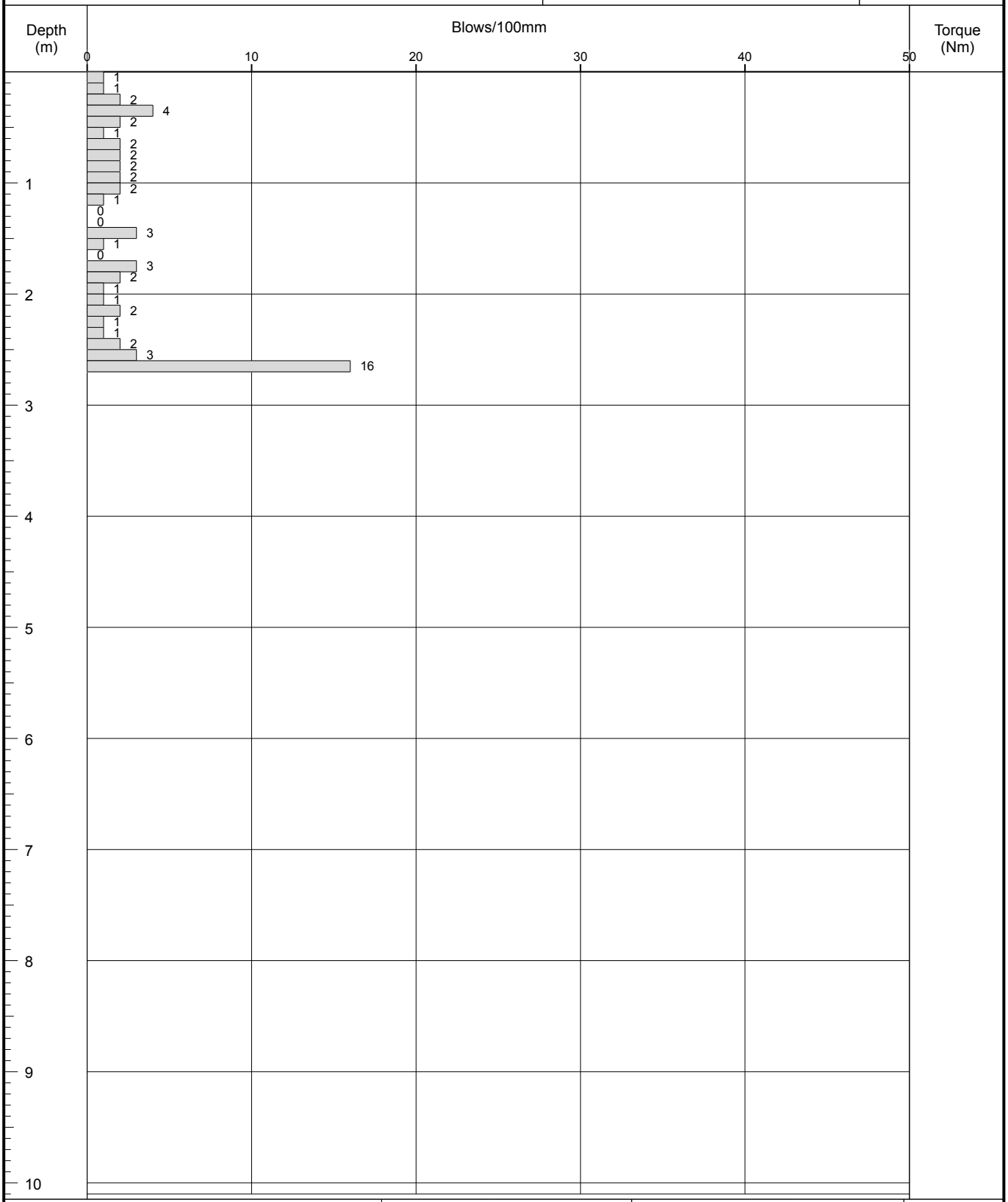


Remarks:				
	Fall Height	750mm	Cone Base Diameter	50.5mm
	Hammer Wt	63.5kg	Final Depth	0.6m
	Probe Type	DPSH-B		

Probe Log

Probe No.
DP29
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 21/09/2015	Logged By KW

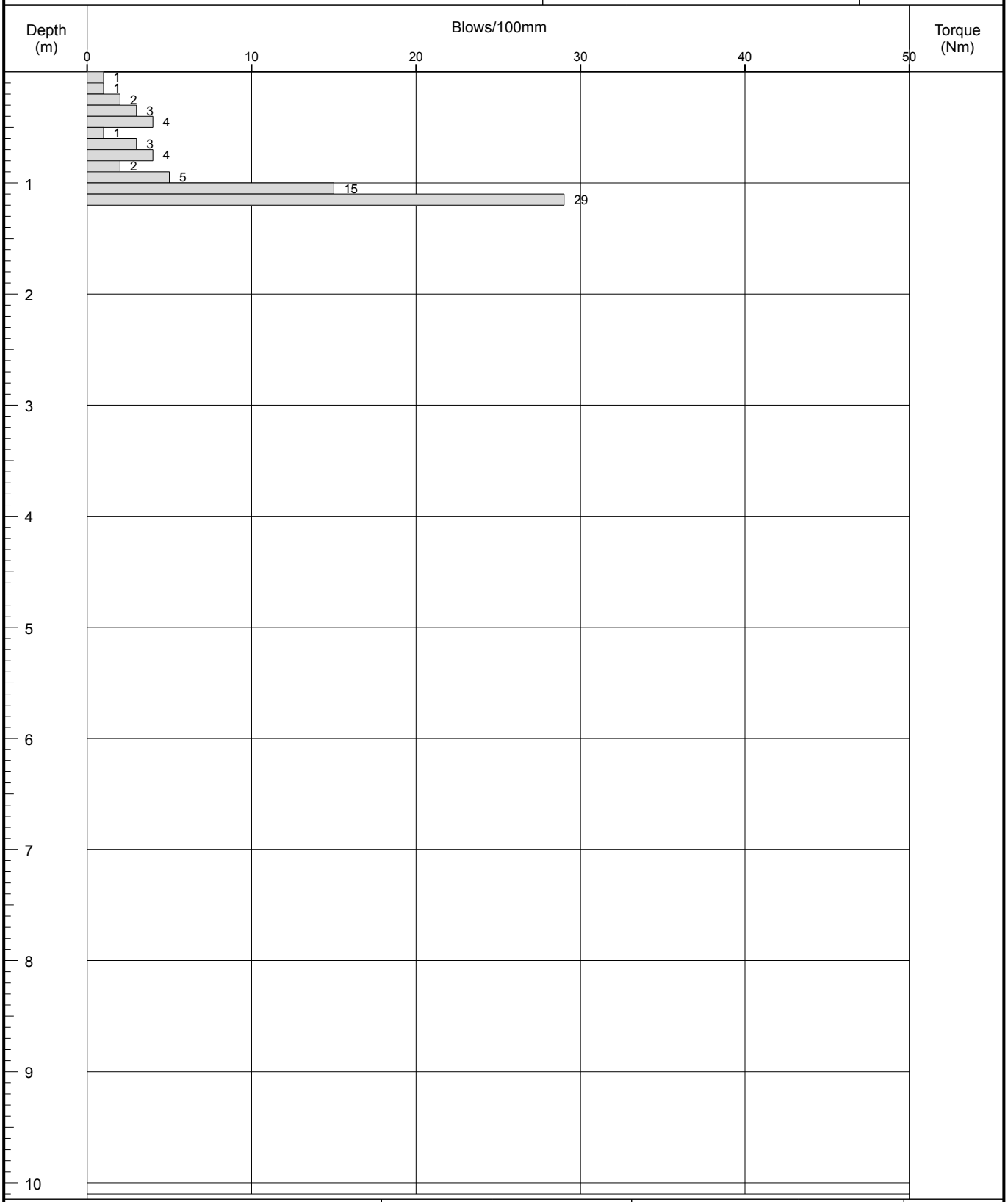


Remarks:				
	Fall Height	750mm	Cone Base Diameter	50.5mm
	Hammer Wt	63.5kg	Final Depth	2.7m
	Probe Type	DPSH-B		

Probe Log

Probe No.
DP30
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords:	Hole Type DCP
Location: Dryclough Road, Huddersfield, HD4 5JA		Level:	Scale 1:50
Client: A.H.R Building Consultancy Ltd.		Dates: 21/09/2015	Logged By KW



Remarks:

Fall Height	750mm	Cone Base Diameter	50.5mm
Hammer Wt	63.5kg	Final Depth	1.1m
Probe Type	DPSH-B		

APPENDIX 4

MACHINE DUG TRIALPITS/SOAKAWAY TESTS

Trial Pit Log

Trialpit No **TP1a**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 20/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): Depth 1.70 (1.7 × 0.45)	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged GLB

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10			TOPSOIL with abundant rootlets.
				0.75			MADE GROUND (Dark brown to black mottled light brown, slightly silty very sandy medium GRAVEL with many cobbles and boulders of brick, concrete, sandstone and ceramics. Gravel is angular to sub-rounded, occasionally tabular and sub-spherical of micaceous sandstone, brick, concrete, glass, ash , wood, clinker, plastic, metal and coal. Rare pockets of light brown fine sand and occasional nodule of firm clay.)
				1.70			MADE GROUND (Dark brown to black slightly silty, very sandy gravelly CLAY with occasional pockets of light brown fine sand and firm to stiff light brown clay. Gravel is angular to sub-rounded fine to coarse of brick , sandstone, coal, siltstone, mudstone, concrete, glass, ceramics, paper, plastics, ash and clinker). *Large dressed sandstone boulders and brick to base of trialpit.* End of pit at 1.70 m

Remarks:

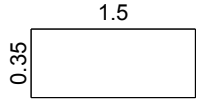
Stability: Good

Trial Pit Log

Trialpit No **TP1b**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 20/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): Depth 1.60	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged GLB



Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15			TOPSOIL (Light to medium brown silty fine gravelly SAND with occasional rootlets.).
				0.70			MADE GROUND (Dark brown to black, slightly silty gravelly SAND. Gravel is sub-angular and sub-rounded fine to medium of ceramic , glass, ash, clinker, brick, plastic, metal and tabular fragments of sandstone.)
				1.60			MADE GROUND (Light brown mottled yellow, silty very sandy gravelly CLAY with discrete horizons of clayey very sandy GRAVEL and cobbles of brick, concrete and sandstone. Gravel is angular to sub-rounded fine and coarse of brick, shale, ash, clinker, coal, quartz , glass and ceramics. Occasional cobbles and boulders of tabular dressed sandstone up to 350mm in diameter. [Demolition rubble]. *Many cobbles and boulders of angular dressed sandstone with brick and sub-rounded coarse grained sandstone to base of trialpit.* End of pit at 1.60 m

Remarks:

Stability: Good

Trial Pit Log

Trialpit No
TP2
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 19/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): 2.2 × 0.7, Depth 0.90	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged JDMI

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.40 - 0.90	B		0.40			TOPSOIL. (Black to dark grey silty gravelly SAND with cobbles. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Cobbles are of angular coarse grained sandstone. Abundant rootlets).
				0.90			Orangish brown medium to coarse sandy gravelly COBBLES with boulders. Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular frequently tabular coarse grained sandstone.
							End of pit at 0.90 m

Remarks:

Stability: Good

Trial Pit Log

Trialpit No **TP3**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 19/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): Depth 0.90 — 1.75 × 0.6	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged JDMI

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.28 - 0.90	B		0.28			TOPSOIL. (Black to dark grey silty gravelly SAND with cobbles. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Cobbles are of angular coarse grained sandstone. Abundant rootlets).
				0.90			Orangish brown medium to coarse sandy gravelly COBBLES with boulders. Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular frequently tabular coarse grained sandstone. Occasional rootlets and roots up to 20mm thick.
							End of pit at 0.90 m

Remarks:

Stability: Good.

Trial Pit Log

Trialpit No
TP4
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 19/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): Depth 1.45 — 1.8 × 0.7	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged JDMI

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.50			TOPSOIL. (Black to dark grey silty gravelly SAND with cobbles. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Cobbles are of angular coarse grained sandstone. Abundant rootlets).
				1.45			Orangish brown medium to coarse very sandy gravelly COBBLES with boulders. Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular frequently tabular coarse grained sandstone.
							End of pit at 1.45 m

Remarks:

Stability: Loose.

Trial Pit Log

Trialpit No **TP5**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 20/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): 1.58 × 0.7, Depth 1.20	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged JDMI

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.30	B		0.40			TOPSOIL. (Black to dark grey silty gravelly SAND with cobbles. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Cobbles are of angular coarse grained sandstone. Abundant rootlets and occasional full brick).
	0.50 - 1.00	B		1.20			Orangish brown medium to coarse sandy gravelly COBBLES with boulders. Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular frequently tabular coarse grained sandstone. Occasional rootlets.
							End of pit at 1.20 m

Remarks:

Stability: Loose.

Trial Pit Log

Trialpit No
TP6
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 20/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): Depth 0.80 — 2 × 0.7	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged JDMI

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.40 - 0.80	B		0.40			TOPSOIL. (Black to dark grey clayey gravelly SAND with cobbles. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Cobbles are of angular coarse grained sandstone. Abundant rootlets)
				0.80			Orangish brown medium to coarse sandy gravelly COBBLES with boulders. Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular frequently tabular coarse grained sandstone.
							End of pit at 0.80 m

Remarks:

Stability: Good

Trial Pit Log

Trialpit No **TP7**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 20/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): 1.9 × 0.7, Depth 0.65	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged JDMI

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.40 - 0.65	B		0.40			TOPSOIL. (Black clayey gravelly SAND with cobbles. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Cobbles are of angular coarse grained sandstone. Abundant rootlets and roots over 25mm thick).
				0.65			Orangish brown medium to coarse sandy gravelly COBBLES with boulders. Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular frequently tabular coarse grained sandstone.
							End of pit at 0.65 m

Remarks:

Stability: Good.

Trial Pit Log

Trialpit No **TP8**

Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 21/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): 1.8 × 0.6, Depth 0.72	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged JDMI

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30 - 0.72	B		0.30			TOPSOIL. (Black to dark grey silty gravelly SAND with cobbles. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Cobbles are of angular coarse grained sandstone. Abundant rootlets and roots up to 30mm thick).
				0.72			Orangish brown medium to coarse sandy gravelly COBBLES with boulders. Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular frequently tabular coarse grained sandstone. Frequent rootlets and 30mm roots.
							End of pit at 0.72 m

Remarks:

Stability: Good.

Trial Pit Log

Trialpit No
TP9
Sheet 1 of 1

Project Name: Moor End Academy	Project No. J2680/14/E	Co-ords: - Level:	Date 21/09/2015
Location: Dryclough Road, Huddersfield, HD4 5JA		Dimensions (m): Depth 0.90 — 1.5 × 0.6	Scale 1:50
Client: A.H.R Building Consultancy Ltd.			Logged JDMI

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.35 - 0.90	B		0.35			TOPSOIL. (Black to dark grey silty gravelly SAND with cobbles. Gravel is sub-angular to rounded fine to coarse of coarse grained sandstone. Cobbles are of angular coarse grained sandstone. Occasional rootlets).
				0.90			Orangish brown medium to coarse sandy gravelly COBBLES with boulders. Gravel is angular to rounded fine to coarse of coarse grained sandstone. Cobbles and boulders are angular to sub-angular frequently tabular coarse grained sandstone. Occasional rootlets.
							End of pit at 0.90 m

Remarks:

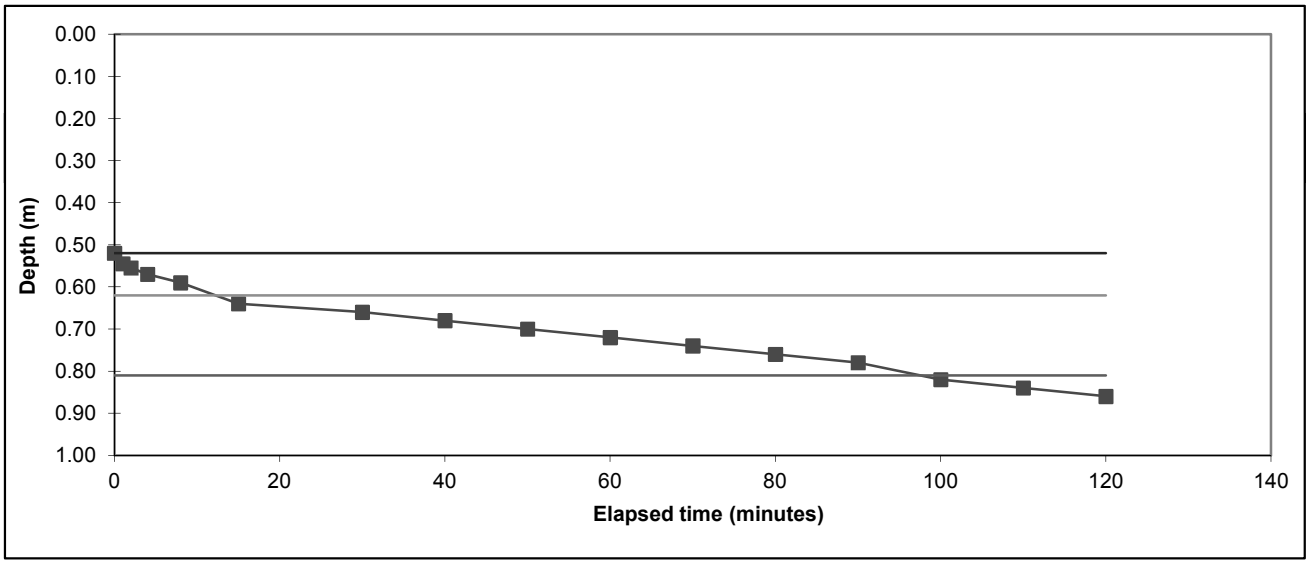
Stability: Good.

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP02/SA02	Test No:	1	Date:	19/09/2015
Length (m):	2.200		Datum Height:	0.00	m agl
Width (m):	0.70		Granular infill:	None	
Depth (m):	0.90		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.520	110	0.840
1	0.545	120	0.860
2	0.555		
4	0.570		
8	0.590		
15	0.640		
30	0.660		
40	0.680		
50	0.700		
60	0.720		
70	0.740		
80	0.760		
90	0.780		
100	0.820		



Start water depth for analysis (mbgl):	0.52		
75% effective depth (mbgl):	0.62	Elapsed time (mins):	12.2
50% effective depth (mbgl):	0.71		
25% effective depth (mbgl):	0.81	Elapsed time (mins):	97.5
Base of soakage zone (mbgl):	0.90		

Volume outflow between 75% and 25% effective depth (m^3):	0.293
Mean surface area of outflow (m^2):	2.64
(side area at 50% effective depth + base area)	
Time for outflow between 75% and 25% effective depth (mins):	85.3

Soil infiltration rate (m/s):	**2.2E-5**

Remarks Results processed following BRE 365 (2007).

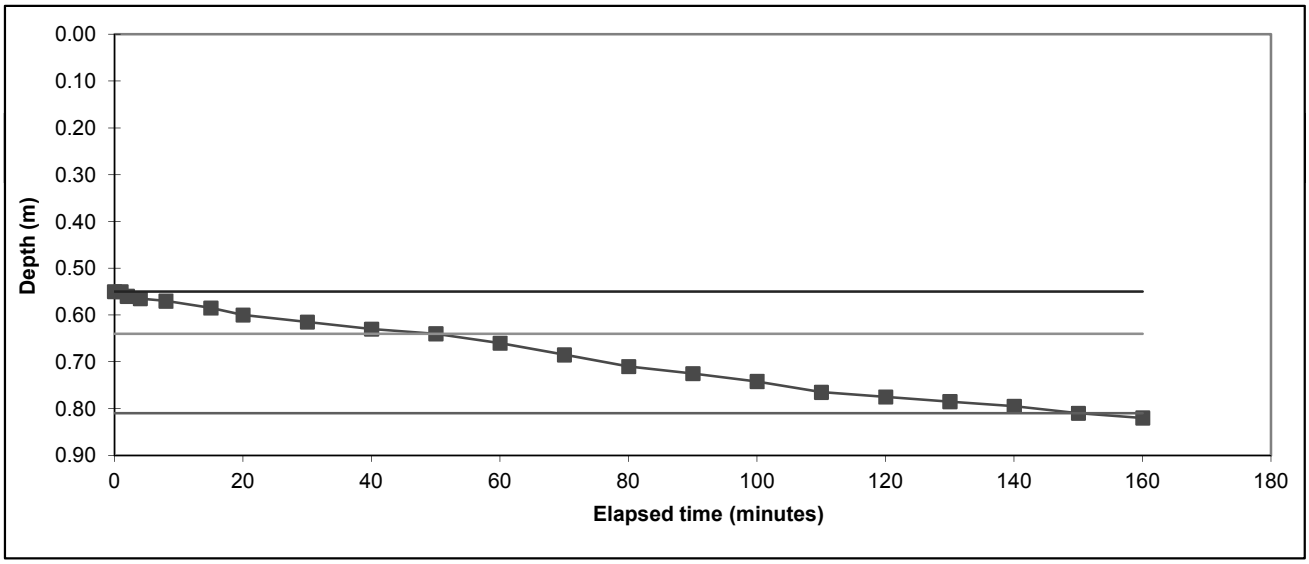
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP02/SA02	Test No:	2	Date:	19/09/2015
Length (m):	2.200		Datum Height:	0.00	m agl
Width (m):	0.70		Granular infill:	None	
Depth (m):	0.90		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.550	100	0.742
1	0.550	110	0.765
2	0.560	120	0.775
4	0.565	130	0.785
8	0.570	140	0.795
15	0.585	150	0.810
20	0.600	160	0.820
30	0.615		
40	0.630		
50	0.640		
60	0.660		
70	0.685		
80	0.710		
90	0.725		



Start water depth for analysis (mbgl):	0.55		
75% effective depth (mbgl):	0.64	Elapsed time (mins):	50.0
50% effective depth (mbgl):	0.73		
25% effective depth (mbgl):	0.81	Elapsed time (mins):	150.0
Base of soakage zone (mbgl):	0.90		

Volume outflow between 75% and 25% effective depth (m^3):	0.262
Mean surface area of outflow (m^2): (side area at 50% effective depth + base area)	2.53
Time for outflow between 75% and 25% effective depth (mins):	100.0

Soil infiltration rate (m/s):	**1.7E-5**

Remarks Results processed following BRE 365 (2007).

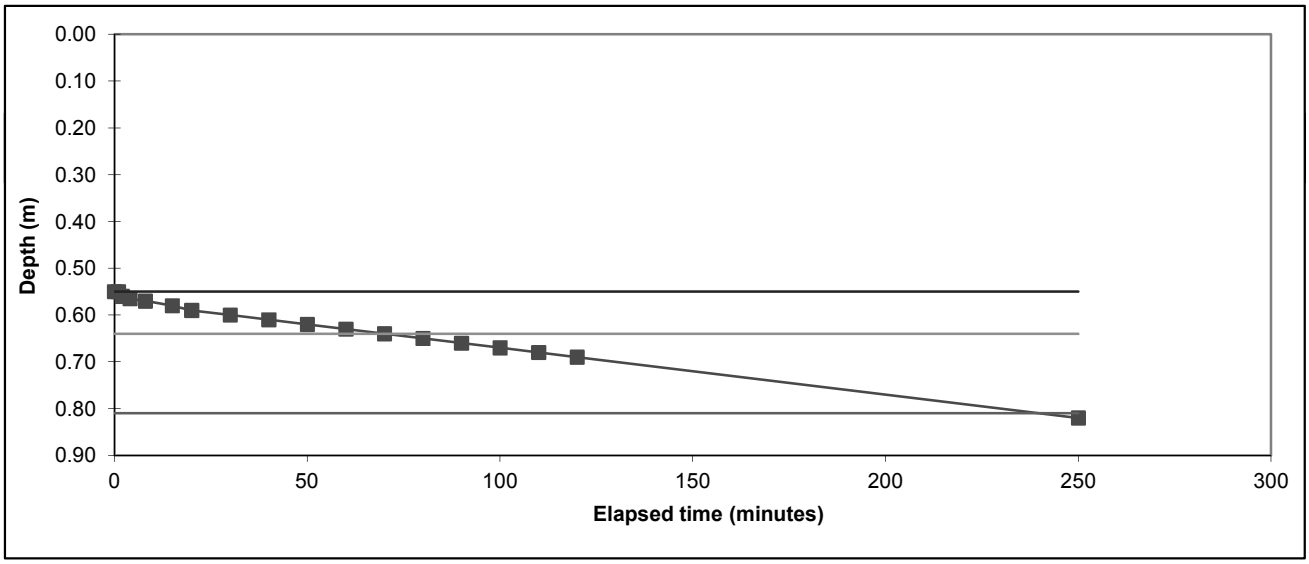
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP03/SA03	Test No:	1	Date:	19/09/2015
Length (m):	1.750		Datum Height:	0.00	m agl
Width (m):	0.60		Granular infill:	None	
Depth (m):	0.90		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.550	100	0.670
1	0.550	110	0.680
2	0.560	120	0.690
4	0.565	*250*	*0.820*
8	0.570		
15	0.580		
20	0.590		
30	0.600		
40	0.610		
50	0.620		
60	0.630		
70	0.640		
80	0.650		
90	0.660		



Start water depth for analysis (mbgl):	0.55		
75% effective depth (mbgl):	0.64	Elapsed time (mins):	70.0
50% effective depth (mbgl):	0.73		
25% effective depth (mbgl):	0.81	Elapsed time (mins):	240.0
Base of soakage zone (mbgl):	0.90		

Volume outflow between 75% and 25% effective depth (m^3):	0.179
Mean surface area of outflow (m^2):	1.85
(side area at 50% effective depth + base area)	
Time for outflow between 75% and 25% effective depth (mins):	170.0

Soil infiltration rate (m/s):	**9.5E-6**

Remarks Results processed following BRE 365 (2007).
Figures in italics are extrapolated using linear progression.

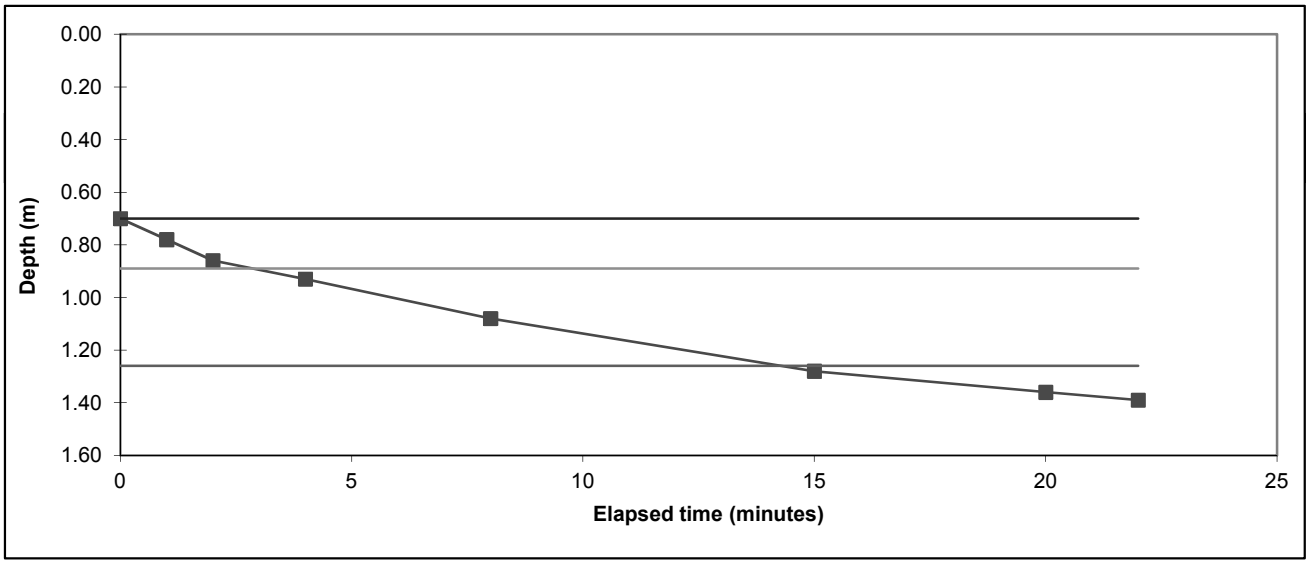
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP04/SA04	Test No:	1	Date:	19/09/2015
Length (m):	1.800		Datum Height:	0.00	m agl
Width (m):	0.70		Granular infill:	None	
Depth (m):	1.45		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.700		
1	0.780		
2	0.860		
4	0.930		
8	1.080		
15	1.280		
20	1.360		
22	1.390		



Start water depth for analysis (mbgl):	0.70		
75% effective depth (mbgl):	0.89	Elapsed time (mins):	2.9
50% effective depth (mbgl):	1.08		
25% effective depth (mbgl):	1.26	Elapsed time (mins):	14.3
Base of soakage zone (mbgl):	1.45		
Volume outflow between 75% and 25% effective depth (m^3):		0.466	
Mean surface area of outflow (m^2):		3.11	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):		11.4	

Soil infiltration rate (m/s):	**2.2E-4**

Remarks Results processed following BRE 365 (2007).

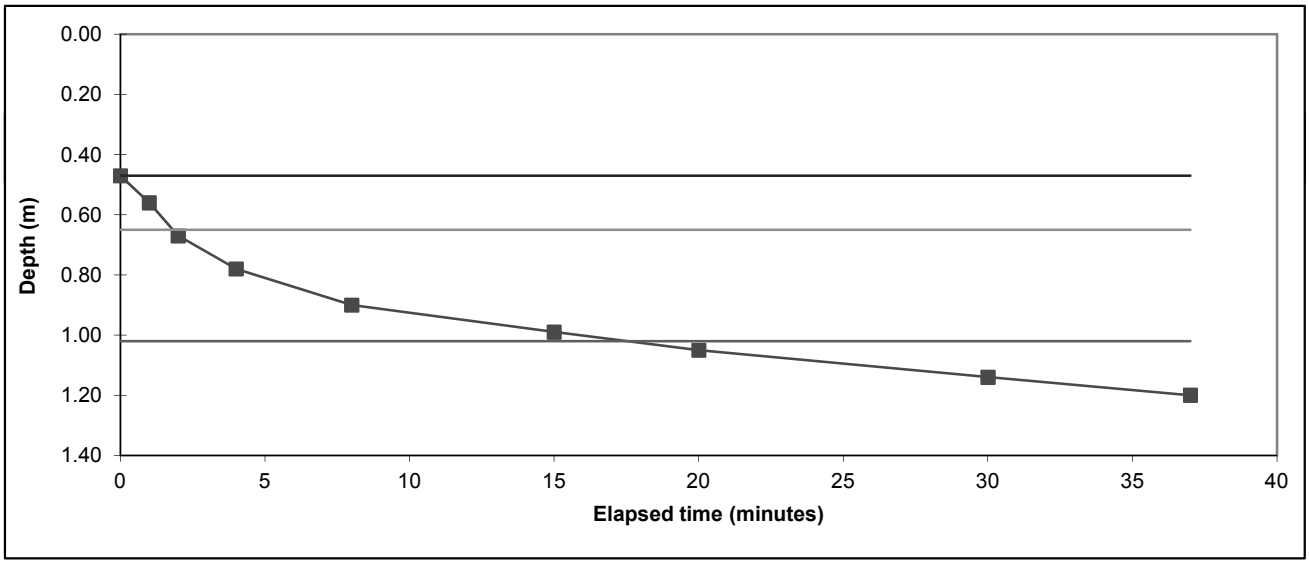
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP05/SA05	Test No:	1	Date:	20/09/2015
Length (m):	1.580		Datum Height:	0.00	m agl
Width (m):	0.70		Granular infill:	None	
Depth (m):	1.20		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.470		
1	0.560		
2	0.670		
4	0.780		
8	0.900		
15	0.990		
20	1.050		
30	1.140		
37	1.200		



Start water depth for analysis (mbgl):	0.47		
75% effective depth (mbgl):	0.65	Elapsed time (mins):	1.8
50% effective depth (mbgl):	0.84		
25% effective depth (mbgl):	1.02	Elapsed time (mins):	17.5
Base of soakage zone (mbgl):	1.20		
Volume outflow between 75% and 25% effective depth (m^3):		0.409	
Mean surface area of outflow (m^2):		2.75	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):		15.7	

Soil infiltration rate (m/s):	**1.6E-4**

Remarks Results processed following BRE 365 (2007).

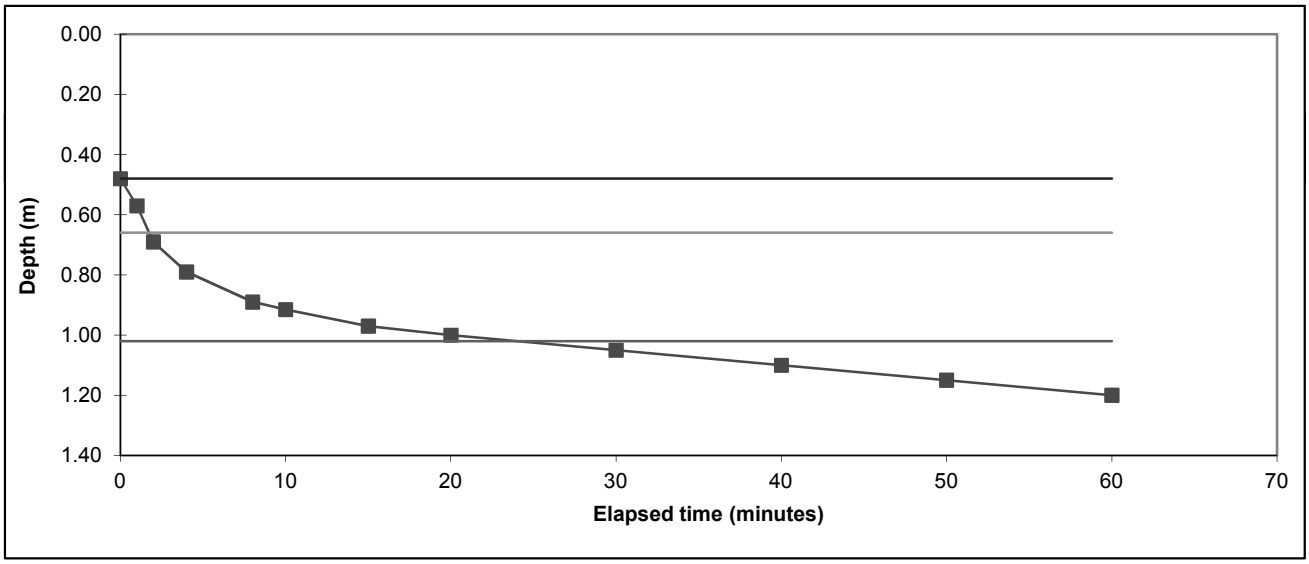
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP05/SA05	Test No:	2	Date:	20/09/2015
Length (m):	1.580		Datum Height:	0.00	m agl
Width (m):	0.70		Granular infill:	None	
Depth (m):	1.20		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.480		
1	0.570		
2	0.690		
4	0.790		
8	0.890		
10	0.915		
15	0.970		
20	1.000		
30	1.050		
40	1.100		
50	1.150		
60	1.200		



Start water depth for analysis (mbgl):	0.48		
75% effective depth (mbgl):	0.66	Elapsed time (mins):	1.8
50% effective depth (mbgl):	0.84		
25% effective depth (mbgl):	1.02	Elapsed time (mins):	24.0
Base of soakage zone (mbgl):	1.20		
Volume outflow between 75% and 25% effective depth (m^3):		0.398	
Mean surface area of outflow (m^2):		2.75	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):		22.2	

Soil infiltration rate (m/s):	**1.1E-4**

Remarks Results processed following BRE 365 (2007).

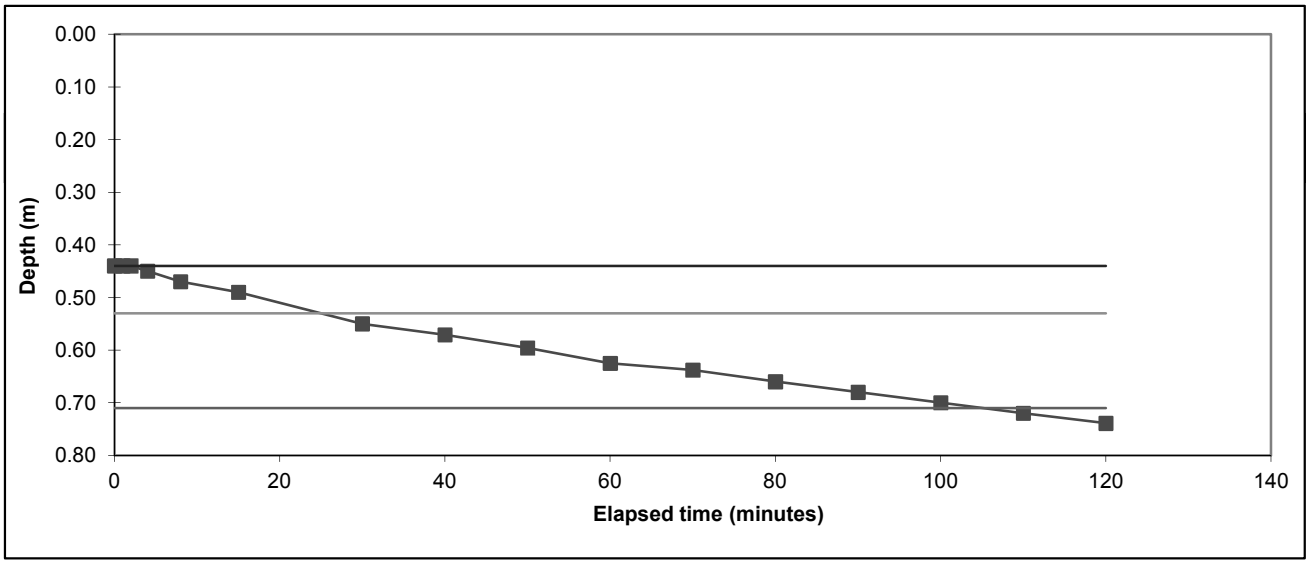
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP06/SA06	Test No:	1	Date:	20/09/2015
Length (m):	2.000		Datum Height:	0.00	m agl
Width (m):	0.70		Granular infill:	None	
Depth (m):	0.80		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.440	110	0.720
1	0.440	120	0.739
2	0.440		
4	0.450		
8	0.470		
15	0.490		
30	0.550		
40	0.571		
50	0.596		
60	0.625		
70	0.638		
80	0.660		
90	0.680		
100	0.700		



Start water depth for analysis (mbgl):	0.44		
75% effective depth (mbgl):	0.53	Elapsed time (mins):	25.0
50% effective depth (mbgl):	0.62		
25% effective depth (mbgl):	0.71	Elapsed time (mins):	105.0
Base of soakage zone (mbgl):	0.80		
Volume outflow between 75% and 25% effective depth (m^3):		0.252	
Mean surface area of outflow (m^2):		2.37	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):		80.0	

Soil infiltration rate (m/s):	**2.2E-5**

Remarks Results processed following BRE 365 (2007).

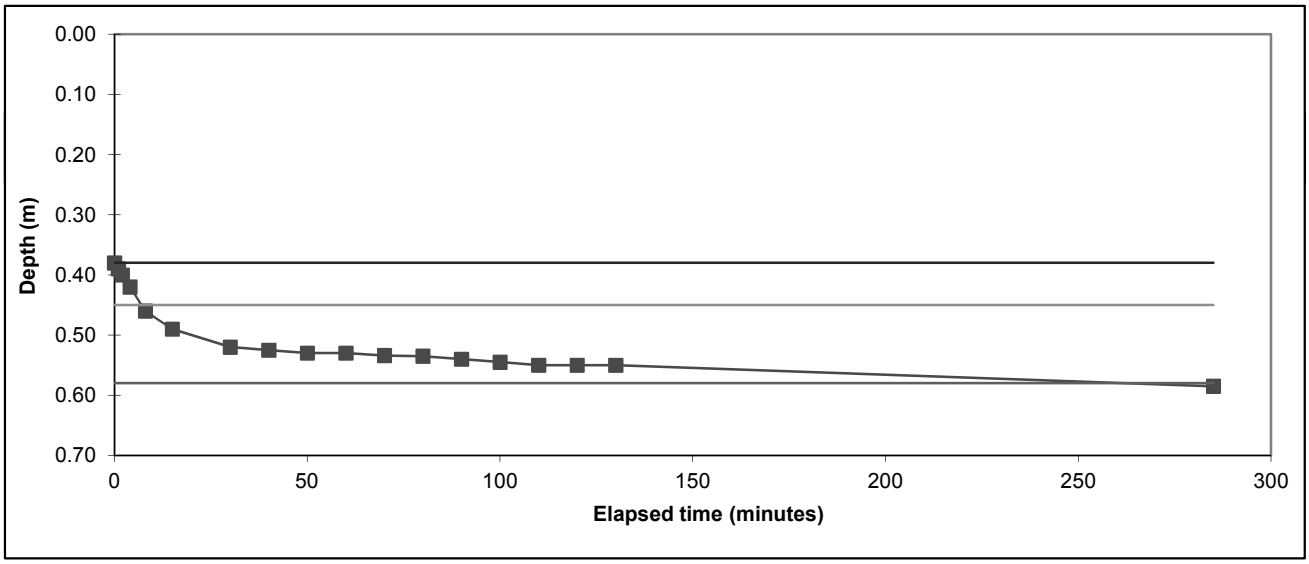
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP07/SA07	Test No:	1	Date:	20/09/2015
Length (m):	1.900		Datum Height:	0.00	m agl
Width (m):	0.70		Granular infill:	None	
Depth (m):	0.65		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.380	110	0.550
1	0.390	120	0.550
2	0.400	130	0.550
4	0.420	*285*	*0.585*
8	0.460		
15	0.490		
30	0.520		
40	0.525		
50	0.530		
60	0.530		
70	0.534		
80	0.535		
90	0.540		
100	0.545		



Start water depth for analysis (mbgl):	0.38		
75% effective depth (mbgl):	0.45	Elapsed time (mins):	7.0
50% effective depth (mbgl):	0.52		
25% effective depth (mbgl):	0.58	Elapsed time (mins):	262.9
Base of soakage zone (mbgl):	0.65		

Volume outflow between 75% and 25% effective depth (m^3):	0.173
Mean surface area of outflow (m^2):	2.01
(side area at 50% effective depth + base area)	
Time for outflow between 75% and 25% effective depth (mins):	255.9

Soil infiltration rate (m/s):	**5.6E-6**

Remarks Results processed following BRE 365 (2007).
Figures in italics' are extrapolated using linear progression.

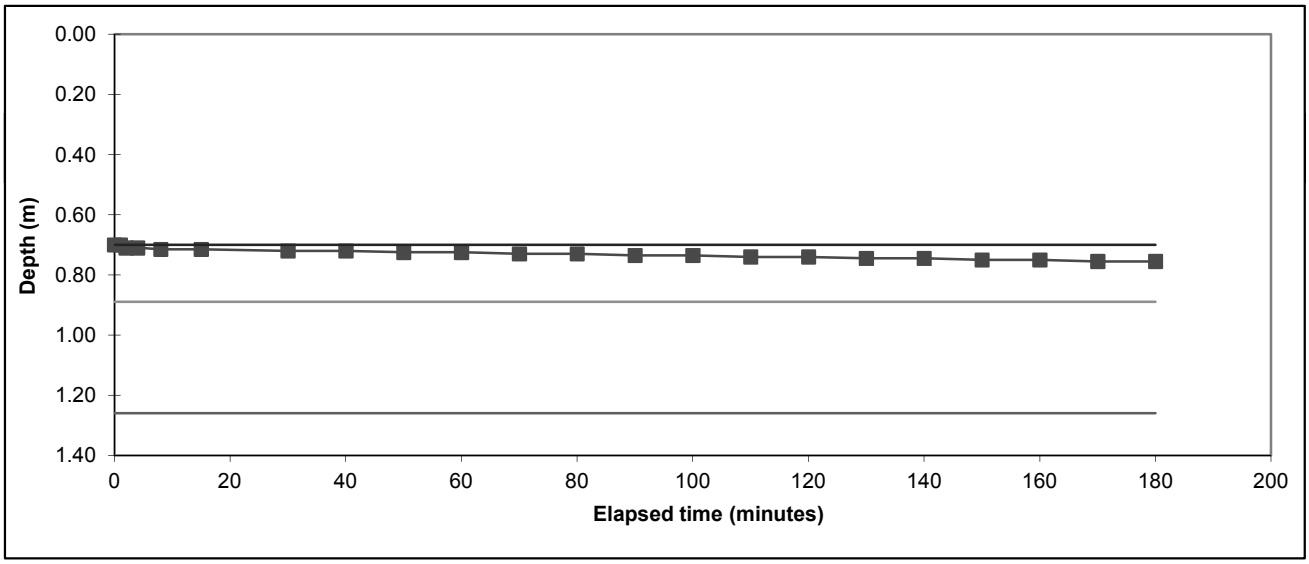
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP08/SA08	Test No:	1	Date:	21/09/2015
Length (m):	1.800		Datum Height:	0.00	m agl
Width (m):	0.60		Granular infill:	None	
Depth (m):	1.45		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.700	110	0.740
1	0.700	120	0.740
2	0.710	130	0.745
4	0.710	140	0.745
8	0.715	150	0.750
15	0.715	160	0.750
30	0.720	170	0.755
40	0.720	180	0.755
50	0.725		
60	0.725		
70	0.730		
80	0.730		
90	0.735		
100	0.735		



Start water depth for analysis (mbgl):	0.70		
75% effective depth (mbgl):	0.89	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	1.08		
25% effective depth (mbgl):	1.26	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.45		
Volume outflow between 75% and 25% effective depth (m^3):			
Mean surface area of outflow (m^2):			2.86
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			

Soil infiltration rate (m/s):	**Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.**

Remarks Results processed following BRE 365 (2007).

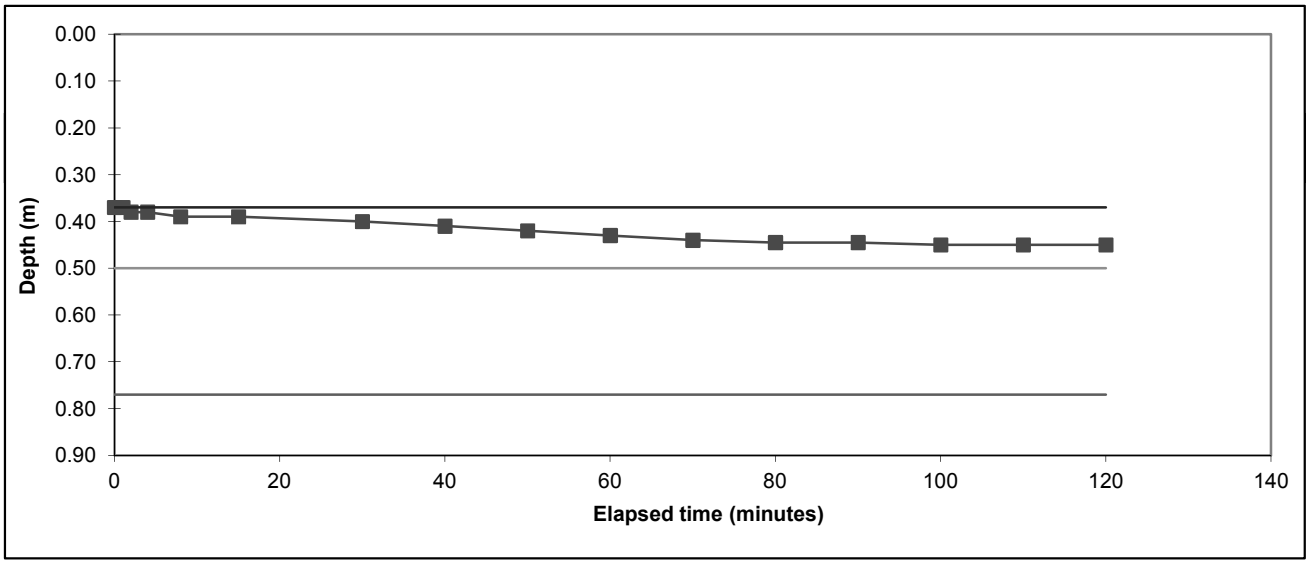
Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP09/SA09	Test No:	1	Date:	21/09/2015
Length (m):	1.500		Datum Height:	0.00	m agl
Width (m):	0.60		Granular infill:	None	
Depth (m):	0.90		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.370	110	0.450
1	0.370	120	0.450
2	0.380		
4	0.380		
8	0.390		
15	0.390		
30	0.400		
40	0.410		
50	0.420		
60	0.430		
70	0.440		
80	0.445		
90	0.445		
100	0.450		



Start water depth for analysis (mbgl):	0.37		
75% effective depth (mbgl):	0.50	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	0.64		
25% effective depth (mbgl):	0.77	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	0.90		
Volume outflow between 75% and 25% effective depth (m^3):			
Mean surface area of outflow (m^2):			1.99
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			

Soil infiltration rate (m/s):	**Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.**

Remarks Results processed following BRE 365 (2007).

Client:	A.H.R Building Consultancy Ltd	**Job No:**
Site:	Moor End Academy, Huddersfield, HD4 5JA	J2680/14/E

APPENDIX 5

HAND DUG PITS

J2380/14/E Moor End Academy, Dryclough Road, Huddersfield, HD4 5JA

Geo-environmental Soil Samples

Sample	Depth (m)	Description	Date
GE01	0.4	Silty, gravelly sand.	20/9/2015
GE02	0.4	Silty, gravelly sand.	20/9/2015
GE03	0.4	Silty, gravelly sand.	20/9/2015
GE04	0.4	Silty, gravelly sand.	20/9/2015
GE05	0.4	Silty, gravelly sand.	20/9/2015
GE06	0.4	Silty, gravelly sand.	20/9/2015
GE07	0.4	Silty, gravelly sand.	20/9/2015
GE08	0.4	Silty, gravelly sand.	20/9/2015
GE09	0.4	Silty, gravelly sand.	20/9/2015
GE10	0.4	Silty, gravelly sand.	20/9/2015
GE11	0.4	Silty, gravelly sand.	20/9/2015
GE12	0.4	Silty, gravelly sand.	20/9/2015
GE13	0.4	Silty, gravelly sand.	20/9/2015
GE14	0.4	Silty, gravelly sand.	20/9/2015
GE15	0.4	Silty, gravelly sand.	20/9/2015
GE16	0.4	Silty, gravelly sand.	20/9/2015
GE17	0.4	Silty, gravelly sand.	20/9/2015
GE18	0.4	Silty, gravelly sand.	20/9/2015
GE19	0.4	Silty, gravelly sand.	20/9/2015
GE20	0.4	Silty, gravelly sand.	20/9/2015
TP01a	0.4	Silty, gravelly sand.	20/9/2015

APPENDIX 6

LABORATORY TESTING – GEOTECHNICAL

Rogers Geotechnical Services Ltd
Offices 1&2 Barncliffe Business Park,
Near Bank, Shelley
Huddersfield
HD8 8LU
www.rogersgeotech.co.uk
Tel : 0843 5066687 **Fax : 0843 5159930**

Job No:	
J2680/14/E	
Site: Moor End Acadamy.	Client: AHR Building Consultants
Date: 12.10.15	Sheet: 1

Determination of Moisture Content, Liquid and Plastic Limits

BS. 1377 : PART 2 : 1990 : 3.2, 4 and 5

borehole/ trial pit no.	sample no.	sample depth (m)	moisture content (%)	sample prep.	test method	fraction >0.425mm (%)	liquid limit (%)	plastic limit (%)	plasticity index (%)	description/remarks
WS03	C1	0.60	A	11						MADE GROUND (Clayey gravelly SAND).
WS05	C1	0.75	A	12						MADE GROUND (Clayey gravelly SAND).
WS05	C2	1.45	A	21						MADE GROUND (Clayey gravelly SAND).
WS07	C1	0.70	A	13	Y	35	28	20	8	MADE GROUND (Slightly clayey gravelly SAND).
WS09	C1	0.75	A	11	Y	29	16	12	4	MADE GROUND (Slightly clayey gravelly SAND).
WS09	C2	1.35	A	11	Y	29	21	12	9	MADE GROUND (Slightly clayey gravelly SAND).
WS12	C1	1.00	A	14						MADE GROUND (Clayey gravelly SAND).
WS12	C2	1.80	A	18						MADE GROUND (Clayey gravelly SAND).
WS12	C3	2.75	A	27						MADE GROUND (Clayey gravelly SAND).
WS16	C1	0.50	A	27	Y	31	33	21	12	MADE GROUND (Clayey gravelly SAND).
WS17	C1	0.60	A	21						MADE GROUND (Clayey gravelly SAND).

remarks:

notes: moisture content undertaken in accordance with BS1377 : Part 2 : 1990 : 3.2 (unless specified)

sample preparation:

A - as recieved
B - washed on 0.425mm sieve
C - air dried
D - oven dried (50°C)
E - not known

test method (liquid limit):

X - cone penetrometer (test 4.3)
Y - one point cone penetrometer (test 4.4)
Z - Casagrande apparatus (test 4.5)

Rogers Geotechnical Services Ltd
Offices 1&2 Barncliffe Business Park,
Near Bank, Shelley
Huddersfield
HD8 8LU
www.rogersgeotech.co.uk
Tel : 0843 5066687 **Fax : 0843 5159930**

Job No:	
J2680/14/E	
Site: Moor End Acadamy.	Client: AHR Building Consultants
Date: 13.10.15	Sheet: 2

Determination of Linear Shrinkage

BS. 1377 : PART 2 : 1990 : 6.5

borehole/ trial pit no.	sample no.	sample depth (m)	sample prep.	fraction >0.425mm (%)	linear shrinkage (%)	description/remarks
WS7	C1	0.70	13	35	95	MADE GROUND (Slightly clayey gravelly SAND).
WS9	C1	0.75	11	29	99	MADE GROUND (Slightly clayey gravelly SAND).
WS9	C2	1.35	11	29	95	MADE GROUND (Slightly clayey gravelly SAND).
WS16	C1	0.50	27	31	94	MADE GROUND (Clayey gravelly SAND).

remarks:

notes:

sample preparation:

A - as recieved
B - washed on 0.425mm sieve
C - air dried
D - not known

Rogers Geotechnical Services Ltd
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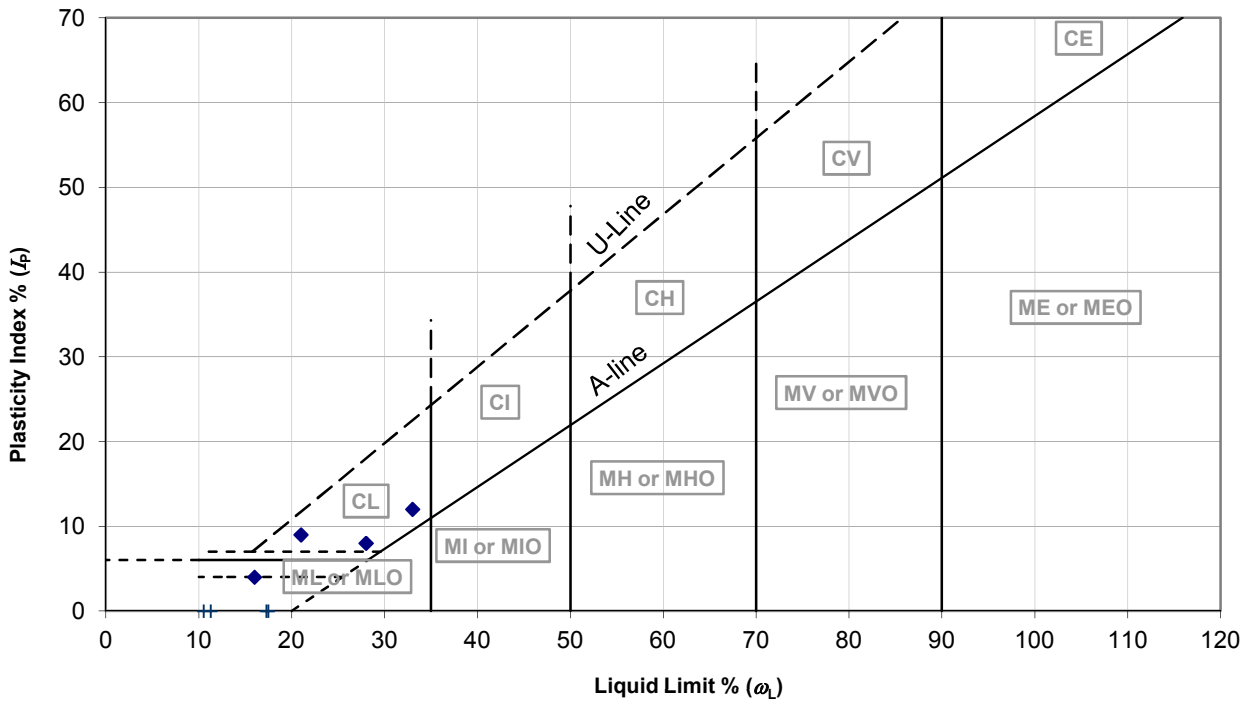
Huddersfield
HD8 8LU
www.rogersgeotech.co.uk
Tel : 0843 5066687 **Fax : 0843 5159930**

Job No:	
J2680/14/E	
Site: Moor End Acadamy.	Client: AHR Building Consultancy
Date: 13.10.15	Sheet: 3

Interpretation of Moisture Content, Liquid and Plastic Limits

Location	Depth (m)	Moisture Content (ω) (%)	Liquid Limit (ω_L) (%)	Plastic Limit (ω_P) (%)	Plasticity Index (I_P) (%)	Retained by 425μm (%)	Modified (ω) (ω') (%)	Modified (I_P) (I_P') (%)	Liquidity/ Consistency (I_L) (%)	Liquidity/ Consistency (I_C) (%)	Casagrande Class	N.H.B.C Class (%)
WS7	0.70	13	28	20	8	35	20	5	-0.9	1.9	C L	*
WS9	0.75	11	16	12	4	29	15	3	-0.3	1.3	C L	*
WS9	1.35	11	21	12	9	29	15	6	-0.1	1.1	C L	*
WS16	0.50	27	33	21	12	31	39	8	0.5	0.5	C L	*

*Clause 4.2 - D5 (b) of the NHBC Standards states that 'shrinkable soils are those...having a modified plasticity index of 10% or greater'



Rogers Geotechnical Services Ltd.

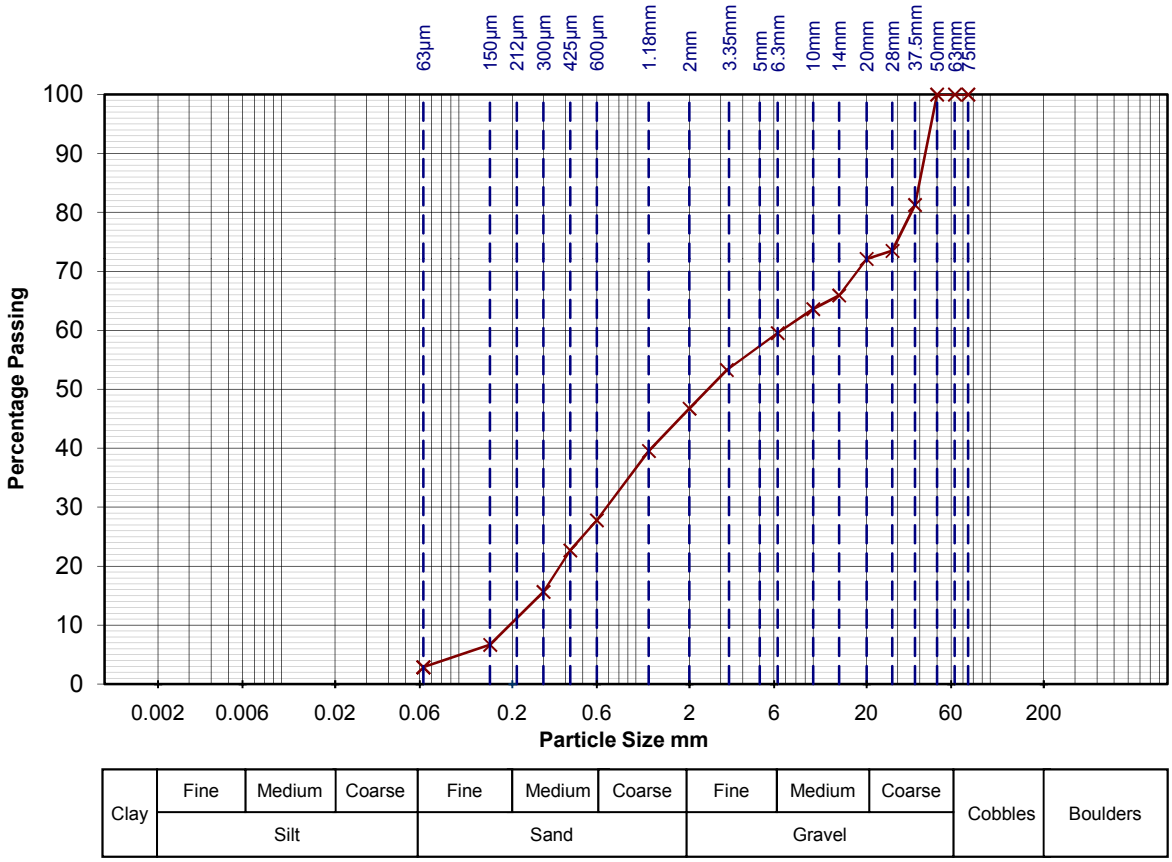
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS01
Sample No. C1
Tested by: CJN **Chkd by:** CJN **Depth:** 0.85-1.00m

Date: 07.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	100.0	81.3	73.5	72.1	65.9	63.6	59.6	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	53.3	46.7	39.5	27.8	22.7	15.6	-	6.7	2.9



DESCRIPTION: SAND & GRAVEL.

Remarks:	Project Number J2680/14/E
	Figure number 4

Rogers Geotechnical Services Ltd.

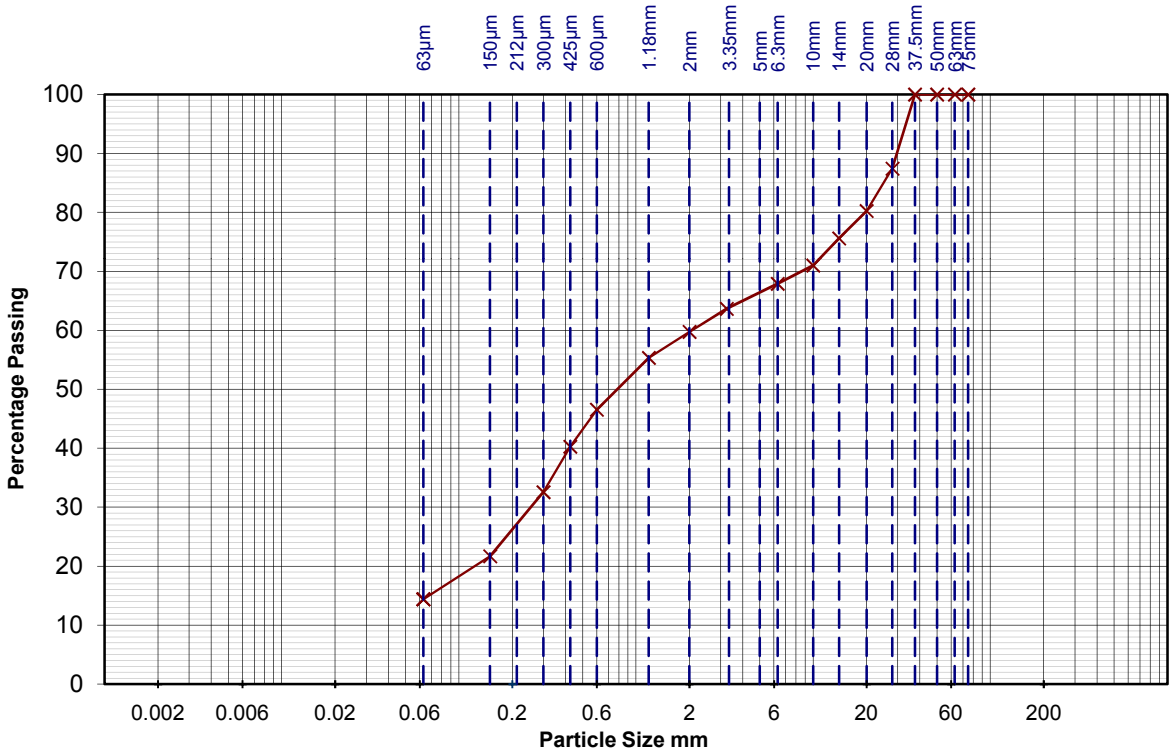
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS02
Sample No. C1
Tested by: GSP **Chkd by:** CJN **Depth:** 0.50-0.70m

Date: 13.10.15 **Date:** 13.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	100.0	100.0	87.4	80.2	75.6	71.0	67.9	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	63.7	59.7	55.3	46.6	40.3	32.6	-	21.7	14.4



DESCRIPTION: Slightly clayey gravelly SAND.

Remarks:	Project Number J2680/14/E
	Figure number 5

Rogers Geotechnical Services Ltd.

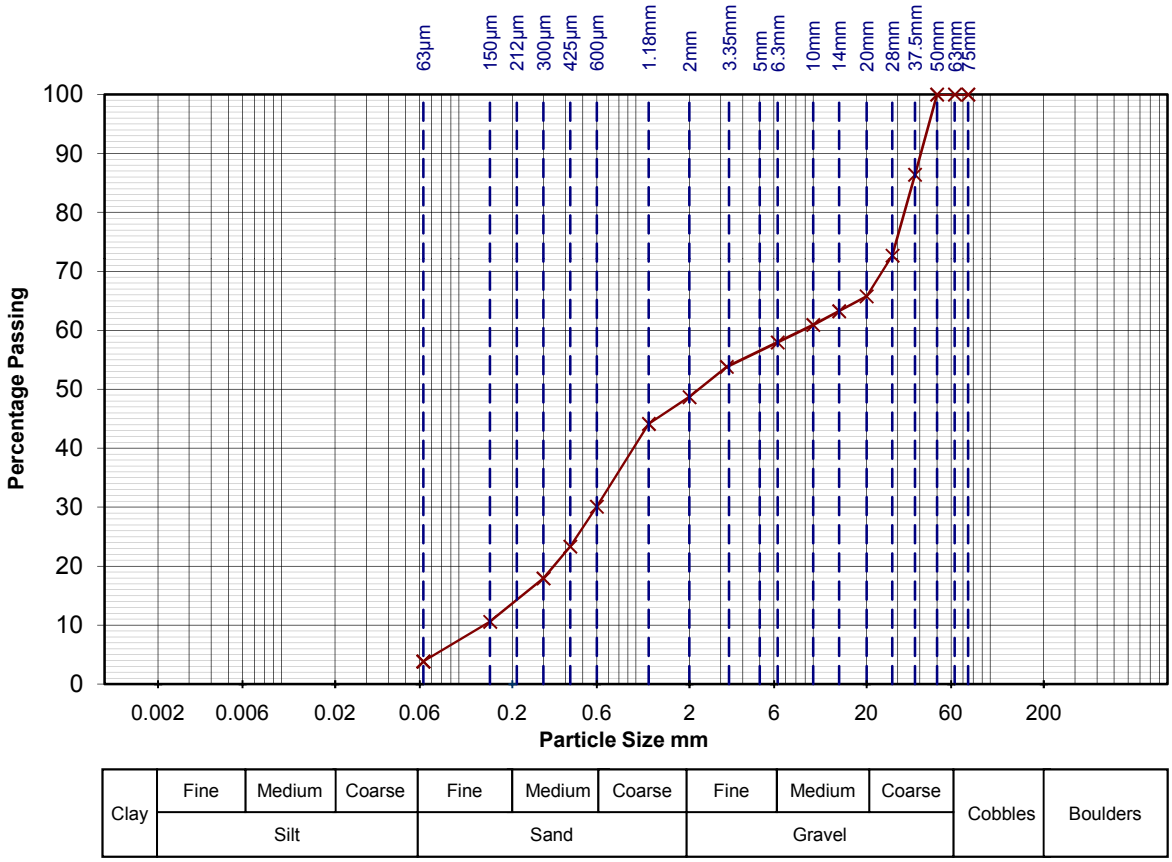
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS08
Sample No. C1
Tested by: GSP **Chkd by:** CJN **Depth:** 0.60-0.80m

Date: 09.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	100.0	86.4	72.7	65.8	63.2	60.9	58.0	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	53.8	48.7	44.1	30.1	23.3	17.9	-	10.6	3.8



DESCRIPTION: SAND & GRAVEL.

Remarks:	Project Number J2680/14/E
	Figure number 6

Rogers Geotechnical Services Ltd.

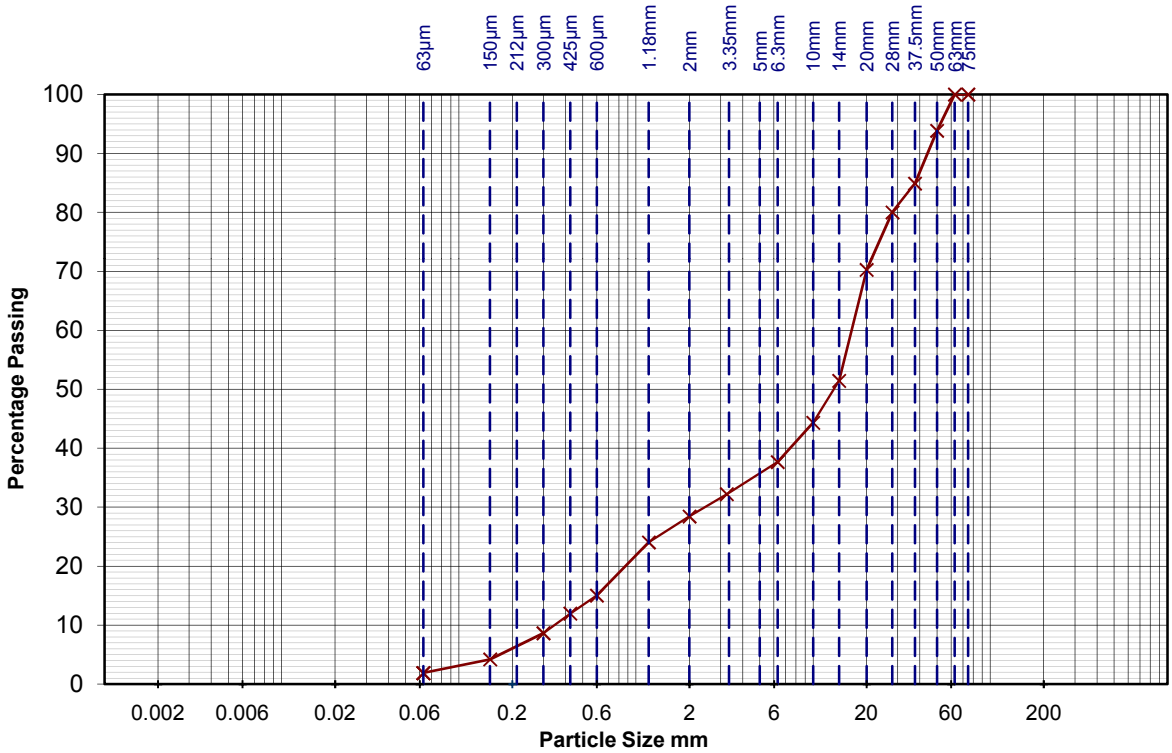
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
Tested by: GSP/TJS **Chkd by:** CJN
Date: 16.10.15 **Date:** 13.10.15

BH/TP No. WS011
Sample No. C1
Depth: 0.50-0.70m

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	93.9	84.9	80.0	70.3	51.4	44.3	37.7	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	32.2	28.4	24.0	15.0	12.0	8.6	-	4.2	1.9



DESCRIPTION: Sandy GRAVEL.

Remarks:	Project Number J2680/14/E
	Figure number 7

Rogers Geotechnical Services Ltd.

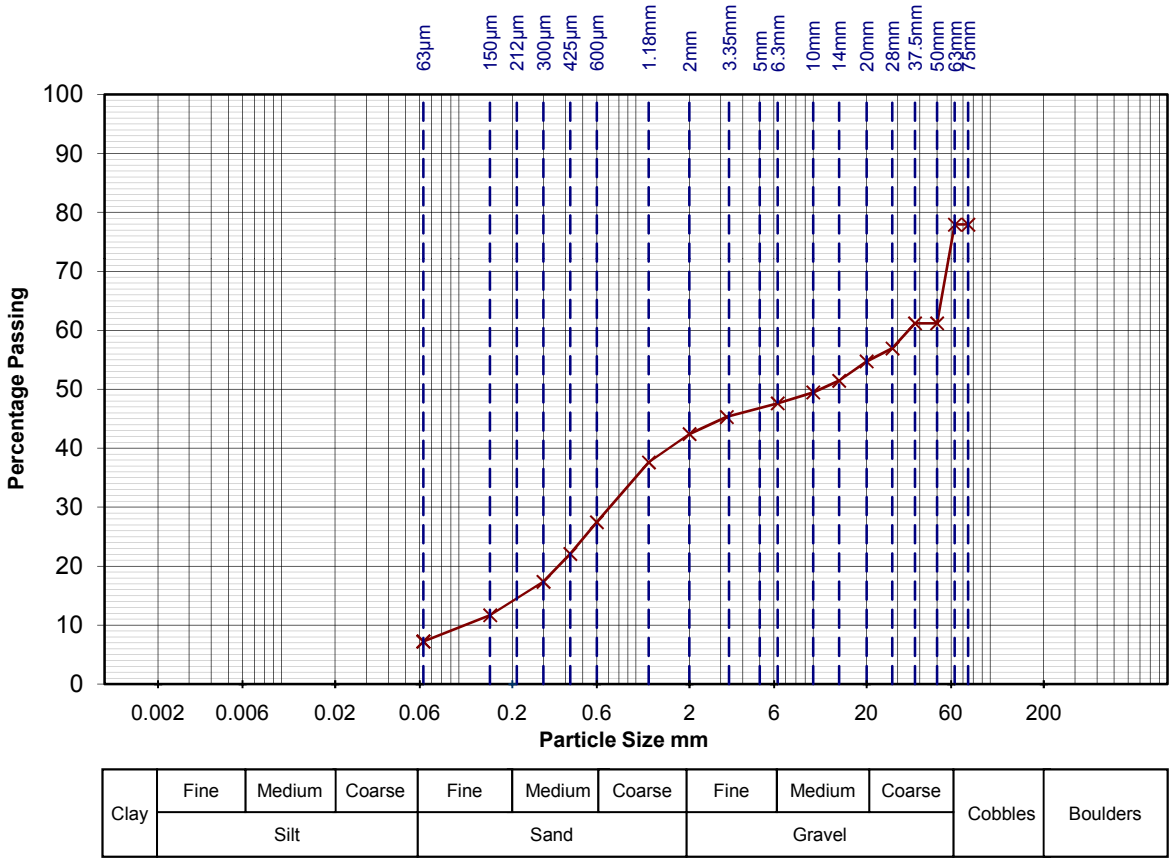
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS12
Sample No. C1
Tested by: CJN **Chkd by:** CJN
Depth: 0.60-0.85m

Date: 07.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	77.9	77.9	61.2	61.2	56.9	54.7	51.5	49.5	47.6	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	45.3	42.4	37.6	27.5	22.1	17.4	-	11.7	7.2



DESCRIPTION: Slightly clayey, silty, SAND and GRAVEL with cobbles.

Remarks:	Project Number
Material retained on the 75mm sieve, possibly comprises cobbles and boulders.	J2680/14/E
	Figure number 8

Rogers Geotechnical Services Ltd.

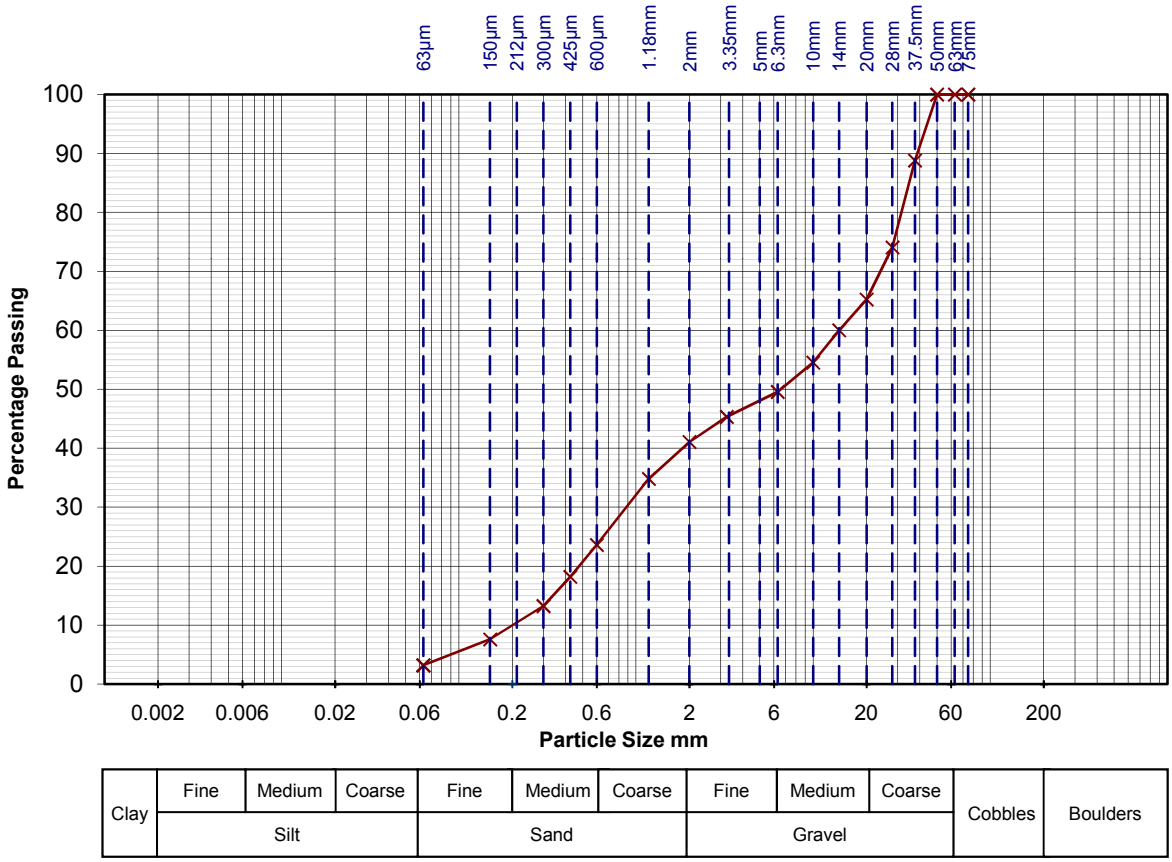
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS12
Sample No. C2
Tested by: CJN **Chkd by:** CJN **Depth:** 1.40-1.60m

Date: 07.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	100.0	88.8	74.1	65.2	60.0	54.5	49.6	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	45.3	41.1	34.8	23.6	18.2	13.2	-	7.6	3.2



DESCRIPTION: Sandy GRAVEL.

Remarks:	Project Number J2680/14/E
	Figure number 9

Rogers Geotechnical Services Ltd.

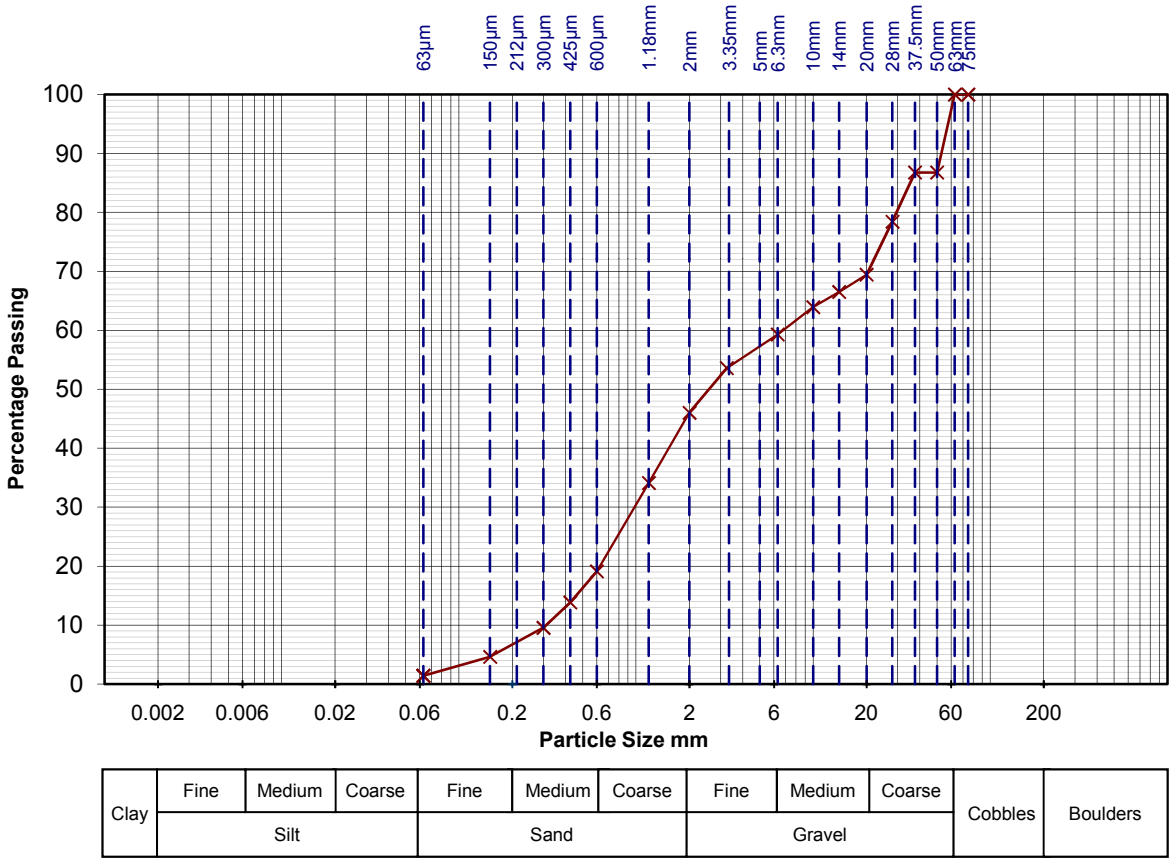
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS13
Sample No. C1
Tested by: GSP **Chkd by:** CJN **Depth:** 0.60-0.80m

Date: 09.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	86.8	86.8	78.4	69.5	66.5	63.9	59.3	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	53.6	46.0	34.1	19.1	13.9	9.6	-	4.6	1.4



DESCRIPTION: Very sandy GRAVEL.

Remarks:	Project Number J2680/14/E
	Figure number 10

Rogers Geotechnical Services Ltd.

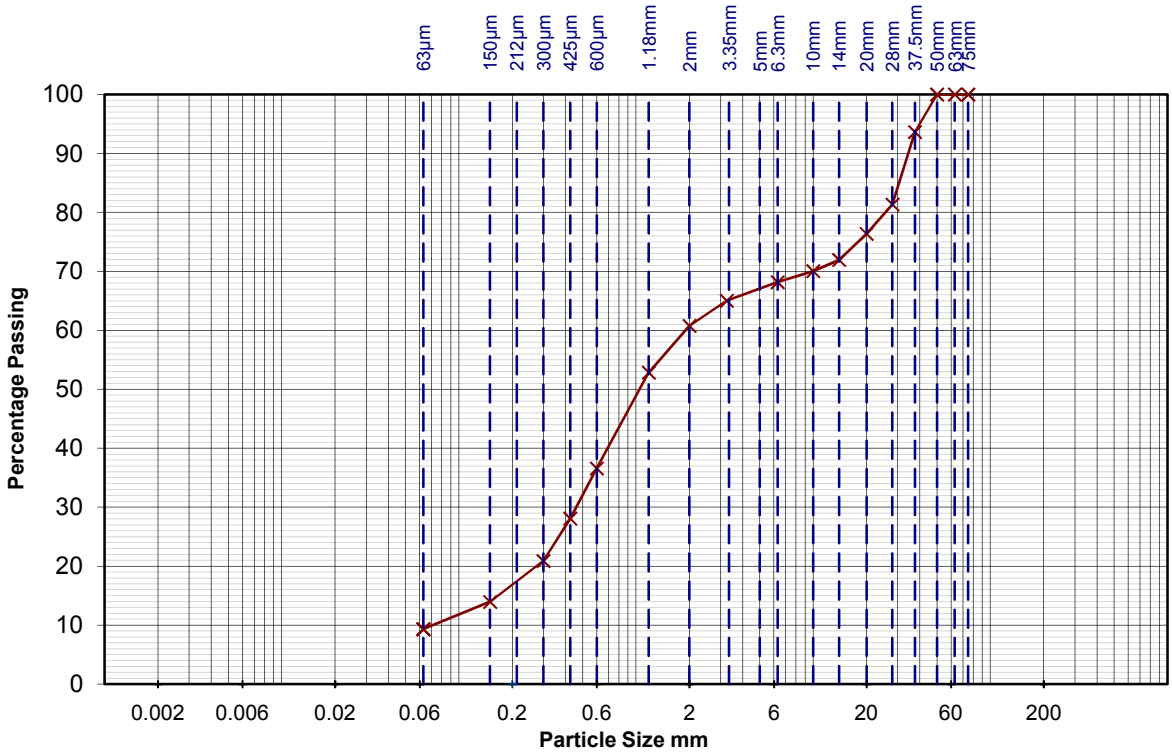
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS16
Sample No. C2
Tested by: CJN **Chkd by:** CJN **Depth:** 1.20-1.30m

Date: 07.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	100.0	93.6	81.3	76.4	72.0	70.1	68.2	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	65.0	60.8	52.8	36.6	28.1	20.9	-	13.9	9.3



DESCRIPTION: Clayey, silty gravelly SAND.

Remarks:	Project Number J2680/14/E
	Figure number 11

Rogers Geotechnical Services Ltd.

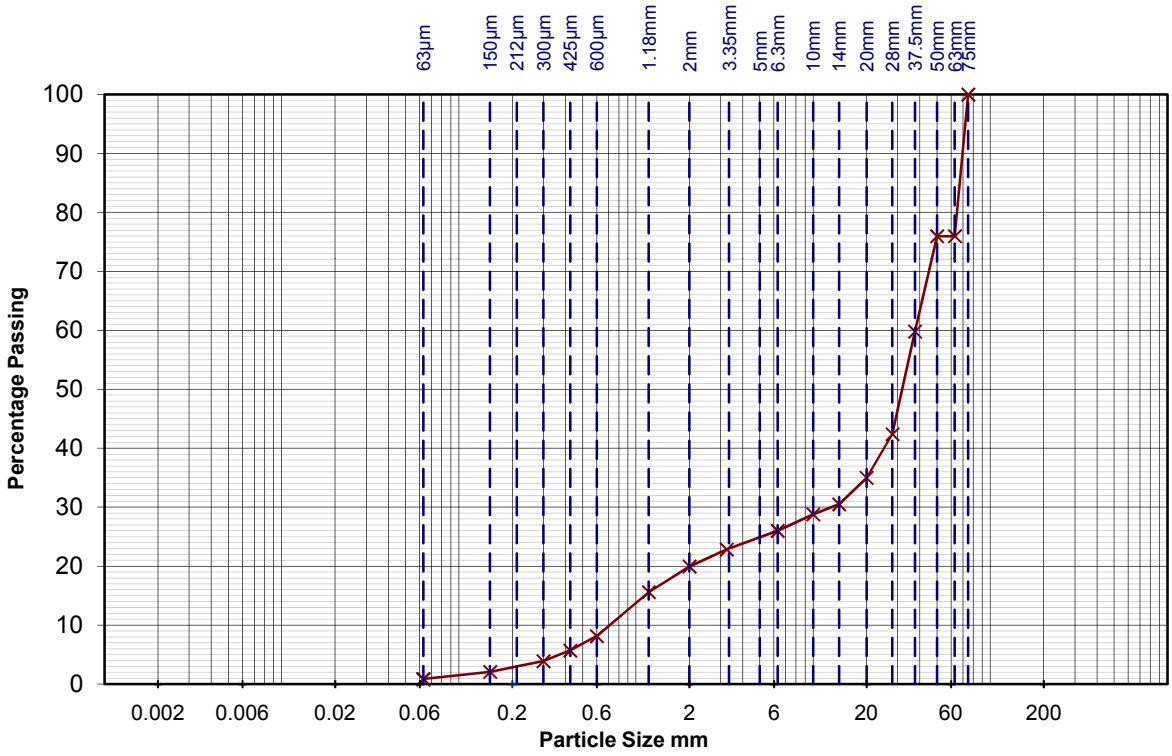
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS17
Sample No.
Tested by: CJN **Chkd by:** CJN
Depth: 0.80-1.55m

Date: 07.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	76.0	76.0	59.8	42.4	35.0	30.5	28.8	26.0	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	22.8	19.9	15.6	8.1	5.7	3.9	-	2.1	0.9



DESCRIPTION: Sandy GRAVEL.

Remarks:	Project Number J2680/14/E
	Figure number 12

Rogers Geotechnical Services Ltd.

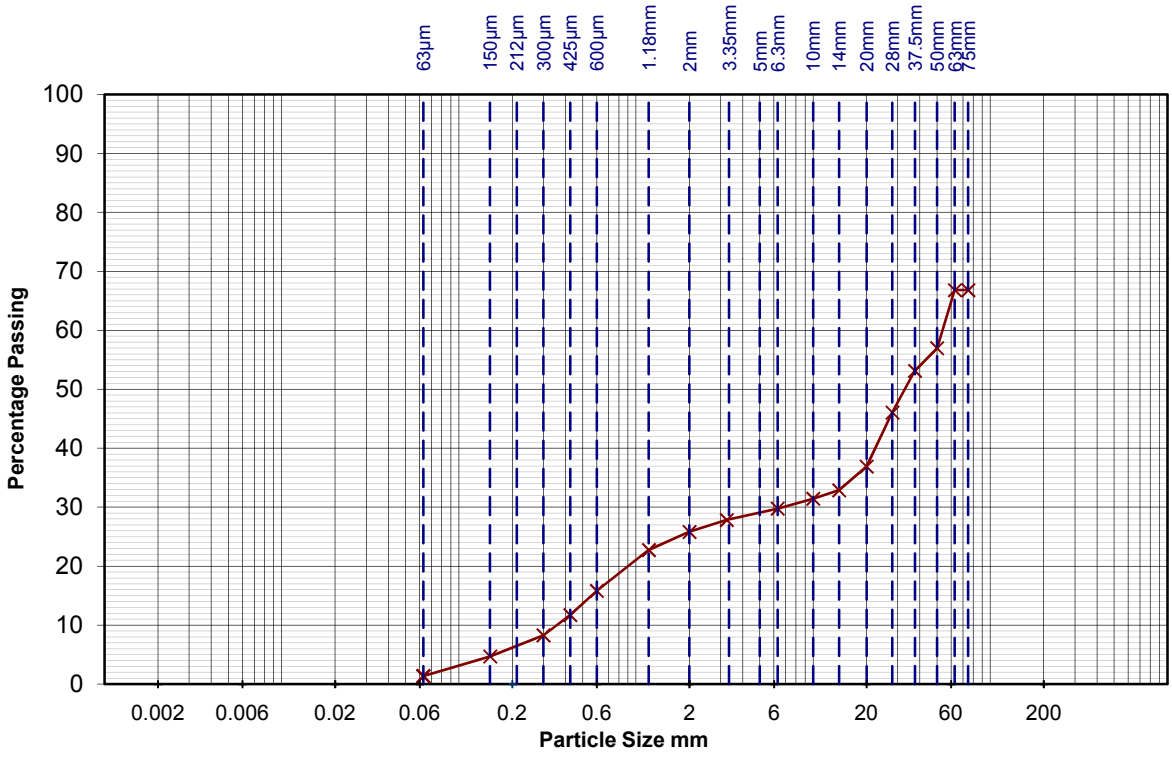
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS18
Sample No. C1
Tested by: GSP **Chkd by:** CJN **Depth:** 0.50-0.70m

Date: 09.10.15 **Date:** 09.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	66.8	66.8	57.0	53.1	46.1	36.9	32.9	31.4	29.8	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	27.8	25.8	22.7	15.8	11.7	8.3	-	4.7	1.4



DESCRIPTION: Sandy GRAVEL and COBBLES.

Remarks:	Project Number
Material retained on the 75mm sieve, possibly comprises cobbles and boulders.	J2680/14/E
	Figure number 13

Rogers Geotechnical Services Ltd.

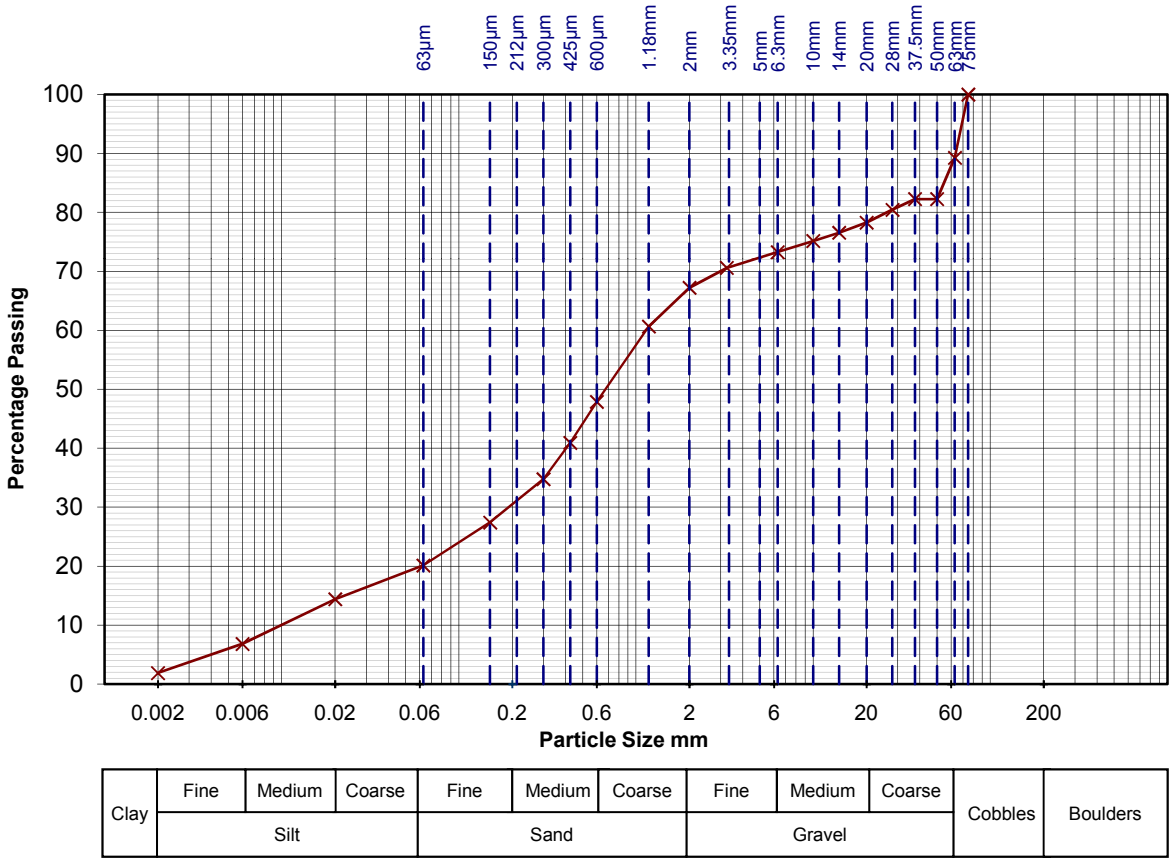
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultancy
Site: Moor End Acadamy.
BH/TP No. WS19
Sample No. C1
Tested by: CJN/GSP **Chkd by:** CJN
Depth: 0.80-1.00m

Date: 14.10.15 **Date:** 14.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	89.3	82.3	82.3	80.4	78.3	76.6	75.2	73.3	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	70.6	67.2	60.7	47.9	40.9	34.8	-	27.4	20.1



DESCRIPTION: Slightly clayey, silty, gravelly SAND.

Remarks:	Contract Number J2680/14/E
Test by Wet Sieve in accordance with BS 1377 : Part 2 : 1990 : 9.2 / 9.3.	Figure number 14

Rogers Geotechnical Services Ltd.

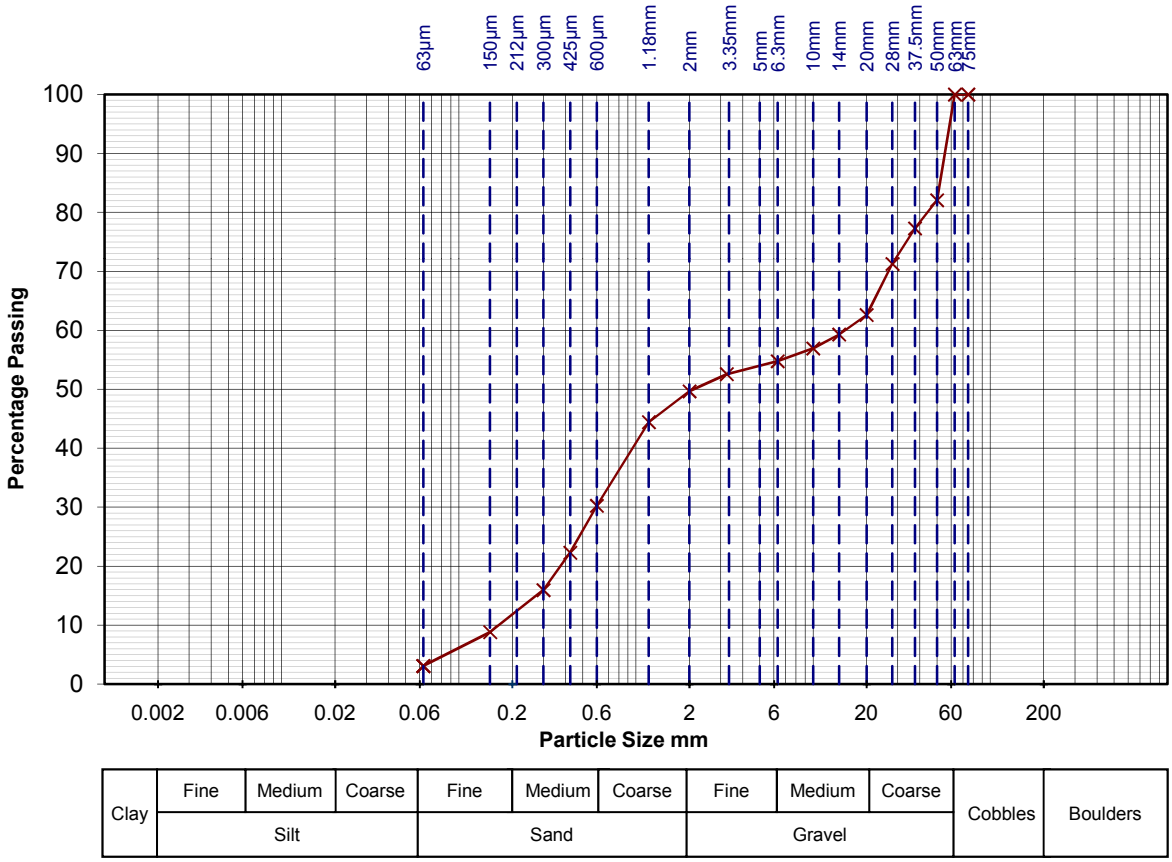
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS20
Sample No. C1
Tested by: GSP **Chkd by:** CJN **Depth:** 0.70-0.90m

Date: 13.10.15 **Date:** 13.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	82.1	77.3	71.3	62.6	59.3	56.9	54.8	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	52.6	49.7	44.4	30.2	22.3	15.9	-	8.8	3.1



DESCRIPTION: SAND & GRAVEL.

Remarks:	Project Number J2680/14/E
	Figure number 15

Rogers Geotechnical Services Ltd.

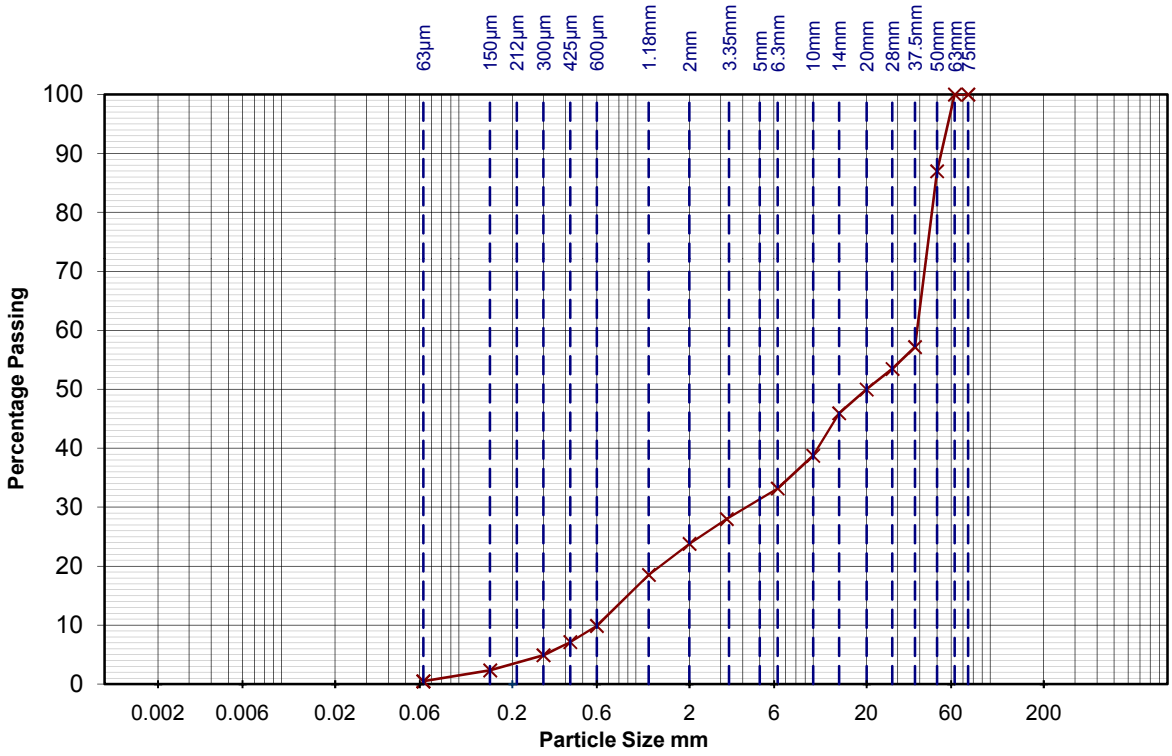
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultancy
Site: Moor End Acadamy.
BH/TP No. WS021
Sample No. C1
Tested by: TJS **Chkd by:** CJN **Depth:** 0.5-0.60m

Date: 16.10.15 **Date:** 16.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	87.0	57.2	53.5	50.0	45.9	38.7	33.2	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	28.0	23.8	18.5	9.9	7.1	4.9	-	2.3	0.5



DESCRIPTION: Sandy GRAVEL

Remarks:	Project Number J2680/14/E
	Figure number 16

Rogers Geotechnical Services Ltd.

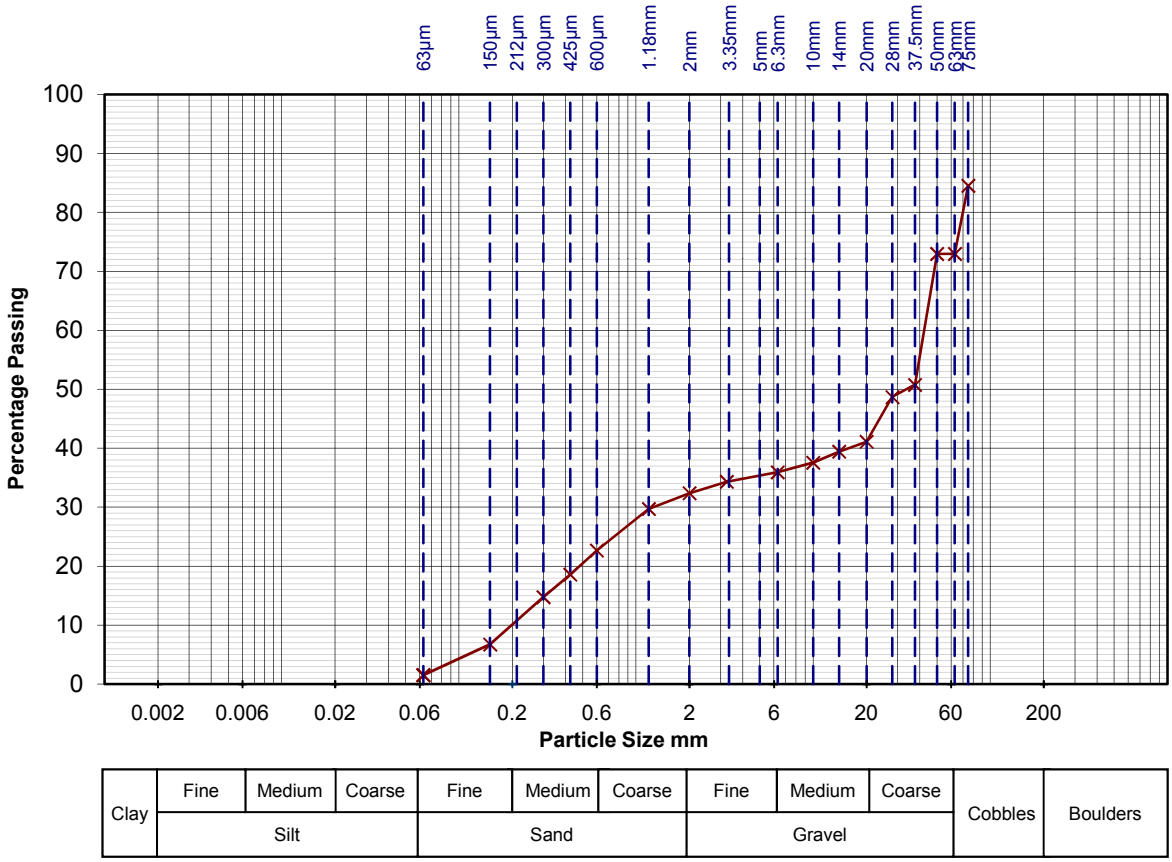
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consulancy
Site: Moor End Acadamy.
BH/TP No. WS22
Sample No. C1
Tested by: GSP **Chkd by:** CJN **Depth:** 0.70-1.00m

Date: 13.10.15 **Date:** 11.06.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	84.5	73.0	73.0	50.8	48.7	41.1	39.4	37.6	35.9	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	34.3	32.4	29.7	22.7	18.6	14.7	-	6.7	1.5



DESCRIPTION: Sandy GRAVEL with cobbles.

Remarks:	Project Number
Material retained on the 75mm sieve, possibly comprises cobbles and boulders.	J2680/14/E
	Figure number 17

Rogers Geotechnical Services Ltd.

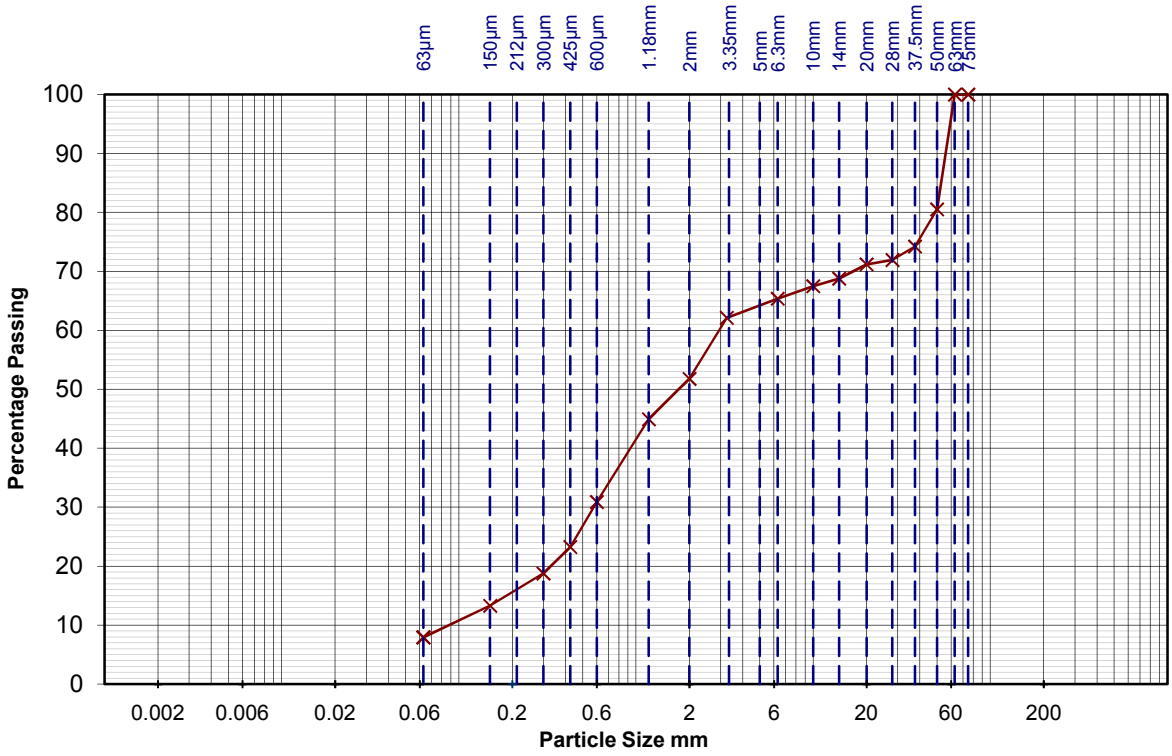
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS23
Sample No. C1
Tested by: CJN **Chkd by:** CJN **Depth:** 0.14-0.70m

Date: 07.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	80.5	74.2	71.9	71.2	68.8	67.5	65.4	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	62.1	51.8	44.9	30.9	23.3	18.8	-	13.3	7.9



DESCRIPTION: Clayey, silty, very sandy GRAVEL

Remarks:	Project Number J2680/14/E
	Figure number 18

Rogers Geotechnical Services Ltd.

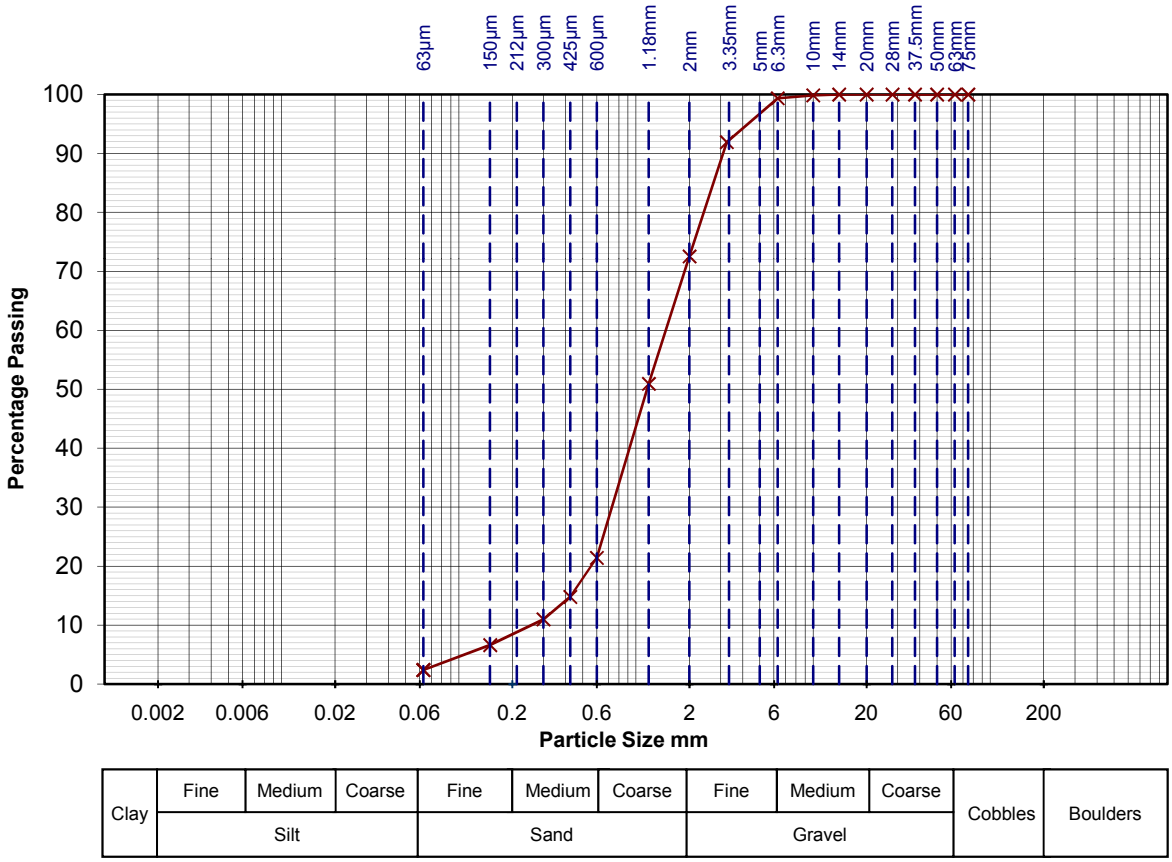
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultants
Site: Moor End Acadamy.
BH/TP No. WS27
Sample No. C2
Tested by: CJN **Chkd by:** CJN
Depth: 1.33 - 1.59m

Date: 07.10.15 **Date:** 07.10.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.4	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	91.9	72.5	50.9	21.4	14.8	11.0	-	6.6	2.4



DESCRIPTION: Gravelly coarse SAND.

Remarks:	Project Number J2680/14/E
	Figure number 19

Rogers Geotechnical Services Ltd.

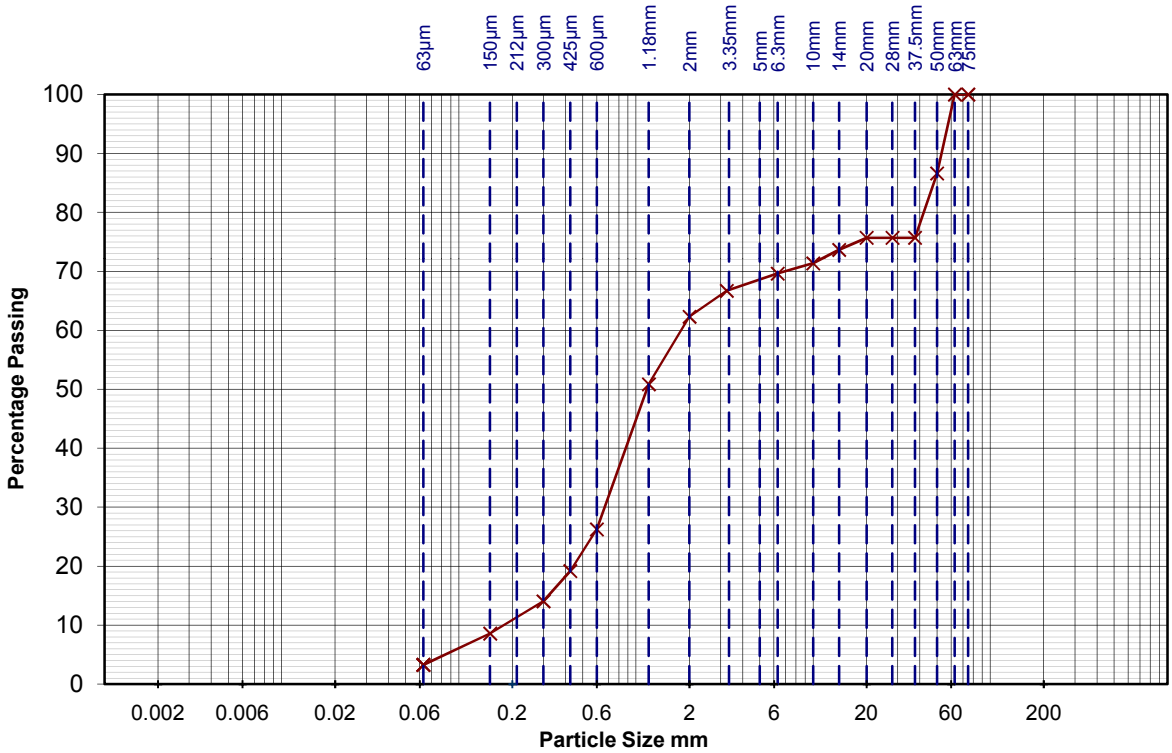
Particle Size Distribution

BS 1377 : Part 2 : 1990 : 9.2 / 9.3

Client: AHR Building Consultancy
Site: Moor End Acadamy.
BH/TP No. WS30
Sample No. C1
Tested by: CJN **Chkd by:** CJN
Depth: 0.70-1.00m

Date: 07.10.15 **Date:** 11.06.15

Sieve Size	75	63	50	37.5	28	20	14	10	6.3	
Percentage Passing	100.0	100.0	86.6	75.7	75.7	75.7	73.7	71.4	69.6	
Sieve Size	5	3.35	2	1.18	0.6	0.425	0.3	0.212	0.15	0.063
Percentage Passing	-	66.7	62.3	50.9	26.3	19.2	14.0	-	8.6	3.3



DESCRIPTION: Gravelly SAND.

Remarks:	Project Number J2680/14/E
	Figure number 20

Rogers Geotechnical Services Ltd.
CALIFORNIA BEARING RATIO
BS.1377 : Part 4 : 1990 : 7

Client: AHR Building Consultants
Site: Moor End Acadamy

Input by : CJN **Chkd by :**

Date: 16.10.15 **Date:**

borehole/ trial pit no.	sample no.	sample depth (m)	sample prep.	gravel >20mm (%)	natural moisture content (%)	bulk density (Mg/m^2)	dry density (Mg/m^2)	CBR top (%)	CBR bottom (%)	descriptions/remarks
Sandstone1	B1	n/a	BN	22	11	2.280	2.050	25	50	Clayey, silty, sandy GRAVEL.

sample preparation :		soaked	CONTRACT	FIGURE
A - undisturbed	D - vibrating plate compaction	Y - yes		
B - dynamic comp. 2.5kg	E - static comp (MDD & OMC)	N - No	J2680/14/E	21
C - dynamic comp. 4.5kg	F - nat. density & m/c			

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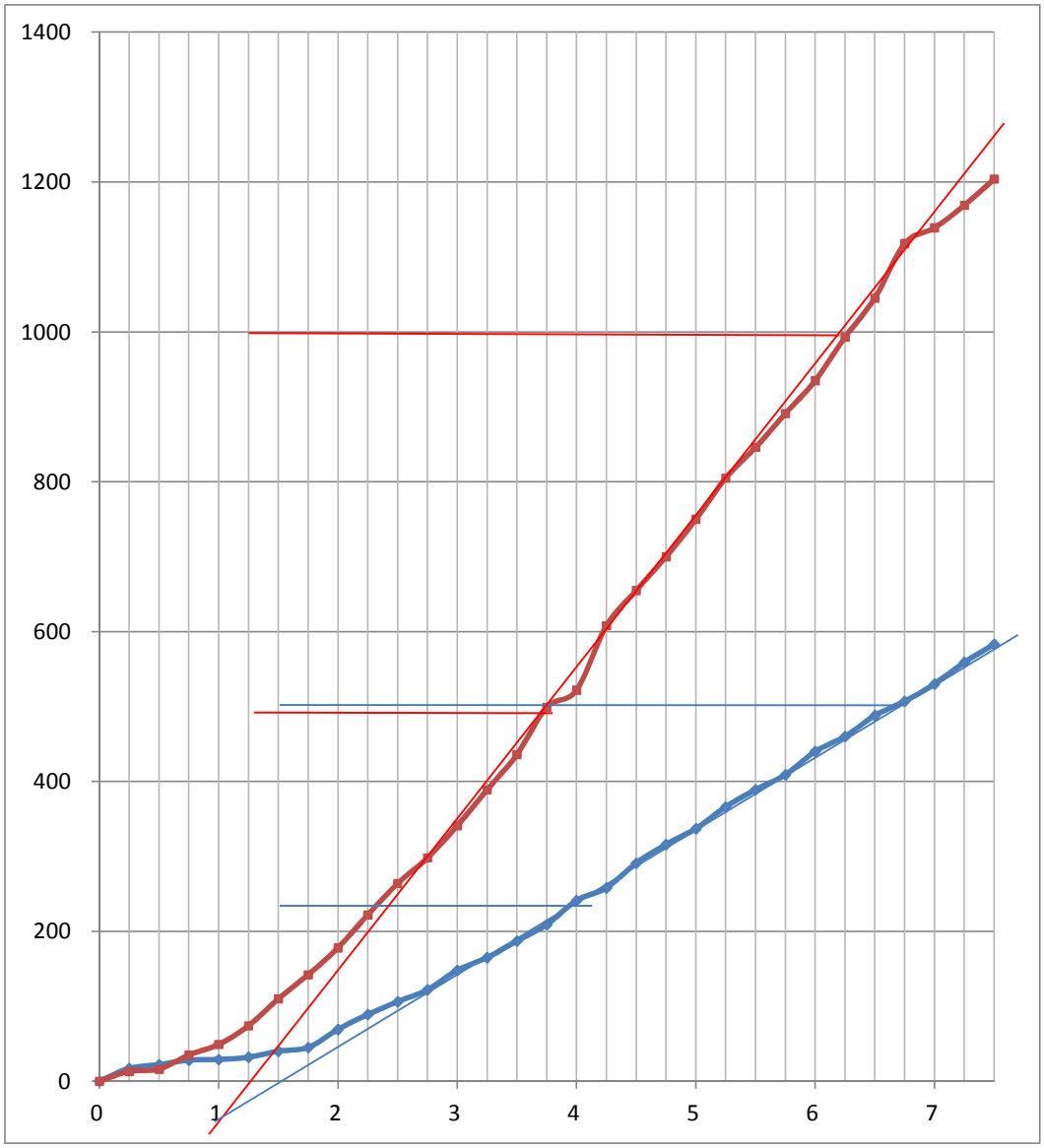
Tel : 0843 5066687 **Fax : 0843 5159930**

Job No:	Client:
J2680/15/E	AHR Build. Consult.
Site:	BH/TP No:
Moor End Acadamy.	SANDSTONE 1
Depth:	Date:
n/a	14.10.15

California Bearing Ratio

BS. 1377 : PART 4 : 1990 : 7

Penetration of Plunger	Top	Bottom
0	0	0
0.25	17	13
0.50	22	16
0.75	28	35
1.00	29	49
1.25	32	74
1.50	40	110
1.75	45	142
2.00	69	178
2.25	89	222
2.50	106	264
2.75	122	298
3.00	148	341
3.25	165	389
3.50	187	436
3.75	209	499
4.00	241	522
4.25	258	608
4.50	291	655
4.75	316	700
5.00	337	750
5.25	366	805
5.50	389	846
5.75	409	891
6.00	440	935
6.25	460	993
6.50	488	1045
6.75	507	1118
7.00	530	1139
7.25	559	1169
7.50	583	1204



Dry Density (Mg/m³)		2.05	Proving ring constant	0.01
		Corrected Dial Guage Reading	Force On Plunger kN	CBR %
Penetration Top	2.5	241	2.41	18%
	5	507	5.07	25%
Penetration Bottom	2.5	499	4.99	37%
	5	993	9.93	50%
Moisture Content		11%		

Prepared by:	Tested by:	Calculated by:	Checked by:	Engineer:	Contract No:
TJS	TJS	CJN	CJN	GLB	J2680/14/E

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Huddersfield
HD8 8LU
www.rogersgeotech.co.uk
Tel : 0843 5066687 **Fax : 0843 5159930**

Job No:	
J2680/14/E	
Site: Moor End Academy	Client: AHR Building Consultants
Date: 21/10/2015	Sheet: 23

Determination of Permeability - Falling Head Test

K. H. Head,Manual of soil laboratory testing, Volume 2.

borehole/ trial pit no.	sample no.	sample depth (m)	sample prep.	sample diameter (mm)	permeability (m/sec)	description/remarks
Perm1	Sandstone 1	0.00	R	116.00	2.75E-08	Clayey, silty, sandy GRAVEL
Perm 2	Sandstone2	0.00	R	116.00	2.37E-08	Clayey, silty, sandy GRAVEL

remarks:

notes:

sample preparation:

U - Undisturbed sample

R - Recompacted sample

APPENDIX 7

LABORATORY TESTING – ENVIRONMENTAL

Rogers Geotechnical Services Ltd.

SUMMARY OF CONTAMINATION ANALYSIS - including Atkins ATRISK SSVs

Client: AHR Global
Site: Moor End Academy, Huddersfield, HD4 5JA

Job Number: J2680/14/E
Date: 21/10/2015

Tox Data Report No.	Compound	Range of Values Found (mg/kg)		Residential without Homegrown Produce Landuse (mg/kg)		Reference
	Metals	*Min*	Max			
3	Cadmium	0.1	0.46	83.6		A
4	Chromium	<0.50	<0.50	38.1		A
	Copper	3	150	8370		A
7	Mercury	0.11	1.6	100.00		A
8	Nickel	1.3	34	130		A
	Lead	4.9	300	235		A
	Zinc	4.2	190	46800		A
	Vanadium	13	47	353		A
	Semi and Non Metals					
1	Arsenic	1.8	38	35		A
10	Selenium	0.27	0.86	595		A
	Free Cyanide	<0.50	<0.5	34		A
9	Phenols (total)	<0.3	<0.3	519		A
	Poly Aromatic Hydrocarbons			ATRISK	CLEA	
20	Naphthalene	0.13	8.8	9.22		A
	Acenaphthene	0.1	19	937	4770	A
	Fluorene	0.11	14	746	3100	A
	Anthracene	0.12	35	20.9	24000	A
	Fluoranthene	0.12	180	113	3210	A
	Pyrene	0.36	170	13.2	2400	A
	Benzo(a)anthracene	0.47	78	9.04		A
2	Chrysene	0.37	97	2.64	1010	A
2	Benzo(b)fluoranthene	0.27	94	7.29	10.3	A
2	Benzo(k)fluoranthene	0.13	38	4.12	104	A
2	Benzo(a)pyrene	0.34	78	1.04		A
2	Dibenzo(a,h)anthracene	0.13	16	0.0236	1.03	A
2	Indeno(1,2,3-cd)pyrene	0.45	54	0.368	10.3	A
2	Benzo(g,h,i)perylene	0.13	54	0.112	104	A
	Petroleum Hydrocarbons					
	Aliphatic C5-C6	<0.1	<0.1	26.1		A
	Aliphatic C6-C8	<0.1	<0.1	87.9		A
	Aliphatic C8-C10	4.5	14	14.5		A
	Aliphatic C10-C12	1.1	71	87.8		A
	Aliphatic C12-C16	4.8	160	126		A
	Aliphatic C16-C21	3.1	16	88900		A
	Aliphatic C21-C35	100	210	88900		A
	Aromatic C5-C7 (Benzene)	<0.1	<0.1	0.998		A*
	Aromatic C7-C8 (Toluene)	<0.1	<0.1	2710		A
	Aromatic C8-C10	<0.1	9.9	24.1		A
	Aromatic C10-C12	<1.0	24	147		A
	Aromatic C12-C16	<0.1	92	700		A
	Aromatic C16-C21	1.3	700	1330		A
	Aromatic C21-C35	<1.0	2700	1330		A
	Others					
	pH	7.2	8.4	-		-
	Organic Content (%)	2.6	16	-		-
	Soluble Sulphate (g/l)	0.017	0.088	-		-
	Total Sulphate (%)	0.068	0.27	-		-
	PCB's	<1				
	VOC's	All below detection limits				
	Dieldrin	<0.2				
	Asbestos	Not Present				

A = WS ATKINS PLC, ATRISK SOIL SCREENING VALUES BASED ON 6% SOIL ORGANIC MATTER

For PAHs ATRISK assumes free product is avalable whilst CLEA assumes no free product

A* Atrisk's SSV is lower than Chemtest's detectable limit for this compound.

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report Number:	15-22078 Issue-1
Initial Date of Issue:	29-Sep-2015
Client:	Rogers Geotechnical Services Ltd
Client Address:	Offices 1 & 2, Barncliffe Business Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Gabriel Bobrowicz
Project:	J2680/15/E - Moor End Academy, Huddersfield, HD4 5JA

Quotation No.:	Q15-04539	**Date Received:**	23-Sep-2015
Order No.:	0915-32	**Date Instructed:**	23-Sep-2015
No. of Samples:	15		
Turnaround: (Wkdays)	5	**Results Due Date:**	29-Sep-2015
Date Approved:	29-Sep-2015		

Approved By:

Details: Robert Monk, Technical Development Chemist

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Results - Soil

Project: J2680/15/E - Moor End Academy, Huddersfield, HD4 5JA

Client: Rogers Geotechnical Services Ltd					Chemtest Job No.:	15-22078	15-22078	15-22078	15-22078	15-22078	15-22078	15-22078	15-22078
Quotation No.: Q15-04539					Chemtest Sample ID.:	195819	195820	195821	195822	195823	195824	195825	195826
Order No.: 0915-32					Client Sample Ref.:								
					Client Sample ID.:	GE1	GE2	GE3	GE4	GE5	GE6	GE7	GE8
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
					Bottom Depth(m):								
					Date Sampled:	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Cadmium	M	2450	mg/kg	0.1		0.22	0.32	0.26	0.28	0.32	0.24	0.23	0.24
Chromium (Hexavalent)	N	2490	mg/kg	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.5		130	31	37	50	28	36	57	34
Mercury	M	2450	mg/kg	0.1		0.42	0.45	0.34	0.51	0.28	0.38	0.48	0.27
Nickel	M	2450	mg/kg	0.5		17	11	11	12	12	9.9	10	9.7
Lead	M	2450	mg/kg	0.5		120	73	88	86	66	76	120	70
Zinc	M	2450	mg/kg	0.5		130	49	66	65	54	57	33	40
Vanadium	U	2450	mg/kg	5		30	20	23	25	21	22	26	20
Arsenic	M	2450	mg/kg	1		30	16	20	21	15	17	33	19
Selenium	M	2450	mg/kg	0.2		0.28	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.65	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	M	2920	mg/kg	0.3		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Naphthalene	M	2700	mg/kg	0.1		0.19	0.14	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.1		< 0.10	0.11	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.1		0.14	0.22	0.11	0.19	< 0.10	0.13	0.11	0.25
Fluorene	M	2700	mg/kg	0.1		0.17	0.23	0.15	0.11	< 0.10	0.11	0.13	0.20
Phenanthrene	M	2700	mg/kg	0.1		1.7	1.9	1.1	0.95	0.41	1.1	0.79	1.7
Anthracene	M	2700	mg/kg	0.1		0.72	0.30	0.20	0.25	< 0.10	0.45	0.12	0.35
Fluoranthene	M	2700	mg/kg	0.1		2.2	2.9	1.7	1.7	0.81	1.9	1.3	2.6
Pyrene	M	2700	mg/kg	0.1		2.2	2.7	1.8	1.7	0.80	1.8	1.5	2.4
Benzo[a]anthracene	M	2700	mg/kg	0.1		2.3	2.5	2.4	1.7	1.0	2.0	2.7	2.5
Chrysene	M	2700	mg/kg	0.1		1.3	1.9	1.8	1.3	0.44	1.6	0.78	1.7
Benzo[b]fluoranthene	M	2700	mg/kg	0.1		1.7	2.0	1.5	1.5	0.77	1.4	1.5	1.7
Benzo[k]fluoranthene	M	2700	mg/kg	0.1		0.47	0.58	0.45	0.43	0.22	0.49	0.40	0.55
Benzo[a]pyrene	M	2700	mg/kg	0.1		1.1	1.2	0.88	0.89	0.34	1.1	0.66	1.0
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.1		< 0.10	1.3	0.45	1.2	< 0.10	0.75	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.1		< 0.10	0.91	0.29	0.64	< 0.10	0.13	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.1		< 0.10	1.7	0.36	0.90	< 0.10	0.23	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2		14	21	13	14	4.8	13	10	15
Aliphatic TPH >C5-C6	N	2680	mg/kg	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Results - Soil

Project: J2680/15/E - Moor End Academy, Huddersfield, HD4 5JA

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22078	15-22078	15-22078	15-22078	15-22078	15-22078	15-22078	15-22078
Quotation No.: Q15-04539		Chemtest Sample ID.:			195819	195820	195821	195822	195823	195824	195825	195826
Order No.: 0915-32		Client Sample Ref.:										
		Client Sample ID.:			GE1	GE2	GE3	GE4	GE5	GE6	GE7	GE8
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
		Bottom Depth(m):										
		Date Sampled:			20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15	20-Sep-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	M	2680	mg/kg	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	M	2680	mg/kg	1	6.6	5.4	6.6	4.9	1.2	5.4	4.9	1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1	9.6	8.6	11	6.5	6.3	8.7	8.6	4.2
Aromatic TPH >C35-C44	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	M	2680	mg/kg	5	16	14	18	11	7.5	14	14	5.2
pH	M	2010			5.3	7.7	6.9	7.5	5.9	7.1	6.0	6.8
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.01	< 0.010	< 0.010	< 0.010	< 0.010	0.026	0.023	< 0.010	0.026
ACM Type	U	2192			-	-	-	-	-	-	-	-
Asbestos Identification	U	2192			No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.02	4.8	13	9.5	14	12	13	11	15
Soil Colour	N				Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N				Stones	Stones	Stones	Stones	Stones	Stones	Stones	Glass
Soil Texture	N				Sand	Sand	Sand	Sand	Sand	Sand	Sand	Clay
Sulphate (Total)	M	2430	%	0.01	0.11	0.083	0.081	0.077	0.085	0.12	0.21	0.13
Organic Matter	M	2625	%	0.4	6.6	5.7	5.2	5.3	4.8	5.9	10	6.6
Total Petroleum Hydrocarbons	M	2680	mg/kg	10	16	14	18	11	< 10	14	14	< 10

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Results - Soil

Project: J2680/15/E - Moor End Academy, Huddersfield, HD4 5JA

Client: Rogers Geotechnical Services Ltd											
				Chemtest Job No.:	15-22078	15-22078	15-22078	15-22078	15-22078	15-22078	15-22078
Quotation No.: Q15-04539				**Chemtest Sample ID.:**	195827	195828	195829	195830	195831	195832	195833
Order No.: 0915-32				Client Sample Ref.:							
				Client Sample ID.:	GE9	GE10	GE11	GE12	GE13	GE14	TP1a
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.40	0.40	0.40	0.40	0.40	0.40	0.40
				Bottom Depth(m):							
				Date Sampled:	20-Sep-15	20-Sep-15	20-Sep-15	21-Sep-15	21-Sep-15	21-Sep-15	20-Sep-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Cadmium	M	2450	mg/kg	0.1	0.17	0.23	< 0.10	0.29	0.28	0.30	0.40
Chromium (Hexavalent)	N	2490	mg/kg	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.5	42	36	26	48	48	55	150
Mercury	M	2450	mg/kg	0.1	0.34	0.26	0.45	0.38	0.28	0.31	0.45
Nickel	M	2450	mg/kg	0.5	11	10	6.3	15	15	19	34
Lead	M	2450	mg/kg	0.5	140	100	110	110	100	110	300
Zinc	M	2450	mg/kg	0.5	49	31	18	73	87	89	190
Vanadium	U	2450	mg/kg	5	27	24	17	27	25	26	47
Arsenic	M	2450	mg/kg	1	33	28	16	29	31	38	33
Selenium	M	2450	mg/kg	0.2	0.32	< 0.20	< 0.20	0.33	0.27	0.34	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.5	< 0.50	0.50	< 0.50	0.50	0.50	0.50	< 0.50
Total Phenols	M	2920	mg/kg	0.3	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Naphthalene	M	2700	mg/kg	0.1	< 0.10	< 0.10	0.43	0.13	1.1	0.17	8.8
Acenaphthylene	M	2700	mg/kg	0.1	< 0.10	0.14	0.19	< 0.10	0.19	< 0.10	1.7
Acenaphthene	M	2700	mg/kg	0.1	< 0.10	< 0.10	0.81	0.18	1.3	0.40	19
Fluorene	M	2700	mg/kg	0.1	< 0.10	< 0.10	0.76	0.17	1.3	0.31	14
Phenanthrene	M	2700	mg/kg	0.1	0.60	0.50	6.9	1.8	9.9	2.7	140
Anthracene	M	2700	mg/kg	0.1	0.12	0.13	1.5	0.41	2.5	0.51	35
Fluoranthene	M	2700	mg/kg	0.1	0.92	1.1	8.4	2.2	10	2.7	180
Pyrene	M	2700	mg/kg	0.1	0.98	1.1	8.3	2.4	9.1	2.9	170
Benzo[a]anthracene	M	2700	mg/kg	0.1	< 0.10	1.4	5.2	< 0.10	7.1	4.4	78
Chrysene	M	2700	mg/kg	0.1	< 0.10	0.99	4.7	< 0.10	5.9	2.8	97
Benzo[b]fluoranthene	M	2700	mg/kg	0.1	< 0.10	0.72	4.6	< 0.10	4.6	3.2	94
Benzo[k]fluoranthene	M	2700	mg/kg	0.1	< 0.10	0.13	1.7	< 0.10	1.7	1.2	38
Benzo[a]pyrene	M	2700	mg/kg	0.1	< 0.10	0.44	3.3	< 0.10	3.1	2.1	78
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.1	< 0.10	< 0.10	2.2	< 0.10	2.0	1.5	54
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.1	< 0.10	< 0.10	0.60	< 0.10	0.57	0.36	16
Benzo[g,h,i]perylene	M	2700	mg/kg	0.1	< 0.10	< 0.10	1.9	< 0.10	1.7	1.6	54
Total Of 16 PAH's	M	2700	mg/kg	2	2.6	6.7	52	7.3	62	27	1100
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	12	14
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	2.5

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Results - Soil

Project: J2680/15/E - Moor End Academy, Huddersfield, HD4 5JA

Client: Rogers Geotechnical Services Ltd											
			Chemtest Job No.:		15-22078	15-22078	15-22078	15-22078	15-22078	15-22078	15-22078
Quotation No.: Q15-04539			**Chemtest Sample ID.:**		195827	195828	195829	195830	195831	195832	195833
Order No.: 0915-32			Client Sample Ref.:								
			Client Sample ID.:		GE9	GE10	GE11	GE12	GE13	GE14	TP1a
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.40	0.40	0.40	0.40	0.40	0.40	0.40
			Bottom Depth(m):								
			Date Sampled:		20-Sep-15	20-Sep-15	20-Sep-15	21-Sep-15	21-Sep-15	21-Sep-15	20-Sep-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.8	6.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	16	16
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	100	120
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.7
Total Aliphatic Hydrocarbons	M	2680	mg/kg	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	140	170
Aromatic TPH >C5-C7	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.7	9.9
Aromatic TPH >C10-C12	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	7.0	8.8
Aromatic TPH >C12-C16	M	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	92	87
Aromatic TPH >C16-C21	M	2680	mg/kg	1	1.8	2.9	5.8	3.2	1.9	660	700
Aromatic TPH >C21-C35	M	2680	mg/kg	1	6.0	5.7	9.1	5.6	5.5	2000	2700
Aromatic TPH >C35-C44	N	2680	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	160	270
Total Aromatic Hydrocarbons	M	2680	mg/kg	5	7.7	8.7	15	8.8	7.4	3000	3800
pH	M	2010			5.8	8.4	8.0	5.6	5.4	5.4	8.3
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.01	0.017	0.020	0.022	< 0.010	0.010	< 0.010	0.049
ACM Type	U	2192			-	-	-	-	-	-	-
Asbestos Identification	U	2192			No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.02	7.9	13	9.8	18	14	13	9.8
Soil Colour	N				Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N				Stones	Stones	Stones	Stones	Stones	Glass	Stones
Soil Texture	N				Sand	Sand	Sand	Sand	Sand	Sand	Sand
Sulphate (Total)	M	2430	%	0.01	0.15	0.17	0.088	0.16	0.17	0.17	0.096
Organic Matter	M	2625	%	0.4	9.1	10	5.0	10	9.0	8.6	12
Total Petroleum Hydrocarbons	M	2680	mg/kg	10	< 10	< 10	15	< 10	< 10	3100	3900

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

2183

Final Report

Report No.:	15-22534-1
Initial Date of Issue:	02-Oct-2015
Client	Rogers Geotechnical Services Ltd
Client Address:	Offices 1 & 2, Barncliffe Business Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Jim Irving
Project	J2680/15/E Moor End Academy, Huddersfield

Quotation No.:		**Date Received:**	28-Sep-2015
Order No.:	0915-44	**Date Instructed:**	28-Sep-2015
No. of Samples:	5	**Target Date:**	02-Oct-2015
Turnaround (Wkdays):	5	**Results Due:**	02-Oct-2015
Date Approved:	02-Oct-2015		

Approved By:

Details: Robert Monk, Technical Development Chemist

Chemtest
The right chemistry to deliver results

Results - Soil

Project: J2680/15/E Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22534	15-22534	15-22534	15-22534	15-22534
Quotation No.:		Chemtest Sample ID.:			198086	198087	198088	198089	198090
Order No.: 0915-44		Client Sample Ref.:			WS7	WS12	WS16	WS17	WS20
		Client Sample ID.:							
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.25	0.37	0.4	0.55	0.4
		Bottom Depth (m):							
		Date Sampled:			24-Sep-2015	24-Sep-2015	24-Sep-2015	24-Sep-2015	24-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Cadmium	M	2450	mg/kg	0.10	< 0.10	0.20	< 0.10	< 0.10	< 0.10
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	13	85	15	23	3.8
Mercury	M	2450	mg/kg	0.10	0.42	0.23	0.12	0.17	< 0.10
Nickel	M	2450	mg/kg	0.50	12	34	13	10	1.3
Lead	M	2450	mg/kg	0.50	23	100	32	51	7.9
Zinc	M	2450	mg/kg	0.50	31	73	35	27	4.2
Vanadium	U	2450	mg/kg	5.0	17	35	17	17	< 5.0
Arsenic	M	2450	mg/kg	1.0	7.2	20	6.6	13	1.8
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Naphthalene	M	2700	mg/kg	0.10	< 0.10	5.5	< 0.10	0.15	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	0.70	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	4.2	< 0.10	0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	3.2	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	28	< 0.10	1.1	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	7.4	< 0.10	0.32	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	0.53	35	0.39	1.7	< 0.10
Pyrene	M	2700	mg/kg	0.10	0.52	35	0.36	1.7	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	0.72	16	< 0.10	1.2	< 0.10
Chrysene	M	2700	mg/kg	0.10	0.37	17	< 0.10	0.81	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	17	< 0.10	0.74	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	7.5	< 0.10	0.21	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	14	< 0.10	0.70	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	8.5	< 0.10	0.50	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	2.3	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	7.1	< 0.10	0.45	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	2.1	210	< 2.0	9.7	< 2.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	12	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	26	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Project: J2680/15/E Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22534	15-22534	15-22534	15-22534	15-22534
Quotation No.:		Chemtest Sample ID.:			198086	198087	198088	198089	198090
Order No.: 0915-44		Client Sample Ref.:			WS7	WS12	WS16	WS17	WS20
		Client Sample ID.:							
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.25	0.37	0.4	0.55	0.4
		Bottom Depth (m):							
		Date Sampled:			24-Sep-2015	24-Sep-2015	24-Sep-2015	24-Sep-2015	24-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	38	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	2.7	< 1.0	2.6	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	8.8	< 1.0	4.1	< 1.0
Aromatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	58	1.1	2.1	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	2.1	92	3.1	2.6	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	7.9	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	170	< 5.0	11	< 5.0
pH	M	2010		N/A	7.9	7.5	6.3	5.9	5.1
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.018	0.026	< 0.010	< 0.010	< 0.010
ACM Type	U	2192		N/A	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	6.6	5.0	7.0	8.6	3.7
Soil Colour	N			N/A	Brown	Brown	Brown	Brown	Brown
Other Material	N			N/A	Stones	Stones	Stones	Stones	Stones
Soil Texture	N			N/A	Sand	Sand	Sand	Sand	Sand
Sulphate (Total)	M	2430	%	0.010	0.025	0.16	0.025	0.051	< 0.010
Organic Matter	M	2625	%	0.40	1.6	8.6	1.4	2.2	0.69
Total Petroleum Hydrocarbons	M	2680	mg/kg	10	< 10	170	< 10	50	< 10

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

2183

Final Report

Report No.:	15-22723-1
Initial Date of Issue:	06-Oct-2015
Client	Rogers Geotechnical Services Ltd
Client Address:	Offices 1 & 2, Barncliffe Business Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Jim Irving
Project	J2680/15/E - Moor End Academy, Huddersfield

Quotation No.:	Q15-04539	**Date Received:**	30-Sep-2015
Order No.:	0915-49	**Date Instructed:**	30-Sep-2015
No. of Samples:	13	**Target Date:**	06-Oct-2015
Turnaround (Wkdays):	5	**Results Due:**	06-Oct-2015
Date Approved:	06-Oct-2015		

Approved By:

Details: Keith Jones, Technical Manager

Chemtest
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Results - Soil

Project: J2680/15/E - Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22723	15-22723	15-22723	15-22723	15-22723	15-22723	15-22723	15-22723
Quotation No.: Q15-04539		Chemtest Sample ID.:			199198	199199	199200	199201	199202	199203	199204	199205
Order No.: 0915-49		Client Sample Ref.:			WS01	WS02	WS03	WS04	WS05	WS06	WS09	WS14
		Client Sample ID.:			C1	C1	C1	C1	C1	C1	C1	C1
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.30	0.55	0.25	0.25	0.10	0.30	0.20
		Bottom Depth (m):										
		Date Sampled:			29-Sep-2015	28-Sep-2015	29-Sep-2015	28-Sep-2015	29-Sep-2015	28-Sep-2015	29-Sep-2015	28-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Cadmium	M	2450	mg/kg	0.10	0.24	0.11	< 0.10	0.13	0.20	0.22	0.10	0.20
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	45	25	14	28	57	47	17	48
Mercury	M	2450	mg/kg	0.10	0.45	0.22	< 0.10	0.26	1.2	0.41	1.6	0.33
Nickel	M	2450	mg/kg	0.50	12	9.6	24	8.7	11	15	5.9	10
Lead	M	2450	mg/kg	0.50	88	45	14	58	83	82	38	90
Zinc	M	2450	mg/kg	0.50	60	37	51	39	47	51	14	30
Vanadium	U	2450	mg/kg	5.0	28	18	29	18	25	28	14	22
Arsenic	M	2450	mg/kg	1.0	26	12	4.8	22	25	25	12	25
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Naphthalene	M	2700	mg/kg	0.10	0.64	< 0.10	< 0.10	< 0.10	3.2	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	0.13	< 0.10	< 0.10	< 0.10	0.31	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	0.47	< 0.10	< 0.10	< 0.10	1.1	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	0.39	< 0.10	< 0.10	< 0.10	0.96	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	3.0	< 0.10	< 0.10	1.5	6.2	1.1	0.95	0.67
Anthracene	M	2700	mg/kg	0.10	0.72	< 0.10	< 0.10	0.32	1.4	0.36	0.33	0.23
Fluoranthene	M	2700	mg/kg	0.10	3.6	0.56	< 0.10	1.9	6.3	1.7	0.96	0.97
Pyrene	M	2700	mg/kg	0.10	3.6	0.50	< 0.10	2.0	6.3	1.6	1.0	0.90
Benzo[a]anthracene	M	2700	mg/kg	0.10	1.5	< 0.10	< 0.10	0.89	3.2	0.84	0.47	< 0.10
Chrysene	M	2700	mg/kg	0.10	2.5	< 0.10	< 0.10	2.0	5.0	1.5	1.0	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	0.52	< 0.10	< 0.10	0.51	1.3	0.27	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	1.6	< 0.10	< 0.10	1.3	3.0	0.84	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	1.4	< 0.10	< 0.10	0.87	2.3	0.84	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	0.97	< 0.10	< 0.10	0.50	1.5	0.64	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.25	< 0.10	< 0.10	0.24	0.48	0.25	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	1.6	< 0.10	< 0.10	1.1	1.0	1.1	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	23	< 2.0	< 2.0	13	44	11	4.7	2.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.5
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6.4	< 1.0	71
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	17	< 1.0	160
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.1
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	210

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Results - Soil

Project: J2680/15/E - Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22723	15-22723	15-22723	15-22723	15-22723	15-22723	15-22723	15-22723
Quotation No.: Q15-04539		Chemtest Sample ID.:			199198	199199	199200	199201	199202	199203	199204	199205
Order No.: 0915-49		Client Sample Ref.:			WS01	WS02	WS03	WS04	WS05	WS06	WS09	WS14
		Client Sample ID.:			C1	C1	C1	C1	C1	C1	C1	C1
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.30	0.55	0.25	0.25	0.10	0.30	0.20
		Bottom Depth (m):										
		Date Sampled:			29-Sep-2015	28-Sep-2015	29-Sep-2015	28-Sep-2015	29-Sep-2015	28-Sep-2015	29-Sep-2015	28-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.6
Total Aliphatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	24	< 5.0	460
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.2	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	21	3.6	< 1.0	24
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	47	11	< 1.0	29
Aromatic TPH >C16-C21	M	2680	mg/kg	1.0	15	6.3	< 1.0	3.0	130	11	2.9	2.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	12	12	< 1.0	< 1.0	180	7.6	< 1.0	32
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	14	< 1.0	< 1.0	2.0
Total Aromatic Hydrocarbons	M	2680	mg/kg	5.0	27	18	< 5.0	< 5.0	400	33	< 5.0	89
pH	M	2010		N/A	7.1	7.0	7.0	7.7	7.8	6.7	7.9	5.2
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	18	6.2	11	15	17	16	10	11
Soil Colour	N			N/A	Black	Brown	Brown	Black	Black	Black	Black	Brown
Other Material	N			N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N			N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Sulphate (Total)	M	2430	%	0.010	0.084	0.052	0.018	0.079	0.10	0.10	0.044	0.13
Organic Matter	M	2625	%	0.40	6.0	2.8	0.78	5.9	6.7	5.7	3.8	7.9
Total Petroleum Hydrocarbons	M	2680	mg/kg	10	27	18	< 10	< 10	400	57	< 10	550

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Results - Soil

Project: J2680/15/E - Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22723	15-22723	15-22723	15-22723	15-22723
Quotation No.: Q15-04539		Chemtest Sample ID.:			199206	199207	199208	199209	199210
Order No.: 0915-49		Client Sample Ref.:			WS19	WS25	WS27	WS28	WS29
		Client Sample ID.:			C1	C1	C1	C1	C1
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.6	0.25	0.60	0.15	0.25
		Bottom Depth (m):							
		Date Sampled:			29-Sep-2015	28-Sep-2015	29-Sep-2015	28-Sep-2015	29-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Cadmium	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.29	0.34
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	5.3	12	7.4	35	58
Mercury	M	2450	mg/kg	0.10	< 0.10	0.35	< 0.10	0.35	0.27
Nickel	M	2450	mg/kg	0.50	9.0	11	12	9.5	27
Lead	M	2450	mg/kg	0.50	8.1	21	7.8	81	80
Zinc	M	2450	mg/kg	0.50	28	26	18	42	100
Vanadium	U	2450	mg/kg	5.0	13	17	16	22	29
Arsenic	M	2450	mg/kg	1.0	3.0	6.3	3.4	24	19
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	0.56	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	0.50	< 0.50
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.67
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.44
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.31
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.47
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.65	2.6
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.27	0.64
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.97	4.5
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.94	5.0
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.4
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.4
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.1
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.9
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.3
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.32
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.9
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	2.8	30
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	12	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	19	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Results - Soil

Project: J2680/15/E - Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22723	15-22723	15-22723	15-22723	15-22723
Quotation No.: Q15-04539		Chemtest Sample ID.:			199206	199207	199208	199209	199210
Order No.: 0915-49		Client Sample Ref.:			WS19	WS25	WS27	WS28	WS29
		Client Sample ID.:			C1	C1	C1	C1	C1
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.6	0.25	0.60	0.15	0.25
		Bottom Depth (m):							
		Date Sampled:			29-Sep-2015	28-Sep-2015	29-Sep-2015	28-Sep-2015	29-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	31	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	5.1	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	7.6	< 1.0
Aromatic TPH >C16-C21	M	2680	mg/kg	1.0	9.6	< 1.0	13	19	22
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	8.0	< 1.0	11	36	50
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	M	2680	mg/kg	5.0	18	< 5.0	25	67	72
pH	M	2010		N/A	5.4	5.5	6.3	6.3	6.6
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
ACM Type	U	2192		N/A	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	13	9.1	8.5	20	13
Soil Colour	N			N/A	Brown	Brown	Brown	Black	Black
Other Material	N			N/A	NONE	Stones	Stones	Roots	Stones
Soil Texture	N			N/A	Sand	Sand	Sand	Sand	Sand
Sulphate (Total)	M	2430	%	0.010	0.016	0.038	< 0.010	0.13	0.12
Organic Matter	M	2625	%	0.40	0.55	1.6	0.48	7.9	14
Total Petroleum Hydrocarbons	M	2680	mg/kg	10	18	< 10	24	98	72

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

2183

Final Report

Report No.:	15-22852-1
Initial Date of Issue:	07-Oct-2015
Client	Rogers Geotechnical Services Ltd
Client Address:	Offices 1 & 2, Barncliffe Business Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Jim Irving
Project	J2680/15/E Moor End Academy, Huddersfield

Quotation No.:		**Date Received:**	01-Oct-2015
Order No.:	0915-46	**Date Instructed:**	01-Oct-2015
No. of Samples:	12	**Target Date:**	07-Oct-2015
Turnaround (Wkdays):	5	**Results Due:**	07-Oct-2015
Date Approved:	07-Oct-2015		

Approved By:

Details: Robert Monk, Technical Development Chemist

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Results - Soil

Project: J2680/15/E Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22852	15-22852	15-22852	15-22852	15-22852	15-22852	15-22852	15-22852
Quotation No.:		Chemtest Sample ID.:			199692	199693	199694	199695	199696	199697	199698	199699
Order No.: 0915-46		Client Sample Ref.:										
		Client Sample ID.:			WS11	WS18	WS21	WS22	WS23	WS24	WS30	WS08
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.1	0.15	0.25	0.6	0.3	0.15	0.35	0.2
		Bottom Depth (m):										
		Date Sampled:			28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Cadmium	M	2450	mg/kg	0.10	0.20	0.25	0.21	< 0.10	0.17	0.18	0.11	0.26
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	19	37	34	4.0	3.0	59	24	27
Mercury	M	2450	mg/kg	0.10	0.21	0.37	0.68	< 0.10	< 0.10	0.30	0.15	0.28
Nickel	M	2450	mg/kg	0.50	13	12	13	8.7	6.5	12	12	8.0
Lead	M	2450	mg/kg	0.50	39	140	83	5.5	4.9	150	30	61
Zinc	M	2450	mg/kg	0.50	40	110	37	32	48	35	42	27
Vanadium	U	2450	mg/kg	5.0	17	25	30	16	26	32	22	19
Arsenic	M	2450	mg/kg	1.0	8.4	21	31	3.2	3.0	34	14	20
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.86	< 0.20	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	0.32	0.83	< 0.10	< 0.10	< 0.10	1.3	< 0.10	1.3
Anthracene	M	2700	mg/kg	0.10	< 0.10	0.22	< 0.10	< 0.10	< 0.10	0.21	< 0.10	0.20
Fluoranthene	M	2700	mg/kg	0.10	0.12	1.7	< 0.10	< 0.10	< 0.10	2.7	< 0.10	1.8
Pyrene	M	2700	mg/kg	0.10	0.73	1.5	< 0.10	< 0.10	< 0.10	2.4	< 0.10	1.6
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	1.7	< 0.10	< 0.10	< 0.10	4.1	< 0.10	2.3
Chrysene	M	2700	mg/kg	0.10	< 0.10	0.93	< 0.10	< 0.10	< 0.10	1.5	< 0.10	0.59
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	1.7	< 0.10	< 0.10	< 0.10	3.5	< 0.10	1.2
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	0.55	< 0.10	< 0.10	< 0.10	0.72	< 0.10	0.26
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	1.1	< 0.10	< 0.10	< 0.10	1.1	< 0.10	0.54
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	10	< 2.0	< 2.0	< 2.0	18	< 2.0	9.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Results - Soil

Project: J2680/15/E Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22852	15-22852	15-22852	15-22852	15-22852	15-22852	15-22852	15-22852
Quotation No.:		Chemtest Sample ID.:			199692	199693	199694	199695	199696	199697	199698	199699
Order No.: 0915-46		Client Sample Ref.:										
		Client Sample ID.:			WS11	WS18	WS21	WS22	WS23	WS24	WS30	WS08
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.1	0.15	0.25	0.6	0.3	0.15	0.35	0.2
		Bottom Depth (m):										
		Date Sampled:			28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	M	2680	mg/kg	1.0	3.4	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	24	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	42	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
pH	M	2010		N/A	7.5	5.6	4.6	5.4	4.6	4.1	5.9	7.5
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.045	< 0.010	< 0.010
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	11	17	17	12	19	23	14	23
Soil Colour	N			N/A	Brown	Brown	Brown	Yellow	Brown, Yellow	Brown	Brown	Black
Other Material	N			N/A	Stones, Roots	Stones, Roots	Stones, Roots	Stones	NONE	Roots	Stones	Roots
Soil Texture	N			N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Sulphate (Total)	M	2430	%	0.010	0.065	0.099	0.10	0.042	0.023	0.27	0.068	0.11
Organic Matter	M	2625	%	0.40	3.8	6.4	9.1	0.66	1.6	16	3.5	7.1
Total Petroleum Hydrocarbons	M	2680	mg/kg	10	< 10	42	< 10	< 10	< 10	< 10	< 10	< 10

Chemtest
The right chemistry to deliver results

Results - Soil

Project: J2680/15/E Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22852	15-22852	15-22852	15-22852
Quotation No.:		Chemtest Sample ID.:			199700	199701	199702	199703
Order No.: 0915-46		Client Sample Ref.:						
		Client Sample ID.:			WS10	WS13	WS26	WS15
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.1	0.17	0.25	0.25
		Bottom Depth (m):						
		Date Sampled:			28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Cadmium	M	2450	mg/kg	0.10	0.25	0.46	0.33	0.22
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	55	59	25	30
Mercury	M	2450	mg/kg	0.10	0.28	0.21	0.11	0.22
Nickel	M	2450	mg/kg	0.50	8.3	24	8.1	13
Lead	M	2450	mg/kg	0.50	52	67	65	64
Zinc	M	2450	mg/kg	0.50	30	110	57	35
Vanadium	U	2450	mg/kg	5.0	22	37	25	32
Arsenic	M	2450	mg/kg	1.0	18	30	16	24
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	1.6	1.7	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	0.31	0.35	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	1.8	2.9	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	1.7	2.6	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	2.0	1.4	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	0.80	1.1	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	1.0	1.7	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	0.24	0.58	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	0.57	1.1	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	10	13	< 2.0	< 2.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: J2680/15/E Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-22852	15-22852	15-22852	15-22852
Quotation No.:		Chemtest Sample ID.:			199700	199701	199702	199703
Order No.: 0915-46		Client Sample Ref.:						
		Client Sample ID.:			WS10	WS13	WS26	WS15
		Sample Type:			SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.1	0.17	0.25	0.25
		Bottom Depth (m):						
		Date Sampled:			28-Sep-2015	28-Sep-2015	28-Sep-2015	28-Sep-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	M	2680	mg/kg	1.0	23	18	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	28	42	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	M	2680	mg/kg	5.0	50	60	< 5.0	< 5.0
pH	M	2010		N/A	7.7	7.0	4.8	4.2
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	21	16	15	15
Soil Colour	N			N/A	Brown	Brown	Brown	Brown
Other Material	N			N/A	Stones	Stones	Stones	Stones
Soil Texture	N			N/A	Sand	Sand	Sand	Sand
Sulphate (Total)	M	2430	%	0.010	0.081	0.069	0.077	0.10
Organic Matter	M	2625	%	0.40	5.3	6.2	4.3	5.5
Total Petroleum Hydrocarbons	M	2680	mg/kg	10	50	60	< 10	< 10

Report Information

Key

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I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
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Final Report

Report No.:	15-23773-1
Initial Date of Issue:	15-Oct-2015
Client	Rogers Geotechnical Services Ltd
Client Address:	Offices 1 & 2, Barncliffe Business Near Bank Shelley Huddersfield West Yorkshire HD8 8LU
Contact(s):	Gabriel Bobrowicz
Project	J2680/15/E Moor End Academy, Huddersfield

Quotation No.:		**Date Received:**	09-Oct-2015
Order No.:	1015-10	**Date Instructed:**	09-Oct-2015
No. of Samples:	3	**Target Date:**	15-Oct-2015
Turnaround (Wkdays):	5	**Results Due:**	15-Oct-2015
Date Approved:	15-Oct-2015		

Approved By:

Details: Keith Jones, Technical Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: J2680/15/E Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd		Chemtest Job No.:			15-23773	15-23773	15-23773
Quotation No.:		Chemtest Sample ID.:			203697	203698	203699
Order No.: 1015-10		Client Sample Ref.:					
		Client Sample ID.:			GE15	GE16	GE17
		Sample Type:			SOIL	SOIL	SOIL
		Top Depth (m):			0.40	0.40	0.40
		Bottom Depth (m):					
		Date Sampled:			07-Oct-2015	07-Oct-2015	07-Oct-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Cadmium	M	2450	mg/kg	0.10	0.11	0.13	0.29
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Copper	M	2450	mg/kg	0.50	24	28	54
Mercury	M	2450	mg/kg	0.10	0.14	0.13	0.49
Nickel	M	2450	mg/kg	0.50	11	11	22
Lead	M	2450	mg/kg	0.50	51	62	130
Zinc	M	2450	mg/kg	0.50	35	45	140
Vanadium	U	2450	mg/kg	5.0	17	22	32
Arsenic	M	2450	mg/kg	1.0	11	14	25
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.36
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.26
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.29
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.43
Phenanthrene	M	2700	mg/kg	0.10	0.73	< 0.10	3.2
Anthracene	M	2700	mg/kg	0.10	0.18	< 0.10	0.42
Fluoranthene	M	2700	mg/kg	0.10	0.96	0.35	4.2
Pyrene	M	2700	mg/kg	0.10	0.64	0.36	4.2
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	1.9
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	2.7
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	2.6
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	1.5
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	1.9
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	1.3
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.56
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	1.7
Total Of 16 PAH's	M	2700	mg/kg	2.0	2.5	< 2.0	28
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: J2680/15/E Moor End Academy, Huddersfield

Client: Rogers Geotechnical Services Ltd			Chemtest Job No.:		15-23773	15-23773	15-23773
Quotation No.:			Chemtest Sample ID.:		203697	203698	203699
Order No.: 1015-10			Client Sample Ref.:				
			Client Sample ID.:		GE15	GE16	GE17
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.40	0.40	0.40
			Bottom Depth (m):				
			Date Sampled:		07-Oct-2015	07-Oct-2015	07-Oct-2015
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
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Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	2.0	13
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	23
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	M	2680	mg/kg	5.0	< 5.0	< 5.0	36
pH	M	2010		N/A	5.7	4.8	5.6
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.088	0.021	0.030
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	15	17	24
Soil Colour	N			N/A	Brown	Brown	Brown
Other Material	N			N/A	Stones	Stones	Stones
Soil Texture	N			N/A	Sand	Sand	Sand
Sulphate (Total)	M	2430	%	0.010	0.084	0.11	0.14
Organic Matter	M	2625	%	0.40	4.1	5.5	11
Total Petroleum Hydrocarbons	M	2680	mg/kg	10	< 10	< 10	36

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