Appendix C Desk study research information and Historical Reports

GROUND INVESTIGATION REPORT

PROPOSED REDEVELOPMENT:

MEADOW SPECIAL SCHOOL, ROYAL LANE, UXBRIDGE, UB8 3QU

Client:	**HILLINGDON COUNCIL** **Civic Centre** **High Street** **Uxbridge UB8 1UW**
Consulting Engineers:	**MHA Structural Design** **14-18 Old Street** **London EC1V 9BH**
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DOCUMENT ISSUE STATUS:

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This investigation has been undertaken within the constraints of the client's instruction/contract, together with those set out in the 'General information, Limitations and exceptions' section at the end of this report. The SCL 'Standard Terms of Appointment' are also included at the end of this report and these identify the contractual arrangements for the investigation. Conclusions or recommendations made in this report are limited to those which can be reasonably based upon the research and/or intrusive investigation work carried out. Any comments which rely on third-party information which has been provided to us are made in good faith and on the assumption that such information is accurate. SCL have not carried out independent validation of any third-party information.

Soil Consultants Ltd (SCL) has prepared this Report for the Client in accordance with the Terms of Appointment under which our services were performed. With respect to third parties, no other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by us. This Report may not be relied upon by any other party without the prior and express written agreement of SCL.

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General Information, Limitations and Exceptions
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APPENDIX A

Fieldwork, in-situ testing and monitoring

- Foreword
- Dynamic sampler borehole records
- Standard Penetration Test results
- SPT hammer calibration certificate
- Trial pit record
- Soakage test result
- TRL penetrometer test results
- Gas and groundwater monitoring results

Laboratory testing

- Index property tests
- Plasticity charts
- Particle size distribution tests

Ground profiles

- SPT'N' v depth plot

Contamination and chemical testing

- Foreword
- Standard soil suite test results
- WAC test results
- Sulphate/pH/sulphur suite

Site plans and drawings

- Topographic survey plan
- Proposed development plan
- Site Plan
- Location Plan

1.0 INTRODUCTION

Consideration is being given to the construction of a substantial new two-storey building within the school grounds, replacing some existing temporary buildings. In connection with the proposed works, Soil Consultants Ltd (SCL) were commissioned by CDC Studio on behalf of the client, Hillingdon Council, to carry out a ground investigation to include the following elements:

- Identification of ground sequence and groundwater conditions
- Provision of advice on foundations, floor slabs, buried concrete and the feasibility of the use of soakaways
- Outline on-site contamination appraisal

This report describes the intrusive investigation undertaken, gives a summary of the ground conditions encountered and discusses foundation options. A detailed environmental risk assessment or appraisal was not requested as part of our investigation; however, an outline on-site contamination appraisal has been provided.

2.0 SITE DESCRIPTION

A summary description of the site and its general setting is as follows:

Site location and setting	↓ Located within the grounds of Meadow Special School, about 2.7km south-east of Uxbridge town centre ↓ Predominantly residential area ↓ Approximate NGR 506470E 181710N
Site dimensions	↓ The proposed development area is rectangular in shape measuring approximately 50m (N-S) x 25m (E-W) at its centre
Site boundaries	↓ Existing single storey school building to the south, playground and MUGA to the east, temporary single storey modular buildings to the north and sports field to the west
Site description	↓ The site comprises an area within the northern part of the existing school grounds, which is currently occupied by several small temporary modular buildings, sheds, grassed areas and areas of hardstanding/playground
Topography and site levels	↓ Global Surveys Topographical Survey (Dwg. No 22198-TOPO, dated October 2022) indicates the proposed development area to generally slope gently down to the north from a maximum of about +33.40mOD adjacent to the existing school building, to about +32.70mOD within the northern part of the site
Existing vegetation within site and adjacent properties	↓ No vegetation is present within the site boundary/development area; however, some semi-mature/mature broadleaf trees are present within a grassed area north-west of the proposed development and lining Benson Close immediately north of the school grounds. Species include possible cherry

The current site features are shown on the Site Plan included in Appendix A.

3.0 EXPLORATORY WORK AND LABORATORY TESTING

The ground investigation was carried out on 13th October 2022 and is described below.

3.1 Constraints of investigation

The investigation was carried out in general accordance with the specification document (Ref 22022-MHA-WS-XX-SP-S-002, dated 08 August 2022) and site plan provided by MHA Structural Design, and access was unrestricted to the proposed exploratory points.

3.2 Dynamic sampler boreholes

Three dynamic (windowless) sampler boreholes (WS01 to WS03) were completed using a tracked rig, under the supervision of an experienced geotechnical engineer, to a maximum depth of 4.45mbgl. Standard Penetration (SPT) tests were undertaken at regular intervals and the hammer Energy Ratio (Er) for the equipment used was 81%; the relevant certificate is appended. Representative samples were taken for geotechnical and environmental testing and 35mm internal diameter combined water/gas monitoring pipes were installed in WS01 and WS03.

Preliminary falling head soakage testing was undertaken in WS01 and WS03 to provide information on the feasibility of the use of shallow soakaways.

3.3 Hand excavated trial pit

A single trial pit (TP01) was excavated using hand tools, at a location specified by the engineer, to expose and record details of the foundations to an existing school building.

3.4 CBR TRL penetrometer testing

CBR testing was undertaken at a location specified by the engineer, using a TRL penetrometer, to provide information for the design of a hard surfaced areas.

3.5 Gas and groundwater monitoring

Gas and groundwater monitoring was undertaken following completion of the fieldwork, on October 26th 2022.

3.6 Geotechnical laboratory testing

The following geotechnical laboratory testing was completed:

- Natural moisture content
- Index properties tests (Atterberg Limits)
- Particle size distribution analyses (PSD)

3.7 Chemical and contamination testing

Selected soil samples were delivered to a specialist laboratory (DETS Ltd) and the following testing was carried out:

- General soil suite - 3no samples
- General water suite - 1no sample
- WAC testing - 1no samples
- Soluble sulphate/sulphur/pH analyses - 5no samples

The engineering borehole/trial pit logs, in situ and the laboratory testing results are included in Appendix A.

4.0 GROUND CONDITIONS

Published BGS information (1:50,000 and 1:10,000 scale maps) indicates that the site is underlain by the Langley Silt resting on the Black Park Gravel Member; this is in turn underlain by the London Clay Formation. Our investigation revealed this sequence below a layer of topsoil/made ground, and locally possibly alluvial clay, as summarised below.

4.1 Topsoil/made ground

A layer of dark brown topsoil was present in all exploratory positions to depths of between 0.10m and 0.35m below ground level (bgl). Made ground was present beneath, extending to depths of between about 0.50m and 0.80mbgl and comprising brown slightly gravelly clay with brick and concrete fragments to sandy gravel of flint and concrete.

4.2 Alluvium

A thin layer (0.30m thick) of clay which we consider probably represent natural alluvial soils was encountered beneath the made ground in WS01 and extended to a depth of about 0.80mbgl. These soils comprised light greenish grey silty clay with subordinate flint gravel which had a distinct organic odour.

Atterberg limit tests indicate the soils to be of marginal low/intermediate plasticity (BS classification) and low volume change potential (NHBC classification).

4.3 Langley Silt

The natural Langley Silt was encountered beneath either made ground or alluvium and extended to depths of between 1.20m and 2.00mbgl, attaining a maximum thickness of 1.20m in WS01. These soils generally comprised brown/orangish brown/grey mottled silty clay with a variable proportion of flint gravel.

SPT 'N' values of 4 and 12, and hand shear vane measurements of between 15kN/m^2 and 50kN/m^2 are indicative of very low to medium strength clay soils. Atterberg limit tests indicate the soils to be of low to intermediate plasticity (BS classification) and medium volume change potential (NHBC classification), with one sample classifying non-plastic following modification for gravel content.

4.4 Black Park Gravel

The natural Black Park Gravel Member was encountered beneath the Langley Silt and was proven to a depth of about 4.0mbgl in WS03, attaining a thickness of 2.60m; the base of this stratum was not penetrated in WS01 or WS02 due to the density of the deposits preventing advancement of the drilling tools. These soils generally comprised brown/orangish brown flint gravel with a variable, but generally decreasing with depth, silt and clay content.

SPT 'N' values of between 29 and >50 (refusal) are indicative of a generally medium dense to very dense state of compaction. PSD analysis of the granular soils indicates a general predominance of gravel (between 58% and 74%) with subordinate sand (between 20% and 27%), and subordinate fines (up to 17%).

Atterberg testing on one sample of marginal granular/cohesive composition (29% fines) indicated the clay fraction to be of intermediate plasticity (BS classification) and the bulk sample to be non-plastic, following modification/allowance for gravel content.

4.5 London Clay Formation

The natural London Clay Formation was encountered at a depth of 4.0mbgl in WS03 and was present at the base of the borehole (4.45mbgl). Based on the SPT sample recovered, the soils comprised dark brown silty clay.

An SPT 'N' value of 12 is indicative medium strength clay soils, and Atterberg limit testing indicate the clay to be of high plasticity (BS classification) and medium volume change potential (NHBC classification).

4.6 Groundwater

Groundwater was present within the Black Park Gravel at depths of between about 2.0m and 2.10mbgl during drilling and between 1.61m and 1.62mbgl during post fieldwork monitoring undertaken on 26th October 2022. Of course, groundwater levels can vary seasonally and may be higher following periods of wet weather.

4.7 Existing foundations

A single trial pits (TP01) was excavated to provide details of the foundations of an existing school building. The findings from the trial pit are included in the Appendix as briefly summarised below:

Trial pit	Location	Foundation base depth	Projection from face of adjacent wall	Bearing stratum
TP01	Main school building	1.30m	0.20m	Light orangish brown/grey mottled slightly gravelly CLAY

5.0 GEOTECHNICAL ASSESSMENT

The proposed works at this site is the construction of a new two-storey teaching building comprising two separate blocks connected by a canopy. Based on the information provided, we understand column loads will be supported by a combination of discrete pad and strip foundations. Maximum column loads of about 1000kN, and line loads in the order of 64kN/m run, are envisaged.

Our investigation has revealed that beneath a layer of topsoil/made ground (up to 0.80m thick) and localised alluvial clay, the Langley Silt is present overlying the Black Park Gravel at depths of between about 1.20m and 2.00mbgl. The top of the underlying London Clay was proven at a depth of about 4.0mbgl within one borehole and is expected to attain a significant thickness in this area; the London Clay was not encountered within the remaining boreholes within the depth drilled. Groundwater was encountered within the Black Park Gravel at depths of between about 2.00m and 2.10m during drilling, and steady state levels of between 1.61m and 1.62mbgl were recorded during post fieldwork monitoring.

On the basis of our investigation the generally low to medium strength alluvial clay and Langley Silt will not be capable of supporting the envisaged moderate to high structural loads without risk of intolerable and differential settlement. We therefore consider that foundations should be placed within the underlying, competent, Black Park Gravel Member; this is discussed below.

5.1 Spread foundations

Foundations must bypass any topsoil/made ground and Langley Silt and be placed within the competent natural Black Park Gravel which, based on our boreholes, is present at depths of between about 1.20m and 2.00mbgl. It should be noted, however, that local deepening may be required to bypass any deeper pockets of topsoil/made ground, alluvial clay or existing services.

For preliminary assessment of foundations placed within the non-shrinkable Black Park Gravel, we envisage that an allowable bearing resistance of 175kN/m^2 would be appropriate; this would be applicable to moderate sized strip or pad foundations; based on the maximum applied column load, a pad base size of about 2.4m x 2.4m would be required. As required by EC7, the design engineer must ensure that the correct comparisons are made between Design Actions and Design Resistances after the application of appropriate partial factors and using the final base geometry. For ULS design the bearing resistance should be determined, using undrained and/or drained analysis as appropriate, to calculate the degree of utilisation of the foundation (limit state GEO). SLS checks should be carried out using appropriate methods in accordance with current practice.

The foundation excavations will encounter a variable layer of topsoil/made ground and both cohesive and granular natural soils; therefore, provision should be made for temporary lateral support. On the basis of our investigation undertaken in October 2022, excavations should generally remain dry if depths are kept to a practical minimum as recommended above. However, where granular soils are present at greater depth (for example WS01) water levels may be at or above excavation depth and may be even higher during winter/spring (when water levels are expected to reach their peak). If groundwater levels rise above

foundation formation levels control measures would be required to keep excavations dry and avoid soil disturbance. Such measures could include pumping from well points or sumps around excavations or installing trench sheeting sealed into the underlying London Clay Formation. We recommend that monitoring of the installations is carried out prior to construction to confirm variations in groundwater levels. Trial excavations, undertaken ahead of the main construction works, would allow an assessment of groundwater flows/rates and inform groundwater control measures. If inflow is sufficiently slow then it may be possible to cast foundations in short runs, and/or immediately following excavation.

Whilst some trees/vegetation is present to the north-west of the proposed development, foundations are expected to bear wholly within non-shrinkable granular soils and, therefore, desiccation is not considered to be a significant risk. Notwithstanding this, foundation excavations should be inspected by an experienced engineer and local deepening carried out to expose granular soils if any obviously desiccated/root infested clay soils are present at formation level. Where cohesive soils are present to >1.50m depth, a compressible material/void former should be placed on the inside faces of all foundations where within influence of trees, in full accordance with NHBC Chapter 4.2 guidelines.

5.2 Ground floor slabs

The investigation has indicated that up to 0.8m of topsoil and non-engineered made ground overlying shrinkable clay soils. Therefore, suspended floor slabs should be adopted for the new building, supported by the main foundations, and incorporating a suitable void beneath based on medium volume change susceptible soils.

5.4 Soakaways

Basic falling head soakage testing was undertaken in boreholes WS01 and WS03 to provide information on the feasibility of the use of shallow soakaways; infiltration rates of between $1.70x10^{-6}$m/s and $6x10^{-7}$m/s were measured. On this basis, we consider the shallow granular soils may provide a suitable medium for disposing of surface run-off if sufficient storage can be incorporated, subject to confirmatory full scale soakage testing in accordance with the procedure outlined in BRE DG365. However, the usual requirement to maintain a 1m buffer between the base of any soakaway and the water table may mean that soakaways cannot be used, and the water would need to be channelled into existing facilities. Whichever method is adopted, approval should be sought at an early stage from the EA. Full scale soakage testing should be undertaken at the location of soakaways once their location has been established. It is noted that the granular soils do attain an inherent variability and thus long trench soakaways may prove more efficient where full potential of more permeable areas could be utilised.

5.3 Pavement design

Based on the TRL penetrometer testing and geotechnical laboratory testing, as well as our observations on site, a CBR value of 1.5% is considered appropriate for the design of hard surfaced areas. The formation would comprise the Langley Silt (or locally alluvial clay), once any topsoil/made ground has been removed, and should be proof rolled prior to construction with any soft/loose zones replaced with suitably compacted granular material. The generally low strength shallow soils will be prone to disturbance from movement of heavy plant and inclement weather. Therefore, we recommend that the formation level is suitably

protected from the elements or construction is taken place immediately following removal of the topsoil/made ground.

Whilst marginal, it is likely that the soils at formation level would be frost-susceptible and general guidelines suggest that in this situation pavements should be designed with a minimum construction thickness of 450mm. This value can be reduced to 350mm if the mean annual frost index (MAFI) of the site is less than 50.

5.4 Foundation concrete

Low concentrations of water-soluble sulphates (2:1 water/soil extract) were measured in selected soil and groundwater samples, with near neutral to slightly alkaline pH values. The results fall into Site Design Class DS-1 of Table C2 given in BRE Special Digest 1 (2005). We assess the site as having 'mobile' groundwater and this would result in an ACEC Site Class of AC-1.

6.0 CONTAMINATION TESTING & OUTLINE APPRAISAL

The outline testing comprised analysis of three non-targeted shallow soil samples and a single water sample from within the proposed development area. Analysis was for a range of contaminants which included heavy metals/ semi-metals, hydrocarbons and asbestos. The soil test results have been assessed where relevant against the DEFRA Soil Guideline Values (SGV) and Category 4 Screening Levels (C4SLs), together with the LQM/CIEH Suitable 4 Use Level (S4UL) for Human Health Risk Assessment in which Generic Assessment Criteria (GACs) have been derived from the CLEA Model (2nd Edition, 2009). Groundwater test results have primarily been assessed against the Water Supply (Water Quality) Regulations 2016, Environmental Quality Standards (EQS) and the WHO Guidelines for Drinking Water Quality WHO/SDE/WSH/0.5.08/123.

The contamination testing was carried out specifically for the purpose of providing a general guidance with regards to the risk to construction workers (the main potential receptors) and end users. Reference should be made to the foreword to the appended contamination test results in order to fully understand the context in which this discussion should be viewed.

As there are currently no trigger levels for schools we have used the trigger levels for **residential (with home-grown produce)** to assess the results of the contamination testing (ie the most stringent criteria for human health). Using these trigger levels, all the determinants were below threshold concentrations, without exception. Therefore, the risk to construction workers and end users is considered low.

A rigorous hazard assessment of the results was not within the scope of our investigation, but our preliminary conclusion from the WAC testing undertaken is that the shallow made ground will probably classify as 'stable non-reactive hazardous waste in non-hazardous landfill'. Early consultations should be made with appropriate waste facilities or regulators to confirm the classification for off-site disposal.

The investigation has provided only limited coverage of the site and it is self-evident that there may be zones of contamination within the site which were not encountered. A careful watching brief should be kept during construction to ensure that any potentially contaminated soil encountered is disposed of in a safe and controlled manner. Site workers should observe normal hygiene precautions when handling soils and if material suspected of being contaminated is identified during construction, this should be set aside under protective cover and further tests undertaken to verify the nature and levels of contamination present. If contamination is present, a full site re-assessment may be required and a contingency should be in place in this regard.

7.0 GROUND GAS/VAPOUR MONITORING

Gas monitoring was undertaken on one occasion following completion of the boreholes. The results indicate depleted oxygen levels within the boreholes (generally about 0.2% in WS01 and 5% in WS02). However, we do not consider these results reflect the true ground gas regime and are probably the result of stagnant air in the borehole installations due to groundwater level generally being within the shallow, impermeable,

clay soils. This is evidenced by negative flow being measured in WS01. No elevated levels of methane or hydrogen sulphide was measured, while maximum carbon monoxide and carbon dioxide concentrations were 1ppm and 3.8% respectively; the maximum recorded PID concentration was 3.5ppm.

On the basis of these results, we consider that Characteristic Situation 1 (very low risk) is appropriate (as described in CIRIA C665 “Assessing risks posed by hazardous ground gases to buildings”, 2007); this assessment should be confirmed with the local EHO/building control, who may require additional monitoring.

GENERAL INFORMATION, LIMITATIONS AND EXCEPTIONS

Unless otherwise stated, our Report should be construed as being a Ground Investigation Report (GIR) as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report (GDR) as defined in EN1997-2. Any 'design' recommendations which are provided are for guidance only and are intended to allow the designer to assess the results and implications of our investigation/testing and to permit preliminary design of relevant elements of the proposed scheme.

The methods of investigation used have been chosen taking into account the constraints of the site including but not limited to access and space limitations. Where it has not been possible to reasonably use an EC7 compliant investigation technique we have adopted a practical technique to obtain indicative soil parameters and any interpretation is based upon our engineering experience and relevant published information.

The Report is issued on the condition that Soil Consultants Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during our investigation. In addition, Soil Consultants Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata between the exploratory points, below the maximum depth of the investigation or where site conditions have changed since the exploratory work; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.

Comments made relating to ground-water or ground-gas are based upon observations made during our investigation unless otherwise stated. Ground-water and ground-gas conditions may vary with time from those reported due to factors such as seasonal effects, atmospheric effects and and/or tidal conditions. We recommend that if monitoring installations have been included as part of our investigation, continued monitoring should be carried out to maximise the information gained.

Specific geotechnical features/hazards such as (but not limited to) areas of root-related desiccation and dissolution features in chalk/soluble rock can exist in discrete localised areas - there can be no certainty that any or all of such features/hazards have been located, sampled or identified. Where a risk is identified the designer should provide appropriate contingencies to mitigate the risk through additional exploratory work and/or an engineered solution.

Where a specific risk of ground dissolution features has been identified in our Report (anything above a 'low' risk rating), reference should be made to the local building control to establish whether there are any specific local requirements for foundation design and appropriate allowances should be incorporated into the design. If such a risk assessment was not within the scope of our investigation and where it is deemed that the ground sequence may give rise to such a risk (for example near-surface chalk strata) it is recommended that an appropriate assessment should be undertaken prior to design of foundations.

Where spread foundations are used, we recommend that all excavations are inspected and approved by suitably experienced personnel; appropriate inspection records should be kept. This should also apply to any structures which are in direct contact with the soil where the soil could have a detrimental effect on performance or integrity of the structure.

Ground contamination often exists in small discrete areas - there can be no certainty that any or all such areas have been located, sampled or identified.

The findings and opinions conveyed in this Report may be based on information from a variety of sources such as previous desk studies, investigations or chemical analyses. Soil Consultants Limited cannot and does not provide any guarantee as to the authenticity, accuracy or reliability of such information from third parties; such information has not been independently verified unless stated in our Report. No liability will be accepted for changes to the ground and groundwater conditions which occur post investigation.

Our Report is written in the context of an agreed scope of work between Soil Consultants Ltd and the Client and should not be used in any different context. In light of additional information becoming available, improved practices and changes in legislation, amendment or re-interpretation of the assessment or the Report in part or in whole may be necessary after its original publication.

Unless otherwise stated our investigation does not include an arboricultural survey, asbestos survey, ecological survey or flood risk assessment and these should be deemed to be outside the scope of our investigation.

We will identify tree and plant species if possible, but a suitably qualified arboriculturalist/botanist should be consulted to provide definitive identification

STANDARD TERMS OF APPOINTMENT OF SOIL CONSULTANTS LTD FOR GEOTECHNICAL SERVICES

1 Unless previously withdrawn, our offer remains valid for a period of sixty days from date of offer. If an instruction is given after the sixty days we reserve the right to reasonably adjust any cost associated with the project to reflect any variance on the original offer. In placing an instruction to proceed with exploratory work, whether directly from the Client or Client's representative, the Client is deemed to have accepted our Terms of Appointment.

2 Our offer is on the basis that free, unhindered access and working conditions are available and that the investigation can be completed in one visit, if applicable. Delays beyond our control will incur additional charges. If additional works outside our offer are required to facilitate the investigation these will be advised and any costs will be passed on to the Client.

3 In our quotation we will provide an estimate of any mobilisation period following an instruction to proceed. This estimate will be accurate at the time of quotation, but it should be noted that the mobilisation period may vary at a later date due to factors such as sub-contractor availability and workload.

4 In commissioning this work, the Client has a responsibility for the health, safety and welfare of operatives invited to undertake work on their site. The Client shall indemnify us in respect of any failure to fulfil their obligations in connection with all relevant and current Health and Safety Regulations.

5 The methods of investigation used have been chosen taking into account the constraints of the site including but not limited to access, space and budgetary limitations. Where it has not been possible to reasonably use an EC7 compliant investigation technique, or where a non-compliant technique has been specified, we will adopt practical and appropriate techniques to obtain indicative soil parameters.

6 Unless otherwise stated, our Report should be construed as being a Ground Investigation Report (GIR) as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report (GDR) as defined in BS EN1997-2. Any interpretation which is provided is for guidance only and must not be regarded as design or design recommendation.

7 Where excavation is required as part of the exploratory work, the Client shall provide drawings or plans showing accurate and complete locations of all underground services and structures. In performing our service, we shall take reasonable precautions to avoid damage to underground services or structures. We will not be responsible for any damage caused to underground services or structures and will not be liable for any claims for damage, expenses arising or losses unless the location of all underground services or structures are accurately shown on drawings and those plans have been provided to us in good time prior to commencement of the exploratory work. Risk to the Client can be further reduced by undertaking a scan of the site using a specialist underground scanning service which would be intended to identify traceable services at shallow depth.

8 With some sites, especially those in certain areas of London and other large towns and cities, there may be a risk of unexploded ordnance (UXO) being present. Unless otherwise stated our offer is on the basis that the Client or their representative provides a preliminary UXO risk assessment for the site. It should be noted that if the site is deemed to be in an area of risk then further measures will be required. These would normally comprise either a more detailed risk assessment and/or specialist site attendance by an EOD engineer. These measures can be commissioned either by the Client or Soil Consultants Ltd. If the Client requires, we would be pleased to obtain a preliminary risk assessment at cost+10%.

9 The Client will supply a site plan (to a rational scale), an indication of the scope and type of the proposed development and an indication of any relevant structural loading information.

10 Should the Client terminate the contract after instruction, we reserve the right to recover costs associated to work carried out between the time of instruction and the point of termination. Cancellation fees, and material costs shall be charged at cost plus 20% (+VAT). Engineer/technician time shall be charged at £95+VAT per hour and principal consultant/director time shall be charged at £125+VAT per hour.

11 The Report is issued on the condition that Soil Consultants Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during the investigation. In addition Soil Consultants Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata both between the exploratory points and/or below the maximum depth of the investigation; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.

12 If and when instructed, an agreed number of contamination tests will be carried out to give an outline assessment of potential contaminants. In some circumstances it may be necessary to recommend further monitoring, contamination testing and assessment and the scope of this work would be agreed with the Client. Notwithstanding this additional scope, local regulatory authorities may have specific requirements which need to be addressed. Unless otherwise agreed or stated our reporting will constitute neither a Quantitative Risk Assessment nor a Remediation Statement or Strategy.

13 Our reports are counter-checked by one of our suitably qualified and experienced engineers/geologists.

14 Notwithstanding anything to the contrary contained in these terms, our liability under or in connection with these terms whether in contract or in tort, in negligence, for breach of statutory duty or otherwise (other than in respect of personal injury or death) shall not exceed the sum equivalent to ten times our contract fee or £100,000 whichever is less in the aggregate for geotechnical and environmental matters unless otherwise agreed.

15 Without prejudice to any other exclusion or limitation of liability, damages, loss, expense or costs our liability for any claim or claims under this agreement be further limited to such sum as it would be just and equitable for us to pay having regard to the extent of our responsibility for the loss or damage giving rise to such claim or claims ("the loss and damage") and on the assumptions that:

(a) All other consultants, contractors, sub-contractors, project managers or advisers engaged in connection with the Project have provided contractual undertakings to the Client on terms no less onerous than those set out in the original contracts in respect of the carrying out of their obligations in connection with the Project; and

(b) There are no exclusions of or limitations of liability nor joint insurance or co-insurance provisions between the Client and any other party referred to in this clause and any such other party who is responsible to any extent for the loss and damage is contractually liable to the Client for the loss and damage; and

(c) All such other consultants, contractors, sub-contractors, project managers or advisers have paid to the Client such proportion of the loss or damage which it would be just and equitable for them to pay having regard to the extent of their responsibility for the loss and damage.

16 Further and notwithstanding anything to the contrary contained in this agreement and without prejudice to any provision in this agreement whereby liability is excluded or limited to a lesser amount, our liability under or in connection with this agreement whether in contract or in tort, in negligence, for breach of statutory duty or otherwise for any claim shall not exceed the amount, if any, recoverable by us by way of indemnity against the claim in question under professional indemnity insurance taken out by us and in force at the time that the claims or (if earlier) circumstances that may give rise to the claim is or are reported to the insurers in question. The limitation shall not apply if no such amount is recoverable due to us having been in breach of our obligations or the terms of any insurance maintained in accordance therewith or having failed to report any such claim or circumstances to the Insurers in question timeously.

17 Whilst our investigation may include asbestos screening/quantification on selected samples, this must not be deemed to constitute a full asbestos survey or be taken as sufficient to definitively identify the presence or quantity of asbestos within or on the ground. We will not accept responsibility if asbestos is encountered during any subsequent construction or development works and in placing a contract with us the Client accepts this condition. Where the fabric of a building is to be disturbed, the Client shall provide an appropriate asbestos survey to us prior to exploratory work and make adequate provision to allow us to provide relevant protective/remedial measures to progress the work safely.

18 The Client agrees that they shall not bring any claim personally against any director/employee of Soil Consultants Ltd or consultant to us in respect of loss or damage suffered by the Client arising out of this contract.

19 Our appointment shall be under simple agreement and our liability under this contract shall be for a period of six years from date of appointment.

20 Our reports are non-assignable and are prepared for the benefit of the Client. No reliance can be assumed by others without written agreement from Soil Consultants Ltd. We will provide a letter of reliance at our discretion and this will be subject to payment of our fee, which will be 10% of contract value, subject to a minimum fee of £750 plus VAT. The terms of our letter of reliance are non-negotiable and the beneficiary should be aware that the information shall only apply to the scheme for which the report was originally produced and the original rights and benefits will apply.

21 A VAT invoice (at current rate) will be presented in respect of the work undertaken. Payment of our account is to be made within twenty-eight days of issue of our invoice unless otherwise agreed. On no account shall payment be on a 'pay-when-paid' basis. The information contained within our report remains the property of Soil Consultants Ltd and no reliance may be assumed by any party with an interest in the project until payment has been received in full. After one calendar month interest shall be chargeable at 10% above the Bank of England Rate and compensation claimed in accordance with 'Late Payments of Commercial Debts (Interest) Act 1998 and subsequent revisions. If the debt is referred to a debt collection agency then we have the right to recover associated fees under the terms of our contract.

APPENDIX A

Fieldwork, in-situ testing and monitoring

- Foreword
- Dynamic sampler borehole records
- Standard Penetration Test results
- SPT hammer calibration certificate
- Trial pit record
- Soakage test result
- TRL penetrometer test results
- Gas and groundwater monitoring results

Laboratory testing

- Index property tests
- Plasticity charts
- Particle size distribution tests

Ground profiles

- SPT'N' v depth plot

Contamination and chemical testing

- Foreword
- Standard soil suite test results
- WAC test results
- Sulphate/pH/sulphur suite

Site plans and drawings

- Topographic survey plan
- Proposed development plan
- Site Plan
- Location Plan

FOREWORD FOR DYNAMIC SAMPLER BOREHOLES (WINDOWLESS) - GUIDANCE NOTES

GENERAL

The borehole records are compiled from the driller's description of the strata encountered, an examination of the samples by our geotechnical engineer and the results of in-situ and laboratory tests. Based on these data, the report presents an opinion on the configuration of strata within the site. However, such reasonable assumptions are given for guidance only and no liability can be accepted for changes in conditions not revealed by the boreholes.

BORING METHODS

The dynamic sampler technique uses 1m long tubes containing a rigid plastic liner. These are driven into the ground by a falling hammer, then withdrawn and the liner removed. The borehole commences using a large diameter tube (usually 100mm) with each succeeding tube reducing usually by 10mm in diameter to assist the extraction of the tube from the ground. Thus, it is theoretically possible to obtain a total continuous sample of the soil for examination or testing. Casing can be utilised as required. The technique allows the ground conditions to be reasonably well established although disturbance of the ground is inevitable, particularly some "softening" of the upper zone of clay immediately beneath a granular soil. The presence of thin layers of different soils within a stratum may not always be detected.

GROUND WATER

The depth at which ground water was struck is entered on the borehole records. However, this observation may not indicate the true water level at that time. Due to the speed of boring and the relatively small diameter of the borehole, natural ground water may be present at a depth higher than the water strike. Moreover, ground water levels are subject to variations caused by changes in the local drainage conditions and by seasonal effects. When a moderate inflow of water does take place, boring is suspended for at least 10 minutes to enable a more accurate short-term water level to be achieved. An estimate of the rate of inflow is also given. This is a relative term and serves only as a guide to the probable flow of water into an excavation.

Further observations of the water level made during the progress of the borehole are shown including end of shift and overnight readings and the depth at which water was sealed off by the borehole casing, if applicable.

SAMPLES

Small disturbed samples can be recovered from the lining tubes for subsequent laboratory testing, including moisture content, index property tests and contamination analyses.

IN-SITU TESTING

Standard Penetration Test (SPT): this test is performed in accordance with the procedure given in BS EN ISO 22476-3:2005. The individual blow count record for each test is given on a separate table. The 'N' value is normally the number of blows to achieve a penetration of 0.3m following a seating distance of 0.15m and is quoted at the mid-depth of the test zone. However if a change of stratum occurs within the test zone then a revised 'N' value can be calculated to assess one layer in particular. In hard strata full penetration may not be obtained. The presence of groundwater and particularly Where groundwater can affect the test and the measured values may not represent the true in-situ density of the soil.

Hand Shear Vane: provides the shear strength of cohesive soils, values reported in kPa

Pocket Penetrometer: provides an estimate of the unconfined compression strength, values reported in kg/cm^2

Site & Location:	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Borehole No:	**WS01**
Client:	**Hillingdon Council**	Coordinates: 506483E, 181695N	Sheet 1 of 1
Engineer:	**MHA Structural Design**	Ground Level: +33.23mOD	Report No: 10776/JW

Progress & Observations	Samples & Tests Type	Samples & Tests Depth (m)	Field Test Results	Strata Depth (m)	Strata Level (m)	Legend	Strata Descriptions	Backfill / Installation
BH commenced: 13 October 2022							Grass over dark brown TOPSOIL with frequent roots	
	D	0.30		0.35	32.88		MADE GROUND: light grey sandy gravel. Gravel is fine to coarse flint and concrete fragments	
	D	0.60		0.50	32.73		Firm light greenish grey slightly gravelly silty CLAY with occasional roots and a slight organic odour. Gravel is angular to subangular fine to coarse flint	
	D	0.90		0.80	32.43		Soft, locally firm, brown/orangish brown/grey mottled slightly gravelly silty CLAY with occasional black staining. Gravel subangular fine flint	
	SPT/S	1.00	N=4					
Hand excavated inspection pit to 1.20m	D	1.20						
BH dia: 100mm from 1.20m to 2.0mbgl, reducing with depth	D	1.50					*below 1.50m; becoming soft and slightly sandy*	
	HV	1.50	50					
	HV	1.70	20					
	D	1.80						
	HV	1.90	15					
	SPT/S	2.00	N=36	2.00	31.23		Dense dark brown very clayey GRAVEL. Gravel is angular to subrounded fine to coarse flint	
	D	2.30						
	D	2.50		2.50	30.73		Very dense light brown clayey very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint	
	SPT/S	2.60	N>50*					
BH refused at 2.90m Groundwater level: 2.05m				2.90	30.33		End of hole at 2.90m	

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet

Borehole type: Dynamic Sampler

Remarks: a) Ground level and coordinates from Global Surveys Topographic Survey (Dwg. No 2298-TOPO, dated October 2022)

b) 35mm ID standpipe installed to 2.70m

Borehole No: **WS01**

Soil Consultants

Site & Location:	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Borehole No:	**WS02**
Client:	**Hillingdon Council**	Coordinates: 506448E, 181710N	Sheet 1 of 1
Engineer:	**MHA Structural Design**	Ground Level: +32.71mOD	Report No: 10776/JW

Progress & Observations	Samples & Tests: Type	Samples & Tests: Depth (m)	Field Test Results	Strata: Depth (m)	Strata: Level (m)	Legend	Strata Descriptions	Backfill / Installation
BH commenced: 13 October 2022							Grass over dark brown TOPSOIL with frequent roots and occasinal brick fragments	
	D	0.30		0.30	32.41		MADE GROUND: dark brown silty sand clay with occasional roots and brick fragments	
				0.60	32.11		Soft to firm light brown, orangish brown and light grey mottled silty CLAY	
	D	0.80						
	SPT/S	1.00	N=14					
	D	1.10						
Hand excavated inspection pit to 1.20m BH dia: 100mm from 1.20m to 2.0mbgl, reducing with depth				1.20	31.51		Medium dense light orangish brown and grey mottled clayey silty very sandy GRAVEL. Gravel is angular to rounded fine to coarse flint	
	D	1.60						
				1.80	30.91		Dense orangish brown clayey very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint and quartzite. Occasional pockets of gravelly clay	
	D	1.90						
	SPT/S	2.00	N=37					
	D	2.30						
	D	2.50						
	SPT/S	2.55	N=44					
BH refused at 3.00m Groundwater level: 1.79m				3.00	29.71		End of hole at 3.00m	

1
2
3
4
5

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet

Borehole type: Dynamic Sampler

Remarks: a) Ground level and coordinates from Global Surveys Topographic Survey (Dwg. No 2298-TOPO, dated October 2022)

b) BH backfilled with arisings

Borehole No: **WS02**

Soil Consultants

Site & Location:	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Borehole No:	**WS03**
Client:	**Hillingdon Council**	Coordinates: 506449E, 181740N	Sheet 1 of 1
Engineer:	**MHA Structural Design**	Ground Level: +33.00mOD	Report No: 10776/JW

Progress & Observations	Samples & Tests Type	Samples & Tests Depth (m)	Field Test Results	Strata Depth (m)	Strata Level (m)	Legend	Strata Descriptions	Backfill / Installation
BH commenced: 13 October 2022	D	0.10		0.10	32.90		Dark brown TOPSOIL with frequent decayed organic matter	
	D	0.50					MADE GROUND: light brown slightly gravelly silty clay. Gravel fine to medium flint	
	D	0.90		0.80	32.20		Soft to firm light brown, grey and orangish brown silty gravelly CLAY. Gravel is angular to subrounded fine to coase flint	
	SPT/S	1.00	N=12					1
Hand excavated inspection pit to 1.20m	D	1.20						
BH dia: 100mm from 1.20m to 2.0mbgl, reducing with depth				1.40	31.60		Medium dense orangish brown clayey sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint and quartzite. Occasional pockets of gravelly clay	
	D	1.60						
	SPT/S	2.00	N=29					2
	D	2.50						
	SPT/S	3.00	N=36	3.00	30.00		Dense dark greyish brown silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint	3
	D	3.50						
	D	4.00		4.00	29.00		Stiff dark brown CLAY	4
	SPT/S	4.00	N=16					
BH completed: 13 October 2022 BH depth: 4.45m Groundwater depth: 2.06				4.45	28.55		End of hole at 4.45m	5

Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet

Borehole type: Dynamic Sampler

Remarks: a) Ground level and coordinates from Global Surveys Topographic Survey (Dwg. No 2298-TOPO, dated October 2022)

b) 35mm ID standpipe installed to 3.00m

Borehole No: **WS03**

Soil Consultants

CHARLIE RIG

Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	110RP 76
Test Date:	02/02/2022
Report Date:	02/02/2022
File Name:	110RP 76.spt
Test Operator:	NPB

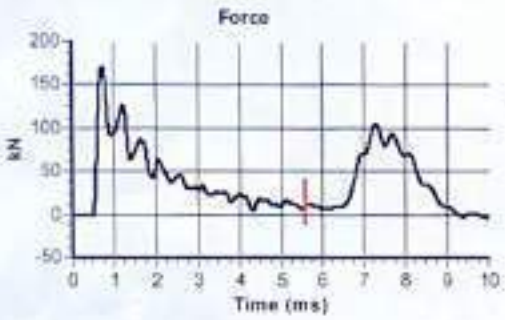
Instrumented Rod Data

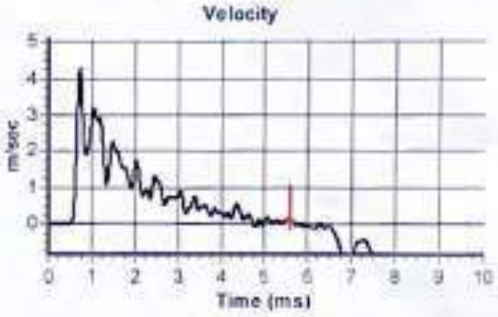
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.6
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	64786
Accelerometer No.2:	64789

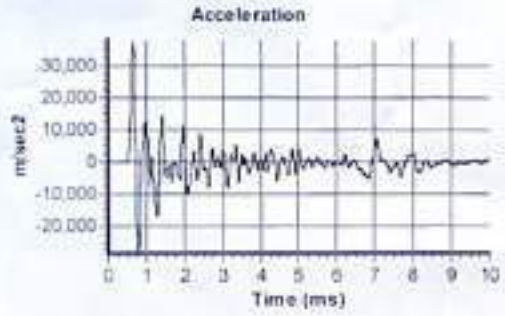
SPT Hammer Information

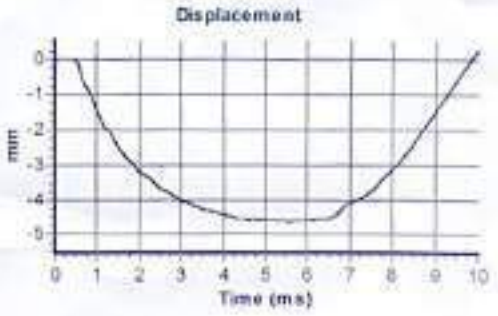
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	14.5

Comments / Location
CHARLWOODS









Calculations

Area of Rod A (mm2):	983
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	382

Energy Ratio E_r (%): **81**

N Burrows

Signed: N Burrows
Title: FOC Manager

The recommended calibration interval is 12 months

Site & Location	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Report No:	**10776/JW**

STANDARD PENETRATION TEST SUMMARY

BH ID	Depth (m)	Test type	N value (Note b)	Blow-counts and penetration						Casing depth (m)	Water depth (m)	Remarks
				Seating blows		Test blows						
WS01	1.00	S	N=4	1	1	1	1	1	1	0.00	BH dry	
WS01	2.00	S	N=36	2	4	7	8	8	13	0.00	BH dry	
WS01	2.60	S	(50)	10	14	15	15	20		0.00	2.00	
WS02	1.00	S	N=14	2	2	3	3	4	4	0.00	BH dry	
WS02	2.00	S	N=37	5	7	8	7	10	12	0.00	BH dry	
WS02	2.55	S	N=44	10	12	11	11	11	11	0.00	2.00	
WS03	1.00	S	N=12	2	2	3	3	3	3	0.00	BH dry	
WS03	2.00	S	N=29	4	5	4	6	9	10	0.00	BH dry	
WS03	3.00	S	N=36	6	7	8	9	10	9	0.00	2.00	
WS03	4.00	S	N=16	6	5	4	4	4	4	0.00	2.00	

a) Standard Penetration Test : BS EN ISO 22476:2005 Part 3

b) Where full penetration was not achieved, the total test blow-counts are reported

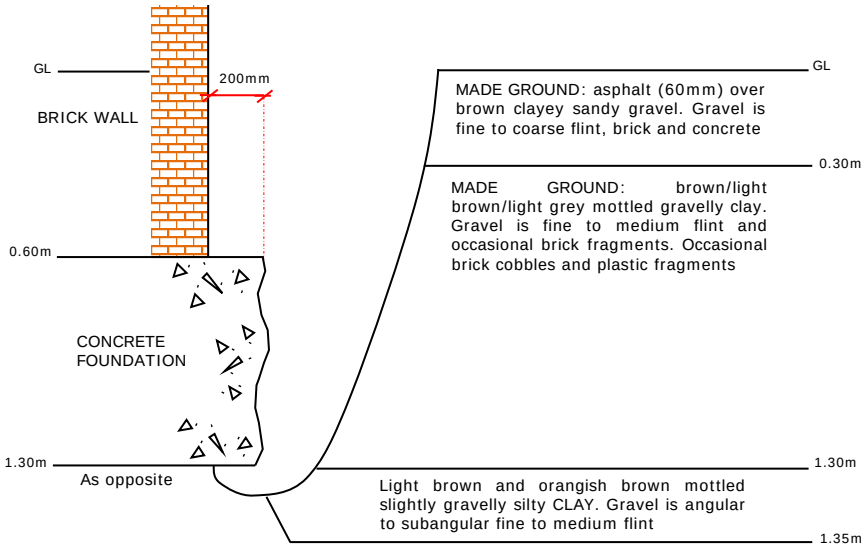
c) Hammer Energy Ratio, Er = 81%

Soil Consultants

Site & Location	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	Trial Pit No: TP01 (1 of 2)
Client:	Hillingdon Council	Report No: 10776/JW
Engineer:	MHA Structural Design	

PLAN

SECTION A-A' (looking WSW)



D = small disturbed sample, E = environmental sample (glass jar and tub), HV = hand shear vane test (kPa), pp = pocket penetrometer (kg/cm²)

Date:	13/10/22	Groundwater details	Samples
Equipment:	Hand excavated	• Dry	D @ 0.60m
Stability:	Stable		
Remarks:			Logged by: JW

Soil Consultants

Site & Location	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	Trial Pit No: TP01 (2 of 2)
Client:	Hillingdon Council	Report No: 10776/JW
Engineer:	MHA Structural Design	

PHOTOGRAPHS

D = small disturbed sample, E = environmental sample (glass jar and tub), HV = hand shear vane test (kPa), pp = pocket penetrometer (kg/cm²)

Date:	13/10/22	**Groundwater details**	**Samples**
Equipment:	Hand excavated	• Dry	D @ 0.60m
Stability:	Stable		
Remarks:			**Logged by**: JW

Soil Consultants

Site & Location	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	Report No: 10776/JW

Borehole soakage test results

BH No: WS01 **Depth:** 2.90 m **Test No:** 1

Dimensions:

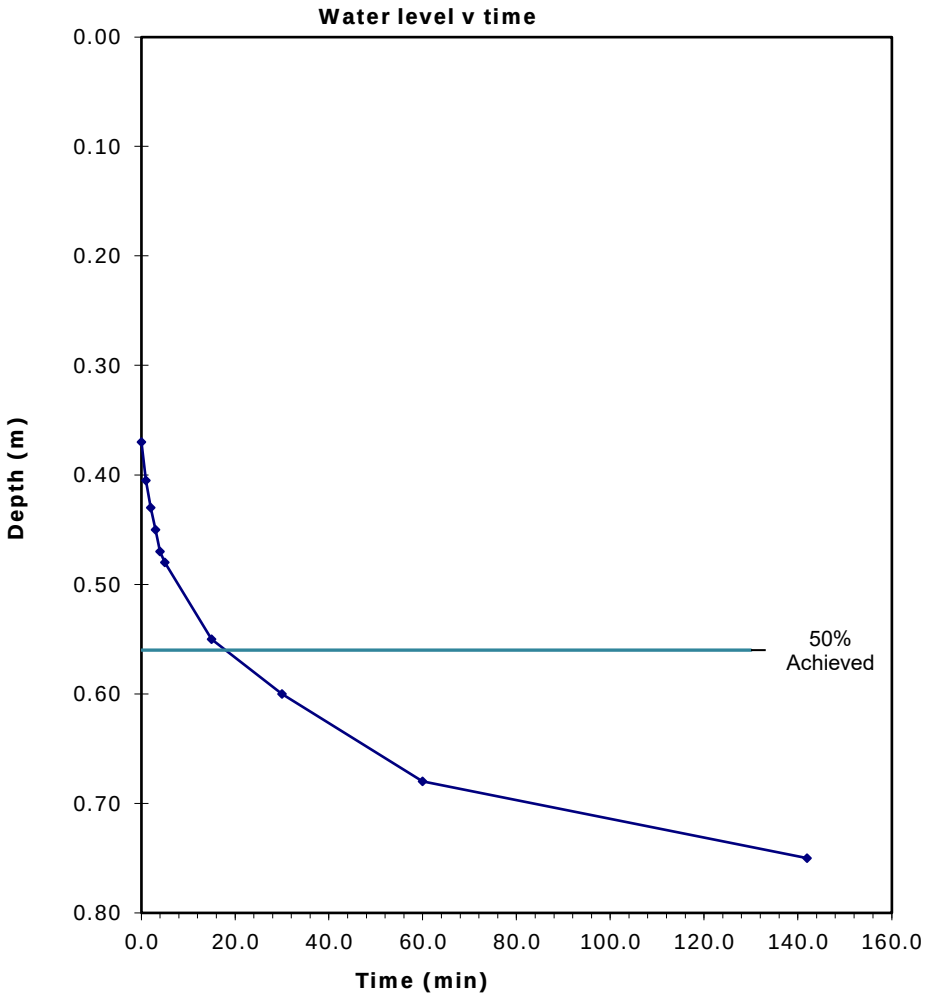
BH Diameter = 0.085 m

Casing Depth = 0.00 m

Ground sequence: See WS01 Log

GW Standing at: **2.05 m**

Time (mins)	Depth (mBGL)
0.0	0.37
1.0	0.41
2.0	0.43
3.0	0.45
4.0	0.47
5.0	0.48
15.0	0.55
30.0	0.60
60.0	0.68
142.0	0.75



Depth of water at start of test	0.37	m
Depth of water at end of test	0.75	m
Depth at 75% full	0.465	m
Depth at 25% full	0.655	m
Base area of pit	0.006	m^2
Effective soakage area a_{s50}	0.631	m^2
Volume Change V_{75}-V_{25}	0.001	m^3
Time used in calculation t_{p75}	225	sec
Time used in calculation t_{p25}	3038	sec

Soil infiltration rate 6.08E-07 m/sec

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")

Soil Consultants

Site & Location	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	Report No: 10776/JW

Borehole soakage test results

BH No: WS03 **Depth:** 3.00 m **Test No:** 1

Dimensions:

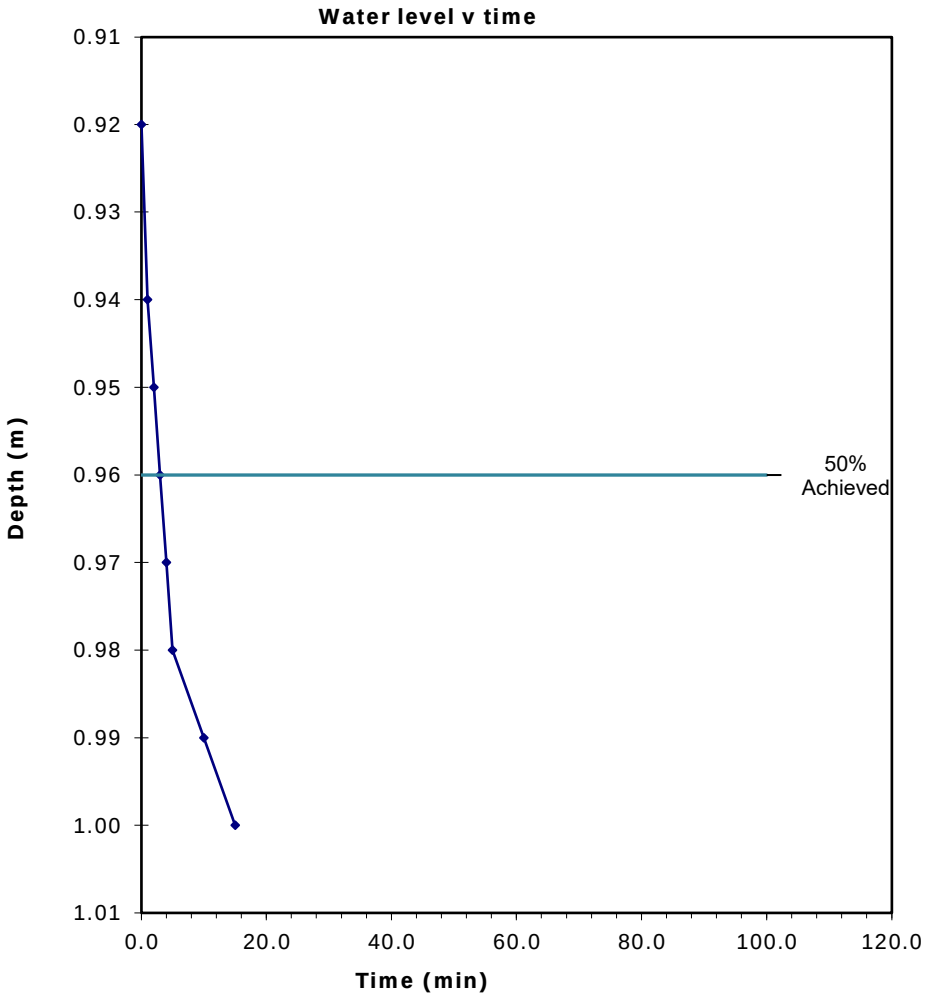
BH Diameter = 0.085 m

Casing Depth = 0.00 m

Ground sequence: See WS03 Log

GW Standing at: **2.06 m**

Time (mins)	Depth (mBGL)
0.0	0.92
1.0	0.94
2.0	0.95
3.0	0.96
4.0	0.97
5.0	0.98
10.0	0.99
15.0	1.00



Depth of water at start of test	0.92	m
Depth of water at end of test	1.00	m
Depth at 75% full	0.940	m
Depth at 25% full	0.980	m
Base area of pit	0.006	m^2
Effective soakage area a_{s50}	0.550	m^2
Volume Change V_{75}-V_{25}	0.000	m^3
Time used in calculation t_{p75}	60	sec
Time used in calculation t_{p25}	300	sec

Soil infiltration rate 1.72E-06 m/sec

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")

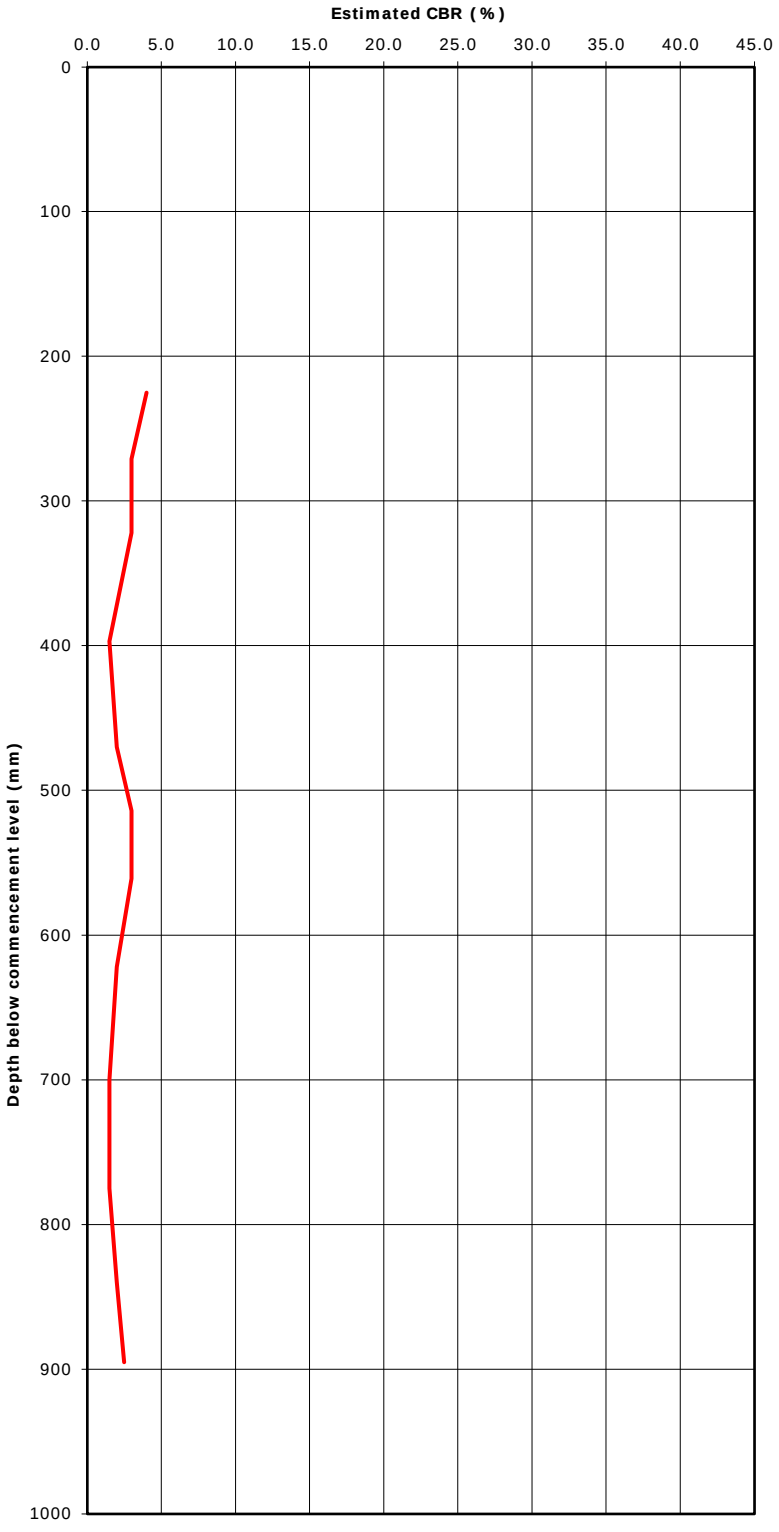
Soil Consultants

Site & Location	**Meadow Special School Royal Lane, Uxbridge UB8 3QU**	TRL Probe No:	**CBR01**
Client:	**Hillingdon Council**	(Sheet 1 of 1)	
Engineers:	**MHA Structural Design**	Report No:	**10776/JW**

TRL Dynamic Cone Penetration test result

Blow Count	Depth (mm)	mm per blow	CBR (%)
0	187	0	
1	225	38.0	4.0
2	271	46.0	3.0
3	322	51.0	3.0
4	397	75.0	1.5
5	470	73.0	2.0
6	514	44.0	3.0
7	561	47.0	3.0
8	622	61.0	2.0
9	700	78.0	1.5
10	775	75.0	1.5
11	840	65.0	2.0
12	895	55.0	2.5

PLOT OF CBR VS DEPTH



Date of test:	**10.11.22**
Depth test commenced (mm bgl):	**146**

Remarks:

Site & Location		Report No:
	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	**10776/JW**

Results of groundwater/gas monitoring

Date:	**26/10/2022**	Monitoring equipment	
Barometric pressure:		Instrument:	GA5000. No. G505055
a) Trend (24hrs):	**Rising**	Calibration check details:	See note 2 below
b) At start (mB):	**1010**	Next calibration date:	Feb 2023
Recorded by:	**NB**		
Surface ground conditions:	**Damp**		
Weather conditions:	**Sunny**		
Ambient air temp (°C):	**18**		

Notes:

1) Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit

2) Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH_4, 5% CO_2 and 6% O_2 gas mixture

3) CH_4 = methane; CO_2 = carbon dioxide; CO = carbon monoxide; O_2 = oxygen; H_2S = hydrogen sulphide

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS01	14:52:08	35	1.61	2.77

Time (s)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)	PID (ppm)
0	0.0	0.1	21.1	0	0	0.1
15	0.0	1.6	4.3	0	0	2.7
30	0.0	1.6	0.5	1	0	2.8
45	0.0	1.6	0.3	1	0	3.1
60	0.0	1.6	0.3	1	0	3.2
75	0.0	1.6	0.2	1	0	3.2
90	0.0	1.6	0.2	1	0	3.4
105	0.0	1.6	0.2	1	0	3.4
120	0.0	1.7	0.2	1	0	3.5
135	0.0	1.7	0.2	1	0	3.5
150	0.0	1.8	0.2	1	0	3.4
165	0.0	2.1	0.3	1	0	3.3
180	0.0	2.5	0.5	1	0	3.2

Max CH_4 (%)	0.0
Max CO_2 (%)	2.5
Min O_2 (%)	0.2
Max CO (ppm)	1
Max H_2S (ppm)	0
Max PID (ppm)	3.5

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
-5.7	N/A	-5.7	1.30

Remarks: Groundwater sample taken.

Site & Location		Report No:
	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	**10776/JW**

Results of groundwater/gas monitoring

Date:	**26/10/2022**	Monitoring equipment	
Barometric pressure:		Instrument:	GA5000. No. G505055
a) Trend (24hrs):	**Rising**	Calibration check details:	See note 2 below
b) At start (mB):	**1010**	Next calibration date:	Feb 2023
Recorded by:	**NB**		
Surface ground conditions:	**Dry**		
Weather conditions:	**Sunny**		
Ambient air temp (°C):	**18**		

Notes:

1) Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit

2) Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH_4, 5% CO_2 and 6% O_2 gas mixture

3) CH_4 = methane; CO_2 = carbon dioxide; CO = carbon monoxide; O_2 = oxygen; H_2S = hydrogen sulphide

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS03	15:28:14	35	1.62	2.92

Time (s)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)	PID (ppm)
0	0.0	0.1	21.5	0	0	0.1
15	0.0	3.6	9.2	1	0	1.3
30	0.0	3.6	5.8	1	0	1.3
45	0.0	3.6	5.6	1	0	1.3
60	0.0	3.7	5.6	1	0	1.2
75	0.0	3.7	5.5	1	0	1.1
90	0.0	3.7	5.4	1	0	1.1
105	0.0	3.7	5.3	1	0	1.0
120	0.0	3.7	5.3	1	0	0.9
135	0.0	3.8	5.2	1	0	0.9
150	0.0	3.8	5.2	1	0	0.8
165	0.0	3.8	5.3	1	0	0.8
180	0.0	3.8	5.6	1	0	0.8
300	0.0	3.8	6.0	0	0	0.8

Max CH_4 (%)	0.0
Max CO_2 (%)	3.8
Min O_2 (%)	5.2
Max CO (ppm)	1
Max H_2S (ppm)	0
Max PID (ppm)	1.3

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.0	0.1	0.1	0.05

Site & Location: **Meadow Special School, Royal Lane, Uxbridge UB8 3QU**

Report No: **10776/JW**

SUMMARY OF CLASSIFICATION TEST RESULTS

BH ID	Depth (m)	Type	w (%)	w_L (%)	w_P (%)	Pass 425 (%)	I_P (%)	Mod I_P (%)	I_L (%)	LOI (%)	Description
WS01	0.60	D	19	35	21	93**	14	13	-0.12		Light greenish grey slightly gravelly silty CLAY
WS01	1.50	D	21								Brown/orangish brown/grey mottled slightly gravelly silty CLAY with occasional black staining
WS01	2.30	D	9	36	19	29.6**	17	5	-0.59		Dark brown very clayey GRAVEL
WS02	0.80	D	24	49	23	>95	26		0.02		Firm light brown, orangish brown and light grey mottled silty CLAY
WS03	1.20	D	10	29	16	46.5**	13	6	-0.47		Light brown, grey and orangish brown silty gravelly CLAY
WS03	4.00	D	28	64	27	86**	37	32	0.02		Dark brown CLAY

Testing in accordance with BS EN ISO 17892 unless specified otherwise

Date: 02 Jan 00

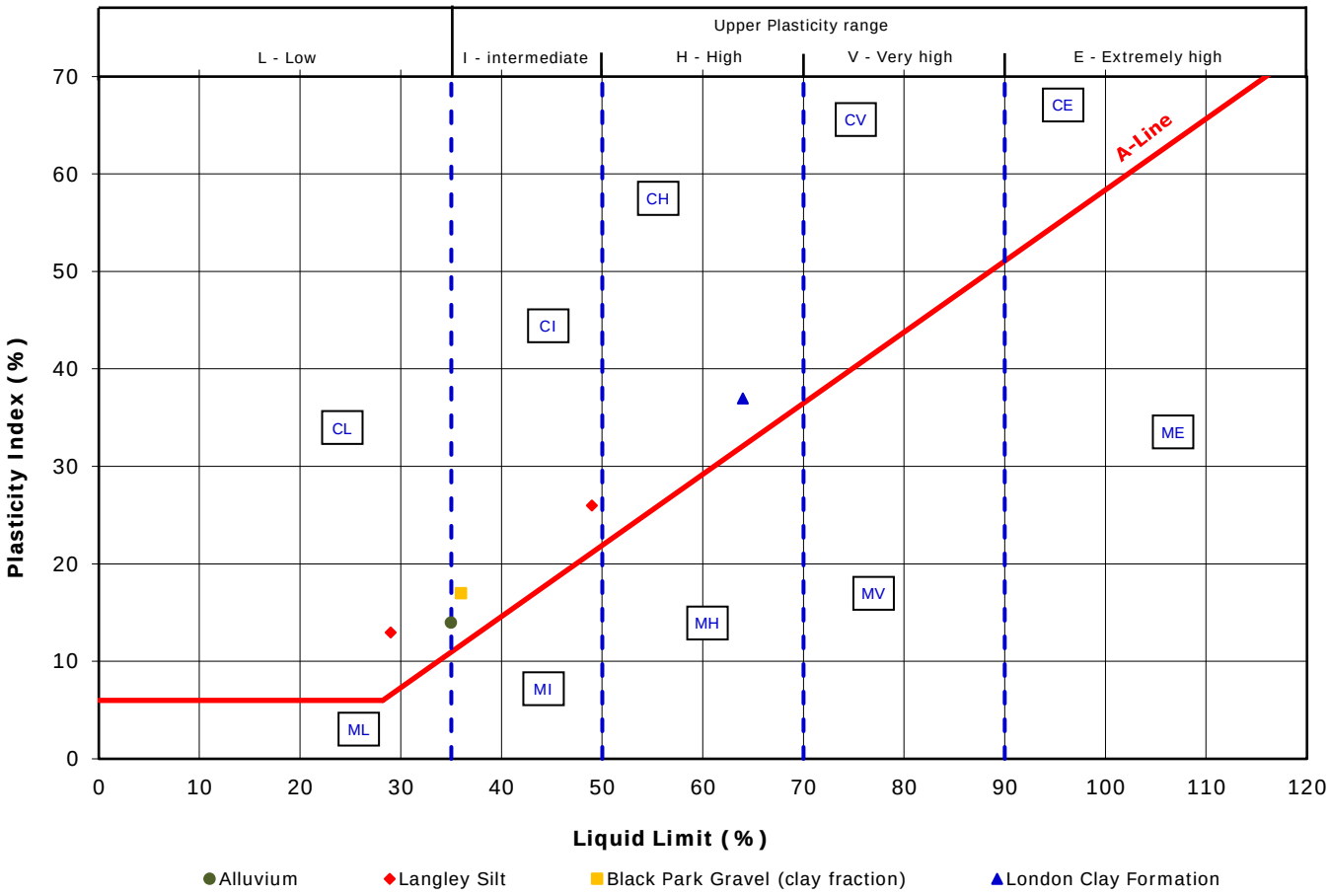
Modified Plasticity Index calculated in accordance with NHBC Standards Chapter 4.2 (reported if %passing 425mm <95%)

Percent passing 425μm: by estimation, by hand* or by sieving**

Soil Consultants

Site & Location	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Report No:	**10776/JW**

Plasticity Chart



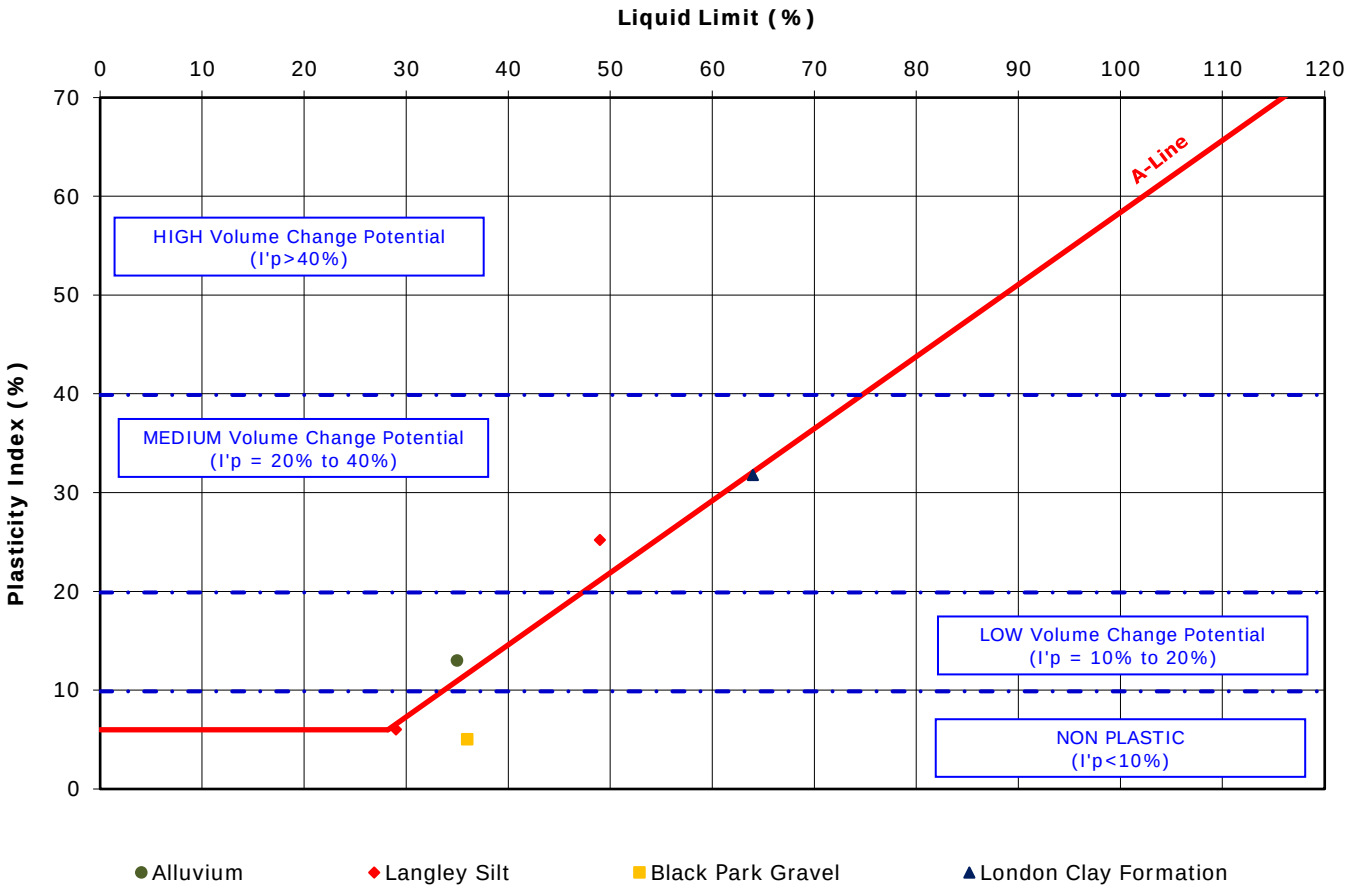
M - SILT [plots below the A-Line}

C - CLAY [plots above the A-Line]

Classification in accordance with BS5930:2015 "Code of practice for site investigations"

Site & Location	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Report No:	**10776/JW**

Plasticity Chart



Modified Plasticity Index, I'p:

$$I'p = \frac{Ip \times (\%\ \text{passing 425mm})}{100\%}$$

(where Ip = Plasticity Index)

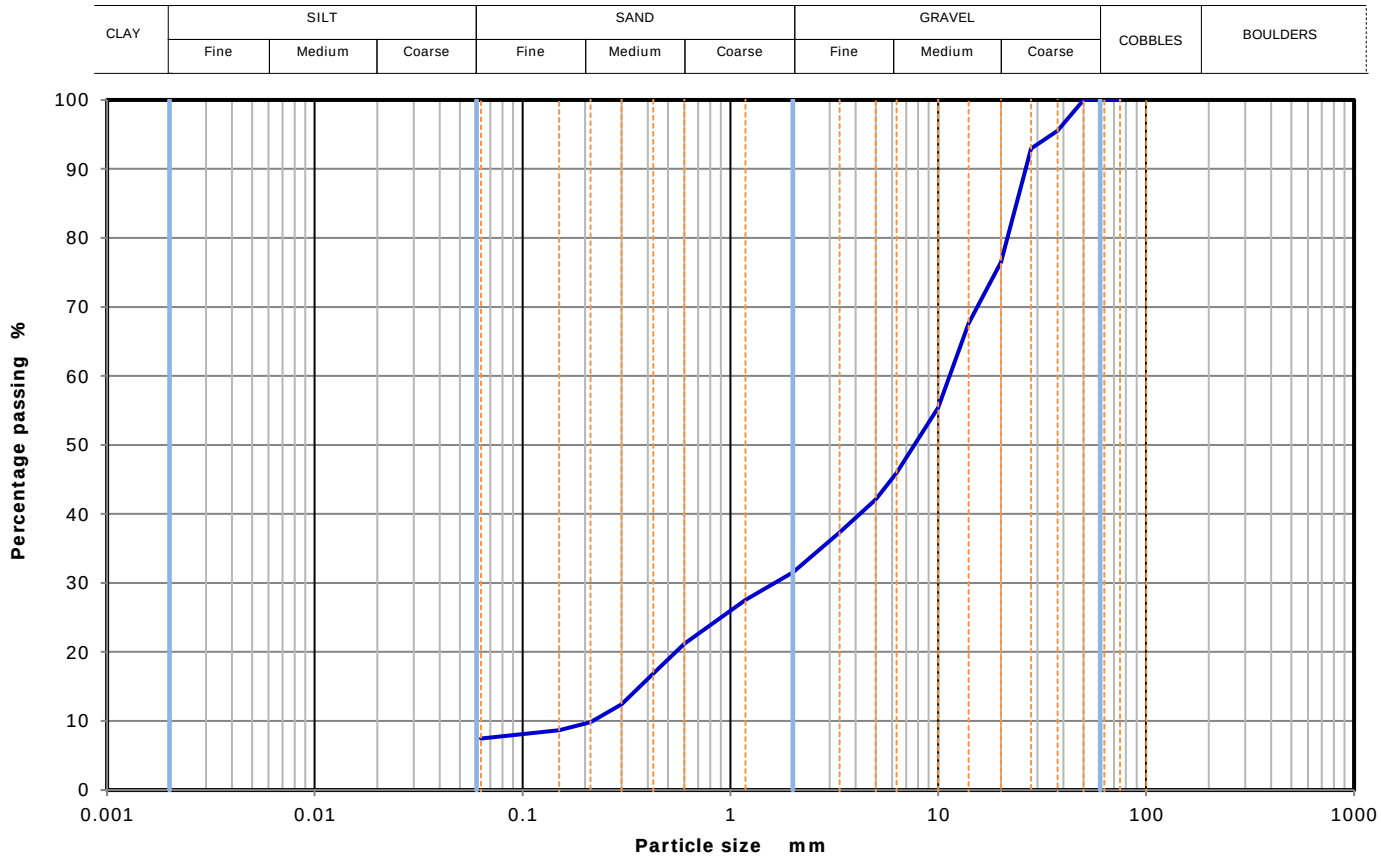
Classification in accordance with NHBC Standards, Part 4 'Foundations', Chapter 4.2 'Building near trees'

Soil Consultants

Site & Location	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	Report No:	10776/JW

Particle size distribution

Hole ID: WS01	Description:
Depth (m): 2.50	Orangish brown clayey very sandy GRAVEL



Sieving	
Size (mm)	% passing
75	100.0
63	100.0
50	100.0
37.5	95.5
28	93.0
20	76.5
14	67.6
10	55.4
6.3	46.0
5	42.1
3.35	37.3
2	31.5
1.18	27.5
0.6	21.2
0.425	16.9
0.3	12.4
0.212	9.8
0.15	8.6
0.063	7.4

Sedimentation	
Size (μm)	% passing

Sample proportions	%
Cobbles	0
Gravel	68
Sand	24
Fines (<0.063mm)	7

Grading analysis		
D60	mm	11
D30	mm	2
D10	mm	0
Uniformity Coefficient		52
Curvature Coefficient		1

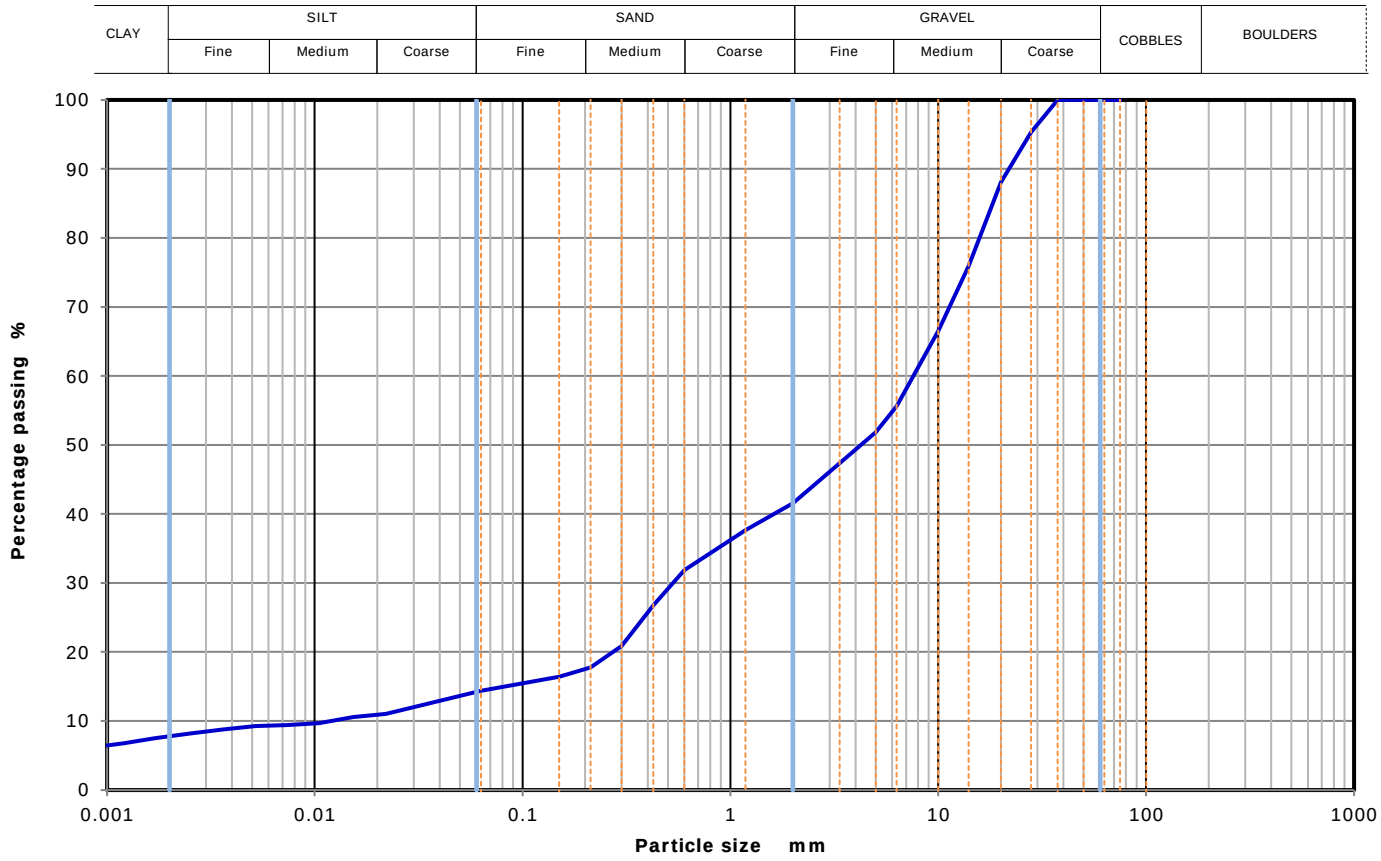
Test method and date	
Method: BS EN ISO 17892-4:2016	
- Wet sieving method	
Reporting date:	11 Nov 22

Soil Consultants

Site & Location	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	Report No:	10776/JW

Particle size distribution

Hole ID: WS02 Depth (m): 1.60	Description: Light orangish brown and grey clayey silty very sandy GRAVEL



Sieving	
Size (mm)	% passing
75	100.0
63	100.0
50	100.0
37.5	100.0
28	95.3
20	88.1
14	75.9
10	66.5
6.3	55.6
5	51.8
3.35	47.3
2	41.5
1.18	37.7
0.6	31.8
0.425	26.7
0.3	20.9
0.212	17.7
0.15	16.4
0.063	14.4

Sedimentation	
Size (μm)	% passing
22.0	11
15.3	10.6
10.5	9.68
7.3	9.39
5.2	9.24
3.7	8.8
2.6	8.22
1.7	7.49
1.2	6.76
0.8	6.03
0.3	5.3

Sample proportions	%
Cobbles	0
Gravel	58
Sand	27
Silt	7
Clay	7

Grading analysis		
D60	mm	8
D30	mm	1
D10	mm	0
Uniformity Coefficient		631
Curvature Coefficient		3

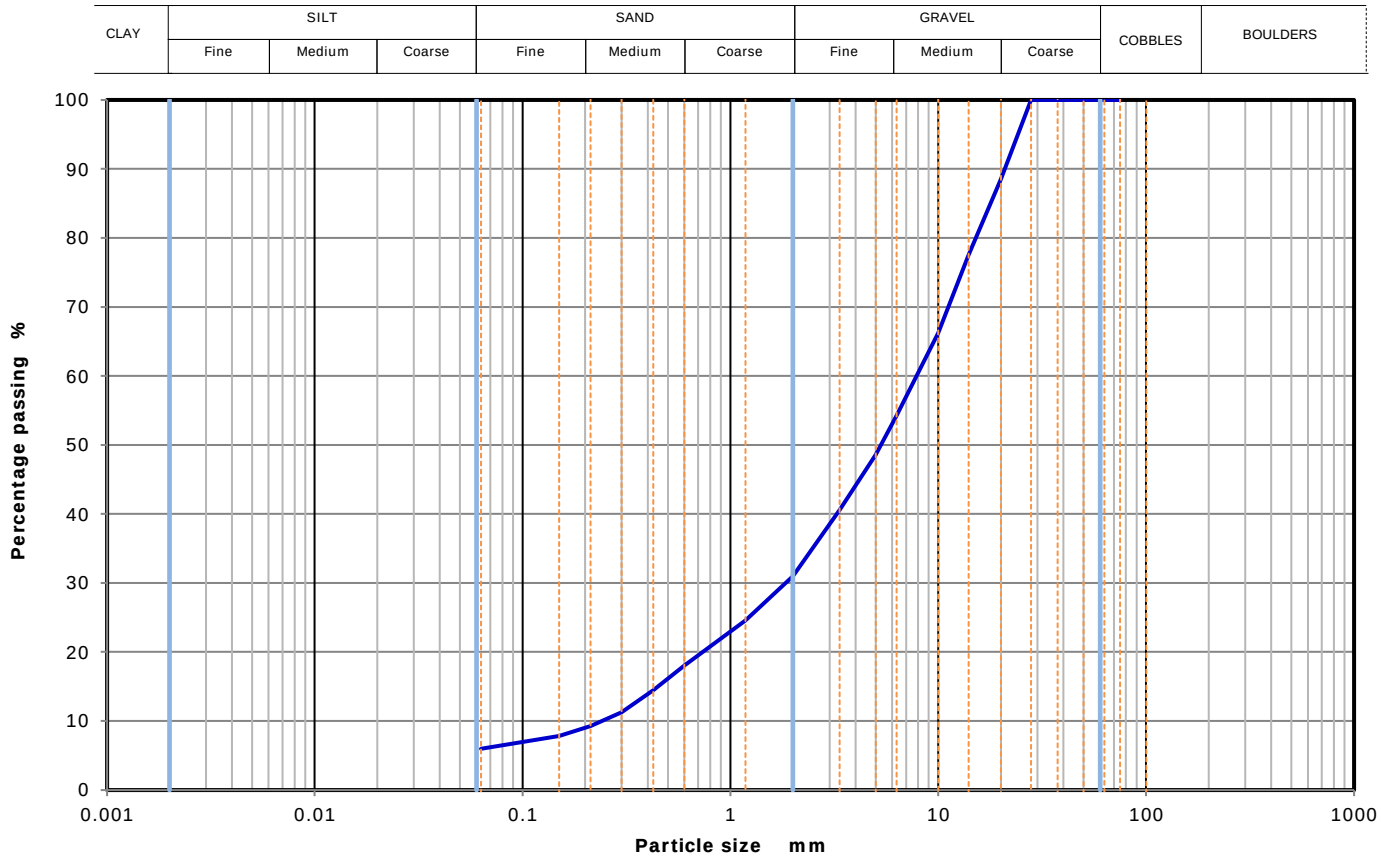
Test method and date	
Method: BS EN ISO 17892-4:2016	
- Wet sieving method	
- Hydrometer method	
Reporting date:	11 Nov 22

Soil Consultants

Site & Location	Report No:
Meadow Special School, Royal Lane, Uxbridge UB8 3QU	**10776/JW**

Particle size distribution

Hole ID: **WS02** Depth (m): **2.50**	Description: **Orangish brown clayey very sandy GRAVEL**



Sieving	
Size (mm)	% passing
75	100.0
63	100.0
50	100.0
37.5	100.0
28	100.0
20	88.6
14	77.5
10	66.2
6.3	54.3
5	48.6
3.35	40.6
2	31.0
1.18	24.6
0.6	18.0
0.425	14.4
0.3	11.3
0.212	9.3
0.15	7.8
0.063	6.0

Sedimentation	
Size (μm)	% passing

Sample proportions	%
Cobbles	0
Gravel	69
Sand	25
Fines (<0.063mm)	6

Grading analysis		
D60	mm	8
D30	mm	2
D10	mm	0
Uniformity Coefficient		33
Curvature Coefficient		2

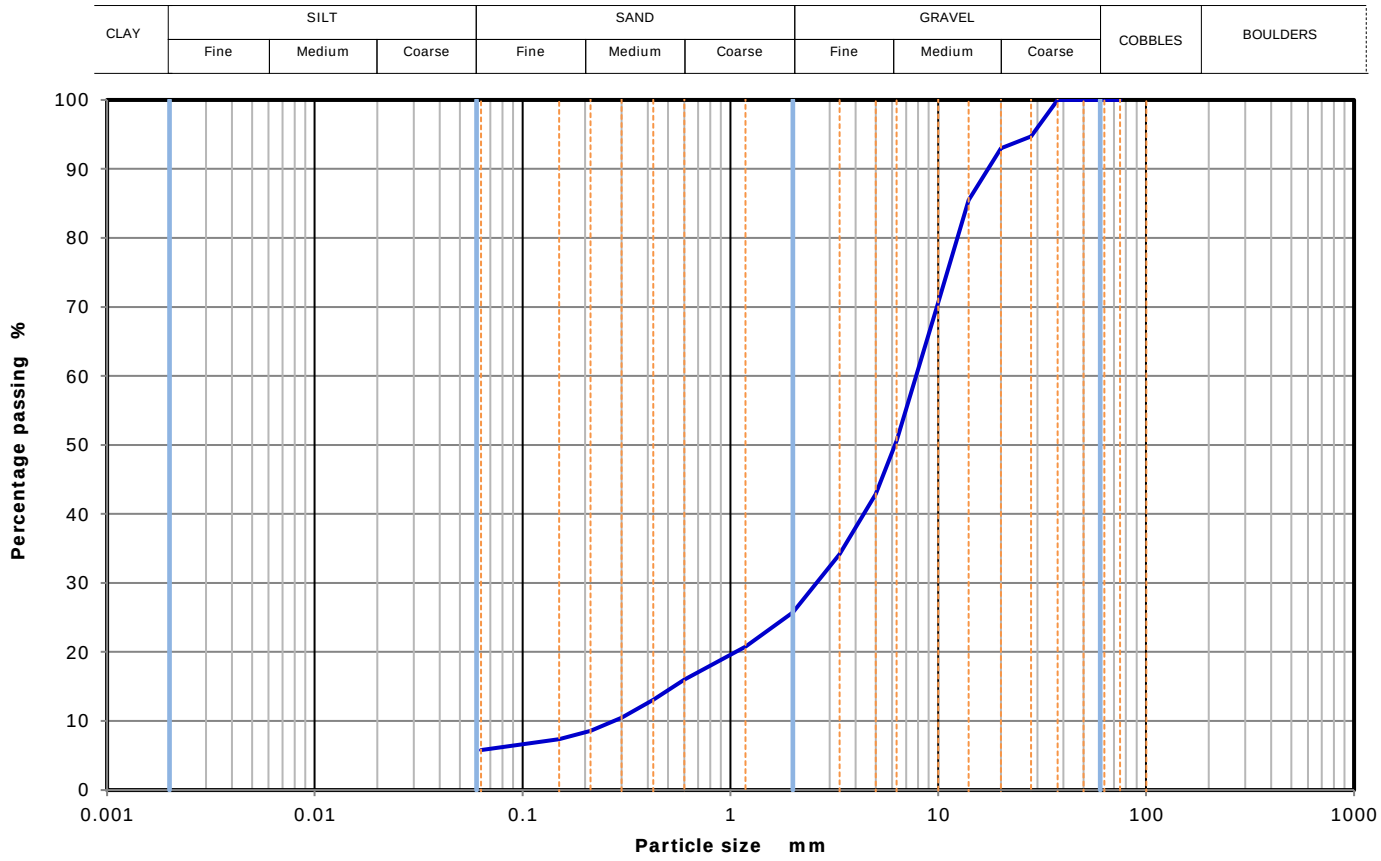
Test method and date	
Method: BS EN ISO 17892-4:2016	
- Wet sieving method	
Reporting date:	11 Nov 22

Soil Consultants

Site & Location	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	Report No:	10776/JW

Particle size distribution

Hole ID: WS03 Depth (m): 3.50	Description: Dark greyish brown silty very sandy GRAVEL



Sieving	
Size (mm)	% passing
75	100.0
63	100.0
50	100.0
37.5	100.0
28	94.7
20	93.0
14	85.5
10	70.6
6.3	50.6
5	42.9
3.35	34.2
2	25.7
1.18	20.7
0.6	16.0
0.425	13.1
0.3	10.4
0.212	8.6
0.15	7.3
0.063	5.8

Sedimentation	
Size (μm)	% passing

Sample proportions	%
Cobbles	0
Gravel	74
Sand	20
Fines (<0.063mm)	6

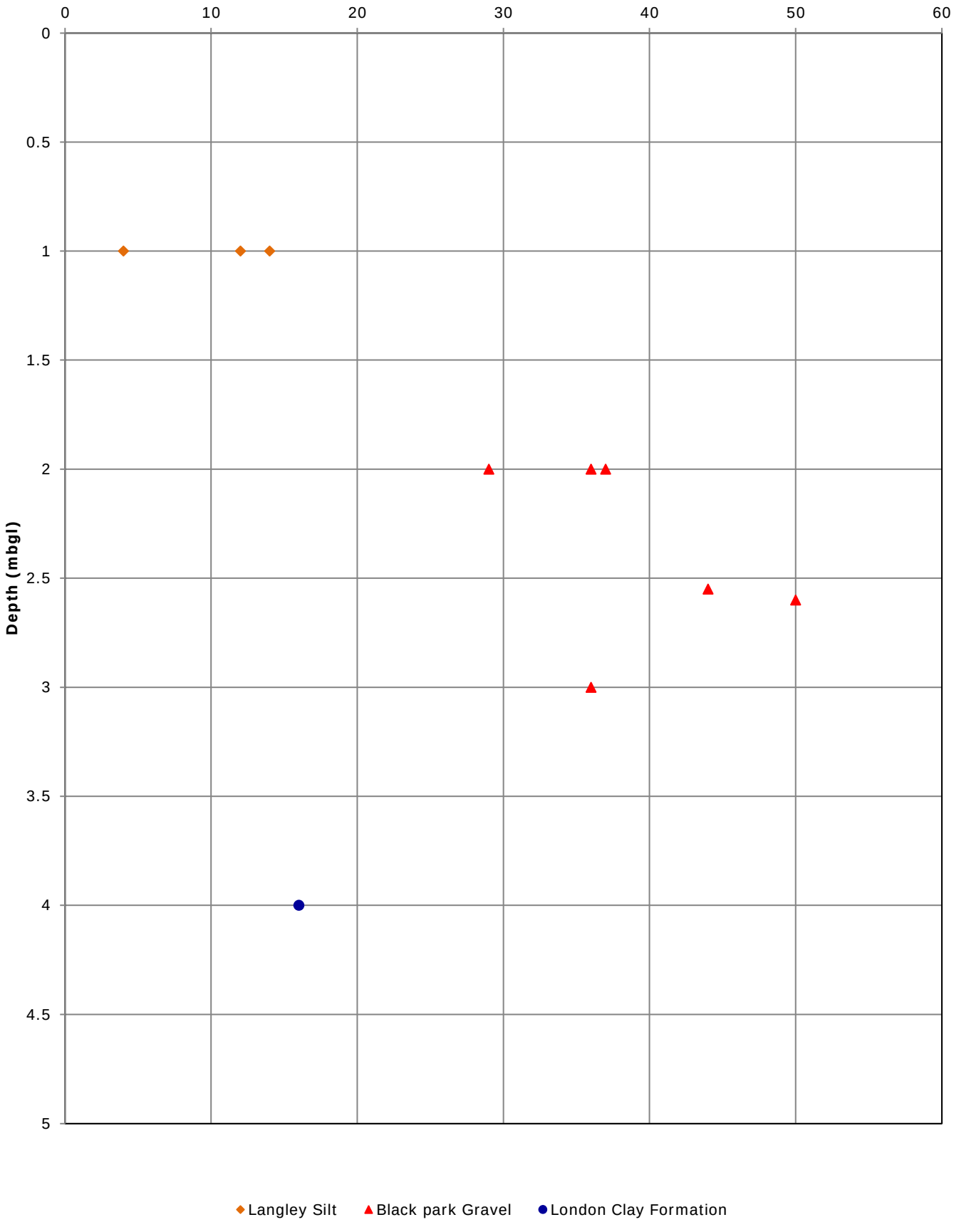
Grading analysis		
D60	mm	8
D30	mm	3
D10	mm	0
Uniformity Coefficient		28
Curvature Coefficient		3

Test method and date	
Method: BS EN ISO 17892-4:2016	
- Wet sieving method	
Reporting date:	11 Nov 22

Soil Consultants

Site & Location	Meadow Special School, Royal Lane, Uxbridge UB8 3QU	Report No:	10776/JW

SPT-N vs depth



FOREWORD TO CONTAMINATION TESTING AND ASSESSMENT

The following statements are designed to inform and guide the Client and other potential parties intending to rely upon this report, with the express intent of protecting them from misunderstanding as to the extent and thus the potential associated risks that may result from proceeding without further evaluations or guidance.

1] Unless otherwise stated in this report, the testing of soils and waters is based on a range of commonly occurring potential contaminants for the specific purpose of providing a general guidance evaluation for the proposed form of development. Thus, the range of potential contaminants is neither exhaustive nor specifically targeted to any previous known uses or influences upon the site.

2] The amount and scope of the testing should not be assumed to be exhaustive but has been selected, at this stage, to provide a reasonable, general view of the site ground conditions. In many cases this situation is quite sufficient for the site to be characterised for the purposes of development and related Health and Safety matters for persons involved in or directly affected by the site development works. It must be understood, however, that in certain circumstances aspects or areas of the site may require further investigation and testing in order to fully clarify and characterise contamination issues, both for regulatory compliance and for commercial reasons.

3] The scope of the contamination testing must not automatically be regarded as being sufficient to fully formulate a remediation scheme. For such a scheme it may be necessary to consider further testing to verify the effectiveness of the remedial work after the site has been treated. It must be understood that a remediation scheme which brings a site into a sufficient state for the proposed development ("fit for purpose") under current legislation and published guidance, may result in some contamination being left in-situ. It is possible that forthcoming legislation may result in a site being classified by the Local Authority and assigned a "Degree of Risk" related to previous use or known contamination.

4] The scope of the environmental investigation and contamination testing must not be automatically regarded as sufficient to satisfy the requirements in the wider environmental setting. The risks to adjacent properties and to the water environment are assessed by the regulatory authorities and there may be a requirement to carry out further exploration, testing and, possibly monitoring in the short or long term. It is not possible to sensibly predict the nature and extent of such additional requirements as these are the direct result of submissions to and liaison with the regulatory authorities. It is imperative, therefore, that such submissions and contacts are made as soon as possible, especially if there are perceived to be critical features of the site and proposed scheme, in this context.

5] New testing criteria have been implemented by the Environment Agency to enable a waste disposal classification to be made. The date of implementation of this Waste Acceptance Criteria [WAC] was July 2005. It is this testing that will be used by the waste regulatory authorities, including waste disposal sites, to designate soils for disposal in landfill sites. In certain circumstances, to satisfy the waste regulations, there may be the necessity to carry out additional testing to clarify and confirm the nature of any contamination that may be present. If commercial requirements are significant then this process may also necessitate further field operations to clarify the extent of certain features. Thus, the waste classification must be obtained from the waste regulation authorities or a licensed waste disposal site and we strongly recommend that this classification is obtained as soon as possible and certainly prior to establishing any costings or procedures for this or related aspects of the scheme.

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Buckinghamshire
HP15 6QT

Derwentside Environmental Testing Services Ltd
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Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 22-08762

Site Reference:	Meadow School
Project / Job Ref:	10776/JW
Order No:	None Supplied
Sample Receipt Date:	21/10/2022
Sample Scheduled Date:	21/10/2022
Report Issue Number:	1
Reporting Date:	27/10/2022

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

For Topsoil and WAC analysis the expanded uncertainty measurement should be considered while evaluating results against compliance values.

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Maidstone
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Soil Analysis Certificate						
DETS Report No: 22-08762	**Date Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soil Consultants Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Meadow School	**TP / BH No**	WS01/D	WS01/D	WS01/D	WS02/D	WS03/D
Project / Job Ref: 10776/JW	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.30	0.60	2.30	0.30	0.10
Reporting Date: 27/10/2022	**DETS Sample No**	617310	617311	617312	617313	617314

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected			Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	8.3	7.2	7.8	7.8	7.5
Electrical Conductivity	uS/cm	< 5	NONE	1050			757	183
Total Cyanide	mg/kg	< 2	NONE	< 2			< 2	< 2
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	795	312	< 200	1500	1432
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.08	0.03	< 0.02	0.15	0.14
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	144	28	31	401	127
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.14	0.03	0.03	0.40	0.13
Total Sulphur	%	< 0.02	NONE	0.07	0.02	< 0.02	0.07	0.06
Organic Matter (SOM)	%	< 0.1	MCERTS	7.4			3	5.8
Arsenic (As)	mg/kg	< 2	MCERTS	10			10	7
W/S Boron	mg/kg	< 1	NONE	1.1			< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2			< 0.2	0.8
Chromium (Cr)	mg/kg	< 2	MCERTS	14			18	16
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	22			30	21
Lead (Pb)	mg/kg	< 3	MCERTS	24			99	37
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1			< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	12			14	10
Selenium (Se)	mg/kg	< 2	MCERTS	< 3			< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	67			92	58
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2			< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	33			38	19

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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Soil Analysis Certificate						
DETS Report No: 22-08762	**Date Sampled**	None Supplied	None Supplied			
Soil Consultants Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Meadow School	**TP / BH No**	WS03/D	WS03/D			
Project / Job Ref: 10776/JW	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	1.20	3.50			
Reporting Date: 27/10/2022	**DETS Sample No**	617315	617316			

Determinand	**Unit**	**RL**	**Accreditation**	(n)				
Asbestos Screen (S)	N/a	N/a	**ISO17025**					
pH	pH Units	N/a	**MCERTS**	7.7	7.2			
Electrical Conductivity	uS/cm	< 5	NONE					
Total Cyanide	mg/kg	< 2	NONE					
Total Sulphate as SO_4	mg/kg	< 200	**MCERTS**	< 200	< 200			
Total Sulphate as SO_4	%	< 0.02	**MCERTS**	< 0.02	< 0.02			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	15	26			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.02	0.03			
Total Sulphur	%	< 0.02	NONE	< 0.02	< 0.02			
Organic Matter (SOM)	%	< 0.1	**MCERTS**					
Arsenic (As)	mg/kg	< 2	**MCERTS**					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**					
Chromium (Cr)	mg/kg	< 2	**MCERTS**					
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	**MCERTS**					
Lead (Pb)	mg/kg	< 3	**MCERTS**					
Mercury (Hg)	mg/kg	< 1	**MCERTS**					
Nickel (Ni)	mg/kg	< 3	**MCERTS**					
Selenium (Se)	mg/kg	< 2	**MCERTS**					
Zinc (Zn)	mg/kg	< 3	**MCERTS**					
Total Phenols (monohydric)	mg/kg	< 2	NONE					
EPH (C10 - C40)	mg/kg	< 6	**MCERTS**					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 22-08762	**Date Sampled**	None Supplied	None Supplied	None Supplied		
Soil Consultants Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Meadow School	**TP / BH No**	WS01/D	WS02/D	WS03/D		
Project / Job Ref: 10776/JW	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.30	0.30	0.10		
Reporting Date: 27/10/2022	**DETS Sample No**	617310	617313	617314		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.20	< 0.1		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.48	< 0.1		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.45	< 0.1		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.34	< 0.1		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.27	< 0.1		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.37	< 0.1		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.35	< 0.1		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.24	< 0.1		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.21	< 0.1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	3.1	< 1.6		

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 22-08762		**Date Sampled**	None Supplied					**Landfill Waste Acceptance Criteria Limits**		
Soil Consultants Ltd		**Time Sampled**	None Supplied					**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Meadow School		**TP / BH No**	WS02/D							
Project / Job Ref: 10776/JW		**Additional Refs**	None Supplied							
Order No: None Supplied		**Depth (m)**	0.30							
Reporting Date: 27/10/2022		**DETS Sample No**	617313							
Determinand	**Unit**	**MDL**								
TOC[MU]	%	< 0.1	1.7					3%	5%	6%
Loss on Ignition	%	< 0.01	5.30					--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05					6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1					1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10					500	--	--
Total PAH[MU]	mg/kg	< 1.7	3.1					100	--	--
pH[MU]	pH Units	N/a	7.8					--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1					--	To be evaluated	To be evaluated
Eluate Analysis			**10:1 mg/l**			**Cumulative 10:1 mg/kg**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01			< 0.1		0.5	2	25
Barium[U]			0.03			0.3		20	100	300
Cadmium[U]			< 0.0005			< 0.005		0.04	1	5
Chromium[U]			< 0.005			< 0.05		0.5	10	70
Copper[U]			0.01			0.1		2	50	100
Mercury[U]			< 0.0005			< 0.005		0.01	0.2	2
Molybdenum[U]			0.080			0.80		**0.5**	10	30
Nickel[U]			< 0.007			< 0.07		0.4	10	40
Lead[U]			< 0.005			< 0.05		0.5	10	50
Antimony[U]			< 0.005			< 0.05		0.06	0.7	5
Selenium[U]			< 0.005			< 0.05		0.1	0.5	7
Zinc[U]			0.009			0.09		4	50	200
Chloride[U]			14.0			140		800	15000	25000
Fluoride[U]			< 0.5			< 5		10	150	500
Sulphate[U]			58.2			583		1000	20000	50000
TDS			158			1581		4000	60000	100000
Phenol Index			0.01			0.1		1	-	-
DOC			16.9			169		500	800	1000
Leach Test Information										
Sample Mass (kg)			0.10							
Dry Matter (%)			88.7							
Moisture (%)			12.8							
Stage 1										
Volume Eluate L10 (litres)			0.89							

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 22-08762	
Soil Consultants Ltd	
Site Reference: Meadow School	
Project / Job Ref: 10776/JW	
Order No: None Supplied	
Reporting Date: 27/10/2022	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 617310	WS01/D	None Supplied	0.30	18.2	Brown loamy sand with stones and vegetation
^ 617311	WS01/D	None Supplied	0.60	15.2	Brown sandy clay
^ 617312	WS01/D	None Supplied	2.30	6.5	Light brown sandy clay with stones
^ 617313	WS02/D	None Supplied	0.30	11.3	Brown sandy clay with stones
^ 617314	WS03/D	None Supplied	0.10	24.2	Brown sandy clay with stones
^ 617315	WS03/D	None Supplied	1.20	8	Brown sandy clay with stones
^ 617316	WS03/D	None Supplied	3.50	8.8	Brown sandy gravel with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
^ no sampling date provided; unable to confirm if samples are within acceptable holding times

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 22-08762
Soil Consultants Ltd
Site Reference: Meadow School
Project / Job Ref: 10776/JW
Order No: None Supplied
Reporting Date: 27/10/2022

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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UKAS TESTING 4480

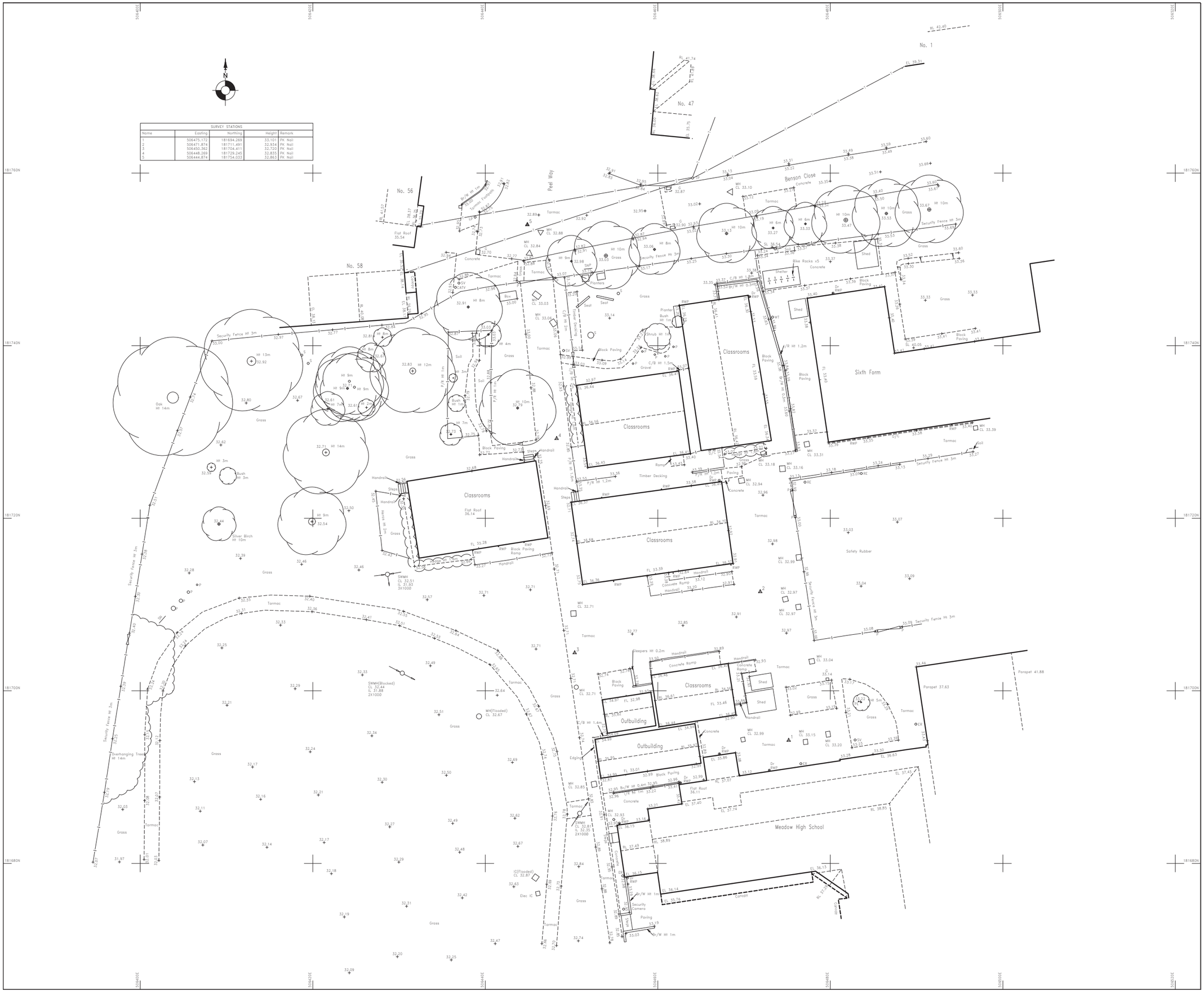
Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 22-08762
Soil Consultants Ltd
Site Reference: Meadow School
Project / Job Ref: 10776/JW
Order No: None Supplied
Reporting Date: 27/10/2022

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
TOC	Soil	BS EN 12457	12.1	%
Loss on Ignition	Soil	BS EN 12457	20.4	%
BTEX	Soil	BS EN 12457	14.0	%
Sum of PCBs	Soil	BS EN 12457	21.1	%
Mineral Oil	Soil	BS EN 12457	9.0	%
Total PAH	Soil	BS EN 12457	13.9	%
pH	Soil	BS EN 12457	0.248	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Arsenic	Leachate	BS EN 12457	15.9	%
Barium	Leachate	BS EN 12457	14.4	%
Cadmium	Leachate	BS EN 12457	12.6	%
Chromium	Leachate	BS EN 12457	13.4	%
Copper	Leachate	BS EN 12457	13.1	%
Mercury	Leachate	BS EN 12457	16.2	%
Molybdenum	Leachate	BS EN 12457	13.6	%
Nickel	Leachate	BS EN 12457	16.0	%
Lead	Leachate	BS EN 12457	12.4	%
Antimony	Leachate	BS EN 12457	14.6	%
Selenium	Leachate	BS EN 12457	16.5	%
Zinc	Leachate	BS EN 12457	14.5	%
Chloride	Leachate	BS EN 12457	17.0	%
Fluoride	Leachate	BS EN 12457	12.0	%
Sulphate	Leachate	BS EN 12457	25.1	%
TDS	Leachate	BS EN 12457	10.0	%
Phenol Index	Leachate	BS EN 12457	12.9	%
DOC	Leachate	BS EN 12457	10.0	%
Clay Content	Soil	BS 3882: 2015	15.0	%
Silt Content	Soil	BS 3882: 2015	14.0	%
Sand Content	Soil	BS 3882: 2015	13.0	%
Loss on Ignition	Soil	BS 3882: 2015	12.4	%
pH	Soil	BS 3882: 2015	0.248	Units
Carbonate	Soil	BS 3882: 2015	12.0	%
Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Zinc	Soil	BS 3882: 2015	14.9	%
Copper	Soil	BS 3882: 2015	16.0	%
Nickel	Soil	BS 3882: 2015	17.7	%
Available Sodium	Soil	BS 3882: 2015	23.0	%
Available Calcium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity	Soil	BS 3882: 2015	10.0	%



Legend:

Abbreviated Features:

AV	Air Valve
Av.	Average
B	Bollard
BB	Belisha Beacon
BH	Borehole
BL	Bed Level
BS	Bus Stop
BT	British Telecom Cover
B/RW	Brick Retaining Wall
Br/W	Brick Wall
CATV	Cable TV Cover
CCTV	Close Circuit TV
CL	Cover Level
Col.	Columns
C/RW	Concrete Retaining Wall
C/Pit	Catch Pit
D/C	Drainage Channel
DPC	Damp Proof Course
DK	Drop Kerb
Dr	Drain
EL	Eaves Level
ER	Earth Rod
EP	Electricity Pole
ET	Electric Terminal
FH	Fire Hydrant
FL	Floor Level
F/Light	Flood Light
FW	Foul Water
FP	Foot Path
G	Gully
GV	Gas Valve
GP	Gate Post
Ht.	Height
IC	Inspection Chamber
IL	Invert Level
KO	Kerb Outlet
LB	Letter Box
LP	Lamp Post
MH	Manhole
Mkr	Marker Post
MS	Mile Stone
OSBM	Ordnance Survey Bench Mark
OH	Overhead
P	Post
OH	Overhead
P	Post
PB	Post Box
PE	Pipe
PM	Parking Meter
RE	Rodding Eye
RL	Ridge Level
RP	Reflector Post
RS	Road Sign
RW	Retaining Wall
RWP	Rain Water Pipe
S	Stump
SL	Soffit Level
SN	Sign
SNP	Street Name Plate
SV	Stop Valve
SVP	Soil & Vent Pipe
SW	Surface Water
S/RW	Stone Retaining Wall
St/W	Stone Wall
TCB	Telephone Call Box
TL	Traffic Light
TP	Telegraph Pole
UG	Underground
US	Underside
UTL	Unable To Lift
DUTL	Damaged UTL
OUTL	Obstructed UTL
SUTL	Sealed UTL
VP	Vent Pipe
WL	Water Level
WM	Water Meter
WO	Wash Out
WT	Water Tap
Ø	Diameter

Fence Abbreviations:

B/W	Barbed Wire
C/B	Close Boarded
C/I	Corrugated Iron
C/L	Chain Link
C/P	Chestnut Paling
I/R	Iron Railing
P/R	Post & Rail
P/W	Post & Wire

Symbols: Control Station; Manhole/Inspection Chamber; Inlet Pipe; Out Flow Pipe; Bush; Tree (Spread & Girth Shown to Scale); Gate; Spot Level (52.36); Bore Hole; Trial Hole

Lines: Wall; Verge; Fence; Boundary; Edge of Spread; Hedge; Embankment (Top of Bank / Bottom of Bank); OH Telecom; OH Electric; Drainage Flow; Contours

Hatching: Building; Open Sided Building

General Notes:

1. Mon entry to sewers has not been undertaken. Depths, pipe sizes and quantity of pipes are measured from the surface. We therefore cannot guarantee the completeness or accuracy of the sewer data which should be checked with the local authority or and/on site.
2. All tree heights and spreads are approximate. The plan position of trunks are taken at ground level. Girth measurements are taken at a 1.5m height. We have attempted to identify tree species, however if tree species are critical specialist advice should be sought.
3. Survey information is as result of measurement to existing features and does not imply legal ownership of boundaries or land divisions. Where boundary alignment lines are added to the survey drawing and are taken from legal documents or other information supplied they are done so within the constraints of drawing quality and scale. They are provided on the basis of opinion and do not imply legal contract.

Plan Coordinate Control:–
Plan Coordinates relate to National Grid OSGB36 using GPS. LSF 1.000 at Stn 2

Level Datum:–
All Levels relate to OSGB36 using GPS

Sheet Location Diagram:

1

Notes:

REV NO	REV NOTE	DATE	SIGNED

RICS · THE SURVEY ASSOCIATION · CHAS · smas · chartered ices

GLOBAL SURVEYS
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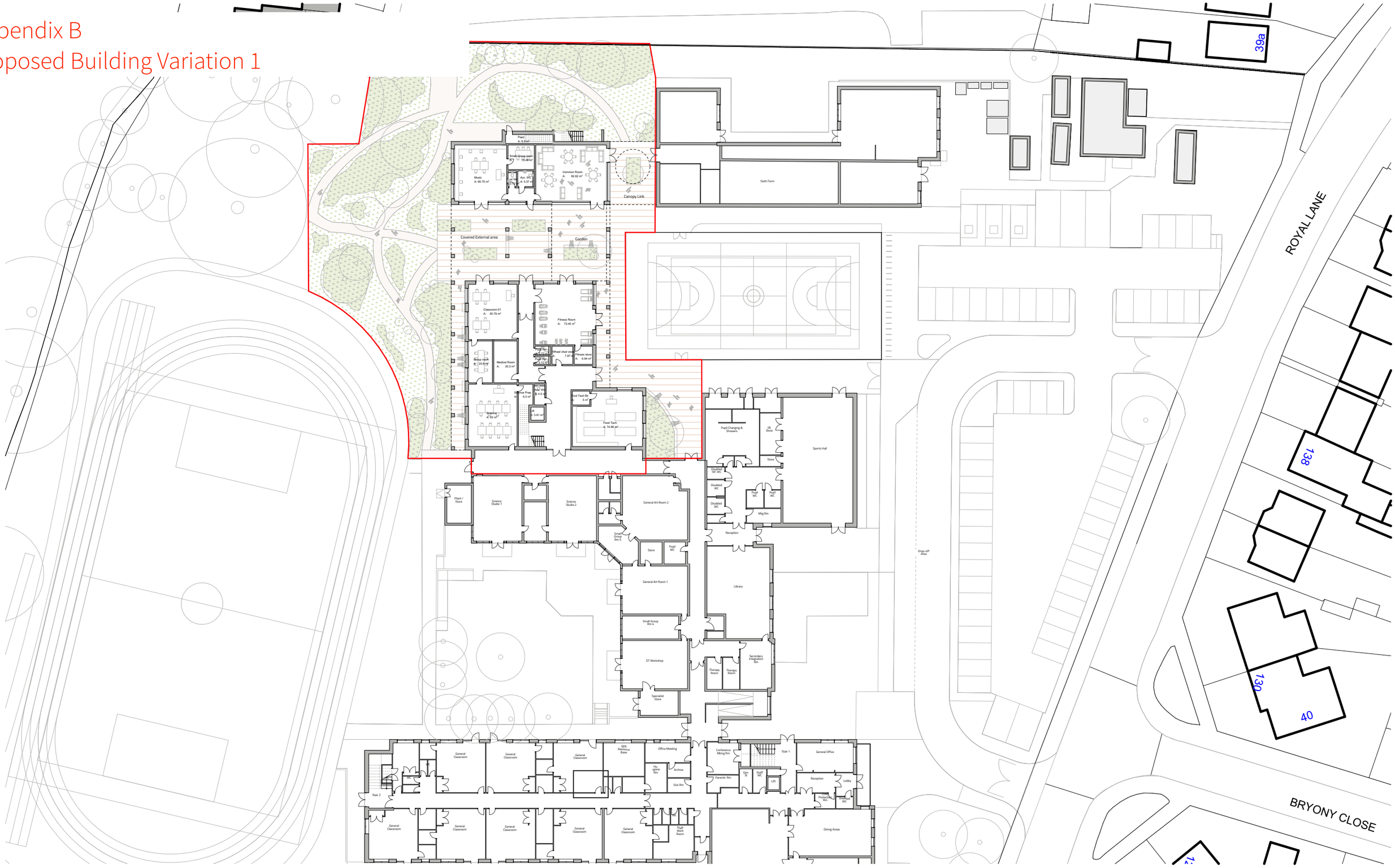
Moulton Park, Northampton NN3 6WL
Tel: 01604 491543
Email: info@globalsurveys.co.uk

Site:	Meadow High School Uxbridge UB8 3QU
Client:	Chadwick Dryer Clarke Ltd
Survey Description:	Topographical Survey

Date	October 2022	Scale	1/200 @ A1
Dwg. No	22198-TOPO	Surveyor	HMH
Sheet	1 of 1	Checked	SJH

Appendix B
Proposed Building Variation 1



0 1 2 3 4 5 10

KEY:

N

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NOTES:

Rev	Date	Issue
--	22/06/2022	Stage 2 Issue
DRAFT	01/06/2022	Stage 2 Issue of Information to QS

STUDIO. 17 COMBERTON RD, CAMBRIDGE CB23 7BA
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info@chadwickdryerclarke.co.uk T. 01223 262413

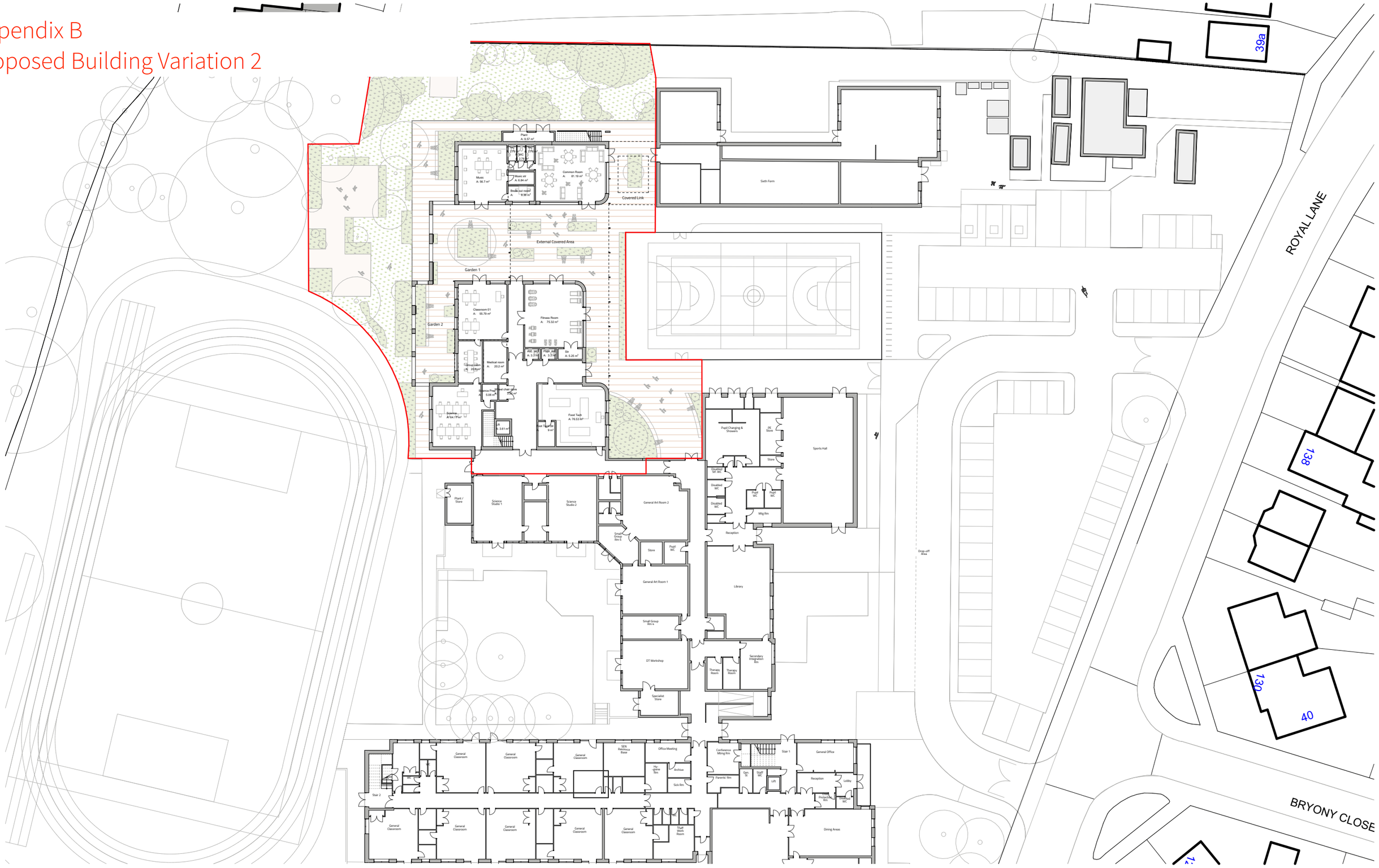
chadwickdryerclarke studio
architects + designers

CLIENT: London Borough if Hillingdon
ADDRESS: Royal Ln Uxbridge UB8 3QU
PROJECT: Meadow School New Building

TITLE: **PROPOSED SITE PLAN_VARIATION 01**

DATE :	SCALE @ A3 :	PROJECT.	DRAWING NO.	REV :
22/06/2022	1:500	4267 CDC XX GF DR A	(SK) 001	--

Appendix B
Proposed Building Variation 2



0 1 2 3 4 5 10

KEY:

N

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NOTES:

Rev	Date	Issue
--	22/06/2022	Stage 2 Issue
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STUDIO. 17 COMBERTON RD, CAMBRIDGE CB23 7BA
5-7 TANNER ST, LONDON SE1 3LE
info@chadwickdryerclarke.co.uk T. 01223 262413

chadwickdryerclarke studio
architects + designers

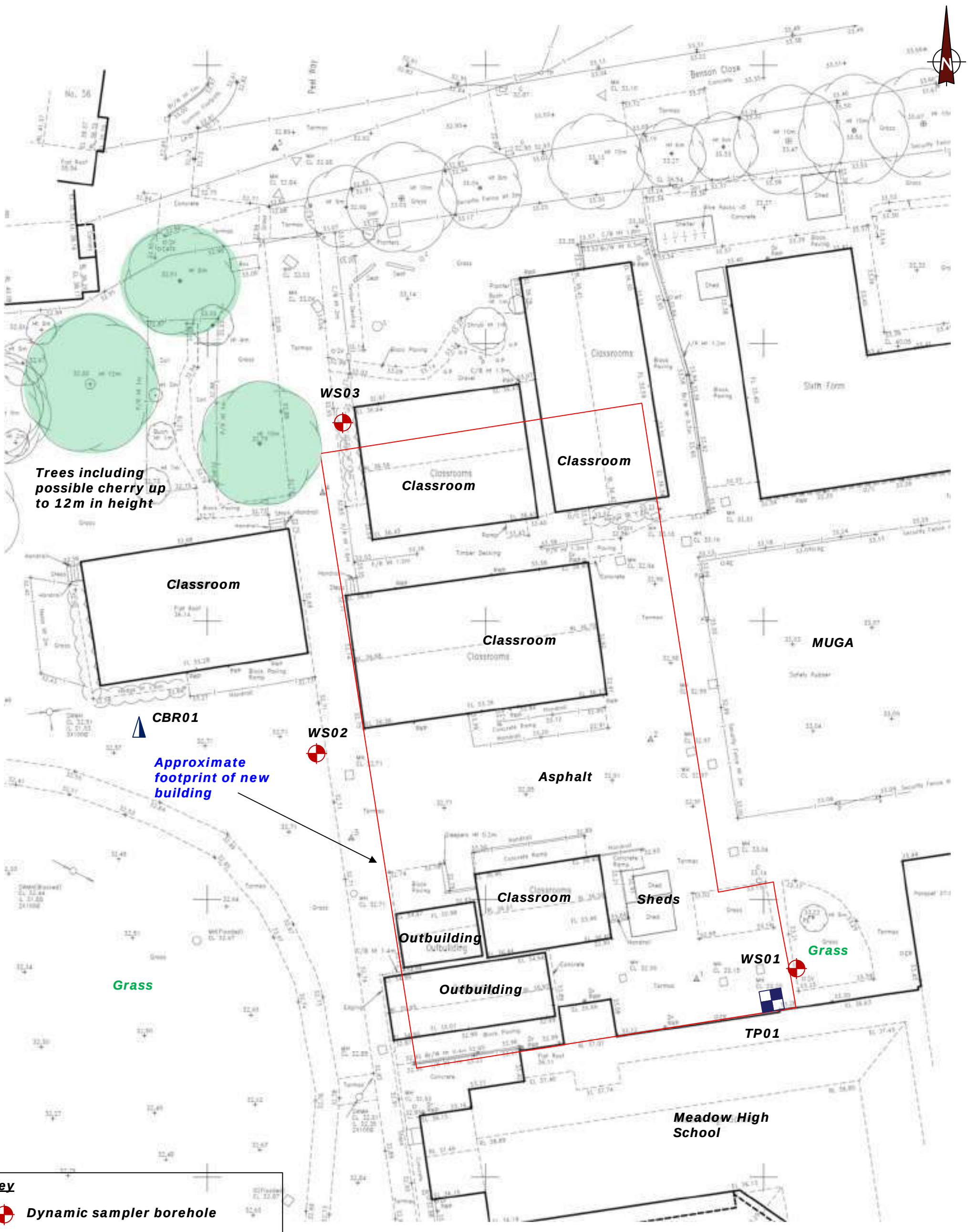
CLIENT: London Borough if Hillingdon
ADDRESS: Royal Ln Uxbridge UB8 3QU
PROJECT: Meadow School New Building

TITLE: **PROPOSED SITE PLAN_VARIATION 02**

DATE :	SCALE @ A3 :	PROJECT.	DRAWING NO.	REV :
22/06/2022	1:500	4267 CDC XX GF DR A	(SK) 002	--

Site & Location	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Report No: **10776/JW**

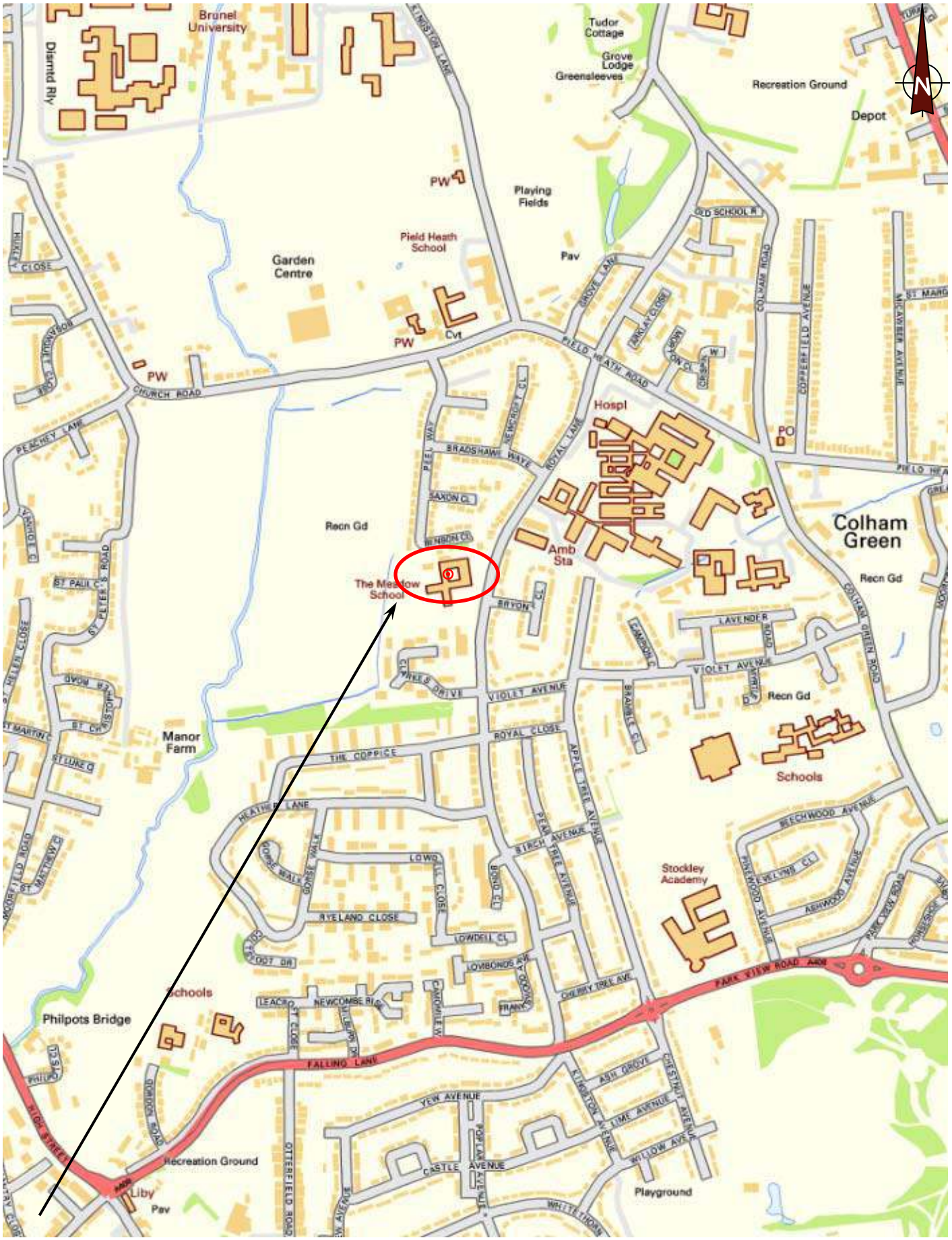
Site Plan



Soil Consultants

Site & Location	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Report No: **10776/JW**

Location Plan



SITE LOCATION

Priority Schools, PSBP2 – Education Funding Agency

Mace Limited

Meadow High School, Hillingdon

Intrusive Geo-Environmental and Geotechnical Site Investigation

Factual and Interpretative Report

Priority Schools, PSBP2 – Education Funding Agency

Mace Limited

Meadow High School, Hillingdon

Intrusive Geo-Environmental and Geotechnical Site Investigation

Factual and Interpretative Report

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Version Control Table

Status / Revision/ Issue Date	Contributors	Purpose	Summary of Changes
Draft Rev 0 18/01/2017	**Author/s:** Emma Small **Reviewed**: Lydia Evans Richard Puchner **Approved:** Neil Morris	Initial draft issued to Mace without final gas monitoring data and ground water testing results.	N/A – Gas/groundwater monitoring ongoing and full data set to be added to the Final report.
Final Rev 0 09/02/2017	**Author/s:** Emma Small **Reviewed**: Lydia Evans Richard Puchner **Approved:** Neil Morris	Final version issued to Mace.	Gas data updated (Sections 5.9, 6.4, 6.5, 8.0 Appendix H). A further three ground gas monitoring visits recommended to re-evaluate the GSV and site Characteristic Situation as per Section 8. Additional groundwater monitoring recommended as per Section 8.

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1 Introduction

1.1 Background

Opus International Consultants (UK) Limited, (also referred to herein as "Opus" for the purposes of this report) was commissioned by Mace Limited (also referred to as "Mace" or "the Client" for the purposes of this report) to undertake intrusive ground investigation works at a number of schools in the south east of England. The works were undertaken in order to define the ground related risks underlying the selected development area of the schools, providing relevant information for the design and construction of the proposed scheme.

The works were carried out under the supervision of Opus. The scope and specification for the Ground Investigation was determined by the Client and implemented by Opus in accordance with instructions provided.

1.2 Objectives

The objectives of the investigation are:

- To provide a detailed understanding of the ground conditions at the site to define the ground related risks in order to make suitable cost allowances for the most likely foundation solution and to identify any risks and costs associated with land contamination and ground gases.

1.3 Limitations

This report has been produced in accordance with the requirements identified within the Education Funding Authority (EFA) Priority Schools Building Programme 2 ("PSBP2") Tender and the site specific Works Package document. Opus were not aware of the precise nature of the development proposals, and in particular the position of new buildings/extensions on the site was yet to be determined. As such the exploratory hole positions, depths and various samples and tests have been specified by Mace to give general coverage of the site and inform the master planning for future development. Further more detailed investigations, samples and tests may be required at a later date once specific development proposals have been finalised, to provide design parameters where specified by the Project Engineer to inform the final design process.

The report has been produced on behalf of Mace and no responsibility to any Third Party for all or any part is accepted. If any unauthorised Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

Whilst this report may express an opinion on the possible configuration of strata, contaminants or groundwater between or beyond exploratory hole positions, or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for any inaccuracy.

This report has been prepared on the understanding that the development is to remain as an educational facility. Should the proposed site usage change significantly from this, the contents of this report will require review and amendment as appropriate.

The comments on groundwater conditions are based on observations made at the time of the investigation. It should be noted, however, that groundwater levels may vary from those reported due to seasonal, tidal or other effects.

The site plans enclosed in this report should not be used for scaling purposes.

A copy of the Opus Conditions and Limitations are presented in Appendix I.

2 The Site

2.1 Location & Access

The study area is located at Meadow High School, Royal Lane, Hillingdon. The site is centred on approximate National Grid Reference (NGR) 506498, 181716.

Access to the site can be gained via either of the two main entrances located off Royal Lane directly to the east of the site. A third entrance was used for access to the rear of the site off Peel Way to the north.

A site location plan is presented in the Drawings section of this report referenced J-M3932.12_100.

2.2 Site Description

The site comprises a complex of buildings and roadways together with soft and hard landscaped areas.

The school buildings occupy the central area of the site and comprise 1-2 story brick built classrooms. Temporary classrooms are present in the southern area of the site, and in the north western area. Parking and a turning area is present to the east of the buildings. Tennis courts are present along the southern site boundary and a sports pitch is located in the western area of the site.

A number of semi mature and mature trees were noted to lie within the eastern site boundary, in the northern area of the site and centrally located within the grassed areas, with some saplings and semi mature trees noted within the remainder of the site.

Vehicular and pedestrian access to the site is possible from the two main entrances located immediately off Royal Lane to the east, and off Peel Way to the north.

The site varies in level from 31.69mAOD in the south west to 35.33m AOD in the north east with gentle slopes across the site from north east to south west, and from east to west.

3 Background Information

3.1 Sources of Information

The following sources of information have been consulted as part of the desk study for the site;

(a) Mott MacDonald Geoenvironmental Desk Study dated July 2015 – referenced PSBP2/EVT/WGEP/102462/A

(b) Interactive British Geological Survey (BGS) Geology of Britain Viewer webpage.

(c) British Geological Survey 1:50,000 Sheet 255 'Beaconsfield'.

(d) BRE 211 (2015) – Radon, guidance on protective measures for new dwellings.

3.2 Summary of Desk Study Information

The salient issues identified within the Mott MacDonald Geoenvironmental Desk Study dated July 2015 and referenced PSBP2/EVT/WGEP/102462/A have been summarised in the following sections. It should be noted that Opus have been provided with the report text only and that the supporting appendices have not been made available for review or comment.

3.2.1 Site History

The historic review undertaken by Mott MacDonald identified the following activities that may have given rise to land contamination at the site:

On site: The site was undeveloped until 1975 when the main school building and school house, were first constructed. A tank was present on the site located adjacent to the main school building's northern façade, which is understood to have been a water tank.

Off site: The surrounding land was predominantly occupied by undeveloped fields in the early map editions. Royal Lane existed from the first available mapping dated 1865 along its current alignment, and along the eastern site boundary. Residential development of the surrounding land started to occur from the 1930's with the density of housing increasing by the mid 1960's. Allotment gardens were noted within the surrounding land during this period of development. Hillingdon Hospital first appeared around the 1960's, located approximately 200m north east of the site.

A number of gravel pits were noted to have been located to the south of the site, the closest being situated approximately 200m from the southern site boundary. A sewage works was located 400m west of the site between 1938 and 1960. No historical activity was identified by the historical search undertaken by Mott MacDonald to have occurred either on site or within the local vicinity.

3.2.2 Geology

According to the interactive BGS Geology of Britain Viewer webpage for the region, 1:50,000 scale, Bedrock and Superficial; and the published geological mapping (BGS Sheet 255 'Beaconsfield' 1:50,000) the site is shown to underlain by superficial deposits of the Langley Silt Member. Alluvium is mapped approximately 200m west of the site and superficial deposits of the Boyn Hill Gravel are

shown approximately 100m north east of the site. The superficial deposits are underlain by the solid geology of the London Clay Formation.

Located approximately 300m south of the site an area of 'Worked Ground' is present.

3.2.3 Hydrogeology

The Langley Silt and the London Clay Formation are both classified by the Environment Agency (EA) as unproductive strata. The Boyn Hill Gravel to the north east of the site is designated as a Secondary A Aquifer.

The site is not located within an Environment Agency designated Groundwater Source Protection Zone (GSPZ). The nearest GSPZ is an Outer Zone (Zone 2) located approximately 250m north east of the site.

3.2.4 Hydrology

The closest surface water feature to the site is a drain running north to south along the western site boundary. The drain makes a dogleg to the west, approximately 100m south of the site where is runs in a westerly direction to the River Pinn. The River Pinn is located approximately 220m west of the site and runs from north to south.

The site is considered to be located within an EA defined Flood Risk Zone 1, indicating low risk of flooding from fluvial or tidal sources, however due to the size of the site, a full flood risk assessment is recommended prior to redevelopment.

3.2.5 Radon

Reference has been made to Annex A of the BR211 Radon: Guidance on protective measures for new dwellings (2015 edition). Although this guidance was not prepared for non-domestic buildings, the protection from radon at work is specified in the Ionising Radiations Regulations 1999 legislation made under the Health and Safety at Work Act administered by the Health and Safety Executive (HSE) and it is therefore considered prudent to consult this guidance.

The BR211 indicates that the site is within a lower probability radon area as less than 1% of homes are above the action level therefore no radon protective measures are necessary in the construction of new dwellings or extensions.

3.2.6 Environmental Sensitivity

No sensitive land use has been reported within 1km of the site.

3.3 Unexploded Ordnance (UXO)

The Mott MacDonald Report made reference to Zetica's UXB Risk Map and concluded that the site was located within a low bomb risk area and no further risk assessment was considered necessary.

3.4 Identified Potential Pollutant Linkages

The Mott MacDonald Report states that there may be a requirement to understand ground and groundwater quality in the area and the quality of the Made Ground at the site through ground

investigation. Any new build will require an understanding of potential risks from off-site sources and whether groundwater has been impacted under the site.

The report indicates that the information available does not suggest that there are significant contaminated land risks at the site, although potential localised leaks and spills within plant rooms may warrant further investigation.

3.5 Preliminary Geotechnical Comments

The Mott MacDonald's report does not give any specific information regarding geotechnical constraints to the site. The report references an Envirocheck Report (not available to Opus at the time of writing) which indicates there is a moderate potential for compressible ground stability hazards. This is considered to be associated with the Langley Silt deposits. The report recommends that the potential for soft ground should be investigated further and considered in relation to foundation design.

Mott MacDonald have also highlighted that aggressive ground conditions may be present associated with the London Clay Formation. The potential presence of pyrite and high concentrations of sulphates in the London Clay Formation may be aggressive to concrete foundations and Mott MacDonald has recommended further investigation.

4 Investigation Methodology

4.1 Clearance of Underground Services

Before any intrusive ground investigation works were undertaken, Opus positioned the exploratory hole locations using plans provided by Mace. Utility plans were made available that were reviewed prior to marking out the exploratory hole locations and kept on site for the duration of the works for reference.

A Cable Avoidance Tool (CAT) and Genny were used by Opus to scan each working area prior to a 1.0m to 1.2m bgl deep inspection pit being excavated with hand tools for the windowless sampling holes and cable percussion boreholes.

Where services were identified within the immediate area of a proposed exploratory hole, the positions were moved a safe distance away.

4.2 Exploratory Holes

The ground investigation comprised the advancement of four windowless sample holes (WS01 to WS04), four Dynamic Cone Penetrometer (DCP) tests (DP01 to DP04) and four cable percussion boreholes (BH01 and BH04).

All exploratory holes and sampling strategies were advanced and completed by approved subcontractors under the direct supervision of Opus in accordance with the Works Package and those instructions included within the appropriate Permit to Work.

All efforts were made to minimise disturbance to the school's access ways prior to advancing the exploratory holes within these areas.

Where exploratory holes were located on grass areas (sports field) ground protection measures were used to protect the service and prevent rutting/damage to the grass/soft ground.

The locations of all exploratory holes are presented on drawing ref. J-M3932.12_101, dated January 2017, a copy of which is included in the Drawings section.

The windowless sampling holes and Dynamic Cone Penetrometer (DCP) tests were advanced by Dynamic Sampling Ltd, on the 19th December 2016.

The DCP tests were undertaken prior to carrying out the window sample hole. The DCP tests were carried out using a Transport Research Laboratory (TRL) DCP to assess the in-situ California Bearing Ratio (CBR) value of the underlying near surface strata. On completion of the TRL DCP a hand excavated service pit was carried out to a depth of 1.00m bgl.

The windowless sample holes were then advanced using a tracked drilling rig from the base of the hand excavated service pit to refusal at 1.40m to 2.00m below ground level (bgl). Window sample boreholes WS01 and WS04 were installed with shallow gas monitoring wells comprising a 19mm plain pipe surrounded by a bentonite seal from 0.10m bgl to 0.50m bgl, and 19mm slotted pipe in a gravel surround to 1.00m bgl. A bentonite seal was placed beneath the pipes. Gas taps were placed at the top of the pipes and a flush cover was cemented in at the surface. Window sample boreholes WS02 and WS03 were backfilled with bentonite pellets on completion and surface layers reinstated.

The cable percussion boreholes were advanced by A G Brown Drilling between the 16th and the 21st December 2016 using a Dando 2000 Cable Percussive Rig and were advanced to a maximum depth of between 15.00 bgl. On completion, two of the boreholes (BH02 and BH04) were installed with a combined gas and groundwater monitoring well comprising a 50mm plain pipe in a bentonite seal from existing ground level to 1.00m bgl and 50mm slotted pipe in a gravel surround to 4.50m bgl. Below the pipe the boreholes were backfilled with bentonite. The well was fitted with a gas tap and a flush lockable cover at ground level to provide protection. The remaining boreholes were backfilled with bentonite upon completion. All works were completed under the supervision of Opus.

All exploratory holes were logged by a qualified Opus Geo-Environmental Engineer generally in accordance with BS 5930:2015 'Code of Practice for Site Investigations', incorporating requirements of BS EN ISO 14688-1+2:2002+2004 'Geotechnical Investigation and Testing – Identification and Classification of Soil', and BS EN ISO 14689-1:2003 'Geotechnical Investigation and Testing – Identification and Classification of Rock'.

In-situ tests comprising SPT testing was carried out in all the window sample and cable percussive boreholes. It should be noted that SPT 'N' values quoted within the borehole logs presented in Appendix 'B', and referenced within this report, are presented as corrected values generally in accordance with BS EN 22476 Part 3, to account for the rig efficiency, borehole depth, overburden factors etc. Further correction of the 'N' values should therefore not be necessary. Raw field data is archived within the Opus project file, and can be provided on request.

Undisturbed and disturbed samples were taken at selected intervals from the strata encountered, placed in appropriate containers and submitted for geotechnical and chemical testing. All samples were labelled following standard protocols to ensure the site location, borehole location, sample depth, sample type, date and job reference were all clearly identifiable.

Soil samples collected for chemical analysis were stored in cool boxes chilled with ice packs to preserve sample integrity as far as reasonably practicable. Subsequently the samples were transported to the laboratory under QA / QC controlled conditions employing a chain of custody system to ensure sample integrity prior to the laboratory testing.

The exploratory hole logs and DCP results are presented in Appendices 'B' and 'C' Respectively.

4.3 Exploratory Hole Locations

All exploratory hole positions were set out on site by Opus in accordance with the positions selected by Mace which were sketched onto Ordnance Survey drawings.

Topographical survey drawings were provided to Opus by Mace and Opus transposed the sketch positions onto these. Where the positions were found to be located on structures not previously shown on the Ordnance Survey plans, the exploratory holes were moved to the closest accessible position. Upon receipt of underground utility survey drawings from Mace, the exploratory hole positions were reviewed and moved, where possible, 5m away from indicated services.

All final positions are shown on the exploratory hole drawing as appended to this report. Coordinates are shown on the logs in Appendix B where accuracies are expected to be +/- 1m to 2m horizontally. Vertical elevations shown on the logs in Appendix B were obtained from extrapolation between spot levels on the topographical survey drawings. Accuracy is expected to be +/-20 to 30mm vertically.

4.4 Chemical Testing – Soil and Soil Leachate

As part of the assessment for potential contamination at the site, selected samples were subjected to appropriate soil total and soil leachate chemical analysis. The analyses were carried out at the UKAS / MCERTS accredited laboratory of i2 Analytical.

The following analyses were carried out on selected soil samples:

Table 4.1: Scheduled Soil Analyses

Analyses	No. of samples
Metals and Metalloids	13
Total Phenols	13
Speciated PAH's	10
TPH CWG including BTEX and MTBE	13
VOC's	13
Asbestos Screen	13
pH Value	13

The following analyses were carried out on selected soil leachate samples:

Table 4.2: Scheduled Soil Leachate Analyses

Analyses	No. of samples
Metals and Metalloids	10
Total Phenols	10
Speciated Phenols	10
pH Value	10

The results of the soil and soil leachate chemical analysis are presented in Appendix 'D'.

4.5 Chemical Testing – Groundwater

Table 4.3: Scheduled Groundwater Analyses

Analyses	No. of samples
Metals and Metalloids	2
General Inorganics	2

Post site investigation groundwater samples were retrieved from two of the groundwater monitoring wells. The groundwater sample laboratory analysis certificates are presented in Appendix D.

4.6 Ground Gas and Groundwater Monitoring

Gas and groundwater level monitoring was undertaken in four monitoring wells (BH02, BH04, WS01 and WS04) during three return visits to site.

Methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide concentrations will be measured using a calibrated HDG5-GA5059 Gas Analyser, with atmospheric pressure and gas flow rates also recorded.

The results of the ground gas / groundwater monitoring are presented as Appendix H.

4.7 Geotechnical Laboratory Testing

Representative samples were obtained for all soil types encountered. The Engineer scheduled the samples, which were despatched for geotechnical testing at the UKAS accredited laboratory of i2 Analytical Services, for the following analysis:

Table 4.4: Scheduled Geotechnical Analyses

Analyses	No. of samples
Moisture Content	22
Liquid Limit, Plastic Limit and Plasticity Index	19
Determination of California Bearing Ratio	8
Dry density / Moisture Content Relationship	8
Particle Size Distribution Analysis	12
Hydrometer	3
One Dimensional Consolidation Test	8
Quick Undrained Triaxial Test	4
Pyritic Sulphate Suite (Suite D)	8

The results of the pH and water soluble sulphate analysis are presented in Appendix 'D' with the remainder of the geotechnical analysis presented in Appendix 'E'.

5 Results of the Investigation

5.1 Ground Conditions

The encountered sub-surface strata generally corroborated the BGS geological mapping for the solid geology. The superficial deposits differed and the site was predominantly underlain by the Boyn Hill Gravels with only thin inconsistent layers of the Langley Silt found to be present. A summary of the strata encountered in the exploratory holes is as follows.

5.1.1 Topsoil

Made Ground was encountered in BH01, BH03, BH04, WS01 and WS03 from the surface to a maximum depth of 0.45m bgl within WS01. The Topsoil generally comprised a soft brown slightly gravelly sandy clay or a dark brown clayey slightly gravelly fine to medium sand with frequent roots and rootlets. The sand was fine to coarse, and the gravel is fine to coarse angular to rounded flint.

5.1.2 Made Ground

Made Ground was encountered in BH02 and WS01 to WS04 inclusive from the surface, or beneath the initial layer of Topsoil.

At the surface of WS02 a layer of concrete was present, and at the surface of WS04 a layer of asphalt was present. These layers were penetrated using a hydraulic breaker. The concrete and asphalt were both 0.10m thick.

At the surface of BH02 a thin layer (0.05m thick) of gravel was present within the car park.

The Made Ground encountered beneath the surface layers of hardstanding or Topsoil within WS01 to WS04 inclusive generally comprised an orange, black or brown gravelly sand, a grey black gravel, a firm to stiff orange brown very gravelly clay. The gravel consisted of asphalt, concrete, clinker, brick, flint and chalk. The Made Ground was proved to depths of between 0.90m and 1.10m bgl.

5.1.3 Alluvium

Strata identified as Alluvium was encountered within BH02, underlying the Made Ground from 0.05m to 0.08m bgl and comprised a firm greenish grey silty sandy organic clay. The gravel consisted of fine to coarse angular to rounded flint.

5.1.4 Langley Silt

The Langley Silt was encountered underlying the Topsoil, Made Ground or Alluvium within all the exploratory holes from 0.20m and 1.90m bgl. The Langley Silt generally comprised a soft to firm orange brown and brown slightly gravelly clay or a firm orange brown slightly sandy clay with occasional roots. The gravel, where present consisted of fine to coarse angular to rounded flint.

SPT 'N' values obtained during the investigation within the cohesive Langley Silt revealed a range of corrected 'N' values of 6 to 37 indicating a soft to very stiff consistency cohesive strata.

5.1.5 Boyn Hill Gravel

The Boyn Hill Gavel was encountered underling the Langley Silt within all the exploratory holes from 1.20m and 1.90m bgl. The Boyn Hill Gravel generally comprised a medium dense to very dense orange brown sand and gravel, the gravel where present comprised fine to coarse angular to rounded flint.

SPT 'N' values obtained during the investigation within the granular Boyn Hill Gravel revealed corrected 'N' values of 14 to 68 indicating a medium dense to very dense granular strata.

The base of the Boyn Hill Gravel was proved within BH01 to BH04 at depths of between 3.60m and 4.40m bgl. The four window sample boreholes were abandoned within the Boyn Hill Gravel at depths of 1.40m and 2.00m bgl due to refusal of the equipment.

5.1.6 London Clay Formation

The London Clay Formation was encountered within BH01 to BH04 inclusive at depths of between 3.60m and 4.40m bgl and proved to a maximum depth of 15.00m bgl at the base of the boreholes. The London Clay Formation encountered within comprised a stiff fissured grey clay with frequent silt and fine sand partings.

SPT 'N' values obtained during the investigation within the cohesive London Clay Formation revealed corrected 'N' values of 17 to 30 indicating a firm to stiff cohesive strata. It is noted that the SPT 'N' values generally increase with depth through the London Clay Formation.

5.2 Groundwater Observations

Water was added during drilling of the cable percussive borehole therefore a groundwater strike was not recorded. The groundwater level on completion of drilling, following removal of casing was between 2.20m and 2.40m bgl. Most of the window sample boreholes were dry during and on completion of drilling, except for WS03 and WS04 where water was encountered at 2.00m and 1.70m.

Subsequent monitoring of the wells installed in BH02, BH04, WS01 and WS04 during the monitoring visits recorded the following standing water levels:

Table 5.1: Recorded Standing Groundwater Levels

Visit	Standing Groundwater Level (m bgl)			
	BH02	BH04	WS01	WS04
15/12/2016	1.43	1.64	1.01	DRY
23/01/2017	1.53	1.63	0.82	1.06
27/01/2017	1.61	1.69	0.91	1.18

Groundwater sampling was carried out within BH2 and BH4 on the 23rd January 2017. Prior to sampling, the installation was purged of 3 well volumes of water. The samples were placed in 500ml amber glass jars, 1 litre plastic bottles and vials. The samples were stored in cool boxes chilled with ice packs to preserve sample integrity as far as reasonably practicable. Subsequently the samples

were transported to the laboratory under QA / QC controlled conditions employing a chain of custody system to ensure sample integrity prior to the laboratory testing.

5.3 Field Observations

Significant visual and/or olfactory evidence of contamination was not generally noted within the Made Ground materials or natural soils during the advancement of the exploratory holes.

Live roots were noted within BH01 to 0.80m bgl.

5.4 TRL DCP Results

Dynamic cone penetrometer tests were undertaken at four locations across the site at the positon of the window sample boreholes. The tests were carried out from either ground level or immediately below hardstanding to a maximum depth of up to 1.00m.

The results within the near surface Made Ground and Topsoil from ground level to 0.30m bgl gave calculated CBR values of between 4% and 9%, these represent the cohesive Topsoil within WS01 and WS03, and the Made Ground within WS02 and WS04.

From approximately 0.30m bgl to 0.50m bgl the CBR values varied greatly from 4% to 108%, the higher values are when large pieces or gravel were encountered by the probe tip and should not be used as a design value.

Deeper materials (beyond 0.50m) typically gave calculated CBR values of between 11% and 18%, representing both the Made Ground and the natural strata of the Langley Silt.

The DCP testing results are presented as Appendix 'C'.

5.5 Chemical Testing - Soil

The procedure of assessing the risk to human health entails the initial comparison of results to the Environment Agency Soil Guideline Values (SGV's), DEFRA Category 4 Screening Levels, Opus In-House Tier 1 Screening Values (IHSV's) and Land Quality Management (LQM) & Chartered Institute for Environmental Health (CIEH) 'Suitable 4 Use Levels' (S4UL's) derived using CLEA 1.06 to be protective of human health. If any potentially significant concentrations are recorded, the results are subjected to statistical analysis in accordance with the CL:AIRE and CIEH document entitled 'Guidance on Comparing Soil Contamination with a Critical Concentration', published in May 2008.

TPH CWG, BTEX and VOC analysis cannot be assessed by statistical means due to the samples analysed being targeted and hence not being part of a general screen. Any elevated concentrations detected as a result of the targeted sampling and analysis would skew the statistical analysis and general distribution of the data set giving a false representation of the distribution of TPHCWG and BTEX contamination at the site.

The proposed end use of the site, which is a school, does not strictly fit any of the Generic Assessment Criteria end land use scenarios. However, it has been considered appropriate by Opus to compare the laboratory analysis results to the Generic Assessment Criteria for a residential land use without plant uptake at this stage to provide a preliminary and conservative assessment of any significant contamination given the intended end use of the site.

The statistical analysis model as outlined below is only undertaken where exceedances of the Tier I Screening values are identified. Where the objective is to demonstrate 'suitability for use', the Null and Alternative Hypotheses are as follows:

- Null Hypothesis: "Is the true mean concentration more than or equal to that of the critical concentration?"
- Alternative Hypothesis: "Is the true mean concentration less than the critical concentration?"

Soil Organic Matter (SOM) analysis has not been undertaken as part of the investigation however to provide a conservative level of assessment and based on the soil descriptions, an SOM% of 1% has been adopted in order to select appropriate screening values for organic based contaminants.

The soil results have initially be screened against the Opus Human Health Generic Assessment Criteria table presented in Appendix 'F' and the ESI spreadsheets are presented within Appendix 'G' as required.

5.5.1 Metals

Eight samples of Made Ground, four samples of Topsoil and one sample of natural strata were analysed for a standard metals suite. The generic screen has identified one slightly elevated result of Lead within the sample of Made Ground taken from WS01 at 0.50m. The subsequent statistical analysis identified that the true mean concentration is less than the critical concentration and therefore, it is not considered that the Made Ground poses a risk of lead contamination to future site users; hence, no remedial action is considered necessary for metals with respect to human health.

5.5.2 Speciated PAH's

Eight samples of Made Ground, four samples or Topsoil and one sample of natural strata were analysed for the USEPA 16 most carcinogenic PAH congeners. Elevated concentrations were recorded in three of the Made Ground samples soil sample as detailed in Table 5.2.

Table 5.2 Exceedances of Screening Analysis for PAH

Determinand	Screening Value (mg/kg)	Elevated Concentration (mg/kg)	Sample Reference	Strata Type
Naphthalene	2.3	3.9	WS02/0.3m	Made Ground
Benzo(b)fluoranthene	3.9	4.1	WS01/0.5m	Made Ground
Dibenz(a,h)anthracene	0.31	0.43	WS01/0.5m	Made Ground
		0.34	WS02/0.90m	Made Ground

The subsequent statistical analysis of the Naphthalene, Benzo(b)fluoranthene and Dibenz(a,h)anthracene data sets within the Made Ground has confirmed the Null Hypothesis, meaning that the true mean concentration is equal or greater than the critical concentration. The generic screen and statistical analysis therefore indicates a potential risk to human health with respect to the identified, elevated PAH's within the Made Ground beneath the site. The results are discussed further within Section 6 of this report.

5.5.3 Cyanide and Total Phenol

Eight samples of Made Ground, four samples or Topsoil and one sample of natural strata were analysed for Cyanide and total Phenol. None of the concentrations were recorded above the lower laboratory detection limit. Hence, no remedial action is considered necessary for Cyanide or Total Phenol with respect to human health.

5.5.4 Speciated TPH, BTEX and MTBE

Eight samples of Made Ground, four samples or Topsoil and one samples of natural strata were analysed for speciated TPH, BTEX and MTBE. None of the concentrations were recorded above the relevant SGV's. Hence, no remedial action is considered necessary for TPH's with respect to human health.

5.5.5 VOC's

Eight samples of Made Ground, four samples or Topsoil and one sample of natural strata were analysed for VOC's.

No VOC concentration was detected above either the laboratory's method detection limit or the relevant generic screening criteria. Hence, no remedial action is considered necessary for VOC's with respect to human health.

5.5.6 Asbestos Screen

Thirteen samples were analysed for the presence of asbestos fibres. Asbestos was not detected within any of the samples tested therefore remedial measures relating to asbestos will not be required.

5.6 Chemical Testing – Soil Leachate

The results of the chemical analysis of ten soil leachate samples have initially been assessed against the UK Drinking Water Standards 2000 (UKDWS) or World Health Organisation (WHO) values. UKDWS values have been used in the first instance as the school is located over a Secondary A Aquifer (within the Boyn Hill Gravel). The site is not located within a source protection zone for groundwater.

This screening allows potential 'contaminants of concern' to be identified with regard to Controlled Waters.

5.6.1 Metals

The soil leachate test results from the eight samples of Made Ground, two samples of Topsoil and one sample of natural strata tested were analysed for a suite of metals. The results gave concentrations that were all below the UKDWS.

5.6.2 Speciated and Total Phenols

The soil leachate test results from eight samples of Made Ground, two samples of Topsoil and one sample of natural strata were analysed for Speciated and Total Phenols. The concentrations of Speciated and Total Phenols did not exceed the lower laboratory detection limits.

5.6.3 Free and Total Cyanide

The soil leachate test results from eight samples of Made Ground, two samples of Topsoil and one sample of natural strata were analysed for Free and Total Cyanide. The concentrations of Free and Total Cyanide did not exceed the lower laboratory detection limits.

5.7 Chemical Testing – Groundwater

Three groundwater level monitoring visits have been undertaken in total between 4th January and 27th January 2017, during which two groundwater samples were collected from monitoring wells BH02 and BH04.

The highest groundwater level was measured at 0.82m begl in WS01 on the 23rd January 2017. Monitoring well WS04 was noted to be dry during the first monitoring visit.

An oil/water interface probe was used to determine whether any floating product was present. No product layer was detected by the interface probe within any of the monitoring wells.

For the purpose of discussing the groundwater results in terms of the risks posed by the site to controlled waters, the groundwater results have been compared to the most stringent standards published on the Environment Agency's web based Chemical Standards Database, these generally being the UK Drinking Water Standards 2000 (UKDWS) or World Health Organisation (WHO) values. The UKDWS values have been used in the first instance as the school is located over a Secondary A Aquifer (within the Boyn Hill Gravel).

The water results from the sample collected were analysed for a range of inorganic and heavy metal contaminants. Concentrations of manganese were present at slightly elevated levels above the guideline value of 500µg/l for one sample:

- BH4 720µg/l

However, it is noted that the use of UKDWS provides very conservative values as the compliance point is at a consumer's drinking water tap. Given that the site is not located within a Groundwater Source Protection Zone and drinking water will not be taken directly from the Secondary A Aquifer, it is considered that the site poses a low risk to controlled waters.

5.8 Geotechnical Testing

The results of the geotechnical testing for pH and sulphate carried out during this investigation are included alongside the chemical testing data in Appendix D. All other geotechnical laboratory results are contained in Appendix E.

5.8.1 Sulphate Testing

The sulphate and pH values determined for selected samples taken from across the site have recorded values in the following ranges:

Table 5.3 Summary of Sulphate and pH testing

Soils	
Sulphur	0.008 to 7.56%
Acid Soluble Sulphate	0.008 to 0.067%
Water Soluble Sulphate	0.02 to 22mg/l
pH	7.1 to 8.0
Soil Leachate	
Sulphate	2.9 to 42mg/l
pH	7.5 to 10.0
Water	
Sulphate	37 to 78mg/l
pH	7.1 to 7.3

5.8.2 Plasticity Index and Moisture Content Testing

The results from the 19No. Plasticity Index tests and moisture content determinations for the strata encountered on site have recorded the following ranges:

Modified Plasticity Index 15 – 37%

Moisture Content 16 - 28%

The seven results tested from samples of Langley Silt gave a modified plasticity indices of between 15% and 36% indicating a low to medium shrinkage potential. The results tested of the cohesive London Clay Formation have a modified plasticity index of between 13% and 37% indicating a low to medium volume change potential variable strata. The two lower values from within the London Clay Formation were taken from the boundary with the Boyn Hill Gravel therefore are more granular and have a low shrinkage potential. The samples taken below this boundary typically indicate a medium shrinkage potential for the London Clay Formation.

5.8.3 Multistage Triaxial's

The results from the multistage triaxial tests indicate that the London Clay Formation is between 104kPa and 203kPa indicating a high strength cohesive strata.

5.8.4 Oedometers

The oedometer results have revealed Mv values of between 0.2 m^2/MN to 0.039m^2/MN.

5.8.5 Particle Size Distribution

The results from the Particle Size Distribution (PSD) analysis corroborate field descriptions.

5.8.6 California Bearing Ratio

The results from the 8No. CBR tests have recorded CBR values in the range of 0.8 – 8.4%, with the highest CBR value recorded in BH01. The lowest values were recorded in WS04 and WS05.

The lower CBR values are considered to represent samples of silty sand or clay laminations within the sand matrix.

5.8.7 Dry Density / Moisture Content Relationship

The results from the 8No. Dry Density and Moisture Content relationship tests indicate a Maximum Dry Density in the range of 1.52 – 1.75mg/m^3 and an Optimum Moisture Content in the range of 15 – 22% (mean 19%).

Geotechnical recommendations relating to the available results are included within Section 7 of this report.

5.9 Ground Gas Monitoring Results

Gas monitoring results have been compared to guidance presented in CIRIA Report C665, Assessing Risks Posed by Hazardous Ground Gases to Buildings, 2007. CIRIA C665 indicates that ground gas protection measures may be necessary in new buildings on sites where methane concentrations exceed a threshold value of 1% v/v and/or where carbon dioxide concentrations exceed a threshold value of 5% v/v. The gas flow rate is also considered in the required level of protection.

Maximum methane (CH_4) and carbon dioxide (CO_2) concentrations, as percentage volume in air (%v/v), minimum oxygen (O_2) concentrations (%v/v), maximum carbon monoxide (CO) and hydrogen sulphide (H_2S) concentrations, in parts per million (ppm), and gas flow rates in litres per hour (l/hr) have been monitored in BH02, BH04, WS01 and WS04 over a total of three return visits to date.

The results of the gas monitoring visits are presented in Appendix G and are summarised as follows:

- Carbon dioxide has been recorded in all four wells at concentrations between <0.1% v/v and 2.3% v/v.
- Methane, Carbon Monoxide, and Hydrogen Sulphide have not been recorded above the instrument's detection limit (<0.1% Methane and <1ppm Carbon Monoxide and Hydrogen Sulphide).Depleted oxygen levels were recorded within WS04 ranging between <0.1% v/v to 5.7% v/v during the monitoring period.
- No gas flow was recorded above 0.0 l/hr in BH02, BH04 and Ws04 however in WS01 a peak flow of 10.2l/hr was recorded during the first visit.

The atmospheric pressure recorded across the monitoring visits ranged between 1001mb to 1020mb.

6 Environmental Assessment

6.1 Soil

Elevated levels of PAH's were identified within soil samples taken from WS01 at 0.50m bgl and in WS02 at 0.30m bgl. The elevated concentrations of Naphthalene are considered to represent outliers within the dataset and are not representative of the Made Ground across the site. However, the elevated concentrations reported for Benzo(b)fluoranthene and Dibenz(ghi)perylene are indicated by the statistical assessment to be representative of the Made Ground across the site and therefore, future site users could potentially be at risk from PAH contamination within the shallow soils on site. Exploratory hole WS01 is located in a small grassed area positioned centrally within the site and WS02 is located within the parking area to the north east.

It is the opinion of Opus that the Made Ground currently located below concrete hardstanding or capped with Topsoil on site does not pose a risk to the health of current site users. Should these areas become playing fields or frequently used areas of soft landscaping, there might exist a direct exposure pathway in the form of dermal contact, inhalation of contaminated fugitive dust and accidental soil ingestion. In order to mitigate against this Opus has provided the below options for consideration:

1) where areas are to be developed as soft landscaping in the future then emplace a clean capping layer (likely to be of 600mm) within areas where Made Ground exists,
2) Complete a Detailed Quantitative Risk Assessment. This would involve modelling the site specific parameters such as exposure duration and age range of the receptor.

6.2 Soil Leachate

Soil leachate analysis was undertaken as part of the agreed scope of works for the site. The results of the analysis have been compared against appropriate UK drinking water standards. The generic screen has determined that none of the results are above UKDWS therefore do not need to be considered further. The outcome of the below groundwater analysis will more accurately assess the metals concentrations in the dissolved phase.

6.3 Groundwater

Groundwater sample analysis was undertaken as part of the agreed scope of works for the site. The results of the analysis have been compared against appropriate UK Drinking Water Standards given that the site is located on a Secondary A Aquifer.

The generic screen has identified manganese at levels that slightly exceed the UKDWS within one groundwater sample. However, it is considered that this concentration does not pose an unacceptable risk to controlled waters due to the sample comprising groundwater, whereas the UKDWS are based on the compliance point being at a consumer's tap.

Based on the results obtained further investigation and groundwater sampling should be carried out to include a larger suite of tests. PAH contamination has been identified within the Made Ground. Therefore it would be considered prudent to test the groundwater for PAH content during any future works to confirm the absence of any significant PAH contamination within the groundwater beneath the site.

6.4 Ground Gas

The ground gas potential for the site and surrounding area is considered to be of negligible risk, due to the limited levels of biodegradable material encountered within either the Made Ground or natural soils and lack of any significant ground gas source identified within influencing distance of the site.

The three monitoring visits carried out to date have recorded a maximum carbon dioxide concentration of 2.3% v/v (BH1) and no detectable concentration of methane.

The maximum carbon dioxide concentration of 2.3% v/v and a maximum gas flow rate of 10.2l/hr (limit of detection) have been selected to calculate an initial Gas Screening Values (GSV) for the site in accordance with CIRIA Report C665 and BS8485:2015 to determine the required level of carbon dioxide protection measures for the proposed future site development. However, it should be noted that the elevated gas flow rate may be anomalous. Further testing will be required to confirm the gas regime in accordance with the CIRIA guidance. Only three gas monitoring visits were carried out and to comply with the guidance at least 6 monitoring visits would be required.

The GSV is calculated as follows:

GSV = Gas Concentration/100 × Flow Rate

Based on elevated values, the GSV for carbon dioxide (0.24) puts the site within 'Characteristic Situation 2' in accordance with CIRIA 665.

Characteristic Situation 2 requires some ground gas protection measures within the proposed buildings. These could include ground bearing floor slab (suspended, non-suspended or raft) with at least 1200g DPM ^{2} and underfloor venting or a beam and block or pre cast concrete floor slab and 2000 g DPM/reinforced gas membrane and underfloor venting, all joints and penetrations sealed, or possibly underfloor venting or pressurisation in combination with the above depending on the proposed use.

It is noted that depleted oxygen levels were recorded within monitoring well WS04 throughout the monitoring exercise. Therefore, construction and maintenance workers who are required to work within manholes and other subsurface confined spaces should be made aware that a low oxygen environment could potentially exist with precautions taken to ensure their welfare.

6.5 Updated Conceptual Site Model

The updated Conceptual Site Model is based on the information obtained from the intrusive investigation.

Table 6.5 Updated Source Pathway-Receptor Relationships

Source Material/Activity	Potential Contaminant	Pathways	Receptor	Risk
Soil				
Made Ground (localised on site)	PAH's	Ingestion, inhalation (contaminated dust), dermal contact.	Site Occupiers (staff and pupils),	**Medium if areas of contamination become surfaced with soft landscaping**
Water				
Made Ground	PAH's	Ingestion, dermal contact.	Secondary A Aquifer	**Low, but additional testing recommended to confirm**
Ground Gas				
Ground Gas	Made Ground	Ingestion, inhalation (contaminated dust), dermal contact.	Site Occupiers (staff and pupils) Construction Workers, Maintenance Workers	**Low**

6.6 Health & Safety

During the construction of the development, a high standard of health and safety awareness should be maintained in order to protect construction workers from exposure to potentially contaminated soil. It is therefore recommended that the appropriate precautions given in Health and Safety Executive Report HS(G)66 'Protection of workers and the general public during the redevelopment of contaminated land' are adopted.

It is our judgement that The Construction Design and Management (CDM) Regulations 2007 (regulation 3) will apply to this project. As a designer, we have a responsibility to inform you of your duties to which you are subject by virtue of the Regulations as specified in regulation 11 (1).

We therefore draw your attention to the CDM Regulations 2007 and the Approved Codes of Practice contained therein.

The following basic health and safety measures should be adopted as a minimum during the site development works:

- Basic Personal Protective Equipment (PPE) including hard hats, gloves, coveralls and steel toe-capped boots to be worn at all times;
- Eating, drinking and smoking to be forbidden at all times except in designated mess areas; and,
- Breathing equipment to be available for those working in confined or unventilated spaces.

If ground conditions should differ significantly from those encountered during the intrusive investigation, including the discovery of any visible or odorous contamination, site redevelopment works should be suspended until the suspect material has been inspected and assessed by a competent Geo-Environmental Engineer.

6.7 Disposal and Re-use of Soil

The reuse of Made Ground as engineered fill should be undertaken in accordance with an appropriate Environment Agency licence as defined in the statutory guidance on the 'Definition of Waste' or CL:AIRE Code of Practice.

Any materials designated for off-site disposal are likely to require classification by the Waste Acceptance Criteria (WAC) in accordance with the Landfill Regulations. No WAC testing has been undertaken as part of this investigation.

6.8 Liaison with Regulators

It is recommended that this report be submitted to the Local Authority Environmental Health Officer for review and comment prior to any irrevocable action taking place.

6.9 Water Supply Pipes

If new water service pipes are required for the proposed development it is recommended that the water supply utility company is contacted for confirmation of pipe type prior to any construction work commencing on the site.

The use of recycled aggregate material made from road planning's should be avoided for backfilling around services.

6.10 Environmental Protection

The following environmental protection measures should be adopted as a minimum during the site redevelopment works:

- Covering and dampening of spoil to prevent the spread of dust;
- Made Ground and natural soils should be stockpiled separately to avoid cross-contamination of material that may be retained on site or for waste disposal purposes;
- Containment of surface water runoff to prevent the pollution of surface water drains, sewers etc.; and
- Cleaning and washing of boots, vehicle wheels and other equipment at site entry and exit points to prevent the spread of mud.

7 Geotechnical Assessment

7.1 Foundation Design

Opus is not aware as to the precise details or form of construction that may be utilised for the proposed development. Subject to review, as and when these details become available, a range of foundation options may therefore be appropriate. The following discussion of foundation options should therefore be regarded as preliminary and subject to review as and when the detail of the intended development and the associated foundation loadings are known.

The Topsoil, Made Ground and Alluvium proven during the investigation is considered to be unsuitable for the support of foundations. The maximum proven depth of these deposits on site is 1.00m begl within WS03.

The soft to firm clay of the Langley Silt was encountered to a maximum depth of 1.90m bgl within BH04 overlying the medium dense to very dense Boyn Hill Gravels. The stiff cohesive London Clay Formation underlies the Boyn Hill Gravels at depths of between 3.60m and 4.50m bgl.

Based on field observations and in-situ SPT data, the Boyn Hill Gravel is considered to be a suitable founding strata for new developments, while reduced loads may be placed onto the Langley Silt at a shallower depth. For indicative purposes, based on the SPT 'N' values, laboratory test results and the above, allowable ground bearing pressures have been calculated using the following assumptions:

- Made Ground and any locally soft strata is fully penetrated by foundations.
- The building constructed is a two story traditional brick structure with 1.00m wide foundations.
- Strip line loads with intermittent pads at nominal distances of 6.00m.
- Ground bearing slabs.

If the building design as assumed above were to change as such that the ground bearing pressures would grossly exceed the current analysis, further assessment should undertaken to determine if the foundation design would need to change.

For indicative purposes, based on the SPT 'N' values, laboratory test results, and the above assumptions (i.e. the Topsoil, Made Ground, Alluvium and any locally soft strata is fully penetrated by foundations), traditional 1.00m wide strip foundations bearing onto the Boyn Hill sands and gravels at a depth of 1.50m to 2.00m bgl may be designed using an allowable net bearing pressure of 150kN/m^2 allowing for a maximum settlement of 25mm.

Depending on the actual proposed foundation design loads, foundations could be placed within the Langley Silt at 1.00m bgl with a reduced bearing capacity. For traditional 1.00m wide strip foundations bearing onto the clays of the Langley Silt at 1.00m bgl foundations may be designed using an allowable net bearing pressure of 50kN/m^2.

If foundations are placed within the Langley Silt, due to the variable nature of the strata it is recommended that reinforcement is used within the foundations to prevent differential settlement.

In accordance with EC7, any values must be checked against the actual proposed factored foundation design loads, and a settlement calculation undertaken. At this stage, the foundation loadings are not known and hence the foundation depths cannot be confirmed until this information is available.

7.2 Floor Slab Design

Where Made Ground and Topsoil are no deeper than 0.60m bgl ground bearing floor slabs should be suitable for the proposed development. If ground bearing slabs are adopted, any near surface soft/loose strata should be suitably compacted and the design should take into account any clay strata across the site.

If proposed planting is close to the buildings then a raised floor slab (block and beam) may be the preferred solution.

Final designs for the floor slabs should be carried out by a suitably qualified Engineer based on the findings of this investigation and with reference to the anticipated loadings and serviceability requirements for the structure.

7.3 Building Near Trees

There are occasional semi mature / mature trees within the site boundary and also a number of mature trees around the perimeter of the site. Although the general strata identified on site is predominantly granular. The cohesive nature of the Langley Silt within the top two meters will have an influence on the foundation design with regards to existing and proposed planting.

If any roots are encountered within foundation trenches in cohesive strata then the foundations should be redesigned by a suitably qualified Engineer to account for the potential influence of shrinking and swelling clay strata. Where tree and shrubs are proposed, foundations should be deepened to account for their influence.

The volume change potential of both the Langley Silt and the London Clay Formation is low to medium. If foundations are placed at shallow depths within the Langley Silt a minimum foundation depth of 0.90m begl where foundations are outside of the influence of new planting. Where restricted new planting is proposed within influencing distance of the foundations a minimum foundation depth of 1.25m begl should be adopted.

7.4 Demolition and Construction

Where any significant obstructions (old foundations, drain runs, basement structures etc.) are encountered then these should be chased out and the position, extent and depth of any resultant voids should be recorded for future reference as this could influence foundation designs for the proposed development. Where deep voids are to be in-filled the advice of an Engineer should be sought to ensure that a suitable earthworks specification is achieved so as to minimise impacts of designs for foundations / floor slabs etc.

It is generally anticipated that excavations within the near surface strata should be readily achieved using conventional plant (JCB 3CX or similar). However, obstructions (old foundations, drain runs, basement structures etc.) associated with previous phases of development may be encountered and may require a higher specification of plant and /or breaking out. Should excavations be taken to

greater depths, care should be taken with regards to collapsing trenches and therefore shoring methods may be required for stabilisation.

Groundwater was encountered during the investigation and during the subsequent monitoring visit at a minimum depth of 1.01m, therefore entries should be anticipated within any excavations. It is considered that sump and pump dewatering techniques should be adequate within the top 2.00m, below 2.00m bgl groundwater entry is likely to be fast and ideally if possible excavations should be kept shallow. If excavations need to be greater than 2.00m bgl a suitable solution to remove the water and prevent sidewall collapse will need to be established.

7.5 Concrete Specification

The results of the pH and sulphate analysis have been assessed for potential aggression to buried concrete in accordance with the Building Research Establishment: Special Digest 1: Concrete in Aggressive Ground. It is considered, with reference to the desk study review findings, that the site can be classified as a brownfield, pyritic site with regard to aggressive ground risks.

With reference to BRE Special Digest No 1 "Concrete in Aggressive Ground" and with reference to the results obtained during the investigation, the Made Ground, Topsoil, Alluvium, Langley Silt and the Boyn Hill Gravel can be classified as Design Sulphate class DS-1 and ACES Class AC-1s assuming mobile groundwater conditions.

If piled foundations are chosen as the preferred method to support the proposed development, a Design Sulphate class DS-5 and ACES Class AC-5 assuming mobile groundwater conditions should be adopted for any below ground concrete within the London Clay Formation.

If piled foundations are used any arisings of the London Clay Formation from the piling should not be placed against any concrete structures.

The specific concrete mixes for the Design Concrete Class (DCC) to be used on site will be determined by the site specific concrete requirements in terms of the required durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM), detailed in Part 2 with further guidance in Parts 3 and 4 of BRE Special Digest 1.

7.6 Pavement Design

The CBR values based on laboratory test results will be included within our final report.

With reference to in-situ CBR values obtained during the ground investigation using the TRL DCP and remoulded CBR's carried out within the laboratory it is suggested that a CBR design value of around 1-2% should be assumed for the design of any access roads/pavements founded within the Made Ground or near surface natural strata. This assumes that any below ground obstructions will be grubbed up and any voids or soft spots will be backfilled and compacted with suitable crushed aggregate to achieve an appropriate standard of compaction.

7.7 Soakaways/Drainage

Based on the presence of Boyn Hill Gravel, soakaways may be a viable drainage option for the site. It is noted that groundwater levels are shallow and this may limit the potential capacity and size of

any proposed soakaways. Soak away testing should be carried out in accordance with BRE 365 to confirm the infiltration rates.

7.8 Earthworks

Based on the laboratory testing results of the shallow silty sand material (Optimum Moisture Content of 19%) a suitable earthworks specification would allow placement and compaction when moisture contents are in the range of 17 – 21%.

It should be noted that some of the results lie outside of this range and that material in some areas may need wetting up or drying out.

7.9 Design Recommendations

Any design recommendations made within this report are considered the most appropriate considering a number of factors including investigation findings, financial and safety implications. All design recommendations are considered to be achievable within a safe system of work. During construction due consideration should be taken in relation to the safety implications inherent in the chosen construction method.

Any design recommendations suggested within this report should be carried out in line with current best practice and regulatory requirements. It is considered that the contractor carrying out any recommendations contained within this report will be aware of the standard construction processes involved and have detailed knowledge of the relevant health and safety measures.

8 Recommendations

The following further works have been recommended prior to the development of the site:

- Complete a Detailed Quantitative Risk Assessment (DQRA) to accurately model the risks to the future site users from the elevated PAH concentrations.

- Carry out further groundwater sampling and testing to establish if any PAH contamination identified within the Made Ground has migrated into the groundwater within the Secondary A Aquifer.

- Carry out a further three ground gas monitoring visits to re-evaluate the GSV values Characteristic Situation.

- Finalisation of geotechnical designs for the proposed development with reference to a finalised planning layout, the magnitude of imposed structural loadings, and following consultation with a design engineer.

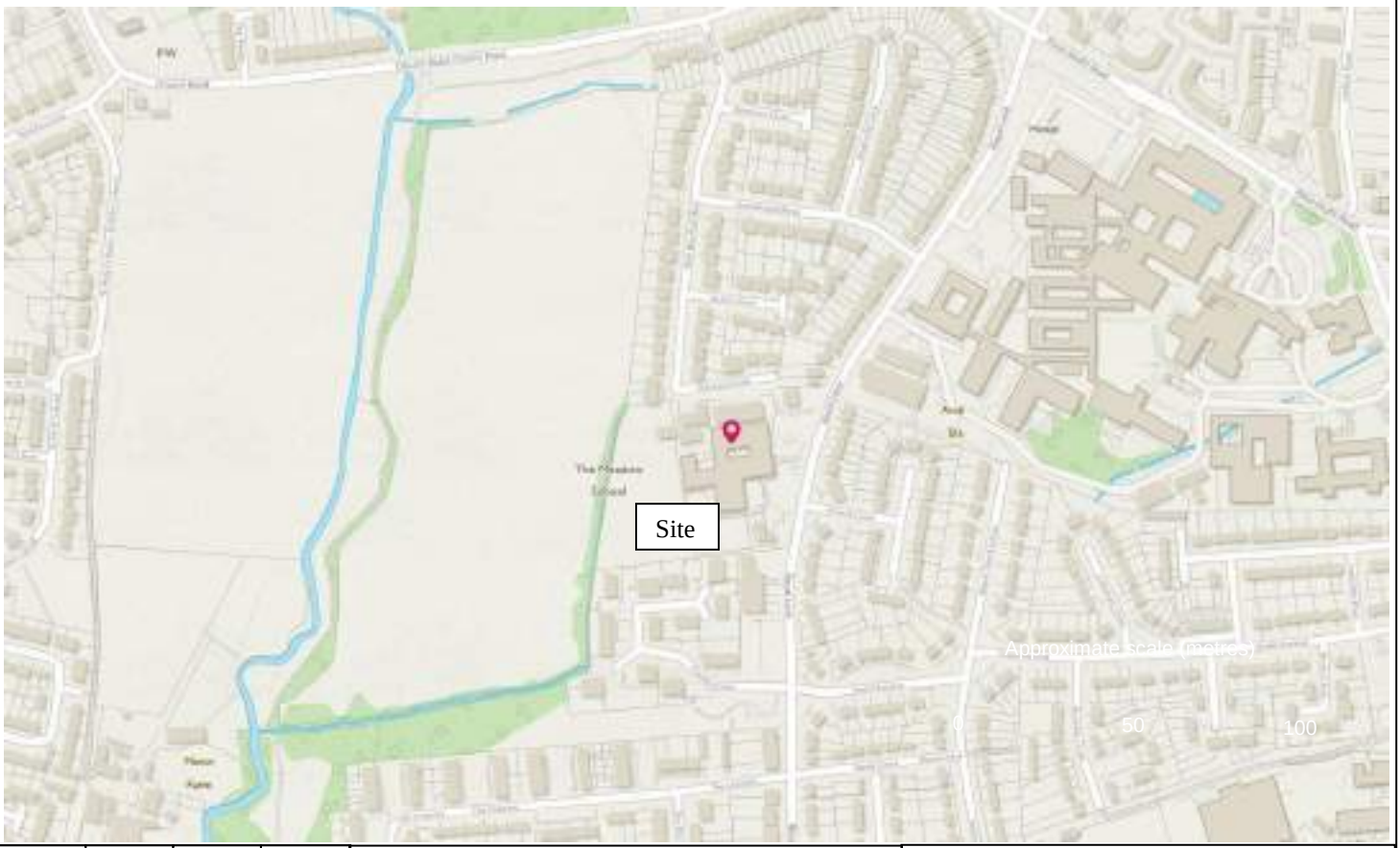
- Submission of this report to the Local Authority Environmental Health Officer for review and comment prior to any irrevocable action taking place.

- Confirmation of the water supply pipe specification with the appropriate authorities prior to construction.

- Further more detailed investigations, samples and tests may be required at a later date once specific development proposals have been finalised to provide design parameters where specified by the Project Engineer to inform the final design process.

DRAWINGS

Site Locality



	BY	CHECKED	DATE
DESIGN	HZ	RP	Jan 17
DRAWN	HZ	RP	Jan 17

APPROVED: NM

OPUS

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1 South House
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MK1 1SW

Site: Meadow High School, Hillingdon

Client: Mace Limited

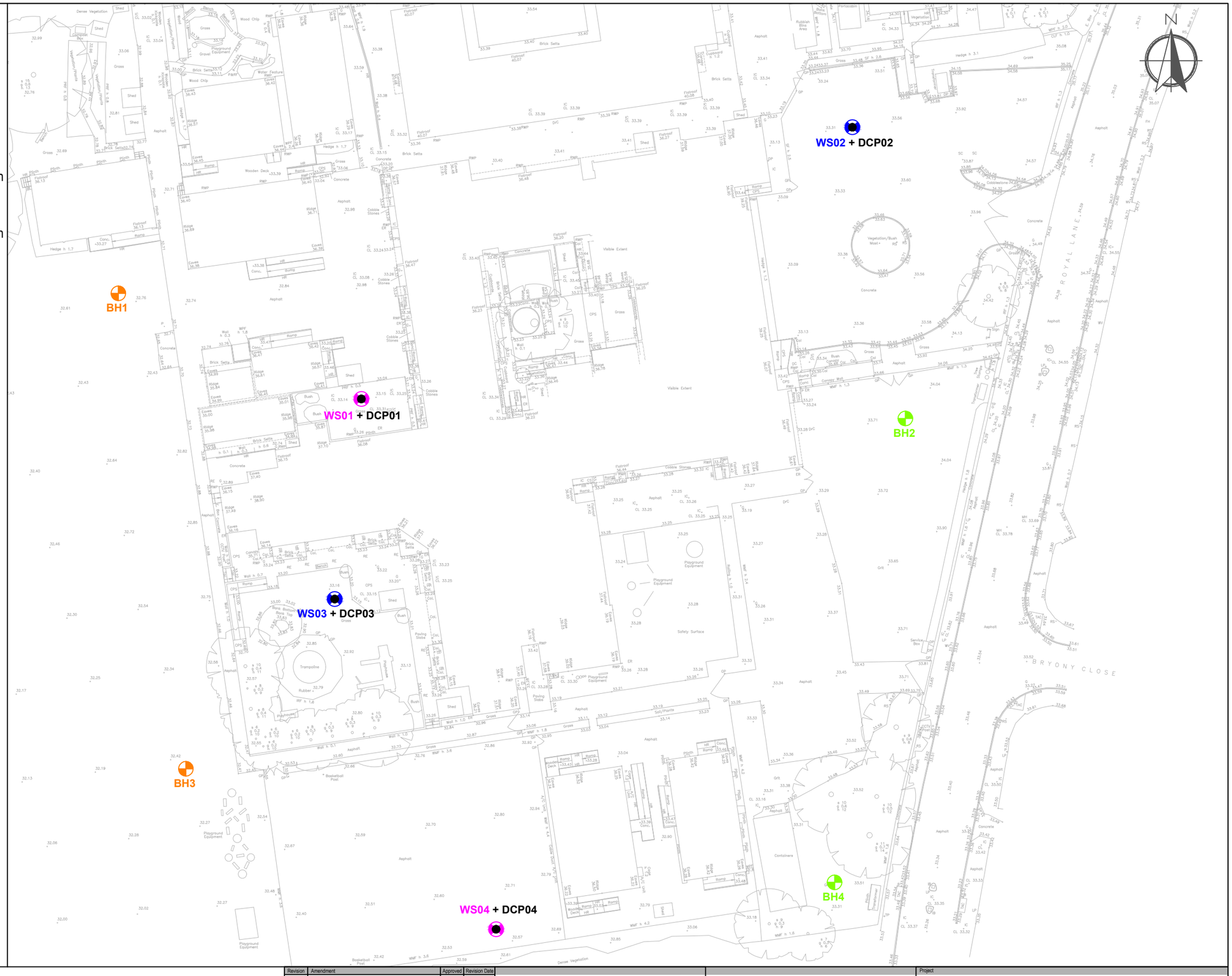
Status: Final Report | **File:** J-M3932.12

Scale: Not to scale | **Date:** 19th January 2017

Drawing Number: **MK J-M3932.12_100_R1**

Key:

- OPUS approximate window sample borehole location (December 2016)
- OPUS approximate window sample borehole location (December 2016) with gas monitoring installation
- OPUS approximate cable percussive borehole location (December 2016)
- OPUS approximate cable percussive borehole location (December 2016) with ground water / gas monitoring installation
- OPUS approximate dynamic cone penetration location (December 2016)



1:500 @ A3 — 0 5 10 15 20 m

Revision	Amendment	Approved	Revision Date
R0	First Issue - Draft	RP	03/01/17

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Drawn	Designed	Approved	Revision Date
HBZ	ES	RP	03/01/17

Project No.	Scale
J-M3932.12	1:500 @ A3

Project: Meadow High School Hillingdon

Sheet: Exploratory Hole Location Plan

Drawing No.	Sheet. No.	Revision
J-M3932.12_101	1	R0

Original Sheet Size A3 [420x297] Plot Date 17 Jan 2017 @ 12:07 PM Path G:\PROJECTS\Milton Keynes job numbers\Projects 2016\Geo\J-M3932.12 Meadow High School, Hillingdon\Drawings\Current\J-M3932.12.101.dwg Layout1

APPENDIX A

Selected Site Photographs

Photograph 1:
View east over car parking area from WS02

Photograph 2:
View of WS01 looking south toward school building

Photograph 3:
View north over school complex from WS01

Photograph 4:
View west toward playing field from WS01

Photograph 5:
View of rig setup at BH03

Photograph 6:
WS01 1.0 – 2.0m

Photograph 7:
WS01 Installation

Photograph 8:
WS01 Reinstatement

Photograph 9:
WS04 Installation

APPENDIX B

Exploratory Hole Logs

Exploratory Hole ID:	Client:		
BH01	Client: Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 20/12/2016	End Date: 20/12/2016

OPUS
www.opusinternational.co.uk

Drilling Equipment/ Excavation Method:	Co-ords:	Backfill Date:	Field Records:
Cable Percussive Rig	506442E - 181709N	20/12/2016	ES
	Ground Level (mAOD): 32.760	Logged: ES / Chkd: RP / Appr: NM	

Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Grass over TOPSOIL comprising soft brown slightly gravelly, slightly sandy CLAY with frequent roots and rootlets. Sand is fine to coarse. Gravel is fine angular flint.	0.35	32.41		ES1	0.10			
				B1	0.40 - 0.80			
				ES2	0.50			
Soft becoming firm orange brown and brown mottled slightly gravelly CLAY with occasional roots. Gravel is fine to coarse angular to rounded flint. (LANGLEY SILT MEMBER)	0.80	31.96		B2	0.80 - 1.10			
				B3	1.20 - 1.60	N=33 (C)		
Firm orange brown gravelly CLAY. Gravel is fine to coarse angular to rounded flint. (LANGLEY SILT MEMBER)	1.80	30.96		B4	2.00 - 2.50	N=68 (C)		
Very dense orange brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to rounded flint. (BOYN HILL GRAVEL MEMBER)						N=64 (C)		
				B5	3.10 - 3.50			
Firm orange brown very gravelly CLAY. Gravel is fine to coarse, angular to rounded flint. (BOYN HILL GRAVEL MEMBER)	3.90	28.86		B6	4.00 - 4.40	N=24 (C)		
	4.30	28.46						
Stiff fissured grey CLAY with frequent silt and fine sand partings. (LONDON CLAY FORMATION)				D1	4.60			
				S5	5.10	N=17 (S)		
				U1	6.60 - 7.00	U Blows=23		
				D2	7.10			
				S6	8.10	N=23 (S)		
				U2	9.60 - 10.00	U Blows=28		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole cased with 150mm casing to 4.40m bgl.
3. Water added from 1.80m to 3.00m bgl - 150 litres.
4. Groundwater strike at 3.00m bgl, slow inflow rate. Groundwater level on completion 2.20m bgl.
5. Borehole completed at the scheduled depth of 15.00m bgl.
6. Borehole backfilled with bentonite on completion.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key	Test Type Key
D - Disturbed Representative	(C) - Cone SPT
B - Bulk Representative	(S) - Spoon SPT
S - Spot Non-Representative	P - Pocket Penetrometer Reading
W - Water	PID - PID Reading
U - Undisturbed Representative	V - Hand Shear Vane Reading
J - Jar Sample	
ES - Environmental Sample	

Exploratory Hole ID:	Client:		
BH01	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 20/12/2016	End Date: 20/12/2016

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Drilling Equipment/ Excavation Method:	Co-ords:	Backfill Date:	Field Records:	
Cable Percussive Rig	506442E - 181709N	20/12/2016	ES	
	Ground Level (mAOD): 32.760	Logged: ES	Chkd: RP	Appr: NM

Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
				D3	10.10			
				S7	11.20	N=26 (S)		
				U3	12.50 - 12.90	U Blows=31		
				D4	13.00			
				S8	14.00	N=30 (S)		
	15.00	17.76		S9	14.90	N=30 (S)		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole cased with 150mm casing to 4.40m bgl.
3. Water added from 1.80m to 3.00m bgl - 150 litres.
4. Groundwater strike at 3.00m bgl, slow inflow rate. Groundwater level on completion 2.20m bgl.
5. Borehole completed at the scheduled depth of 15.00m bgl.
6. Borehole backfilled with bentonite on completion.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Sheet: Sheet 2 of 2

Exploratory Hole ID:	Client:		
BH02	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 20/12/2016	End Date: 21/12/2016
Drilling Equipment/ Excavation Method: Cable Percussive Rig	Co-ords: 506543E - 181693N	Backfill Date: 21/12/2016	Field Records: ES/RP
	Ground Level (mAOD): 33.710	Logged: ES/RP	Chkd: RP / Appr: NM

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Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
MADE GROUND comprising black sandy fine to coarse, angular flint, concrete, ashphalt GRAVEL. Sand is fine to coarse.	0.10	33.61		ES1	0.05			
				B1	0.20 - 0.50			
				ES2	0.40			
Firm greenish grey silty sandy organic CLAY with a faint organic odour. Sand is fine to coarse. (ALLUVIUM)	0.80	32.91		B2	0.70 - 1.00			
Firm orange brown gravelly CLAY. Gravel is fine to coarse angular to rounded flint. (LANGLEY SILT MEMBER)				B3	1.30 - 1.70	N=37 (C)		
Very dense orange brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to rounded flint. (BOYN HILL GRAVEL MEMBER)	1.80	31.91		B4	2.10 - 2.50	N=68 (C)		
Firm orange brown very gravelly CLAY. Gravel is fine to coarse, angular to rounded flint. (BOYN HILL GRAVEL MEMBER)	2.80	30.91		B5	3.20 - 3.60	N=38 (C)		
Stiff fissured grey CLAY with frequent silt and fine sand partings. (LONDON CLAY FORMATION)	3.60	30.11		D1	3.80			
Stiff fissured bluish grey CLAY with frequent silt and fine sand partings. (LONDON CLAY FORMATION)	3.90	29.81		U1	4.00 - 4.40	U Blows=17		
				D2	4.40			W
				S4	5.10	N=24 (C)		
				U2	6.50 - 6.90	U Blows=22		
				D3	7.00			
				S5	8.20	N=24 (S)		
				U3	9.60 - 10.00	U Blows=28		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole cased with 150mm casing to 4.40m bgl.
3. Water added from 1.80m to 3.10m bgl - 150 litres.
4. Groundwater strike at 3.10m bgl, slow inflow rate. Borehole dry on completion.
5. Borehole completed at the scheduled depth of 15.00m bgl.
6. Monitoring pipe installed to 4.50m bgl, response zone from 1.00m to 4.50m bgl.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Exploratory Hole ID:	Client:		
BH02	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 20/12/2016	End Date: 21/12/2016

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Drilling Equipment/ Excavation Method:	Co-ords:	Backfill Date:	Field Records:
Cable Percussive Rig	506543E - 181693N	21/12/2016	ES/RP
	Ground Level (mAOD): 33.710	Logged: ES/RP	Chkd: RP / Appr: NM

Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
				D4	10.10			
				S6	11.00	N=27 (S)		
				U4	12.60 - 13.00	U Blows=28		
				D5	13.10			
				S7	13.90	N=28 (S)		
	15.00	18.71		S8	15.00	N=30 (S)		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole cased with 150mm casing to 4.40m bgl.
3. Water added from 1.80m to 3.10m bgl - 150 litres.
4. Groundwater strike at 3.10m bgl, slow inflow rate. Borehole dry on completion.
5. Borehole completed at the scheduled depth of 15.00m bgl.
6. Monitoring pipe installed to 4.50m bgl, response zone from 1.00m to 4.50m bgl.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Sheet: Sheet 2 of 2

Exploratory Hole ID:	Client:		
BH03	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 16/12/2016	End Date: 16/12/2016
Drilling Equipment/ Excavation Method: Cable Percussive Rig	Co-ords: 506449E - 181638N	Backfill Date: 16/12/2016	Field Records: ES
	Ground Level (mAOD): 32.280	Logged: ES	Chkd: RP / Appr: NM

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Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Grass over TOPSOIL comprising soft brown slightly gravelly, slightly sandy CLAY with frequent roots and rootlets. Sand is fine to coarse. Gravel is fine angular flint.	0.20	32.08		ES1	0.10			
				B1	0.40 - 0.70			
				ES2	0.40			
				B2	0.70 - 1.00			
Soft becoming firm orange brown and brown mottled slightly gravelly CLAY with occasional roots. Gravel is fine to coarse angular to rounded flint. (LANGLEY SILT MEMBER)	1.20	31.08		B3	1.30 - 1.60	N=14 (C)		
Firm orange brown gravelly CLAY. Gravel is fine to coarse angular to rounded flint. (LANGLEY SILT MEMBER)	1.80	30.48		B4	2.10 - 2.50	N=44 (C)		
Very dense orange brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to rounded flint. (BOYN HILL GRAVEL MEMBER)				B5	3.10 - 3.50	N=62 (C)		
Medium dense orange brown clayey fine to coarse angular to rounded GRAVEL. (BOYN HILL GRAVEL MEMBER)	3.80	28.48		B6	4.10 - 4.40	N=26 (C)		
Stiff fissured grey CLAY with frequent silt and fine sand partings. (LONDON CLAY FORMATION)	4.40	27.88		D1	4.60			
				U1	5.00 - 5.30	U Blows=22		
				D2	5.40			
				S5	6.50	N=21 (S)		
				U2	8.00 - 8.40	U Blows=25		
				D3	8.50			
				S6	9.50	N=22 (S)		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole cased with 150mm casing to 4.50m bgl.
3. Water added from 2.30m to 3.80m bgl - 150 litres.
4. Groundwater strike at 3.50m bgl, slow inflow rate. Borehole dry on completion.
5. Borehole completed at the scheduled depth of 15.00m bgl.
6. Borehole backfilled with bentonite on completion.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Exploratory Hole ID:	Client:		
BH03	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 16/12/2016	End Date: 16/12/2016

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Drilling Equipment/ Excavation Method:	Co-ords:	Backfill Date:	Field Records:	
Cable Percussive Rig	506449E - 181638N	16/12/2016	ES	
	Ground Level (mAOD): 32.280	Logged: ES	Chkd: RP	Appr: NM

Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
				U3	11.00 - 11.50	U Blows=29		
				D4	11.60			
				D5	12.50			
				S7		N=27 (S)		
				D6	13.60			
				U4	14.10 - 14.50	U Blows=31		
				D7	14.50			
	15.00	17.28		S8	15.00	N=29 (S)		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole cased with 150mm casing to 4.50m bgl.
3. Water added from 2.30m to 3.80m bgl - 150 litres.
4. Groundwater strike at 3.50m bgl, slow inflow rate. Borehole dry on completion.
5. Borehole completed at the scheduled depth of 15.00m bgl.
6. Borehole backfilled with bentonite on completion.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Sheet: Sheet 2 of 2

Exploratory Hole ID:	Client:		
BH04	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 19/12/2016	End Date: 19/12/2016
Drilling Equipment/ Excavation Method: Cable Percussive Rig	Co-ords: 506534E - 181634N	Backfill Date: 19/12/2016	Field Records: ES
	Ground Level (mAOD): 33.400	Logged: ES	Chkd: RP / Appr: NM

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Strata Description	Depth (m)	Level (m)	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Grass over TOPSOIL comprising dark brown slightly clayey slightly gravelly fine to medium SAND with frequent roots and rootlets. Gravel is fine to medium subangular to subrounded of flint.	0.40	33.00	ES1	0.20			
			B1	0.40 - 0.70			
			ES2	0.50			
Soft becoming firm orange brown and brown mottled slightly gravelly CLAY with occasional roots. Gravel is fine to coarse angular to rounded flint. (LANGLEY SILT MEMBER)	1.10	32.30	B2	0.70 - 1.10			
			B3	1.30 - 1.70	N=26 (C)		
Firm orange brown gravelly CLAY. Gravel is fine to coarse angular to rounded flint. (LANGLEY SILT MEMBER)	1.90	31.50	B4	2.00 - 2.40	N=68 (C)		
Orange brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to rounded flint. (BOYN HILL GRAVEL MEMBER)			B5	3.10 - 3.50	N=65 (C)		
			B6	4.00 - 4.30	N=24 (C)		
Orange brown clayey fine to coarse angular to rounded GRAVEL. (BOYN HILL GRAVEL MEMBER)	4.30	29.10	D1	4.30			
Stiff fissured grey CLAY with frequent silt and fine sand partings. (LONDON CLAY FORMATION)	4.50	28.90	S5	4.90	N=17 (S)		
			U1	6.50	U Blows=25		
			D2	7.00			
			S6	8.00	N=23 (S)		
			U2	9.60 - 10.45	U Blows=27		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole cased with 150mm casing to 4.40m bgl.
3. Water added from 2.10m to 3.80m bgl - 150 litres.
4. Groundwater strike at 2.50m bgl, slow inflow rate. Borehole dry on completion.
5. Borehole completed at the scheduled depth of 15.00m bgl.
6. Monitoring pipe installed to 4.50m bgl, response zone from 1.00m to 4.50m bgl.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Exploratory Hole ID:	Client:		
BH04	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 19/12/2016	End Date: 19/12/2016
Drilling Equipment/ Excavation Method: Cable Percussive Rig	Co-ords: 506534E - 181634N	Backfill Date: 19/12/2016	Field Records: ES
	Ground Level (mAOD): 33.400	Logged: ES	Chkd: RP / Appr: NM

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Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
				D3	10.10			
				S7	11.10	N=27 (S)		
				U3	12.50 - 12.95	U Blows=29		
				D4	13.00			
				S8	14.10	N=28 (S)		
	15.00	18.40		S9	15.00	N=30 (S)		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole cased with 150mm casing to 4.40m bgl.
3. Water added from 2.10m to 3.80m bgl - 150 litres.
4. Groundwater strike at 2.50m bgl, slow inflow rate. Borehole dry on completion.
5. Borehole completed at the scheduled depth of 15.00m bgl.
6. Monitoring pipe installed to 4.50m bgl, response zone from 1.00m to 4.50m bgl.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Sheet: Sheet 2 of 2

Exploratory Hole ID:	Client:		
WS01	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 19/12/2016	End Date: 19/12/2016

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Drilling Equipment/ Excavation Method:	Co-ords:	Backfill Date:	Field Records:
Tracked Windowless Sampling Rig	506474E - 181696N	19/12/2016	LSB
	Ground Level (mAOD): 33.150	Logged: LSB / Chkd: RP / Appr: NM	

Strata Description	Depth (m)	Level (m)	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Grass over TOPSOIL comprising dark brown slightly clayey slightly gravelly fine to medium SAND. Gravel is fine to medium subangular to subrounded of flint.			ES1	0.20			
MADE GROUND comprising orange black brown very gravelly fine to medium SAND. Gravel is fine to coarse angular to subrounded of brick, concrete, sandstone and flint.	0.45	32.70	B1 ES2	0.45 - 0.70 0.50			
MADE GROUND comprising firm grey black slightly silty slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of brick and chalk.	0.70	32.45	B2 ES3	0.70 - 1.10 1.00			G
Soft to firm orange brown slightly sandy CLAY. (LANGLEY SILT MEMBER)	1.10	32.05	ES4 D1	1.20 1.40	N=7 (C)		
Very dense orange brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of flint. (BOYN HILL GRAVEL MEMBER)	1.80	31.35	D2	1.90			
	2.00	31.15			N=68 (C)		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole not cased.
4. Borehole dry during and on completion.
5. Borehole abandoned at 2.00m bgl due to refusal.
6. Monitoring pipe installed to 1.00m bgl, response zone from 0.50m to 1.00m bgl.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Sheet: Sheet 1 of 1

Exploratory Hole ID:	Client:		
WS02	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 19/12/2016	End Date: 19/12/2016
Drilling Equipment/ Excavation Method: Tracked Windowless Sampling Rig	Co-ords: 506536E - 181731N	Backfill Date: 19/12/2016	Field Records: LSB
	Ground Level (mAOD): 33.310	Logged: LSB	Chkd: RP / Appr: NM

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Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
MADE GROUND comprising grey CONCRETE.	0.10	33.21						
MADE GROUND comprising grey black medium to coarse subangular GRAVEL of asphalt, concrete and clinker.				B1 ES1	0.30 - 0.60 0.30			
MADE GROUND comprising firm to stiff orange brown sandy very gravelly CLAY. Gravel is fine to coarse subangular to subrounded of brick, flint and chalk.	0.60	32.71		B2	0.60 - 0.90			
Firm orange mottled grey slightly silty sandy CLAY. (LANGLEY SILT MEMBER)	0.90	32.41		ES2 D1	0.90 1.00			
Medium dense, becoming very dense range brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of flint. (BOYN HILL GRAVEL MEMBER)	1.20	32.11		D2	1.30	N=26 (C)		
	1.40	31.91				N=68 (C)		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole not cased.
4. Borehole dry during and on completion.
5. Borehole abandoned at 1.40m bgl due to refusal.
6. Borehole backfilled with arisings upon completion.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
ES - Environmental Sample

Test Type Key
(C) - Cone SPT
(S) - Spoon SPT
P - Pocket Penetrometer Reading
PID - PID Reading
V - Hand Shear Vane Reading

Sheet: Sheet 1 of 1

Exploratory Hole ID:	Client:		
WS03	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 19/12/2016	End Date: 19/12/2016
Drilling Equipment/ Excavation Method: Tracked Windowless Sampling Rig	Co-ords: 506470E - 181670N	Backfill Date: 19/12/2016	Field Records: LSB
	Ground Level (mAOD): 33.160	Logged: LSB	Chkd: RP / Appr: NM

OPUS
www.opusinternational.co.uk

Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Grass over TOPSOIL comprising dark brown slightly clayey slightly gravelly fine to medium SAND. Gravel is fine to medium subangular to subrounded of flint.				ES1	0.10			
MADE GROUND comprising orange brown gravelly fine to medium SAND. Gravel is fine to coarse subangular to subrounded of sandstone and brick.	0.40	32.76		B1 ES2	0.50 - 0.70 0.50			
Firm orange brown slightly sandy CLAY. (LANGLEY SILT MEMBER)	1.00	32.16		D1 ES3	1.10 1.20	N=6 (C)		
Very dense orange brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of flint. (BOYN HILL GRAVEL MEMBER)	1.80	31.36		D2	1.80			
	2.00	31.16				N=68 (C)	2.00 2.00 ▼	

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole not cased.
4. Groundwater strike at 2.00m bgl, slow inflow rate. Groundwater level on completion 2.00m bgl.
5. Borehole abandoned at 2.00m bgl due to refusal.
6. Borehole backfilled with arisings upon completion.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- U - Undisturbed Representative
- J - Jar Sample
- ES - Environmental Sample

Test Type Key
- (C) - Cone SPT
- (S) - Spoon SPT
- P - Pocket Penetrometer Reading
- PID - PID Reading
- V - Hand Shear Vane Reading

Sheet: Sheet 1 of 1

Exploratory Hole ID:	Client:		
WS04	Mace Limited		
	Site: Meadow High School		
Job No: J-M3932.12		Start Date: 19/12/2016	End Date: 19/12/2016
Drilling Equipment/ Excavation Method: Tracked Windowless Sampling Rig	Co-ords: 506491E - 181628N	Backfill Date: 19/12/2016	Field Records: LSB
	Ground Level (mAOD): 32.570	Logged: LSB	Chkd: RP / Appr: NM

OPUS
www.opusinternational.co.uk

Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
MADE GROUND comprising grey black ASPHALT.	0.10	32.47						
MADE GROUND comprising grey black sandy fine to coarse angular to subrounded GRAVEL of concrete.				ES1	0.20			
MADE GROUND comprising firm slightly silty sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of brick, flint and chalk.	0.40	32.17		B1	0.40 - 0.70			
				ES2	0.60			
Firm orange brown slightly sandy CLAY. (LANGLEY SILT MEMBER)	1.00	31.57		ES3	1.10			
Medium dense, becoming very dense orange brown SAND and GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of flint. (BOYN HILL GRAVEL MEMBER)	1.20	31.37				N=14 (C)		
				D1	1.40		1.70 1.70	
	2.00	30.57				N=68 (C)		

Remarks:

1. Hand excavated service pit to 1.20m bgl.
2. Borehole not cased.
4. Groundwater strike at 1.70m bgl, slow inflow rate. Groundwater level on completion 1.70m bgl.
5. Borehole abandoned at 2.00m bgl due to refusal.
6. Monitoring pipe installed to 1.00m bgl, response zone from 0.50m to 1.00m bgl.
7. Corrected SPT 'N' values N60 shown in accordance with BS EN 22476 Part 3.
8. Density and strength descriptions are reported in accordance with the guidance stated in BS 5930:2015 incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
ES - Environmental Sample

Test Type Key
(C) - Cone SPT
(S) - Spoon SPT
P - Pocket Penetrometer Reading
PID - PID Reading
V - Hand Shear Vane Reading

Sheet: Sheet 1 of 1

APPENDIX C

TRL DCP Test Results

Dynamic Cone Penetrometer Test Results

Project Number: J-M3932.12
Project Name: Meadow High School
Client: Mace Group Limited
Test Location: DCP01
Depth at Start of Test: 0.00m
Date of Test: 19/12/2016

No. of Blows	*Reading (mm)*
0	45
1	117
2	172
3	238
4	261
5	266
6	272
7	276
8	287
9	297
10	309
11	321
12	335
13	348
14	364
15	374
16	392
17	412
18	432
19	447
20	462
21	466
22	467
32	485
42	520
44	554
45	581
46	607
47	634
48	661
49	684
50	708
51	738
52	764
53	785
54	810
55	831
56	852
57	870
58	888
59	907
60	924
61	940

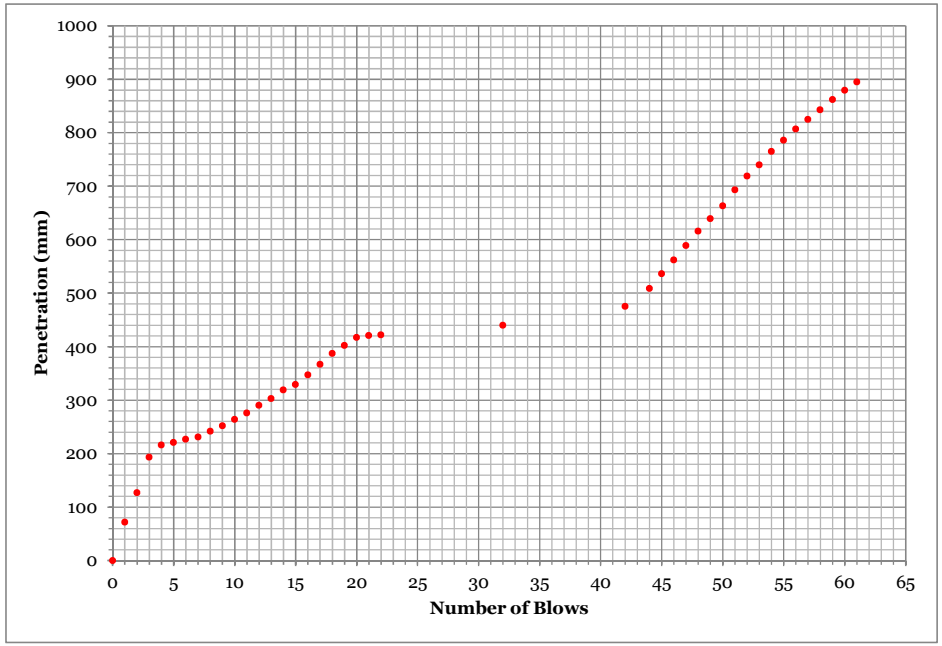
No. of Blows	*Reading (mm)*

No. of Blows	*Reading (mm)*

Dynamic Cone Penetrometer Test Results

Project Number: J-M3932.12
Project Name: Meadow High School
Client: Mace Group Limited
Test Location: DCP01
Depth at Start of Test: 0.00m
Date of Test: 19/12/2016

Blows vs Penetration Graph



Range Top	*Range Bottom*	*Blow count*	*CBR(%)*	*Stratum*
0	216	4	4.45512	Clayey gravelly SAND
216	417	16	20.8102	Clayey gravelly SAND
417	475	22	108.392	Clayey gravelly SAND
475	895	19	11.4516	Gravelly SAND

Notes
Test commenced from ground level.

Dynamic Cone Penetrometer Test Results

Project Number: J-M3932.12
Project Name: Meadow High School
Client: Mace Group Limited
Test Location: DCP02
Depth at Start of Test: 0.10m
Date of Test: 19/12/2016

No. of Blows	*Reading (mm)*
0	160
1	203
2	212
3	235
4	262
5	292
6	314
7	352
8	456
9	506
10	544
11	575
12	605
13	631
14	654
15	673
16	692
17	710
18	726
19	744
20	757
21	772
22	786
23	800
24	812
25	823
26	836
27	847
28	858
29	868
30	877
31	887
32	895
33	904
34	913
35	921
36	925
37	934
38	942

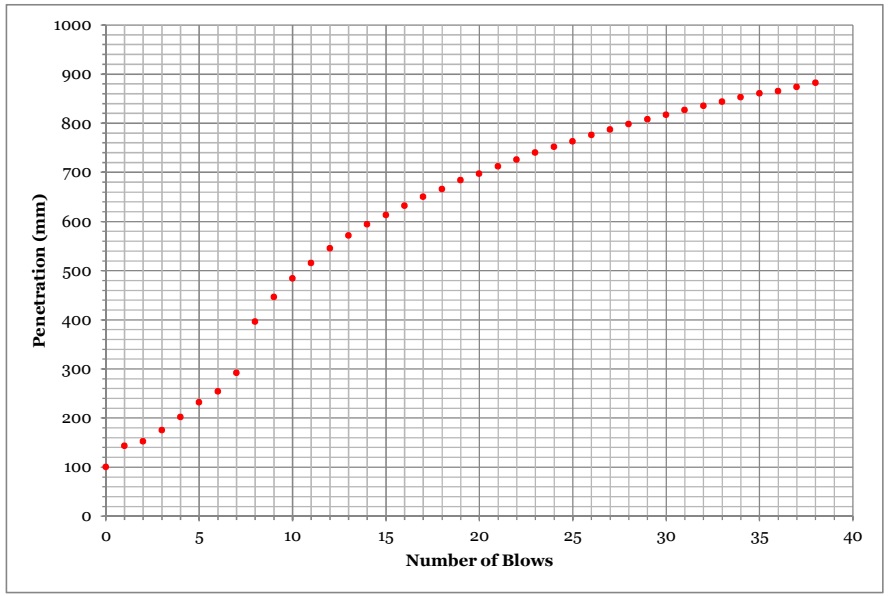
No. of Blows	*Reading (mm)*

No. of Blows	*Reading (mm)*

Dynamic Cone Penetrometer Test Results

Project Number: J-M3932.12
Project Name: Meadow High School
Client: Mace Group Limited
Test Location: DCP02
Depth at Start of Test: 0.10m
Date of Test: 19/12/2016

Blows vs Penetration Graph



Range Top	*Range Bottom*	*Blow count*	*CBR(%)*	*Stratum*
100	292	7	9.11631	GRAVEL
292	484	3	3.72278	GRAVEL
484	882	28	18.2629	GRAVEL and sandy gravelly CLAY

Notes
Test commenced at 0.1m bgl following breaking out of hardstanding.

Dynamic Cone Penetrometer Test Results

Project Number: J-M3932.12
Project Name: Meadow High School
Client: Mace Group Limited
Test Location: DCP03
Depth at Start of Test: 0.00m
Date of Test: 19/12/2016

No. of Blows	*Reading (mm)*
0	36
1	65
2	128
3	242
4	315
5	356
6	384
7	408
8	434
9	451
10	460
11	466
12	474
13	481
14	486
15	492
16	496
17	501
18	505
19	512
20	515
21	531
22	556
23	588
24	613
25	638
26	663
27	684
28	706
29	727
30	747
31	767
32	787
33	807
34	828
35	849
36	872
37	890
38	912
39	931
40	945

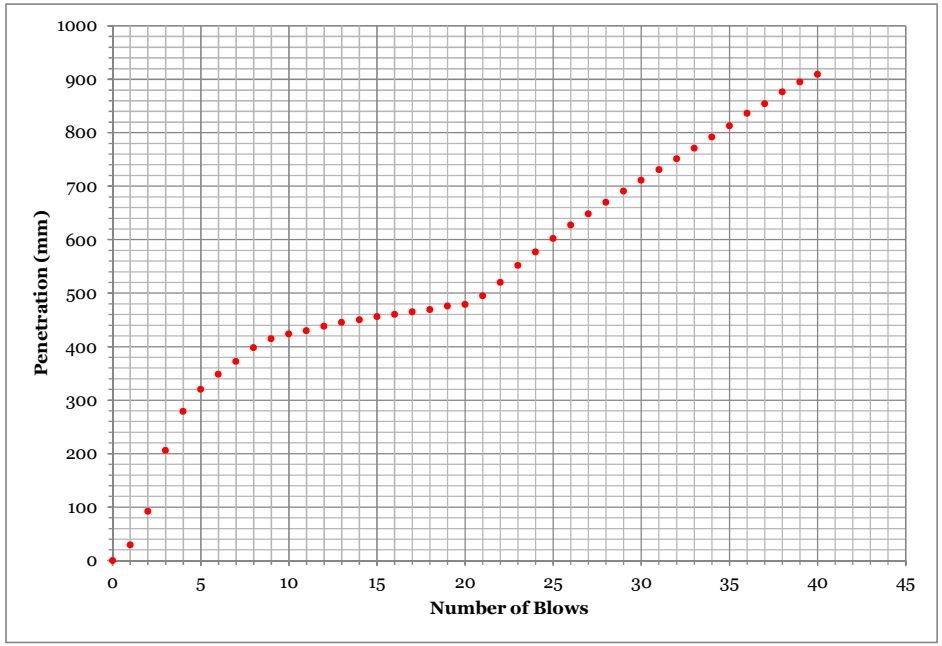
No. of Blows	*Reading (mm)*

No. of Blows	*Reading (mm)*

Dynamic Cone Penetrometer Test Results

Project Number: J-M3932.12
Project Name: Meadow High School
Client: Mace Group Limited
Test Location: DCP03
Depth at Start of Test: 0.00m
Date of Test: 19/12/2016

Blows vs Penetration Graph



Range Top	*Range Bottom*	*Blow count*	*CBR(%)*	*Stratum*
0	398	8	4.85836	Clayey gravelly SAND
398	479	12	40.126	Gravelly SAND
479	909	20	11.7927	Gravelly SAND

Notes
Test commenced from ground level.

Dynamic Cone Penetrometer Test Results

Project Number: J-M3932.12
Project Name: Meadow High School
Client: Mace Group Limited
Test Location: DCP04
Depth at Start of Test: 0.10m
Date of Test: 19/12/2016

No. of Blows	*Reading (mm)*
0	111
1	160
2	170
3	172
4	176
5	183
6	184
11	212
16	262
19	327
20	377
21	414
22	448
23	479
24	508
25	534
26	557
27	584
28	608
29	633
30	656
31	682
32	702
33	721
34	736
35	756
36	774
37	792
38	809
39	827
40	844
41	862
42	878
43	894
44	910
45	924

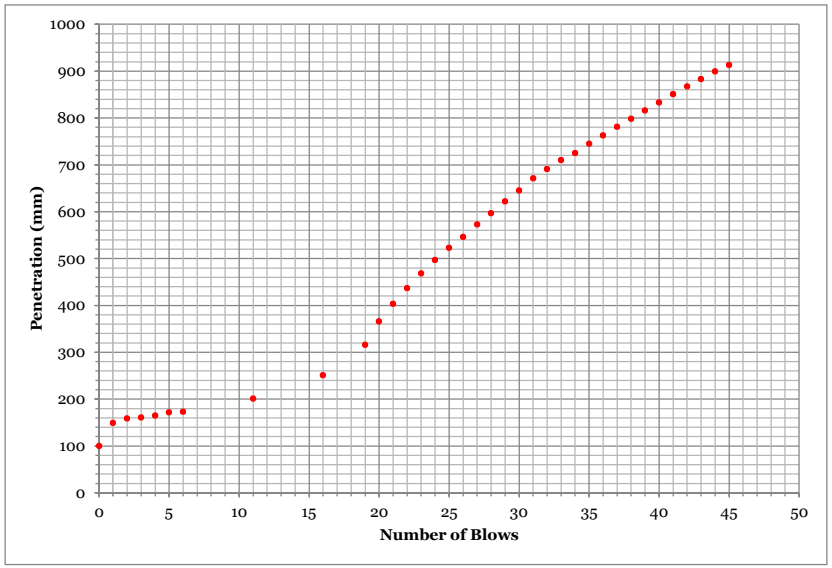
No. of Blows	*Reading (mm)*

No. of Blows	*Reading (mm)*

Dynamic Cone Penetrometer Test Results

Project Number: J-M3932.12
Project Name: Meadow High School
Client: Mace Group Limited
Test Location: DCP04
Depth at Start of Test: 0.10m
Date of Test: 19/12/2016

Blows vs Penetration Graph



Range Top	*Range Bottom*	*Blow count*	*CBR(%)*	*Stratum*
100	149	1	4.937	Sandy GRAVEL
149	173	5	57.5345	Sandy GRAVEL
173	251	10	34.4394	Sandy GRAVEL
251	913	29	11.069	Sandy GRAVEL and silty sandy gravelly CLAY

Notes
Test commenced at 0.1m bgl following breaking out of hardstanding.

APPENDIX D

Chemical Analysis Results

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WD18 8YS

t: 01923 225404
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e: reception@i2analytical.com

Analytical Report Number : 16-35834

Project / Site name:	Meadow School	**Samples received on:**	16/12/2016
Your job number:	J-M3932.12	**Samples instructed on:**	16/12/2016
Your order number:	MK PO 20615	**Analysis completed by:**	23/12/2016
Report Issue Number:	1	**Report issued on:**	23/12/2016
Samples Analysed:	1 soil sample		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 16-35834

Project / Site name: Meadow School
Your Order No: MK PO 20615

Lab Sample Number				675863				
Sample Reference				BH03				
Sample Number				None Supplied				
Depth (m)				0.10				
Date Sampled				16/12/2016				
Time Taken				0900				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	19				
Total mass of sample received	kg	0.001	NONE	0.96				
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.6				
Free Cyanide	mg/kg	1	MCERTS	< 1				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.039				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	38.7				
Total Sulphur	%	0.005	MCERTS	0.031				
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	< 1.0				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15				
Barium (aqua regia extractable)	mg/kg	1	MCERTS	67				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.58				
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (III)	mg/kg	1	NONE	21				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22				
Iron (aqua regia extractable)	mg/kg	40	MCERTS	20000				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	52				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6				
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	0.95				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	31				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48				

Analytical Report Number: 16-35834

Project / Site name: Meadow School
Your Order No: MK PO 20615

Lab Sample Number				675863				
Sample Reference				BH03				
Sample Number				None Supplied				
Depth (m)				0.10				
Date Sampled				16/12/2016				
Time Taken				0900				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

Analytical Report Number: 16-35834

Project / Site name: Meadow School
Your Order No: MK PO 20615

Lab Sample Number				675863				
Sample Reference				BH03				
Sample Number				None Supplied				
Depth (m)				0.10				
Date Sampled				16/12/2016				
Time Taken				0900				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	< 1.0				
Chloroethane	µg/kg	1	NONE	< 1.0				
Bromomethane	µg/kg	1	ISO 17025	< 1.0				
Vinyl Chloride	µg/kg	1	NONE	< 1.0				
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0				
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0				
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0				
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0				
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0				
Trichloromethane	µg/kg	1	MCERTS	< 1.0				
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0				
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0				
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0				
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0				
Benzene	µg/kg	1	MCERTS	< 1.0				
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0				
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0				
Trichloroethene	µg/kg	1	MCERTS	< 1.0				
Dibromomethane	µg/kg	1	MCERTS	< 1.0				
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0				
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0				
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0				
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0				
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0				
Tetrachloroethene	µg/kg	1	NONE	< 1.0				
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0				
Chlorobenzene	µg/kg	1	MCERTS	< 1.0				
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-Xylene	µg/kg	1	MCERTS	< 1.0				
Styrene	µg/kg	1	MCERTS	< 1.0				
Tribromomethane	µg/kg	1	NONE	< 1.0				
o-Xylene	µg/kg	1	MCERTS	< 1.0				
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0				
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0				
Bromobenzene	µg/kg	1	MCERTS	< 1.0				
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0				
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0				
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0				
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0				
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0				
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0				
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0				
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0				
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0				
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0				
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0				
Butylbenzene	µg/kg	1	MCERTS	< 1.0				
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0				
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0				
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0				
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0				

Analytical Report Number : 16-35834

Project / Site name: Meadow School

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
675863	BH03	None Supplied	0.10	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 16-35834

Project / Site name: Meadow School

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cations in soil by ICP-OES	Determination of cations in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 16-35980

Project / Site name:	Meadow High School	**Samples received on:**	19/12/2016
Your job number:	J-M3932.12	**Samples instructed on:**	19/12/2016
Your order number:	MK PO 20615	**Analysis completed by:**	28/12/2016
Report Issue Number:	1	**Report issued on:**	28/12/2016
Samples Analysed:	10 leachate samples - 12 soil samples		

Signed: _____

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed: _____

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 16-35980

Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676858	676859	676860	676861	676862
Sample Reference				WS01 ES2	WS01 ES3	WS02 ES1	WS02 ES2	WS03 ES2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.30	0.90	0.50
Date Sampled				19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	20	20	14	17	16
Total mass of sample received	kg	0.001	NONE	0.89	1.1	0.81	1.0	0.98
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.9	8.2	9.5	8.2	8.6
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.12	0.20	0.21	0.051	0.15
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	119	205	215	51.0	145
Total Sulphur	%	0.005	MCERTS	0.057	0.072	0.071	0.010	0.064
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.31	0.23	3.9	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	0.20	< 0.10	0.37	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.36	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.65	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	1.8	0.50	4.1	< 0.10	< 0.10
Anthracene	mg/kg	0.1	MCERTS	0.47	< 0.10	0.82	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	4.1	0.95	6.3	< 0.10	0.54
Pyrene	mg/kg	0.1	MCERTS	4.7	0.94	7.3	< 0.10	0.55
Benzo(a)anthracene	mg/kg	0.1	MCERTS	2.1	0.42	2.0	< 0.10	0.40
Chrysene	mg/kg	0.05	MCERTS	2.0	0.37	2.3	< 0.05	0.40
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	4.1	0.61	3.2	< 0.10	0.48
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	2.5	0.31	2.2	< 0.10	0.44
Benzo(a)pyrene	mg/kg	0.1	MCERTS	5.0	0.58	3.8	< 0.10	0.51
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	3.9	0.54	3.2	< 0.10	0.45
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	0.43	< 0.10	0.34	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	4.9	0.68	4.5	< 0.05	0.48
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	36.4	6.13	45.2	< 1.60	4.25
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	1.1	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	10	7.9	11	12
Barium (aqua regia extractable)	mg/kg	1	MCERTS	120	90	83	77	58
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.84	0.91	1.1	0.70	0.51
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	7.2	0.6	0.4	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2	< 0.2	< 0.2	0.4	11
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (III)	mg/kg	1	NONE	22	26	21	29	23
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24	28	21	29	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	69	44	100	13	19
Iron (aqua regia extractable)	mg/kg	40	MCERTS	21000	20000	17000	27000	17000
Lead (aqua regia extractable)	mg/kg	1	MCERTS	320	87	38	14	45
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.3	< 0.3	< 0.3	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	2.1	1.3	4.3	0.79	0.89
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	30	21	41	14	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	48	42	45	53	37
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	90	67	32	32	57

Analytical Report Number: 16-35980

Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676858	676859	676860	676861	676862
Sample Reference				WS01 ES2	WS01 ES3	WS02 ES1	WS02 ES2	WS03 ES2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.30	0.90	0.50
Date Sampled				19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	1.3	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	8.5	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	26	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	130	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	170	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	4.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	7.3	< 2.0	6.4	< 2.0	3.3
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	41	< 10	19	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	240	17	24	< 10	15
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	290	21	54	< 10	24

Analytical Report Number: 16-35980

Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676858	676859	676860	676861	676862
Sample Reference				WS01 ES2	WS01 ES3	WS02 ES1	WS02 ES2	WS03 ES2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.30	0.90	0.50
Date Sampled				19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Analytical Report Number: 16-35980

Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676863	676864	676865	676866	676867
Sample Reference				WS03 ES3	WS04 ES1	WS04 ES2	BH01 ES1	BH01 ES2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.20	0.60	0.10	0.50
Date Sampled				19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	19	5.3	16	21	18
Total mass of sample received	kg	0.001	NONE	1.0	0.82	1.1	0.95	1.2
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.1	8.2	7.3	7.0	7.8
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.085	0.024	0.020	0.019	0.042
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	85.2	24.2	19.6	19.2	41.5
Total Sulphur	%	0.005	MCERTS	0.011	0.045	0.019	0.050	0.013
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	-
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	-
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	-
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.30	-
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	-
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.76	-
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.65	-
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.41	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.35	-
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.40	-
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.22	-
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.36	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.27	-
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.32	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	< 1.60	4.04	-
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	5.0	9.3	12	15
Barium (aqua regia extractable)	mg/kg	1	MCERTS	85	89	76	84	100
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.96	< 0.06	0.66	0.72	1.3
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	0.6	1.2	1.4	1.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.3	< 0.2	0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (III)	mg/kg	1	NONE	36	11	25	24	34
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	36	11	26	24	34
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	13	19	25	22
Iron (aqua regia extractable)	mg/kg	40	MCERTS	35000	10000	23000	22000	34000
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	9.0	40	72	27
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	0.91	0.54	0.74	0.95	0.85
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	6.0	15	15	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	53	18	40	40	57
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48	39	45	65	60

Analytical Report Number: 16-35980

Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676863	676864	676865	676866	676867
Sample Reference				WS03 ES3	WS04 ES1	WS04 ES2	BH01 ES1	BH01 ES2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.20	0.60	0.10	0.50
Date Sampled				19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	1.1	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	5.3	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	17	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	90	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	110	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	7.1	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	26	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	190	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	230	< 10	10	< 10

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Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676863	676864	676865	676866	676867
Sample Reference				WS03 ES3	WS04 ES1	WS04 ES2	BH01 ES1	BH01 ES2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.20	0.60	0.10	0.50
Date Sampled				19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Analytical Report Number: 16-35980

Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676868	676869			
Sample Reference				BH04 ES1	BH04 ES2			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.20	0.50			
Date Sampled				19/12/2016	19/12/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	14	13			
Total mass of sample received	kg	0.001	NONE	1.0	0.94			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.2	7.8			
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.017	0.015			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	17.4	14.9			
Total Sulphur	%	0.005	MCERTS	0.021	0.009			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-			
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	-			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	-			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	-			
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	-			
Anthracene	mg/kg	0.1	MCERTS	< 0.10	-			
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	-			
Pyrene	mg/kg	0.1	MCERTS	< 0.10	-			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	-			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	-			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	-			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	-			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	-			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	-			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	-			
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	< 1.0	< 1.0			
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.6	14			
Barium (aqua regia extractable)	mg/kg	1	MCERTS	88	66			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.63	0.79			
Boron (water soluble)	mg/kg	0.2	MCERTS	3.8	0.6			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0.2			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (III)	mg/kg	1	NONE	27	37			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	37			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	30	18			
Iron (aqua regia extractable)	mg/kg	40	MCERTS	23000	37000			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	68	17			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	0.95	0.52			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	19			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	37	52			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	86	74			

Analytical Report Number: 16-35980

Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676868	676869			
Sample Reference				BH04 ES1	BH04 ES2			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.20	0.50			
Date Sampled				19/12/2016	19/12/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	2.0	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	10	< 10			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	1.7			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	3.3	5.9			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	15	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	17	< 10			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	36	20			

Analytical Report Number: 16-35980

Project / Site name: Meadow High School
Your Order No: MK PO 20615

Lab Sample Number				676868	676869			
Sample Reference				BH04 ES1	BH04 ES2			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.20	0.50			
Date Sampled				19/12/2016	19/12/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0			
Chloroethane	µg/kg	1	NONE	< 1.0	< 1.0			
Bromomethane	µg/kg	1	ISO 17025	< 1.0	< 1.0			
Vinyl Chloride	µg/kg	1	NONE	< 1.0	< 1.0			
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	< 1.0			
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0			
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	< 1.0			
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0			
Trichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0			
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0			
Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Dibromomethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0			
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0			
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0			
Tetrachloroethene	µg/kg	1	NONE	< 1.0	< 1.0			
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	< 1.0			
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Styrene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Tribromomethane	µg/kg	1	NONE	< 1.0	< 1.0			
o-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0			
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Bromobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0			
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0			
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0			
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0			
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	< 1.0			
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0			

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Project / Site name: Meadow High School

Your Order No: MK PO 20615

Lab Sample Number				676870	676871	676872	676873	676874
Sample Reference				WS01 ES2	WS01 ES3	WS02 ES1	WS02 ES2	WS03 ES2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.30	0.90	0.50
Date Sampled				19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	7.9	8.1	10.0	7.8	8.0
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Sulphate as SO_4	mg/l	0.1	ISO 17025	14	11	30	20	36
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	2.3	5.0	5.8	7.7	2.4
Fluoride	µg/l	50	NONE	1000	710	680	750	780
Ammoniacal Nitrogen as N	µg/l	15	NONE	71	900	38	45	250
Phenols by GC-MS								
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Phenols								
Total Phenols (GC-MS)	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids								
Antimony (dissolved)	µg/l	1.7	ISO 17025	5.0	2.0	< 1.7	< 1.7	< 1.7
Arsenic (dissolved)	µg/l	1.1	ISO 17025	3.0	7.7	8.5	< 1.1	3.1
Barium (dissolved)	µg/l	0.05	ISO 17025	11	41	8.6	7.5	18
Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	0.2	0.3
Boron (dissolved)	µg/l	10	ISO 17025	< 10	970	13	< 10	15
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	0.65
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	21	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	1.6	1.3	9.8	< 1.0	7.7
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.6	1.3	30	0.4	7.7
Copper (dissolved)	µg/l	0.7	ISO 17025	39	24	23	11	37
Iron (dissolved)	mg/l	0.004	ISO 17025	0.44	0.60	0.11	0.038	0.94
Lead (dissolved)	µg/l	1	ISO 17025	8.7	1.8	2.6	< 1.0	6.4
Manganese (dissolved)	µg/l	0.06	ISO 17025	4.7	430	0.96	2.4	10
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Molybdenum (dissolved)	µg/l	0.4	ISO 17025	4.5	6.6	16	2.6	4.9
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.0	3.3	< 0.3	< 0.3	4.3
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	7.0	4.5	< 4.0
Vanadium (dissolved)	µg/l	1.7	ISO 17025	4.7	3.4	25	< 1.7	5.2
Zinc (dissolved)	µg/l	0.4	ISO 17025	8.5	13	2.7	3.4	12
Calcium (dissolved)	mg/l	0.012	ISO 17025	22	30	26	14	39
Magnesium (dissolved)	mg/l	0.005	ISO 17025	0.26	2.0	< 0.005	1.4	1.4

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Lab Sample Number				676875	676876	676877	676878	676879
Sample Reference				WS03 ES3	WS04 ES1	WS04 ES2	BH01 ES1	BH04 ES1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.20	0.60	0.10	0.20
Date Sampled				19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	7.8	8.0	8.1	7.5	7.7
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Sulphate as SO_4	mg/l	0.1	ISO 17025	42	4.8	3.1	5.1	2.9
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	0.39	1.1	1.7	3.9	3.3
Fluoride	µg/l	50	NONE	970	490	610	640	610
Ammoniacal Nitrogen as N	µg/l	15	NONE	17	170	5200	28	17
Phenols by GC-MS								
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Phenols								
Total Phenols (GC-MS)	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Heavy Metals / Metalloids								
Antimony (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7	2.6	< 1.7	< 1.7
Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	4.1	4.4	3.8	1.5
Barium (dissolved)	µg/l	0.05	ISO 17025	9.5	120	45	9.4	11
Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	0.2
Boron (dissolved)	µg/l	10	ISO 17025	92	< 10	86	37	38
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	1.8	1.7
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4	< 0.4	0.5	1.8	1.7
Copper (dissolved)	µg/l	0.7	ISO 17025	14	17	31	41	38
Iron (dissolved)	mg/l	0.004	ISO 17025	0.026	0.025	0.45	1.6	1.9
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	6.4	6.1
Manganese (dissolved)	µg/l	0.06	ISO 17025	3.9	5.6	190	9.1	8.9
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Molybdenum (dissolved)	µg/l	0.4	ISO 17025	1.2	2.5	1.9	2.7	1.8
Nickel (dissolved)	µg/l	0.3	ISO 17025	< 0.3	< 0.3	1.9	3.9	3.3
Selenium (dissolved)	µg/l	4	ISO 17025	5.2	< 4.0	< 4.0	< 4.0	< 4.0
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7	4.9	3.4	5.4	3.7
Zinc (dissolved)	µg/l	0.4	ISO 17025	6.2	2.7	8.5	14	11
Calcium (dissolved)	mg/l	0.012	ISO 17025	27	12	40	11	12
Magnesium (dissolved)	mg/l	0.005	ISO 17025	1.5	0.81	1.9	0.45	0.38

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
676858	WS01 ES2	None Supplied	0.50	Brown loam and clay with gravel and brick.
676859	WS01 ES3	None Supplied	1.00	Brown clay and loam with brick.
676860	WS02 ES1	None Supplied	0.30	Black sandy gravel.**
676861	WS02 ES2	None Supplied	0.90	Light brown clay and sand.
676862	WS03 ES2	None Supplied	0.50	Light brown loam and sand with gravel and vegetation.
676863	WS03 ES3	None Supplied	1.20	Brown clay and sand.
676864	WS04 ES1	None Supplied	0.20	Grey gravelly sand.
676865	WS04 ES2	None Supplied	0.60	Brown loam and clay.
676866	BH01 ES1	None Supplied	0.10	Brown loam and clay with gravel and vegetation.
676867	BH01 ES2	None Supplied	0.50	Light brown clay and sand.
676868	BH04 ES1	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
676869	BH04 ES2	None Supplied	0.50	Light brown clay and sand.

**Non MCerts matrix

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Project / Site name: Meadow High School

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cations in soil by ICP-OES	Determination of cations in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Chloride in leachate	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Fluoride in leachate	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033-PL	W	NONE
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE

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Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Phenols, speciated, in leachate, by GCMS	Determination of speciated phenols in leachate by extraction in hexane followed by GC-MS.	In-house method based on USEPA 8270	L070-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in leachate	Determination of sulphide in leachate by ion selective electrode.	In-house method	L010-PL	W	NONE
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS04 ES1		S	16-35980	676864	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
WS04 ES1		S	16-35980	676864	b	Monohydric phenols in soil	L080-PL	b
WS04 ES1		S	16-35980	676864	b	Speciated EPA-16 PAHs in soil	L064-PL	b
WS04 ES1		S	16-35980	676864	b	TPHCWG (Soil)	L076-PL	b
WS04 ES1		S	16-35980	676864	b	Volatile organic compounds in soil	L073B-PL	b

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

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Analytical Report Number : 17-36644

Project / Site name:	Meadow School	**Samples received on:**	04/01/2017
Your job number:	J-M932.12	**Samples instructed on:**	04/01/2017
Your order number:	MK PO 20615	**Analysis completed by:**	11/01/2017
Report Issue Number:	1	**Report issued on:**	11/01/2017
Samples Analysed:	8 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 17-36644

Project / Site name: Meadow School
Your Order No: MK PO 20615

Lab Sample Number				682121	682122	682123	682124	682125
Sample Reference				BH01	BH02	BH03	BH04	WS01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.60	6.50-6.90	8.00-8.40	6.50-6.90	1.40
Date Sampled				20/12/2016	21/12/2016	16/12/2016	19/12/2016	19/12/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	21	20	16	20	18
Total mass of sample received	kg	0.001	NONE	0.34	2.0	2.0	2.0	0.33
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	7.7	7.4	7.5	7.1
Total Sulphate as SO_4	%	0.005	MCERTS	0.037	0.048	0.067	0.034	0.017
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.11	0.21	0.32	0.15	0.020
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	8.6	22	18	4.3	3.6
Total Sulphur	%	0.005	MCERTS	0.313	0.392	7.56	0.633	0.008
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Heavy Metals / Metalloids								
Magnesium (water soluble)	mg/kg	5	NONE	25	63	92	44	< 5.0
Magnesium (leachate equivalent)	mg/l	2.5	NONE	12	32	46	22	< 2.5

Analytical Report Number: 17-36644

Project / Site name: Meadow School
Your Order No: MK PO 20615

Lab Sample Number				682126	682127	682128		
Sample Reference				WS02	WS03	WS04		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.30	1.10	1.40		
Date Sampled				19/12/2016	19/12/2016	19/12/2016		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	8.0	20	7.4		
Total mass of sample received	kg	0.001	NONE	1.1	0.33	1.3		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	7.4	8.0		
Total Sulphate as SO_4	%	0.005	MCERTS	0.008	0.031	0.017		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.024	0.083	0.064		
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	5.4	1.4	3.0		
Total Sulphur	%	0.005	MCERTS	0.008	0.011	0.009		
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	3.5	< 2.0		
Heavy Metals / Metalloids								
Magnesium (water soluble)	mg/kg	5	NONE	< 5.0	5.3	< 5.0		
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5	2.7	< 2.5		

Analytical Report Number : 17-36644

Project / Site name: Meadow School

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
682121	BH01	None Supplied	4.60	Brown clay.
682122	BH02	None Supplied	6.50-6.90	Brown clay and sand.
682123	BH03	None Supplied	8.00-8.40	Brown clay and sand.
682124	BH04	None Supplied	6.50-6.90	Brown clay and sand.
682125	WS01	None Supplied	1.40	Brown clay.
682126	WS02	None Supplied	1.30	Brown clay and sand with gravel.
682127	WS03	None Supplied	1.10	Brown clay.
682128	WS04	None Supplied	1.40	Brown clay and sand with gravel.

The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 17-36644

Project / Site name: Meadow School

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests. 2:1 extraction.	L082-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L038	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038	W	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL		NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
BH01		S	17-36644	682121	c	Water Soluble Nitrate (2:1) as N in soil	L078-PL	c
BH02		S	17-36644	682122	c	Water Soluble Nitrate (2:1) as N in soil	L078-PL	c
BH03		S	17-36644	682123	c	Water Soluble Nitrate (2:1) as N in soil	L078-PL	c
BH04		S	17-36644	682124	c	Water Soluble Nitrate (2:1) as N in soil	L078-PL	c
WS01		S	17-36644	682125	c	Water Soluble Nitrate (2:1) as N in soil	L078-PL	c
WS02		S	17-36644	682126	c	Water Soluble Nitrate (2:1) as N in soil	L078-PL	c
WS03		S	17-36644	682127	c	Water Soluble Nitrate (2:1) as N in soil	L078-PL	c
WS04		S	17-36644	682128	c	Water Soluble Nitrate (2:1) as N in soil	L078-PL	c

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

APPENDIX E

Geotechnical Analysis Results

TEST CERTIFICATE

Determination of Moisture Content

Tested in Accordance with BS 1377-2:1990: Clause 3.2

4041

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12 - 21/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

Test results

Laboratory Reference	Sample Reference	Location	Depth Top [m]	Depth Base [m]	Sample Type	Description	Moisture Content [%]
682149	Not Given	BH01	4.6	Not Given	B	Brown slightly gravelly CLAY	25
682150	Not Given	BH01	7.1	Not Given	B	Brown CLAY	26
682152	Not Given	BH01	9.6	10	U	Greyish brown CLAY	26
682153	Not Given	BH01	5.1	Not Given	B	Brown CLAY	26
682159	Not Given	BH01	4	4.4	B	Brown gravelly slightly sandy CLAY	22
682160	Not Given	BH02	3.8	Not Given	B	Brown slightly gravelly CLAY	27
682161	Not Given	BH02	4.4	Not Given	B	Brown CLAY	27
682162	Not Given	BH02	7	Not Given	B	Brown CLAY	27
682165	Not Given	BH02	5.1	Not Given	B	Brown CLAY	26
682171	Not Given	BH03	5.4	Not Given	B	Brown CLAY	27

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 18/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

UKAS TESTING
4041

TEST CERTIFICATE

Determination of Moisture Content

Tested in Accordance with BS 1377-2:1990: Clause 3.2

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12 - 19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

Test results

Laboratory Reference	Sample Reference	Location	Depth Top [m]	Depth Base [m]	Sample Type	Description	Moisture Content [%]
682172	Not Given	BH03	8.5	Not Given	B	Brown CLAY	28
682175	Not Given	BH03	6.5	Not Given	B	Brown CLAY	28
682181	Not Given	BH03	4.1	4.4	B	Brown very gravelly CLAY	19
682182	Not Given	BH04	4.4	Not Given	B	Orangish brown slightly gravelly CLAY	27
682183	Not Given	BH04	7	Not Given	B	Brown CLAY	26
682187	Not Given	BH04	0.7	1.1	B	Orangish brown slightly gravelly slightly sandy CLAY	23
682188	Not Given	BH04	1.3	1.7	B	Brown gravelly slightly sandy CLAY	16
682193	Not Given	WS01	0.7	1.1	B	Mottled brown slightly gravelly slightly sandy CLAY	20
682194	Not Given	WS01	1.4	Not Given	D	Orangish brown sandy CLAY	24
682196	Not Given	WS02	0.6	0.9	B	Yellowish brown to grey slightly gravelly CLAY	25

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 18/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Moisture Content

Tested in Accordance with BS 1377-2:1990: Clause 3.2

4041

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

Test results

Laboratory Reference	Sample Reference	Location	Depth Top [m]	Depth Base [m]	Sample Type	Description	Moisture Content [%]
682197	Not Given	WS02	1	Not Given	D	Orangish brown to grey slightly gravelly CLAY	23
682199	Not Given	WS03	1.1	Not Given	D	Brown slightly sandy CLAY	26

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 18/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

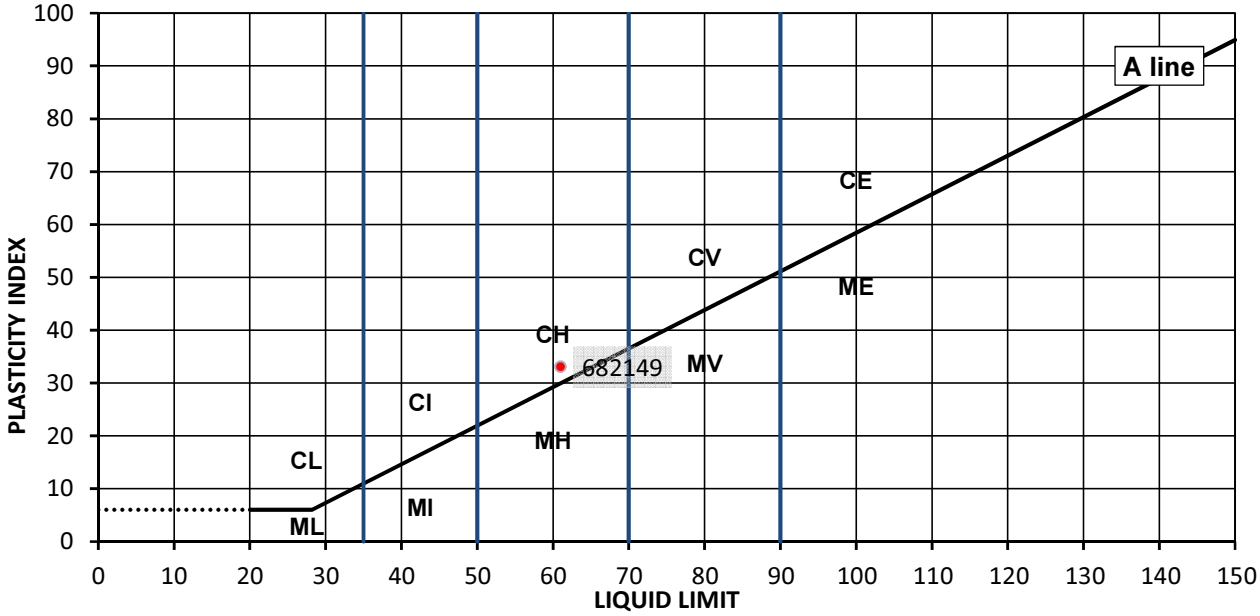
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	13/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682149
Sample Reference: Not Given

Description:	Brown slightly gravelly CLAY	Sample Type:	B
Location:	BH01	Depth Top [m]:	4.6
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
25	61	28	33	96



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

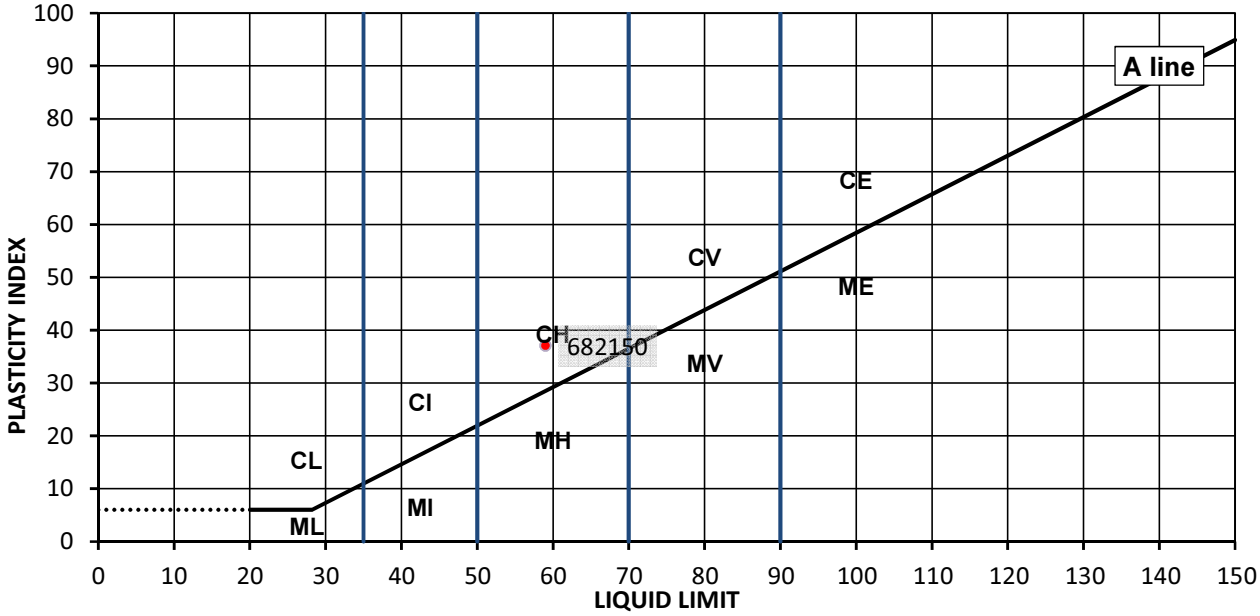
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	13/11/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682150
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH01	Depth Top [m]:	7.1
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
26	59	22	37	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

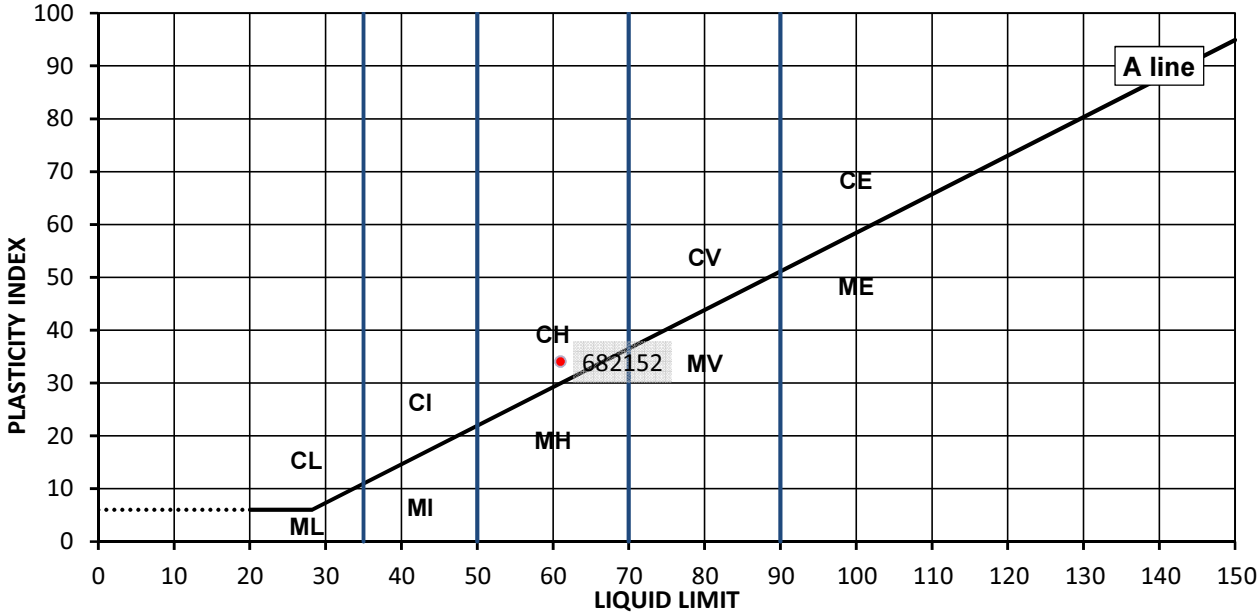
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682152
Sample Reference: Not Given

Description:	Greyish brown CLAY	Sample Type:	U
Location:	BH01	Depth Top [m]:	9.6
Sample Preparation:	Tested in natural condition	Depth Base [m]:	10

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
26	61	27	34	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	13/11/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

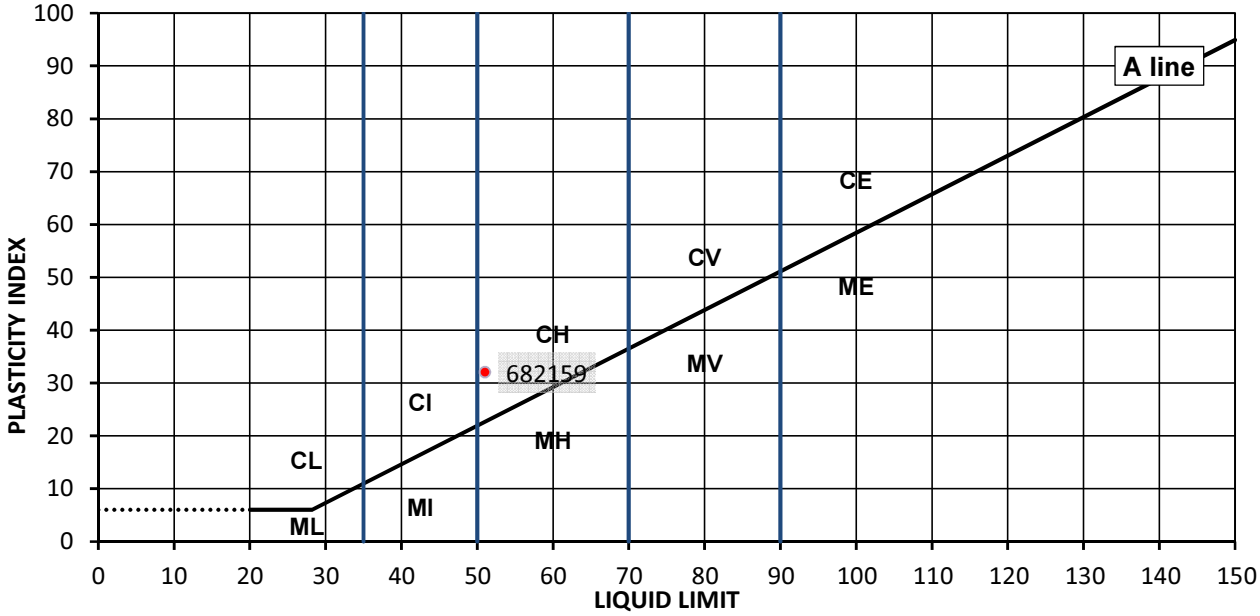
TEST RESULTS

Laboratory Reference: 682159
Sample Reference: Not Given

Description: Brown gravelly slightly sandy CLAY
Location: BH01
Sample Preparation: Tested after washing to remove >425um

Sample Type: B
Depth Top [m]: 4
Depth Base [m]: 4.4

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
22	51	19	32	52



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

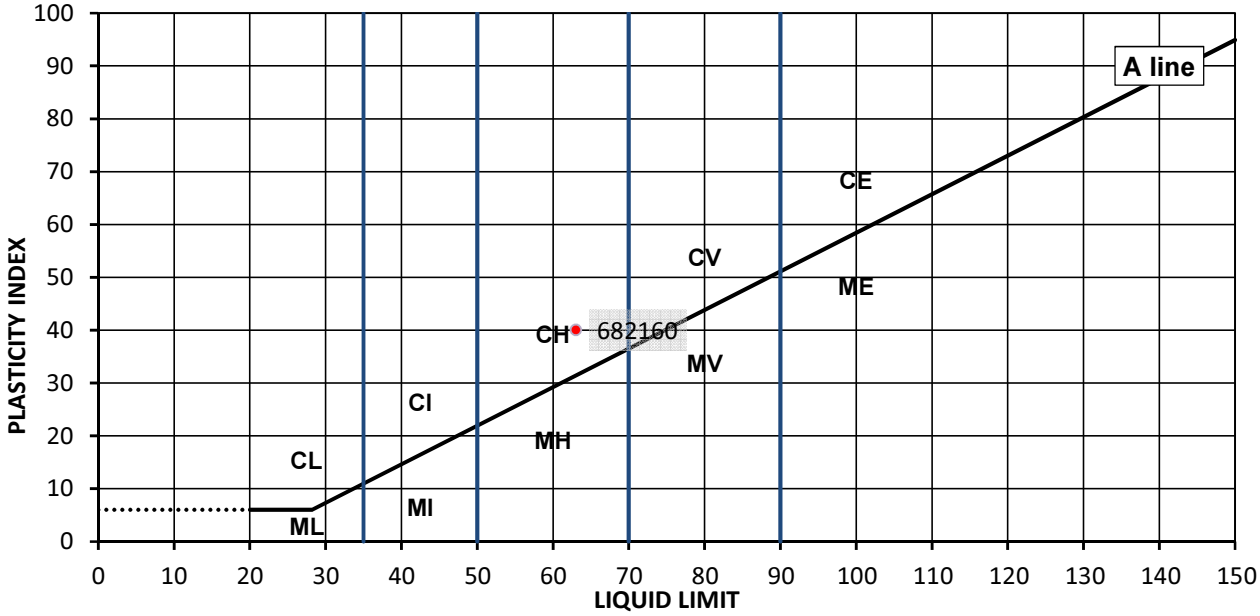
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	21/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	13/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682160
Sample Reference: Not Given

Description:	Brown slightly gravelly CLAY	Sample Type:	B
Location:	BH02	Depth Top [m]:	3.8
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	63	23	40	76



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

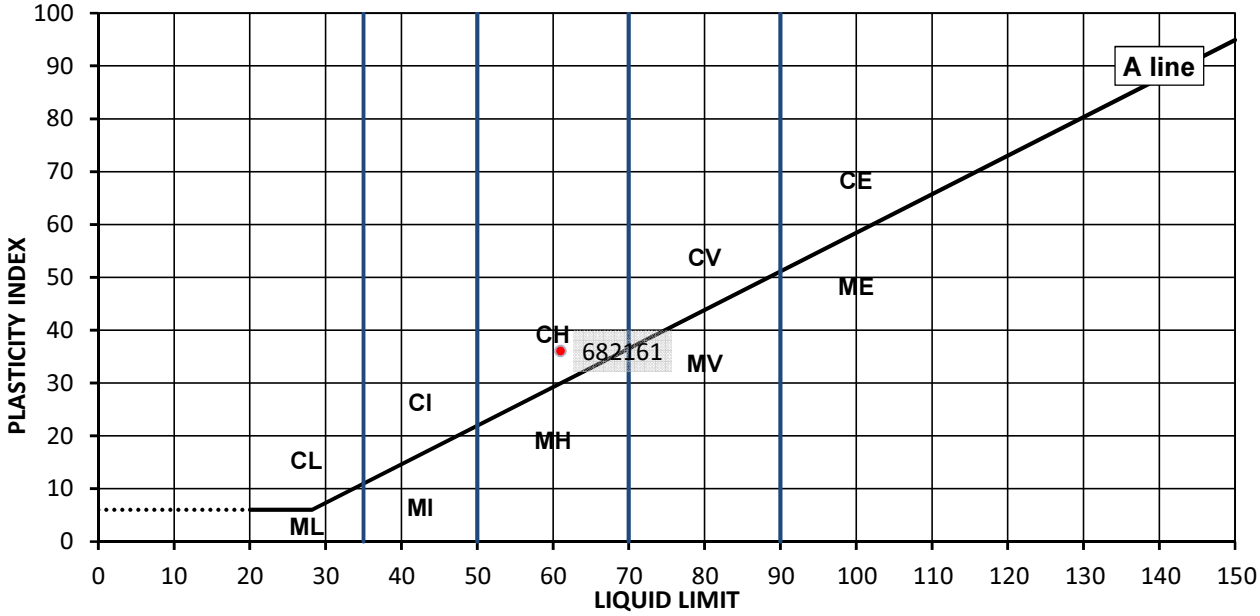
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	21/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682161
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH02	Depth Top [m]:	4.4
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	61	25	36	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

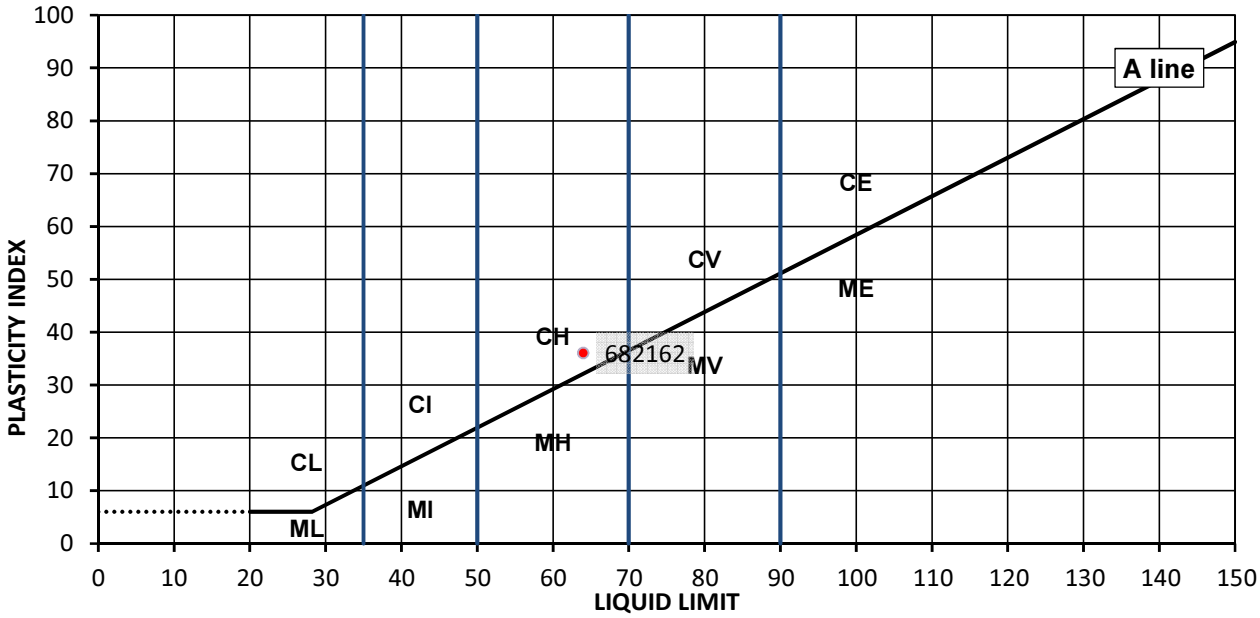
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	21/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682162
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH02	Depth Top [m]:	7
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	64	28	36	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

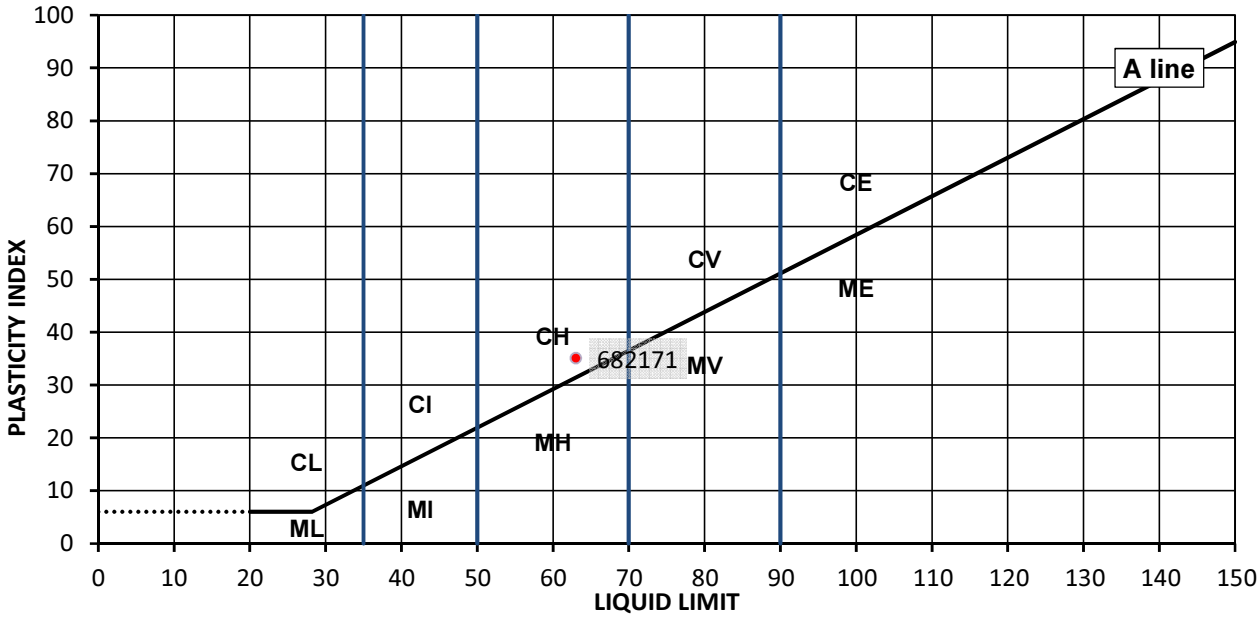
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682171
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH03	Depth Top [m]:	5.4
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	63	28	35	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

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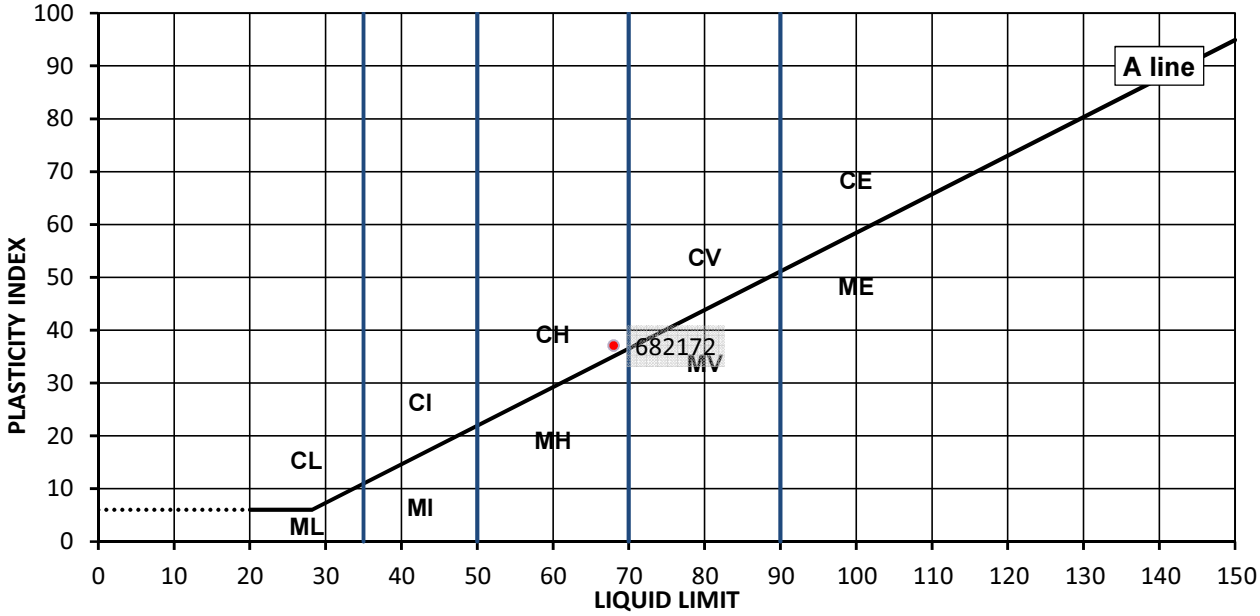
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682172
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH03	Depth Top [m]:	8.5
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
28	68	31	37	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

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PL Head of
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Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

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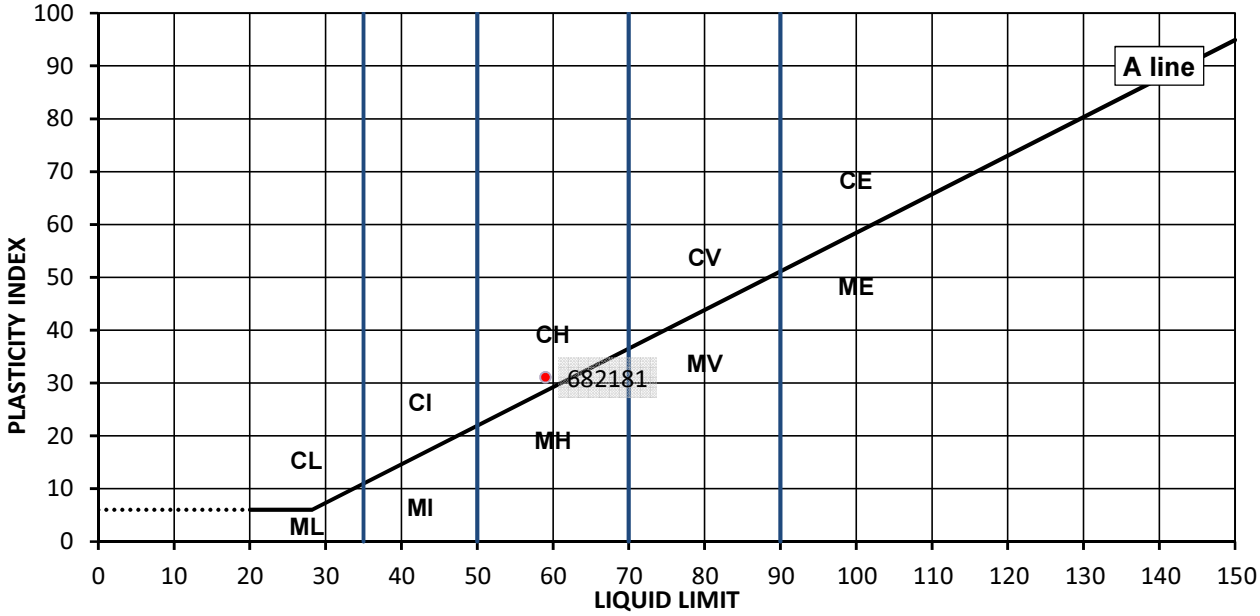
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682181
Sample Reference: Not Given

Description:	Brown very gravelly CLAY	Sample Type:	B
Location:	BH03	Depth Top [m]:	4.1
Sample Preparation:	Tested after washing to remove >425um	Depth Base [m]:	4.4

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
19	59	28	31	41



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

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Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

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UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

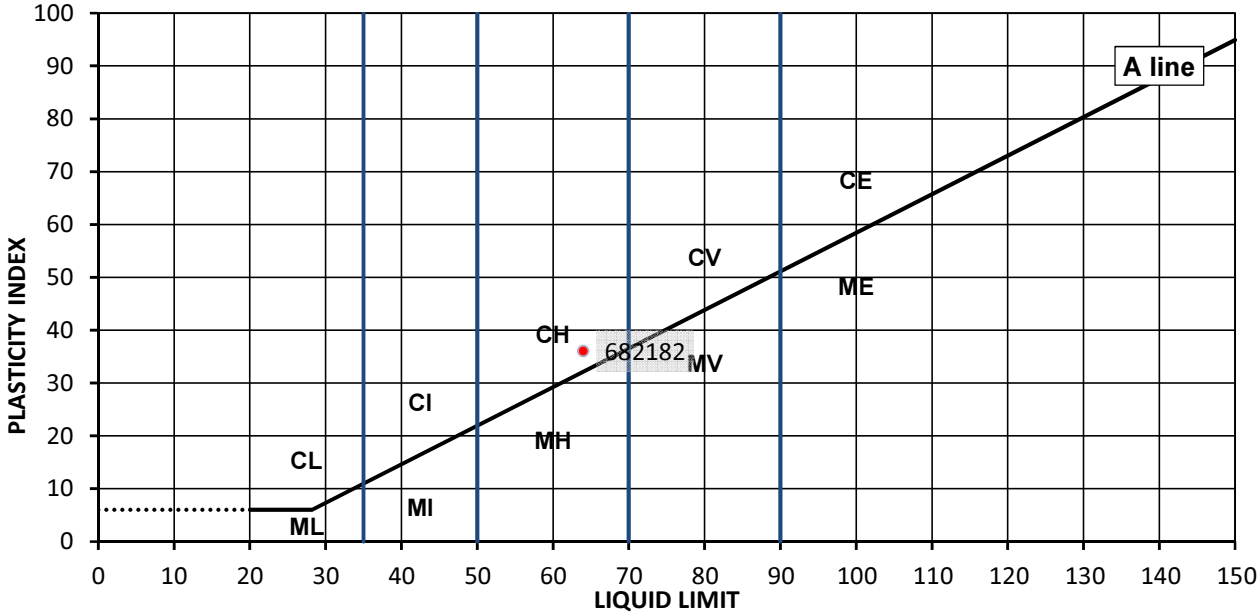
TEST RESULTS

Laboratory Reference: 682182
Sample Reference: Not Given

Description: Orangish brown slightly gravelly CLAY
Location: BH04
Sample Preparation: Tested after washing to remove >425um

Sample Type: B
Depth Top [m]: 4.4
Depth Base [m]: Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	64	28	36	80



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

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Determination of Liquid and Plastic Limits

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Croxley Green Business Park
Watford Herts WD18 8YS

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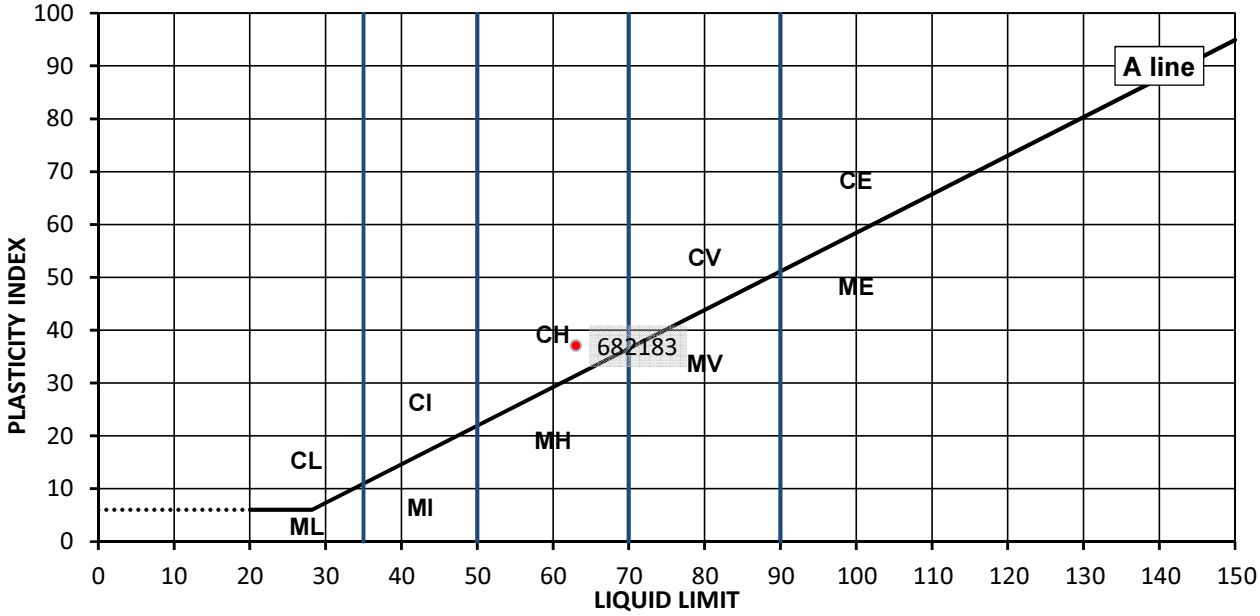
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682183
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH04	Depth Top [m]:	7
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
26	63	26	37	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

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Watford Herts WD18 8YS

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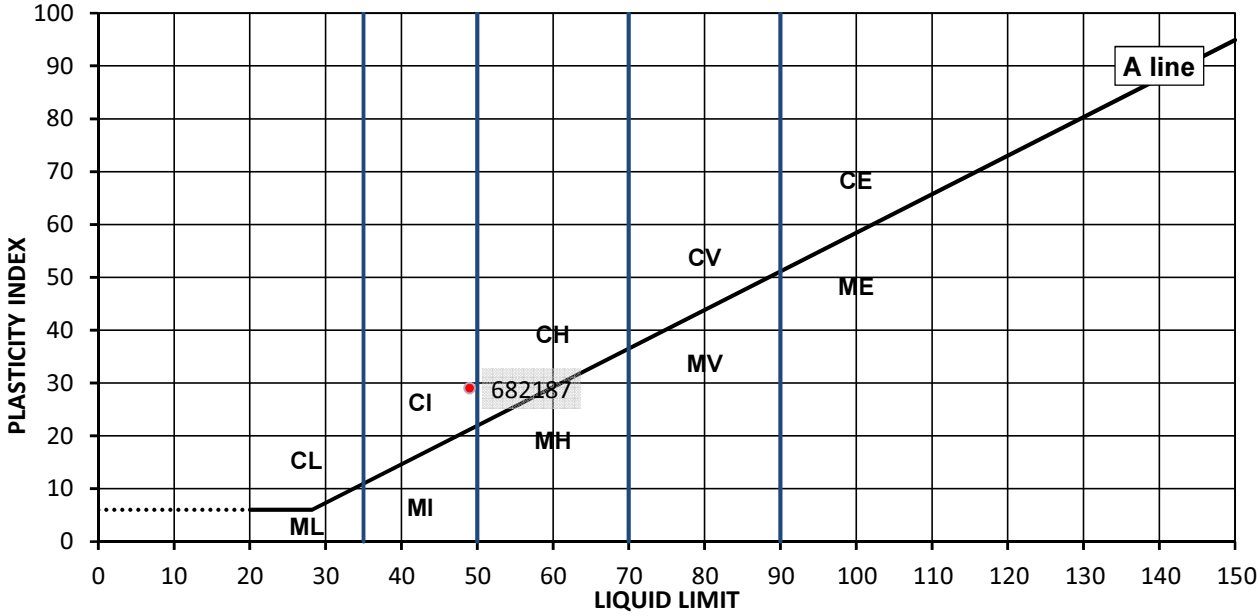
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682187
Sample Reference: Not Given

Description:	Orangish brown slightly gravelly slightly sandy CLAY	Sample Type:	B
Location:	BH04	Depth Top [m]:	0.7
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	1.1

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
23	49	20	29	96



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

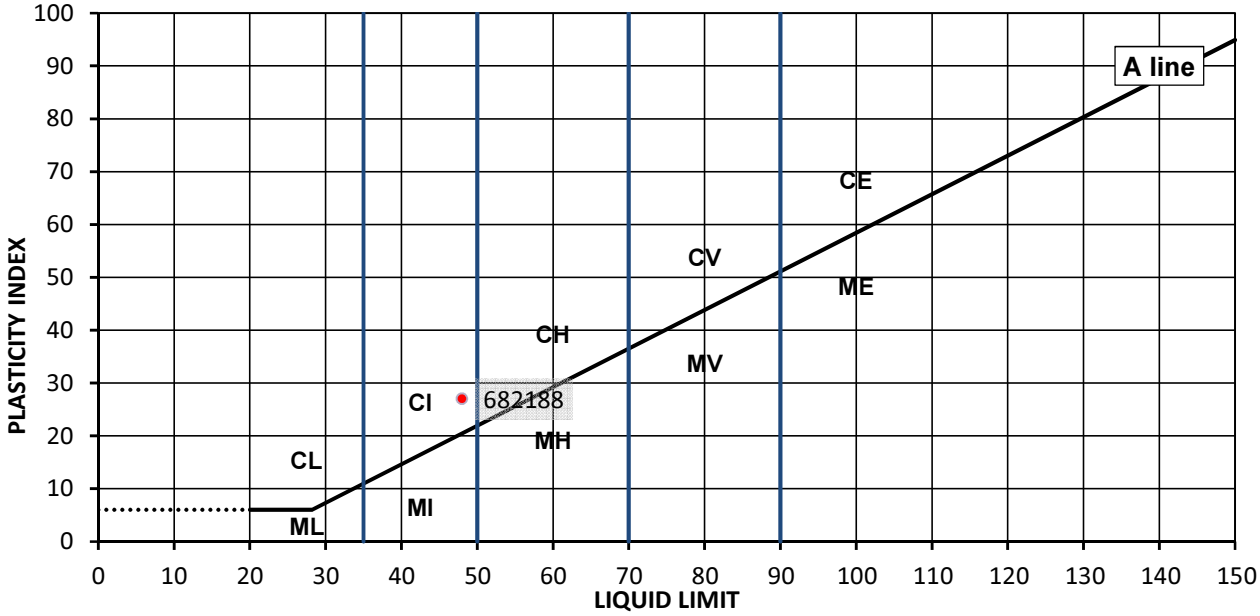
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682188
Sample Reference: Not Given

Description:	Brown gravelly slightly sandy CLAY	Sample Type:	B
Location:	BH04	Depth Top [m]:	1.3
Sample Preparation:	Tested after washing to remove >425um	Depth Base [m]:	1.7

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
16	48	21	27	54



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

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PL Head of
Geotechnical Section

Signed:

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Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

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Croxley Green Business Park
Watford Herts WD18 8YS

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Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

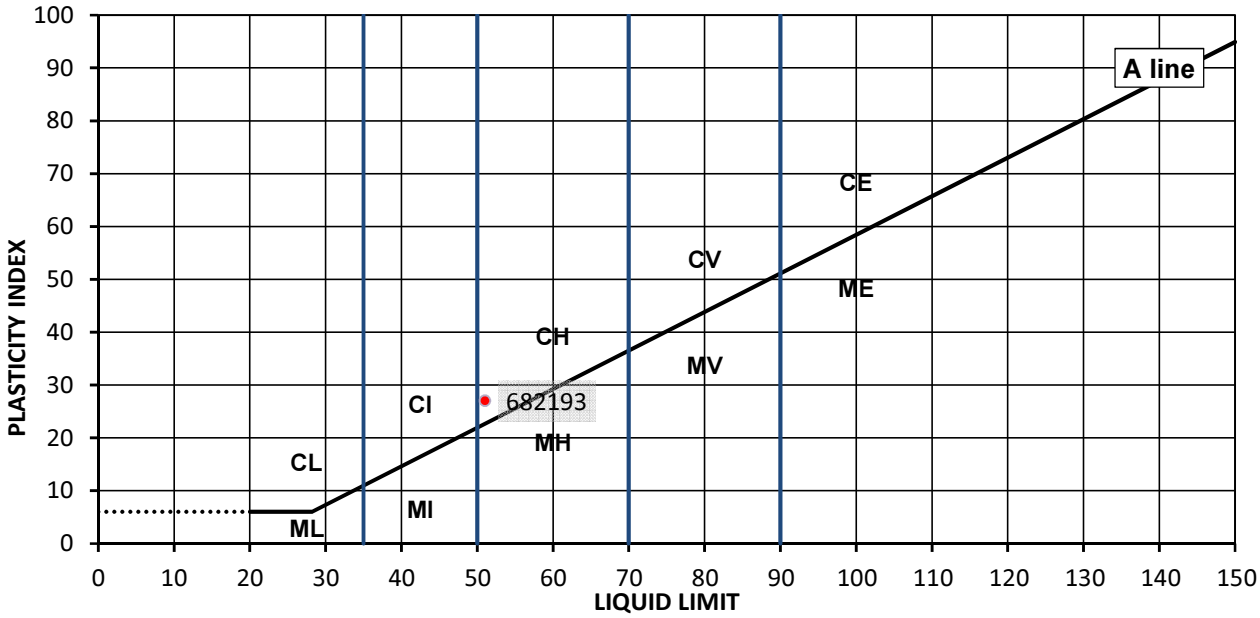
TEST RESULTS

Laboratory Reference: 682193
Sample Reference: Not Given

Description: Mottled brown slightly gravelly slightly sandy CLAY
Location: WS01
Sample Preparation: Tested after >425um removed by hand

Sample Type: B
Depth Top [m]: 0.7
Depth Base [m]: 1.1

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
20	51	24	27	98



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

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PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

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Croxley Green Business Park
Watford Herts WD18 8YS

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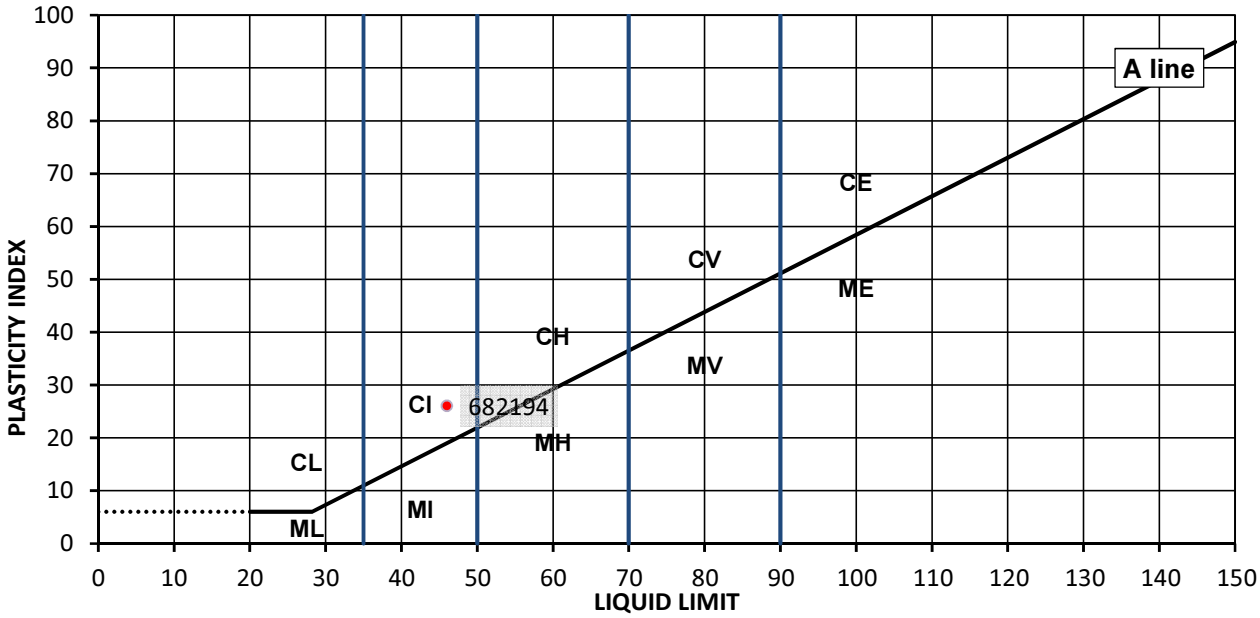
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682194
Sample Reference: Not Given

Description:	Orangish brown sandy CLAY	Sample Type:	D
Location:	WS01	Depth Top [m]:	1.4
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
24	46	20	26	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

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PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

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Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

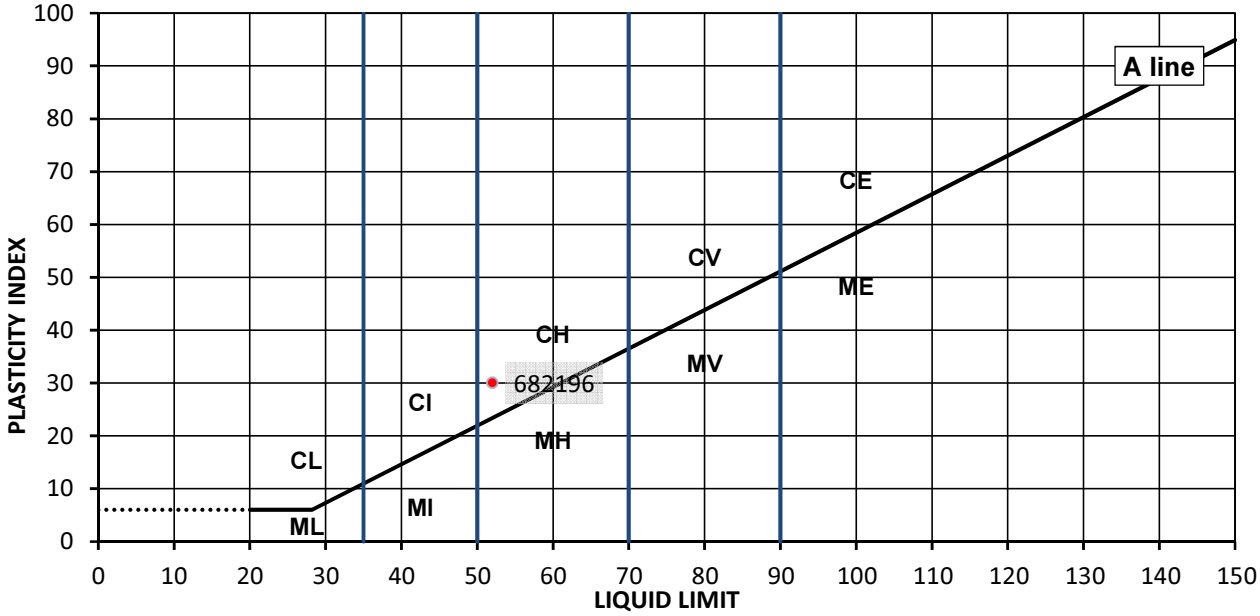
TEST RESULTS

Laboratory Reference: 682196
Sample Reference: Not Given

Description: Yellowish brown to grey slightly gravelly CLAY
Location: WS02
Sample Preparation: Tested after >425um removed by hand

Sample Type: B
Depth Top [m]: 0.6
Depth Base [m]: 0.9

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
25	52	22	30	95



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

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PL Head of
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Signed:

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Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

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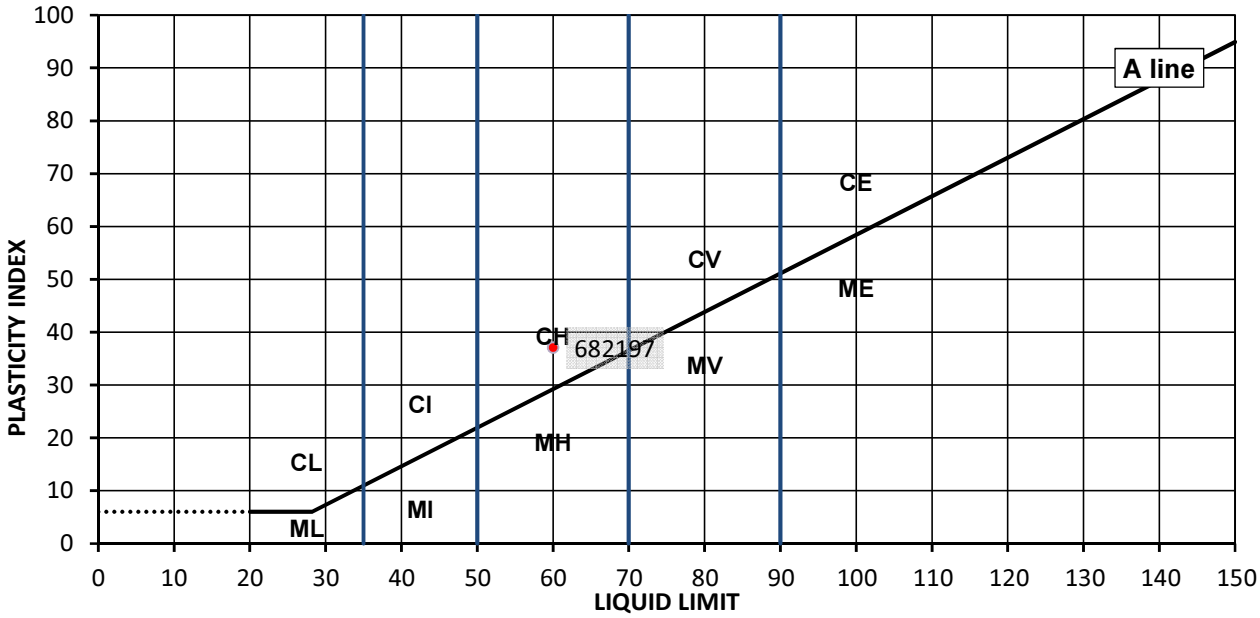
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682197
Sample Reference: Not Given

Description:	Orangish brown to grey slightly gravelly CLAY	Sample Type:	D
Location:	WS02	Depth Top [m]:	1
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
23	60	23	37	98



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

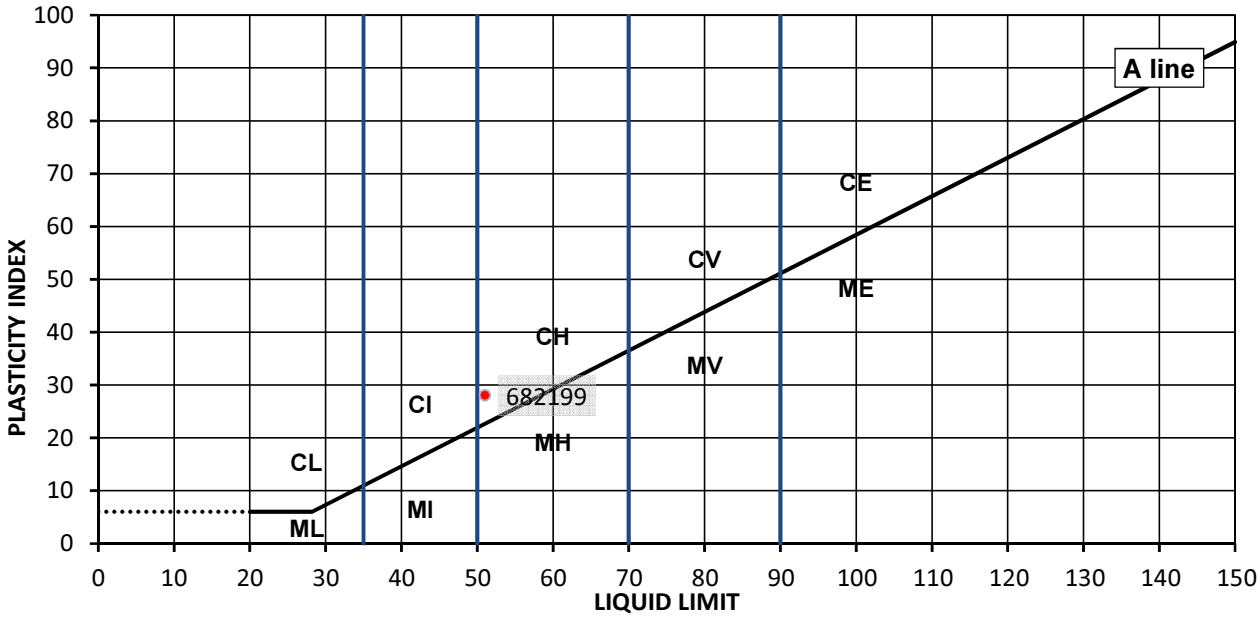
Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 682199
Sample Reference: Not Given

Description:	Brown slightly sandy CLAY	Sample Type:	D
Location:	WS03	Depth Top [m]:	1.1
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
26	51	23	28	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client: Opus International Consultants (UK) Ltd
Client Address: 1 South House
Bond Avenue
Milton Keynes
MK1 1SW
Contact: Emma Small
Site Name: Meadow School
Site Address: Not Given

Client Reference: J-M3932.12
Job Number: 17-36655
Date Sampled: 16/12 - 21/12/2016
Date Received: 04/01/2017
Date Tested: 13/01 - 13/11/2017
Sampled By: ES/EDH

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	Density		M/C	Atterberg				PD
		Reference	Top depth [m]	Base depth [m]	Type		bulk Mg/m3	dry Mg/m3	%	% Passing 425um %	LL %	PL %	PI %	Mg/m3
682149	BH01	Not Given	4.60	Not Given	B	Brown slightly gravelly CLAY			25	96	61	28	33	
682150	BH01	Not Given	7.10	Not Given	B	Brown CLAY			26	100	59	22	37	
682152	BH01	Not Given	9.60	10.00	U	Greyish brown CLAY			26	100	61	27	34	
682159	BH01	Not Given	4.00	4.40	B	Brown gravelly slightly sandy CLAY			22	52	51	19	32	
682160	BH02	Not Given	3.80	Not Given	B	Brown slightly gravelly CLAY			27	76	63	23	40	
682161	BH02	Not Given	4.40	Not Given	B	Brown CLAY			27	100	61	25	36	
682162	BH02	Not Given	7.00	Not Given	B	Brown CLAY			27	100	64	28	36	
682171	BH03	Not Given	5.40	Not Given	B	Brown CLAY			27	100	63	28	35	
682172	BH03	Not Given	8.50	Not Given	B	Brown CLAY			28	100	68	31	37	
682181	BH03	Not Given	4.10	4.40	B	Brown very gravelly CLAY			19	41	59	28	31	

Comments:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager (Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client: Opus International Consultants (UK) Ltd
Client Address: 1 South House
Bond Avenue
Milton Keynes
MK1 1SW
Contact: Emma Small
Site Name: Meadow School
Site Address: Not Given

Client Reference: J-M3932.12
Job Number: 17-36655
Date Sampled: 19/12/2016
Date Received: 04/01/2017
Date Tested: 16/01/2017
Sampled By: ES/EDH

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	Density		M/C	Atterberg				PD
		Reference	Top depth [m]	Base depth [m]	Type		bulk Mg/m3	dry Mg/m3	%	% Passing 425um %	LL %	PL %	PI %	Mg/m3
682182	BH04	Not Given	4.40	Not Given	B	Orangish brown slightly gravelly CLAY			27	80	64	28	36	
682183	BH04	Not Given	7.00	Not Given	B	Brown CLAY			26	100	63	26	37	
682187	BH04	Not Given	0.70	1.10	B	Orangish brown slightly gravelly slightly sandy CLAY			23	96	49	20	29	
682188	BH04	Not Given	1.30	1.70	B	Brown gravelly slightly sandy CLAY			16	54	48	21	27	
682193	WS01	Not Given	0.70	1.10	B	Mottled brown slightly gravelly slightly sandy CLAY			20	98	51	24	27	
682194	WS01	Not Given	1.40	Not Given	D	Orangish brown sandy CLAY			24	100	46	20	26	
682196	WS02	Not Given	0.60	0.90	B	Yellowish brown to grey slightly gravelly CLAY			25	95	52	22	30	
682197	WS02	Not Given	1.00	Not Given	D	Orangish brown to grey slightly gravelly CLAY			23	98	60	23	37	
682199	WS03	Not Given	1.10	Not Given	D	Brown slightly sandy CLAY			26	100	51	23	28	

Comments:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager (Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

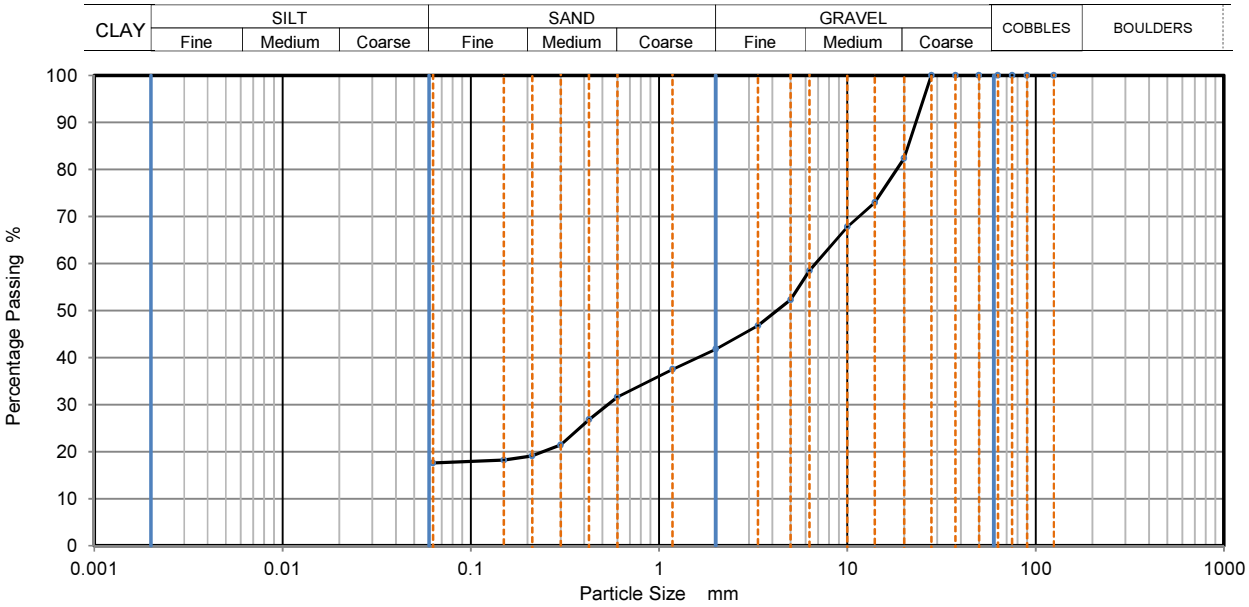
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682156

Sample description:	Brown sandy clayey GRAVEL	Sample Reference:	Not Given
Location:	BH01	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	1.2
		Depth Base [m]:	1.6



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	82		
14	73		
10	68		
6.3	59		
5	52		
3.35	47		
2	42		
1.18	38		
0.6	32		
0.425	27		
0.3	21		
0.212	19		
0.15	18		
0.063	18		

Dry Mass of sample [g]: 638

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	58.20
Sand	24.20
Fines <0.063mm	17.60

Grading Analysis		
D100	mm	28
D60	mm	6.79
D30	mm	0.534
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

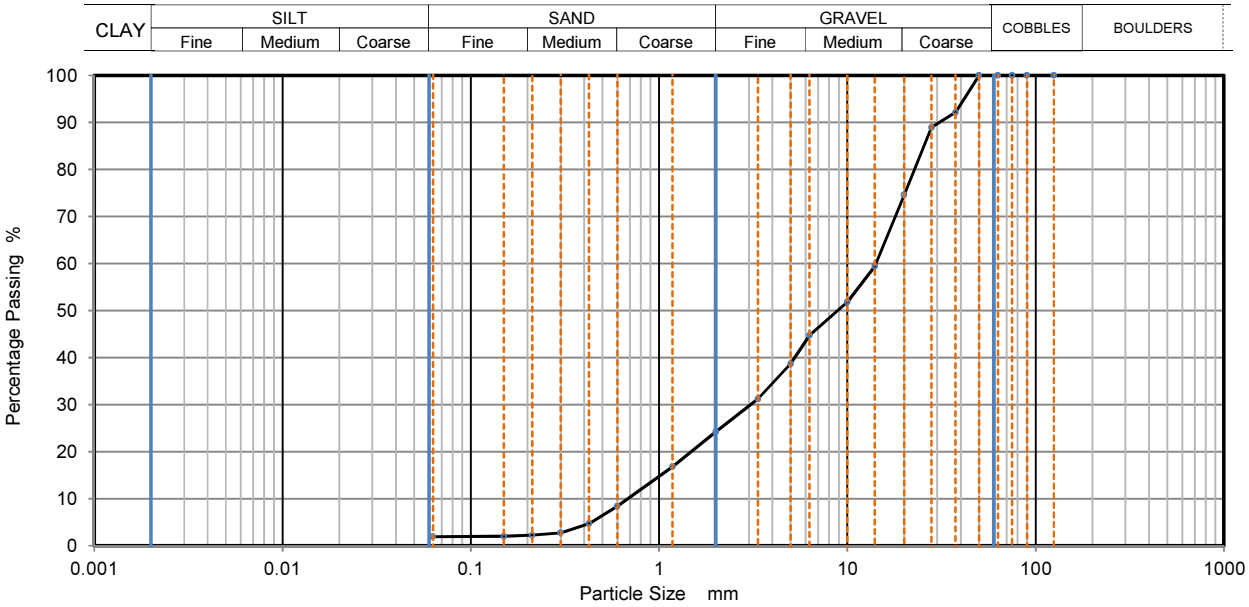
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682157

Sample description:	Brown slightly clayey sandy GRAVEL	Sample Reference:	Not Given
Location:	BH01	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	2
		Depth Base [m]:	2.5



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	92		
28	89		
20	75		
14	59		
10	52		
6.3	45		
5	39		
3.35	31		
2	24		
1.18	17		
0.6	8		
0.425	5		
0.3	3		
0.212	2		
0.15	2		
0.063	2		

Dry Mass of sample [g]: 2191

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	75.80
Sand	22.20
Fines <0.063mm	1.90

Grading Analysis		
D100	mm	50
D60	mm	14.2
D30	mm	3.07
D10	mm	0.681
Uniformity Coefficient		21
Curvature Coefficient		0.98

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

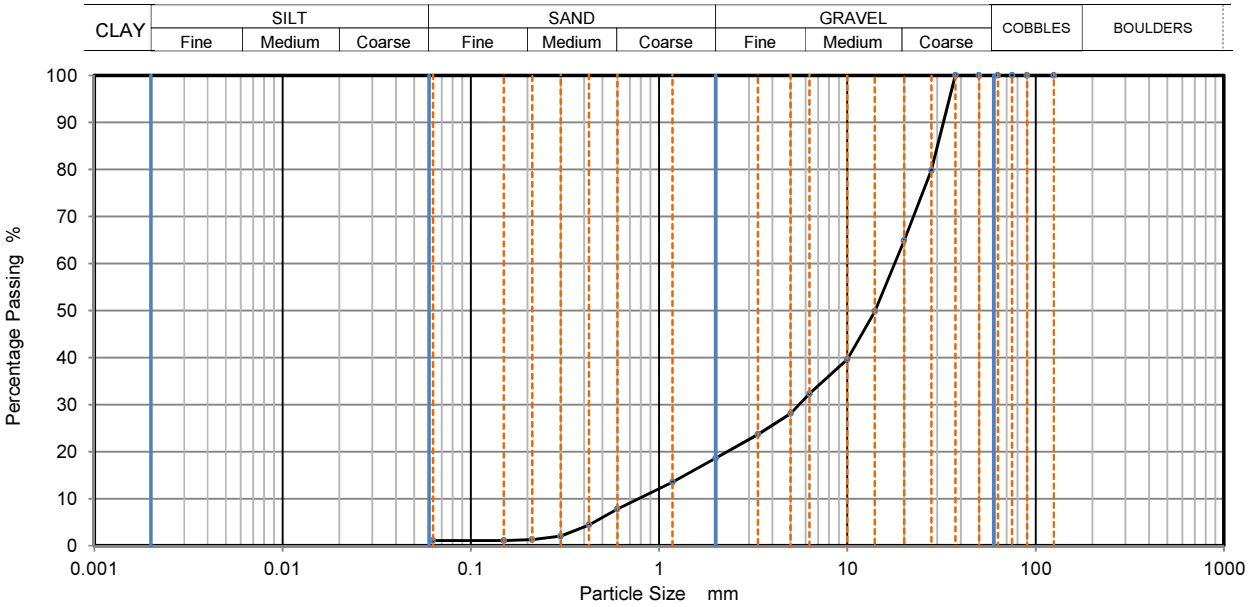
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682158

Sample description:	Brown slightly clayey sandy GRAVEL	Sample Reference:	Not Given
Location:	BH01	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	3.1
		Depth Base [m]:	3.5



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	80		
20	65		
14	50		
10	40		
6.3	32		
5	28		
3.35	24		
2	19		
1.18	14		
0.6	8		
0.425	4		
0.3	2		
0.212	1		
0.15	1		
0.063	1		

Dry Mass of sample [g]: 2024

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	81.40
Sand	17.50
Fines <0.063mm	1.10

Grading Analysis		
D100	mm	37.5
D60	mm	17.8
D30	mm	5.55
D10	mm	0.779
Uniformity Coefficient		23
Curvature Coefficient		2.2

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

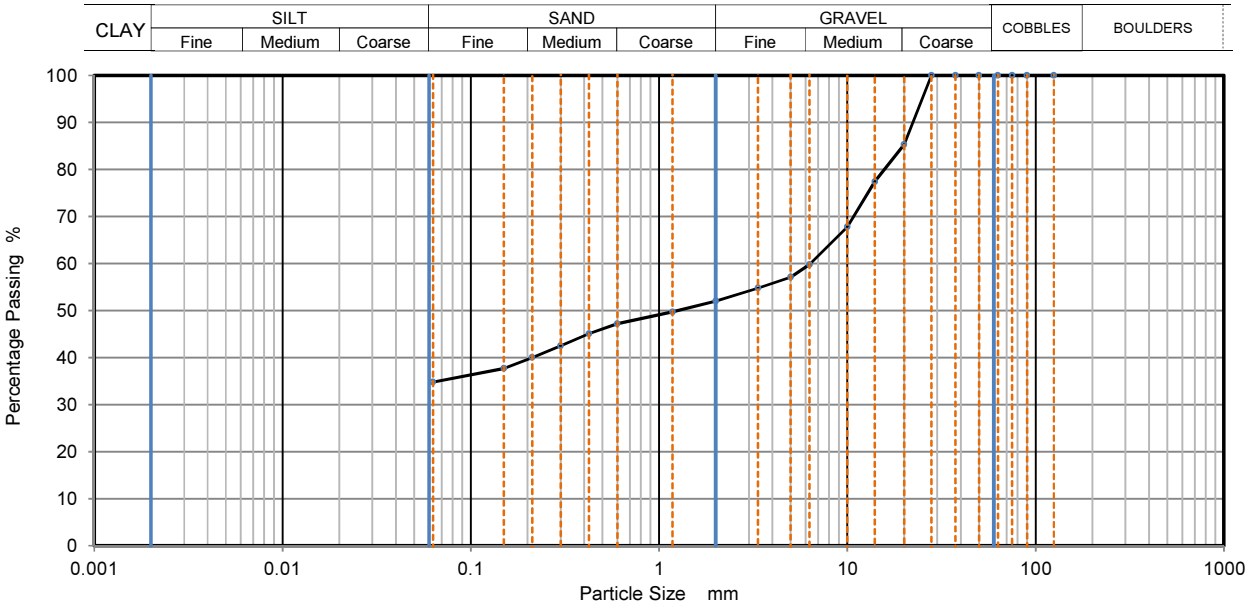
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682168	Sample Reference:	Not Given
Sample description:	Greyish brown clayey sandy GRAVEL	Sample Type:	B
Location:	BH02	Depth Top [m]:	1.3
Supplier:	Not Given	Depth Base [m]:	1.7



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	85		
14	77		
10	68		
6.3	60		
5	57		
3.35	55		
2	52		
1.18	50		
0.6	47		
0.425	45		
0.3	43		
0.212	40		
0.15	38		
0.063	35		

Dry Mass of sample [g]: 452

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	48.00
Sand	17.20
Fines <0.063mm	34.80

Grading Analysis		
D100	mm	28
D60	mm	6.36
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

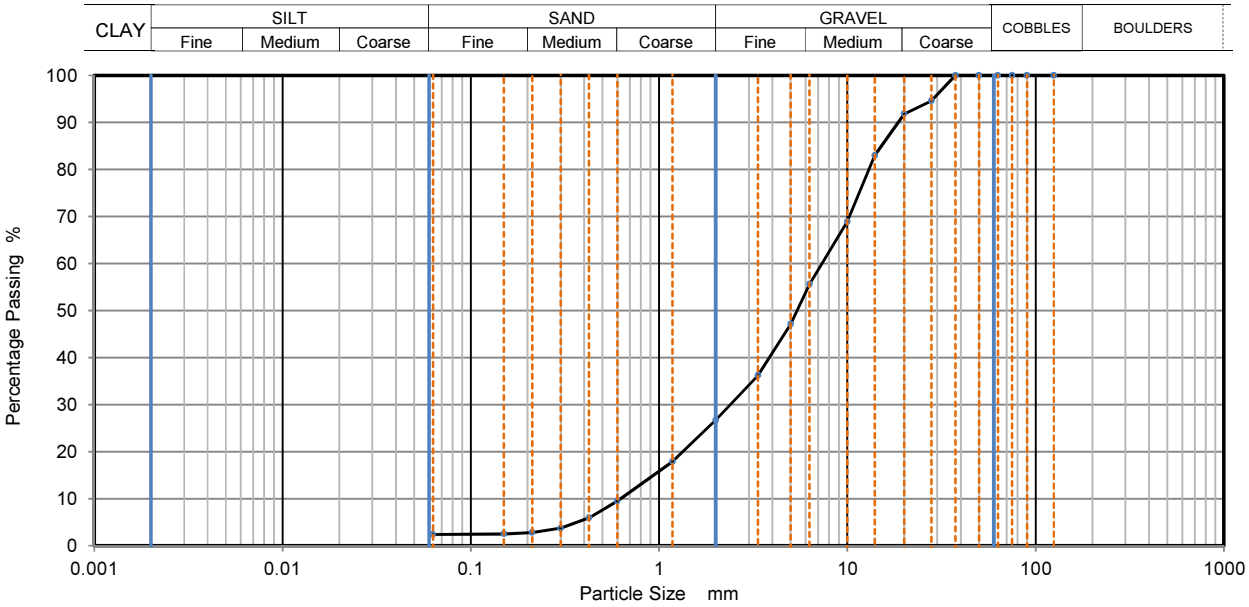
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682169

Sample description:	Multicolour slightly clayey sandy GRAVEL	Sample Reference:	Not Given
Location:	BH02	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	2.1
		Depth Base [m]:	2.5



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	95		
20	92		
14	83		
10	69		
6.3	56		
5	47		
3.35	36		
2	27		
1.18	18		
0.6	10		
0.425	6		
0.3	4		
0.212	3		
0.15	3		
0.063	2		

Dry Mass of sample [g]: 754

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	73.30
Sand	24.30
Fines <0.063mm	2.40

Grading Analysis		
D100	mm	37.5
D60	mm	7.34
D30	mm	2.39
D10	mm	0.625
Uniformity Coefficient		12
Curvature Coefficient		1.2

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

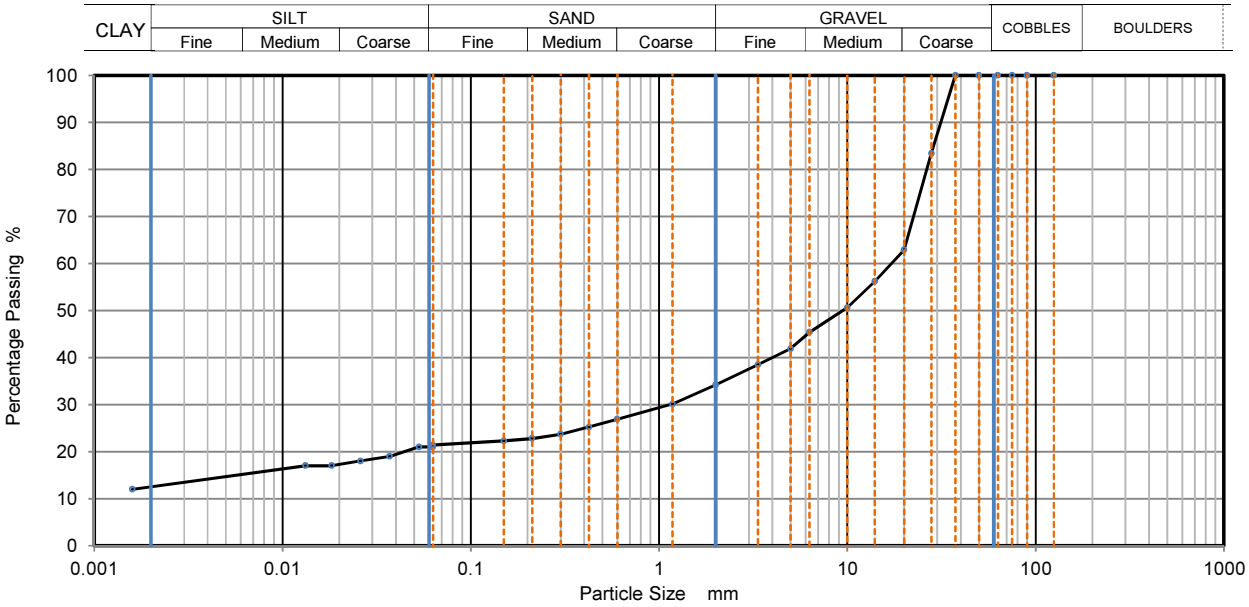
4041

Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682170

Sample description:	Brown silty clayey sandy GRAVEL	Sample Reference:	Not Given
Location:	BH02	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	3.2
		Depth Base [m]:	3.6



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	21
90	100	0.0531	21
75	100	0.0371	19
63	100	0.0260	18
50	100	0.0182	17
37.5	100	0.0132	17
28	83	0.0016	12
20	63		
14	56		
10	51		
6.3	45		
5	42		
3.35	39		
2	34		
1.18	30		
0.6	27	Particle density (assumed)	
0.425	25	2.65 Mg/m3	
0.3	24		
0.212	23		
0.15	22		
0.063	21		

Dry Mass of sample [g]: 719

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	65.80
Sand	12.80
Silt	8.50
Clay	12.90

Grading Analysis		
D100	mm	37.5
D60	mm	17.1
D30	mm	1.16
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

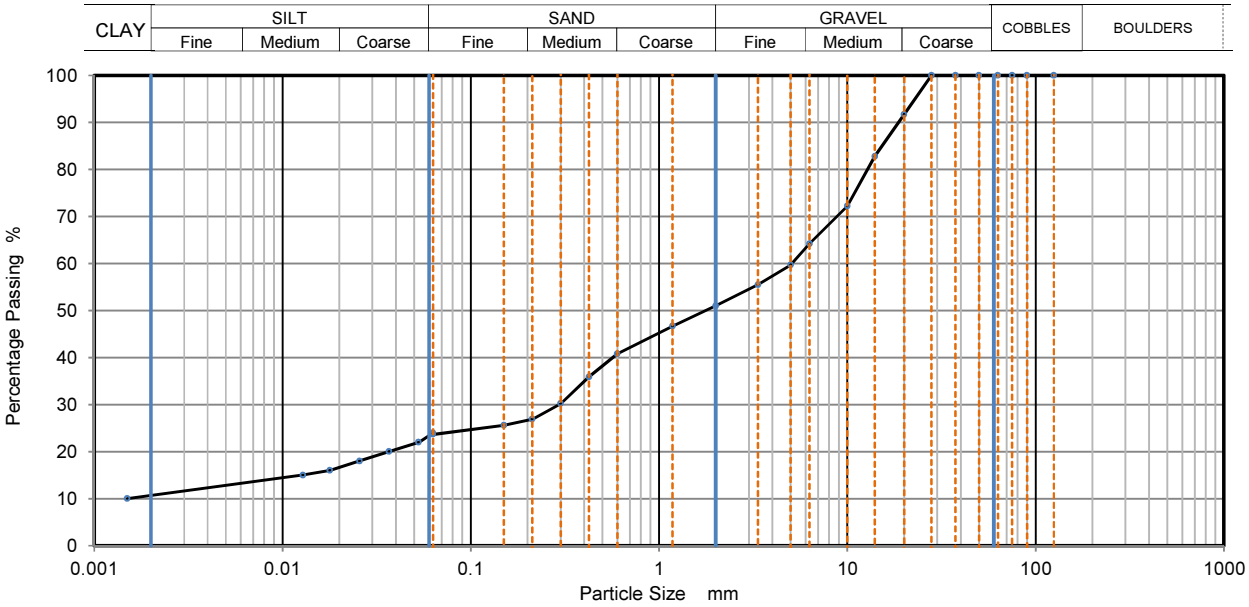
i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682178

Sample description:	Brown silty clayey sandy GRAVEL	Sample Reference:	Not Given
Location:	BH03	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	1.3
		Depth Base [m]:	1.6



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	24
90	100	0.0528	22
75	100	0.0367	20
63	100	0.0257	18
50	100	0.0178	16
37.5	100	0.0128	15
28	100	0.0015	10
20	92		
14	83		
10	72		
6.3	64		
5	60		
3.35	56		
2	51		
1.18	47		
0.6	41	Particle density (assumed)	
0.425	36	2.65	Mg/m3
0.3	30		
0.212	27		
0.15	26		
0.063	24		

Dry Mass of sample [g]: 684

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	49.00
Sand	27.30
Silt	13.10
Clay	10.60

Grading Analysis		
D100	mm	28
D60	mm	5.09
D30	mm	0.294
D10	mm	0.00154
Uniformity Coefficient		3300
Curvature Coefficient		11

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

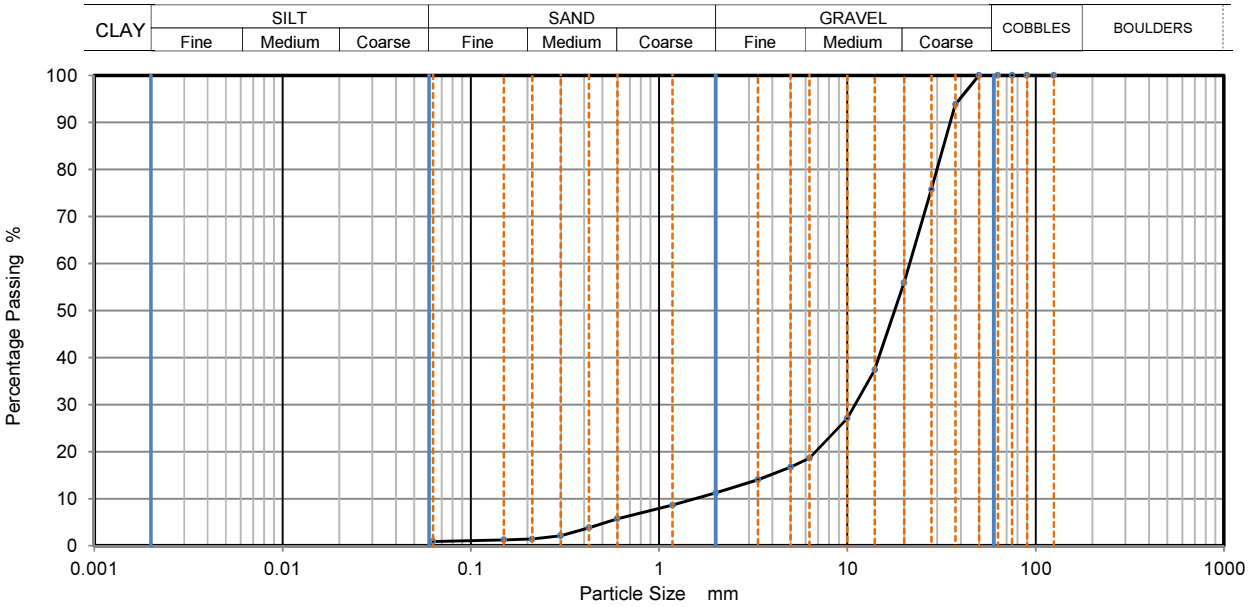
UKAS TESTING 4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	13/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682179

Sample description:	Yellowish brown sandy GRAVEL	Sample Reference:	Not Given
Location:	BH03	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	2.1
		Depth Base [m]:	2.5



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	94		
28	76		
20	56		
14	37		
10	27		
6.3	19		
5	17		
3.35	14		
2	11		
1.18	9		
0.6	6		
0.425	4		
0.3	2		
0.212	1		
0.15	1		
0.063	1		

Dry Mass of sample [g]: 6203

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	88.80
Sand	10.30
Fines <0.063mm	0.90

Grading Analysis		
D100	mm	50
D60	mm	21.4
D30	mm	11
D10	mm	1.56
Uniformity Coefficient		14
Curvature Coefficient		3.6

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

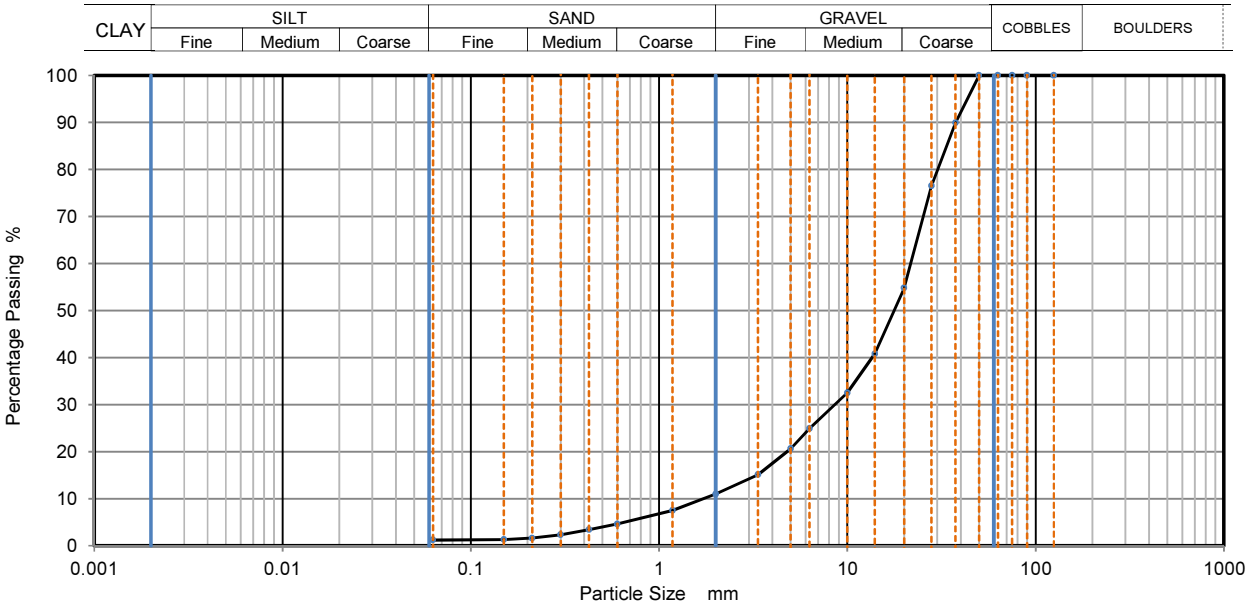
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2007
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682180

Sample description:	Brown slightly clayey sandy GRAVEL	Sample Reference:	Not Given
Location:	BH03	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	3.1
		Depth Base [m]:	3.5



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	90		
28	77		
20	55		
14	41		
10	33		
6.3	25		
5	21		
3.35	15		
2	11		
1.18	8		
0.6	5		
0.425	3		
0.3	2		
0.212	2		
0.15	1		
0.063	1		

Dry Mass of sample [g]: 5769

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	89.00
Sand	9.80
Fines <0.063mm	1.20

Grading Analysis		
D100	mm	50
D60	mm	21.7
D30	mm	8.57
D10	mm	1.72
Uniformity Coefficient		13
Curvature Coefficient		2

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

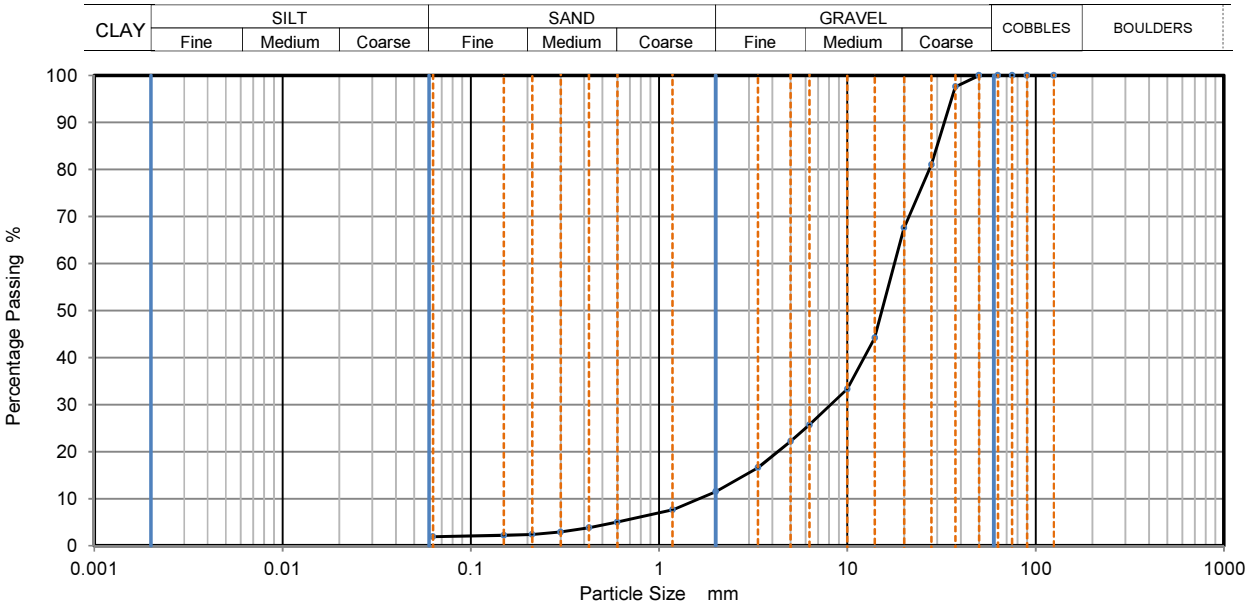
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682189

Sample description:	Brown sligthly clayey sandy GRAVEL	Sample Reference:	Not Given
Location:	BH04	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	2
		Depth Base [m]:	2.4



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	98		
28	81		
20	68		
14	44		
10	33		
6.3	26		
5	22		
3.35	17		
2	12		
1.18	8		
0.6	5		
0.425	4		
0.3	3		
0.212	2		
0.15	2		
0.063	2		

Dry Mass of sample [g]: 4671

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	88.50
Sand	9.70
Fines <0.063mm	1.90

Grading Analysis		
D100	mm	50
D60	mm	17.8
D30	mm	8.18
D10	mm	1.62
Uniformity Coefficient		11
Curvature Coefficient		2.3

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

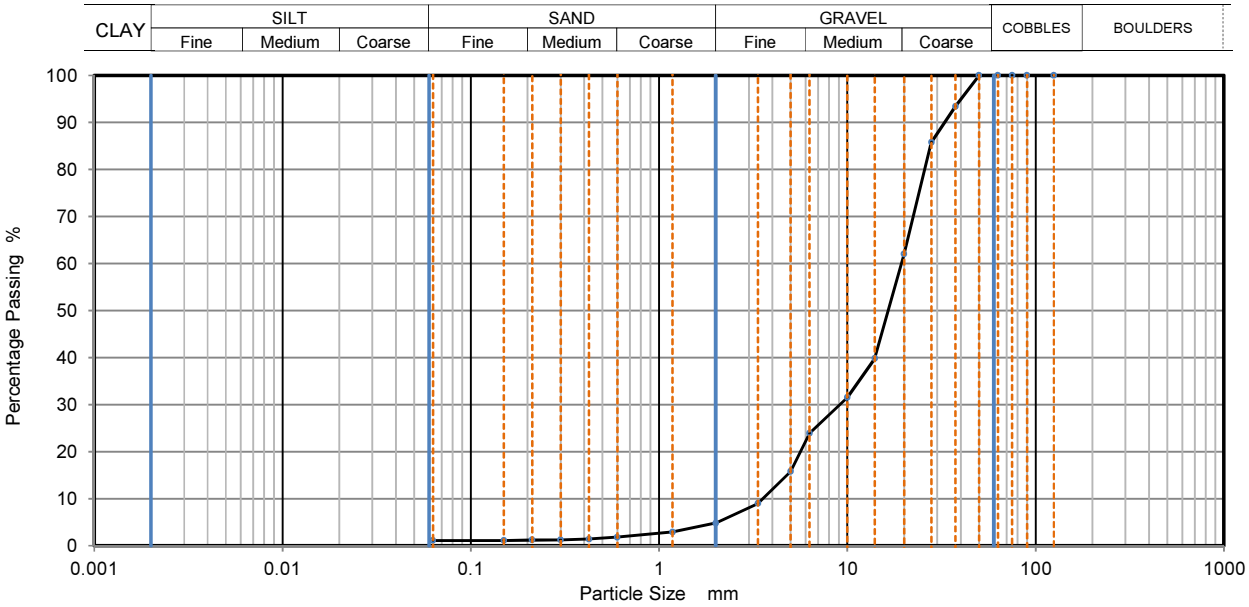
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682190

Sample description:	Brown slightly sandy GRAVEL	Sample Reference:	Not Given
Location:	BH04	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	3.1
		Depth Base [m]:	3.5



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	93		
28	86		
20	62		
14	40		
10	32		
6.3	24		
5	16		
3.35	9		
2	5		
1.18	3		
0.6	2		
0.425	1		
0.3	1		
0.212	1		
0.15	1		
0.063	1		

Dry Mass of sample [g]: 2424

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	95.20
Sand	3.60
Fines <0.063mm	1.10

Grading Analysis		
D100	mm	50
D60	mm	19.4
D30	mm	9.14
D10	mm	3.56
Uniformity Coefficient		5.4
Curvature Coefficient		1.2

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

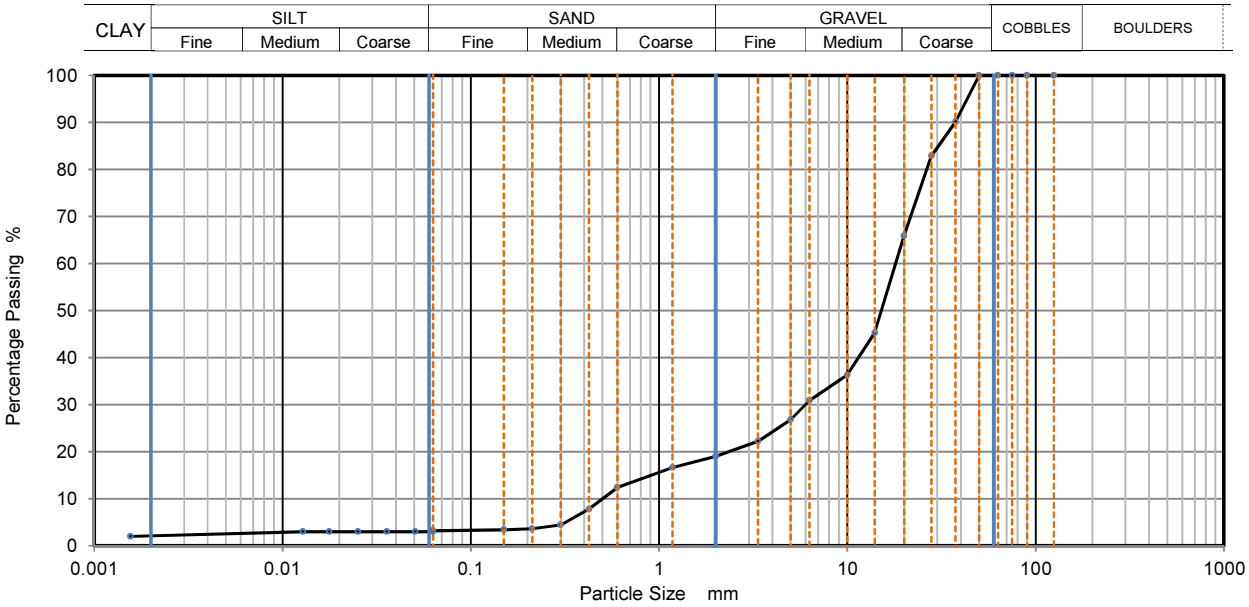
UKAS TESTING 4041

Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 682191

Sample description:	Brown sandy GRAVEL	Sample Reference:	Not Given
Location:	BH04	Sample Type:	B
Supplier:	Not Given	Depth Top [m]:	4
		Depth Base [m]:	4.3



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	3
90	100	0.0507	3
75	100	0.0358	3
63	100	0.0252	3
50	100	0.0177	3
37.5	90	0.0128	3
28	83	0.0016	2
20	66		
14	45		
10	36		
6.3	31		
5	27		
3.35	22		
2	19		
1.18	17		
0.6	12	Particle density (assumed)	
0.425	8	2.65 Mg/m3	
0.3	4		
0.212	4		
0.15	3		
0.063	3		

Dry Mass of sample [g]: 3832

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	81.00
Sand	15.80
Silt	1.20
Clay	2.00

Grading Analysis		
D100	mm	50
D60	mm	18.1
D30	mm	5.97
D10	mm	0.502
Uniformity Coefficient		36
Curvature Coefficient		3.9

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

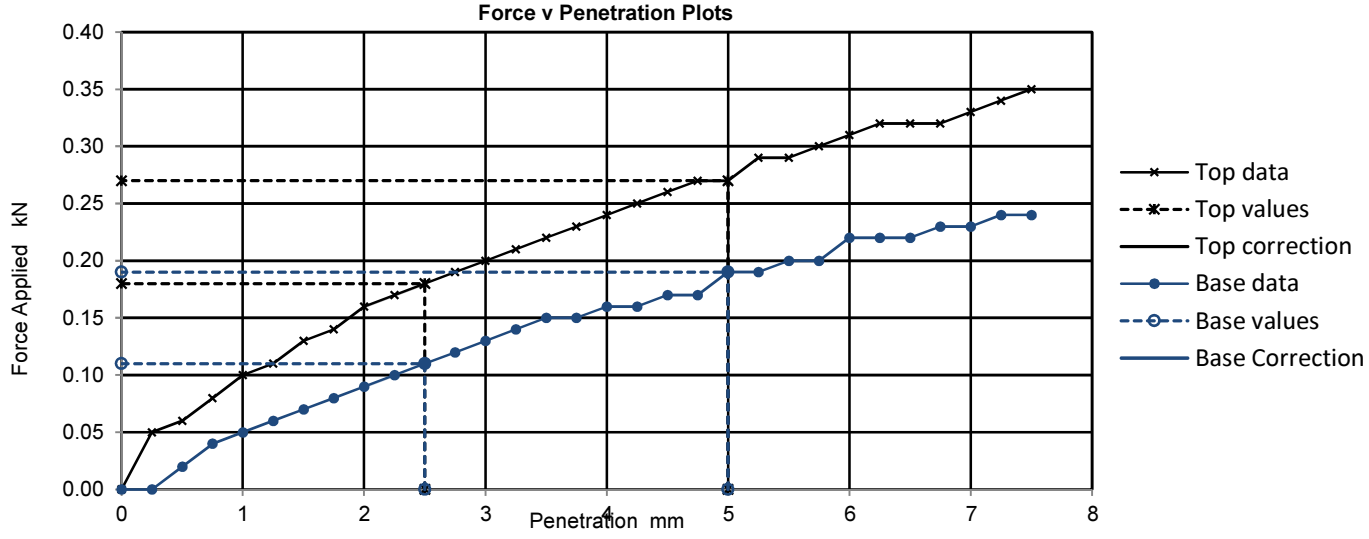
Test Results:

Laboratory Reference:	682154	Depth Top [m]:	0.4
Hole No.:	BH01	Depth Base [m]:	0.8
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Yellowish brown slightly gravelly CLAY			Amount of swell recorded		mm
Material retained on 20mm sieve removed		0	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.98	Mg/m3	Surcharge applied	8	kg
	Dry density	1.58	Mg/m3		4.9	kPa
	Moisture content	25	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	1.4	1.4	1.4		25
BASE	No	0.8	1.0	1.0		25

Remarks:

Test/ Specimen specific remarks:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

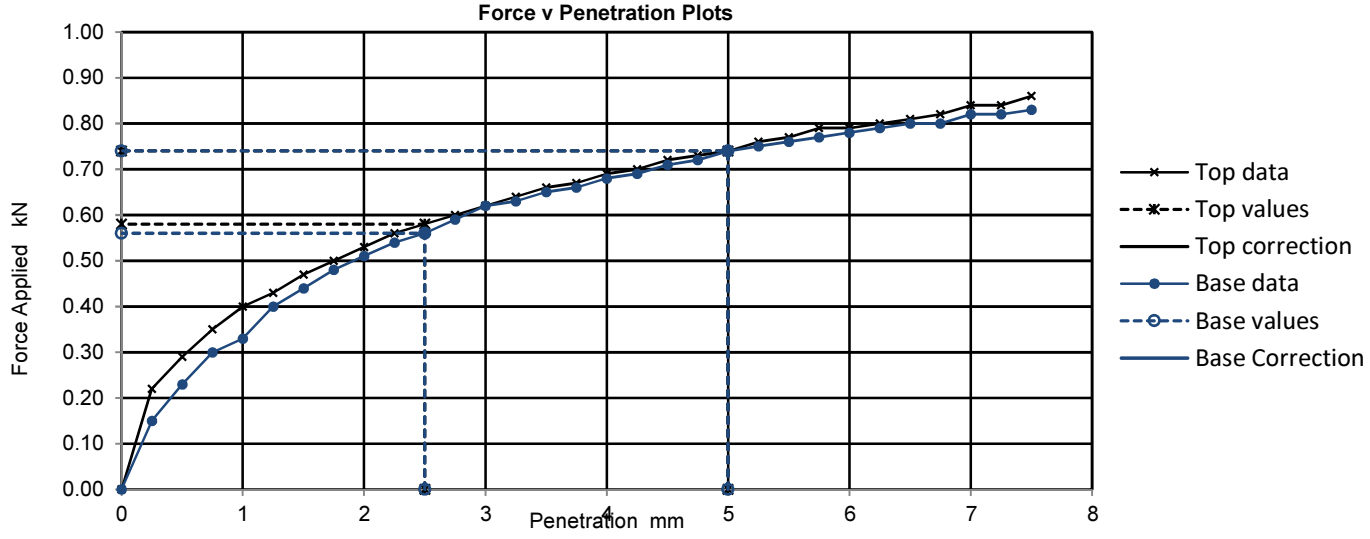
Test Results:

Laboratory Reference:	682167	Depth Top [m]:	0.7
Hole No.:	BH02	Depth Base [m]:	1
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking	days
				Time to surface	days
Sample Description:	Brown slightly gravelly slightly sandy CLAY			Amount of swell recorded	mm
Material retained on 20mm sieve removed		0	%	Dry density after soaking	Mg/m3
Initial Specimen details	Bulk density	1.98	Mg/m3	Surcharge applied	8 kg
	Dry density	1.58	Mg/m3		4.9 kPa
	Moisture content	25	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	4.4	3.7	4.4	4.3	24
BASE	No	4.2	3.7	4.2		24

Remarks:

Test/ Specimen specific remarks:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

4041

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

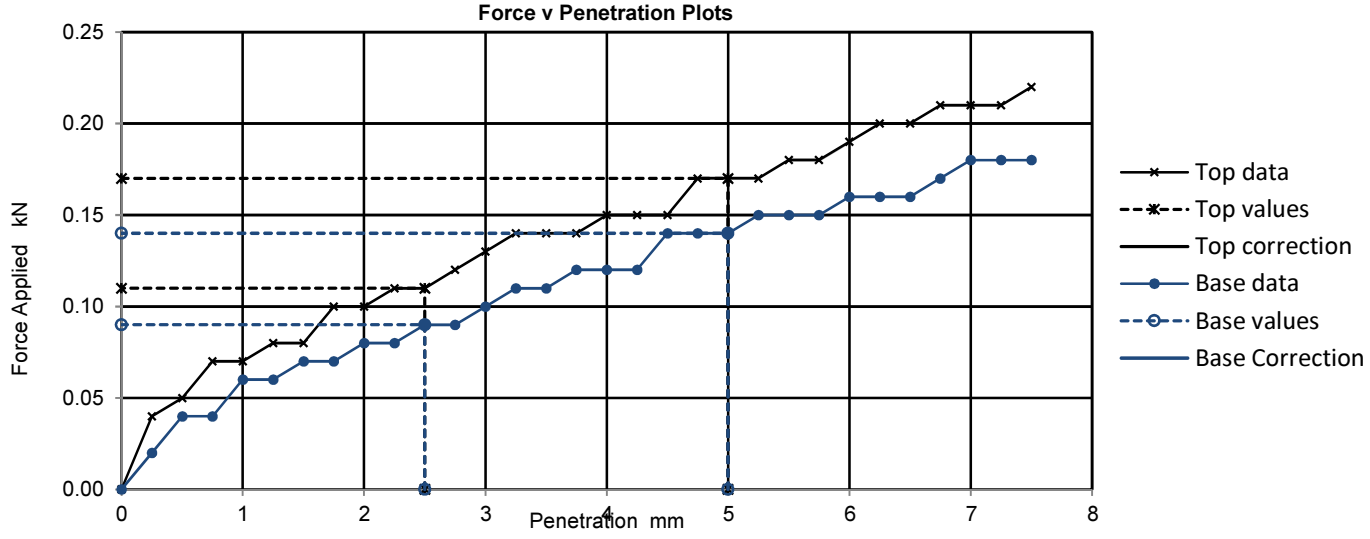
Test Results:

Laboratory Reference:	682176	Depth Top [m]:	0.4
Hole No.:	BH03	Depth Base [m]:	0.7
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking	days
				Time to surface	days
Sample Description:	Yellowish brown slightly gravelly slightly sandy CLAY			Amount of swell recorded	mm
Material retained on 20mm sieve removed		0	%	Dry density after soaking	Mg/m3
Initial Specimen details	Bulk density	1.96	Mg/m3	Surcharge applied	8 kg
	Dry density	1.58	Mg/m3		4.8 kPa
	Moisture content	24	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	0.8	0.9	0.9	0.8	24
BASE	No	0.7	0.7	0.7		24

Remarks:

Test/ Specimen specific remarks:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

4041

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

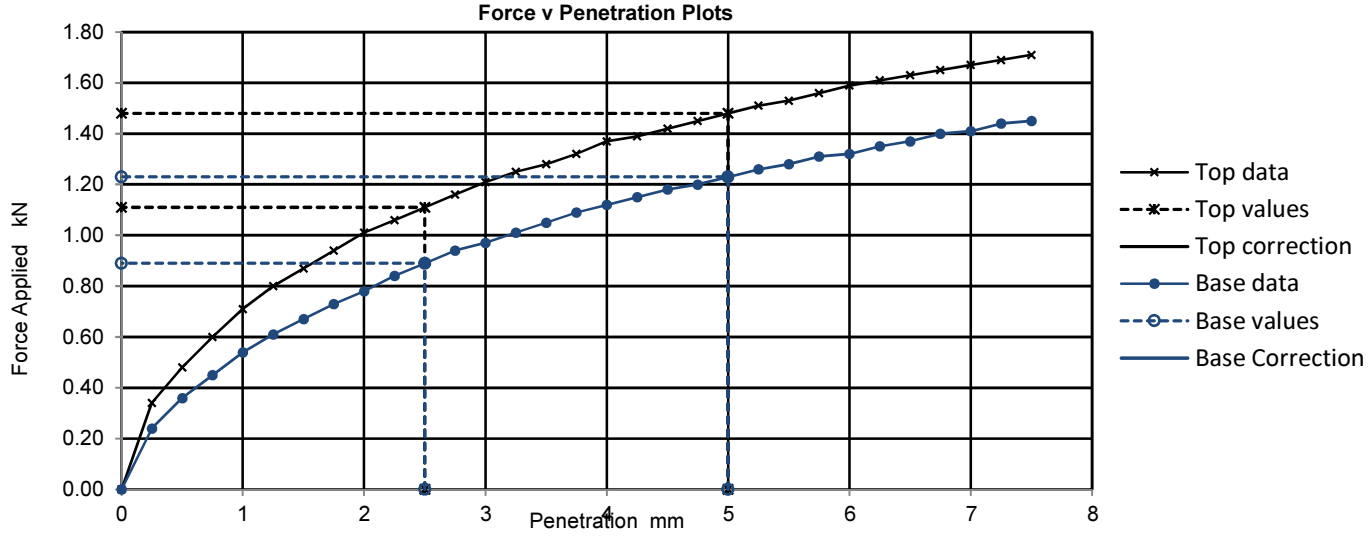
Test Results:

Laboratory Reference:	682187	Depth Top [m]:	0.7
Hole No.:	BH04	Depth Base [m]:	1.1
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Orangish brown slightly gravelly slightly sandy CLAY			Amount of swell recorded		mm
Material retained on 20mm sieve removed		1	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.98	Mg/m3	Surcharge applied	8	kg
	Dry density	1.64	Mg/m3		4.8	kPa
	Moisture content	21	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	8.4	7.4	8.4		20
BASE	No	6.7	6.2	6.7		21

Remarks:

Test/ Specimen specific remarks:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

4041

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	17/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

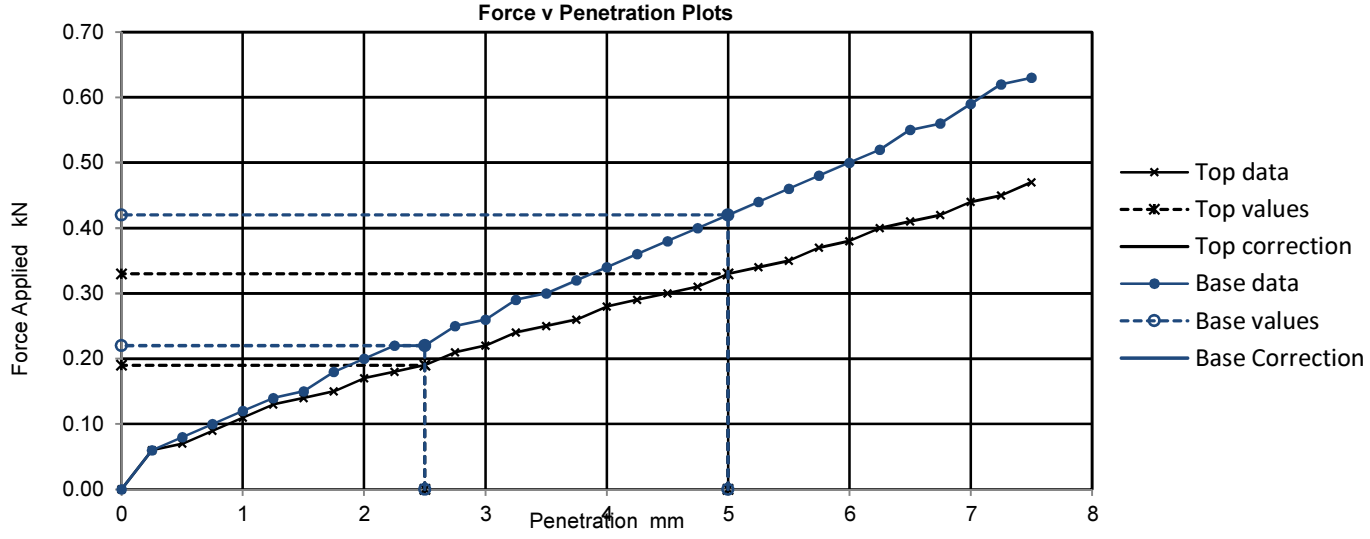
Test Results:

Laboratory Reference:	682192	Depth Top [m]:	0.45
Hole No.:	WS01	Depth Base [m]:	0.7
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Brown gravelly clayey SAND			Amount of swell recorded		mm
Material retained on 20mm sieve removed		44	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.74	Mg/m3	Surcharge applied	8	kg
	Dry density	1.29	Mg/m3		4.9	kPa
	Moisture content	35	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	1.4	1.7	1.7		35
BASE	No	1.7	2.1	2.1		30

Remarks:

Test/ Specimen specific remarks:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

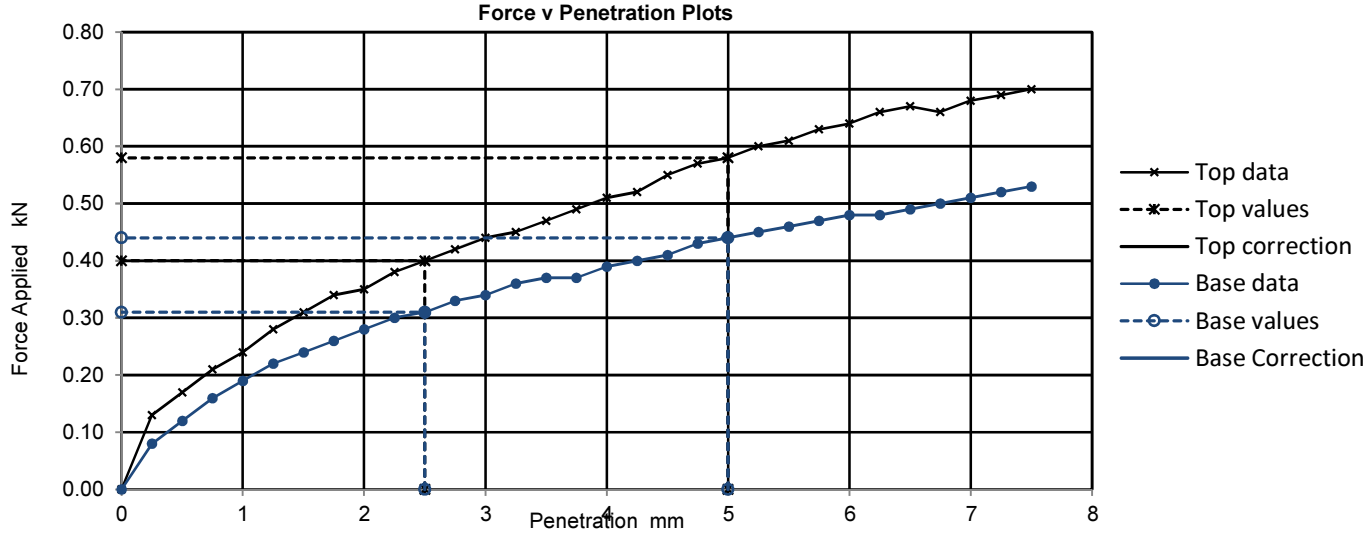
Test Results:

Laboratory Reference:	682196	Depth Top [m]:	0.6
Hole No.:	WS02	Depth Base [m]:	0.9
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Yellowish brown to grey slightly gravelly CLAY			Amount of swell recorded		mm
Material retained on 20mm sieve removed		1	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.57	Mg/m3	Surcharge applied	8	kg
	Dry density	1.26	Mg/m3		4.9	kPa
	Moisture content	25	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	3.0	2.9	3.0		23
BASE	No	2.3	2.2	2.3		24

Remarks:

Test/ Specimen specific remarks:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

4041

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

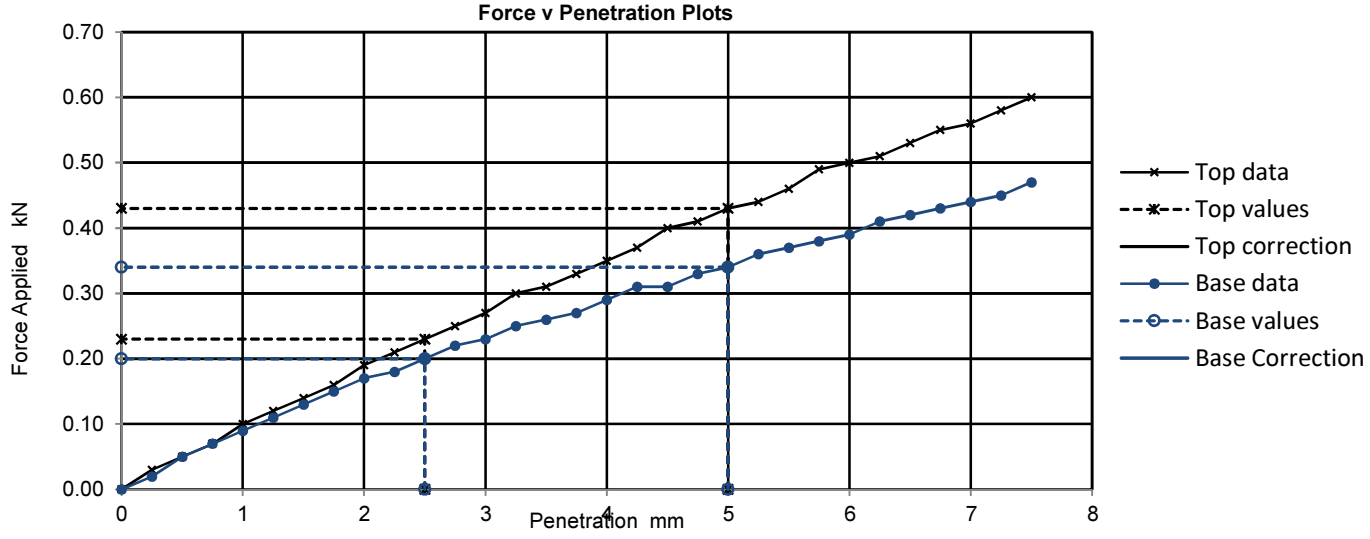
Test Results:

Laboratory Reference:	682198	Depth Top [m]:	0.5
Hole No.:	WS03	Depth Base [m]:	0.7
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Brown slightly gravelly clayey SAND			Amount of swell recorded		mm
Material retained on 20mm sieve removed		2	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	1.90	Mg/m3	Surcharge applied	8	kg
	Dry density	1.52	Mg/m3		4.9	kPa
	Moisture content	25	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	1.7	2.2	2.2		24
BASE	No	1.5	1.7	1.7		25

Remarks:

Test/ Specimen specific remarks:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of California Bearing Ratio

Tested in Accordance with BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

4041

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	16/01/2017
Site Name:	Meadow School	Sampled By:	ES/EDH
Site Address:	Not Given		

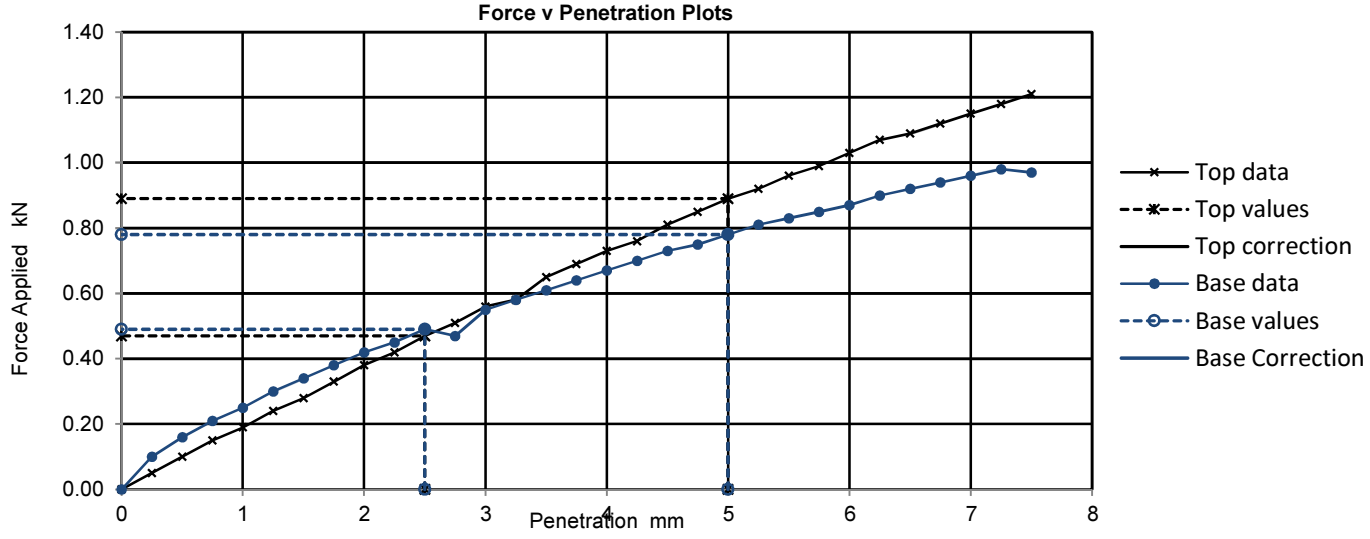
Test Results:

Laboratory Reference:	682200	Depth Top [m]:	0.4
Hole No.:	WS04	Depth Base [m]:	0.7
Sample Reference:	Not Given	Sample Type:	B

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
Sample Description:	Brown slightly gravelly slightly sandy CLAY			Amount of swell recorded		mm
Material retained on 20mm sieve removed		3	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.07	Mg/m3	Surcharge applied	8	kg
	Dry density	1.73	Mg/m3		4.9	kPa
	Moisture content	20	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP		3.6	4.5	4.5	4.2	17
BASE		3.7	3.9	3.9		18

Remarks:

Test/ Specimen specific remarks:

Approved:

Mirosława Pytlik
PL Head of Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Dry Density / Moisture Content Relationship
Light Compaction

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

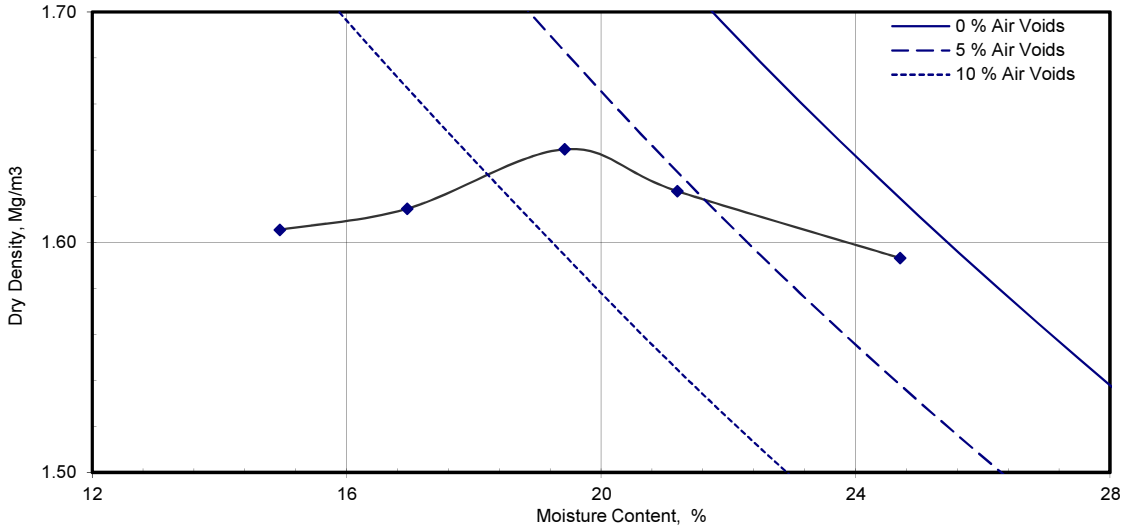
4041

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Sampled By:	ES/EDH
Site Name:	Meadow School		
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682155		
Hole No.:	BH01	Depth Top [m]:	0.8
Sample Reference:	Not Given	Depth Base [m]:	1.1
Sample Description:	Yellowish brown slightly gravelly sandy CLAY	Sample Type:	B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Composite specimens tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m³	2.70
As received Moisture Content	%	25
Maximum Dry Density	Mg/m³	**1.64**

Optimum Moisture Content	%	**19**

Remarks

Aproved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Dry Density / Moisture Content Relationship
Light Compaction

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

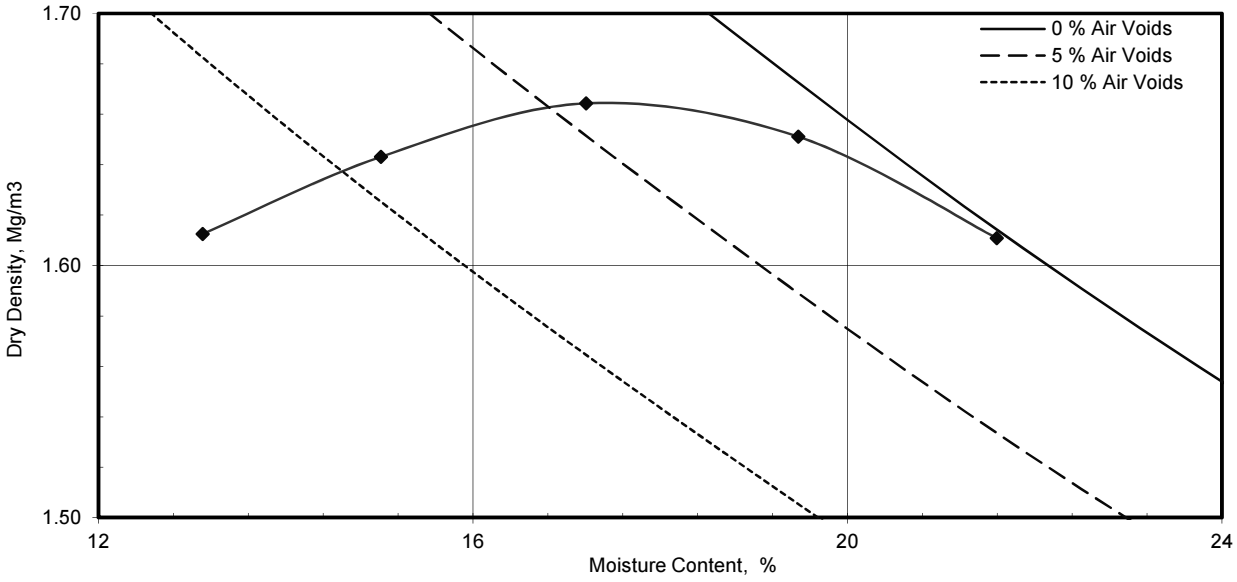
4041

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
		Date Tested:	16/01/2017
Contact:	Emma Small	Sampled By:	ES/EDH
Site Name:	Meadow School		
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682166		
Hole No.:	BH02	Depth Top [m]:	0.2
Sample Reference:	Not Given	Depth Base [m]:	0.5
Sample Description:	Brown gravelly clayey SAND	Sample Type:	B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Composite specimens tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	4
Particle Density - Assumed	Mg/m³	2.48
As received Moisture Content	%	19
Maximum Dry Density	Mg/m³	**1.66**

Optimum Moisture Content	%	**17**

Remarks

Aproved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Dry Density / Moisture Content Relationship
Light Compaction

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

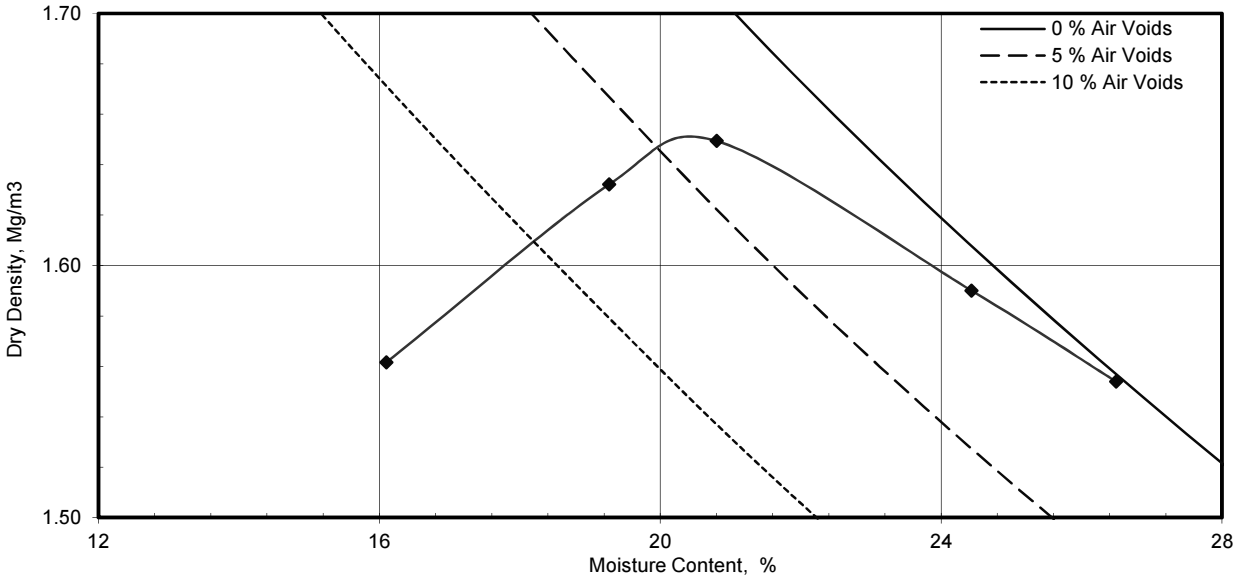
4041

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
		Date Tested:	16/01/2017
Contact:	Emma Small	Sampled By:	ES/EDH
Site Name:	Meadow School		
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682177		
Hole No.:	BH03	Depth Top [m]:	0.7
Sample Reference:	Not Given	Depth Base [m]:	1
Sample Description:	Yellowish brown slightly gravelly slightly sandy CLAY	Sample Type:	B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Composite specimens tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m³	2.65
As received Moisture Content	%	26
Maximum Dry Density	Mg/m³	**1.65**

Optimum Moisture Content	%	**21**

Remarks

Aproved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Dry Density / Moisture Content Relationship
Light Compaction

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

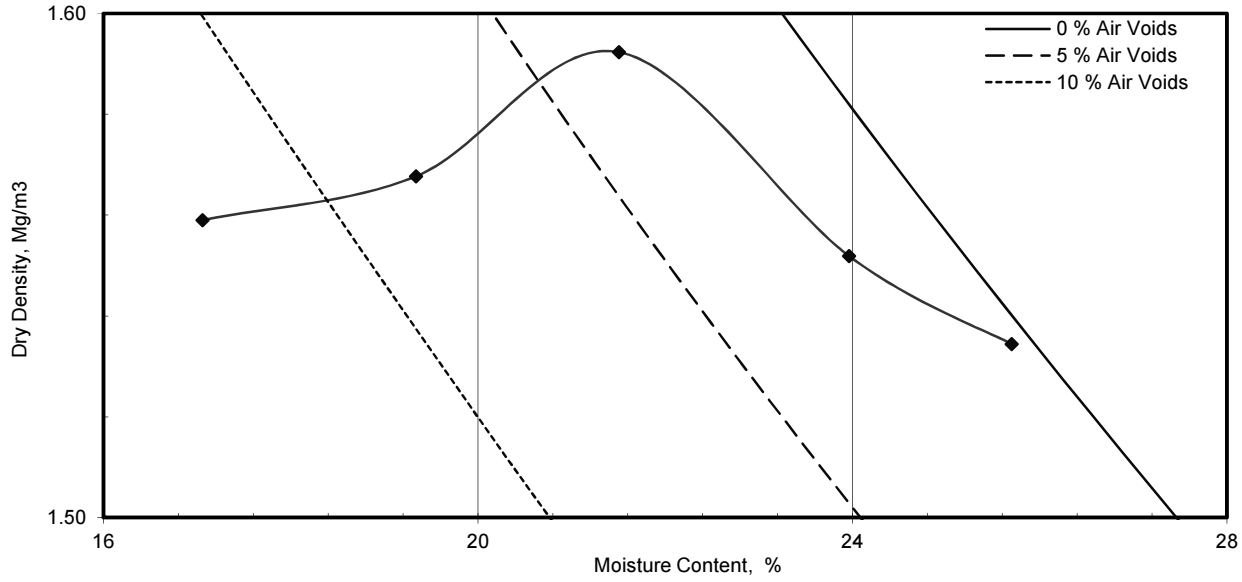
4041

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
		Date Tested:	16/01/2017
Contact:	Emma Small	Sampled By:	ES/EDH
Site Name:	Meadow School		
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682193		
Hole No.:	WS01	Depth Top [m]:	0.7
Sample Reference:	Not Given	Depth Base [m]:	1.1
Sample Description:	Mottled brown slightly gravelly slightly sandy CLAY	Sample Type:	B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Composite specimens tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	4
Particle Density - Assumed	Mg/m³	2.55
As received Moisture Content	%	26
Maximum Dry Density	Mg/m³	**1.59**

Optimum Moisture Content	%	**22**

Remarks

Aproved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Dry Density / Moisture Content Relationship
Light Compaction

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

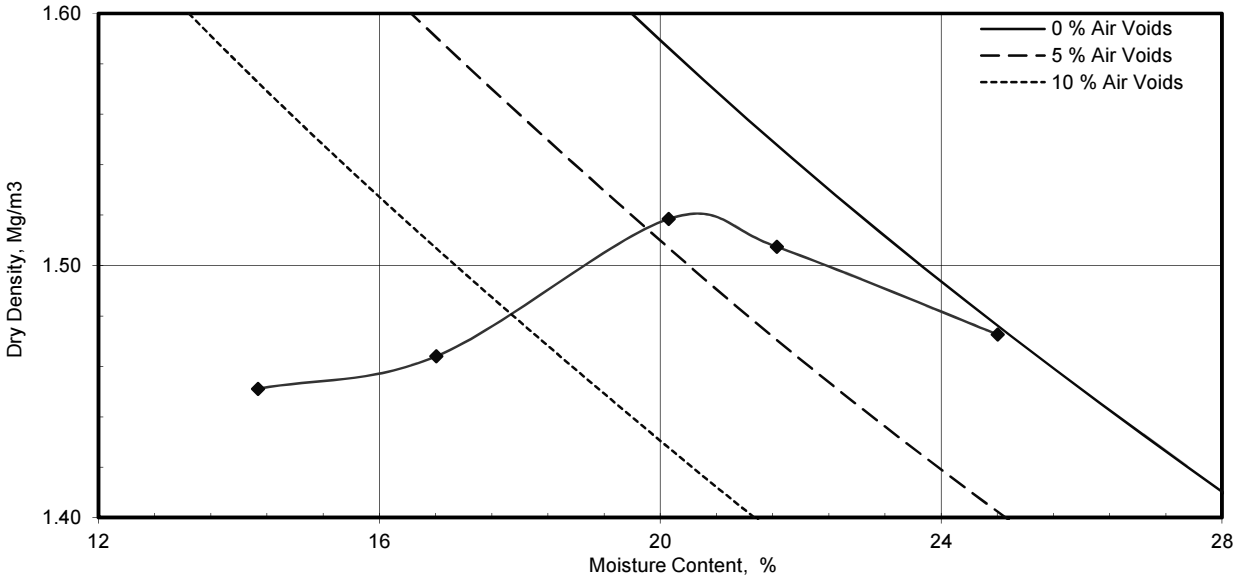
4041

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
		Date Tested:	16/01/2017
Contact:	Emma Small	Sampled By:	ES/EDH
Site Name:	Meadow School		
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682195		
Hole No.:	WS02	Depth Top [m]:	0.3
Sample Reference:	Not Given	Depth Base [m]:	0.6
Sample Description:	Yellowish brown gravelly sandy CLAY	Sample Type:	B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Composite specimens tested
Material Retained on 37.5 mm Sieve	%	15
Material Retained on 20.0 mm Sieve	%	5
Particle Density - Assumed	Mg/m³	2.33
As received Moisture Content	%	25
Maximum Dry Density	Mg/m³	**1.52**

Optimum Moisture Content	%	**20**

Remarks: Grading Zone X. Test carried out as per client request. Insufficient material for CBR mould, compacted in 1litre mould

Aproved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Dry Density / Moisture Content Relationship
Light Compaction

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

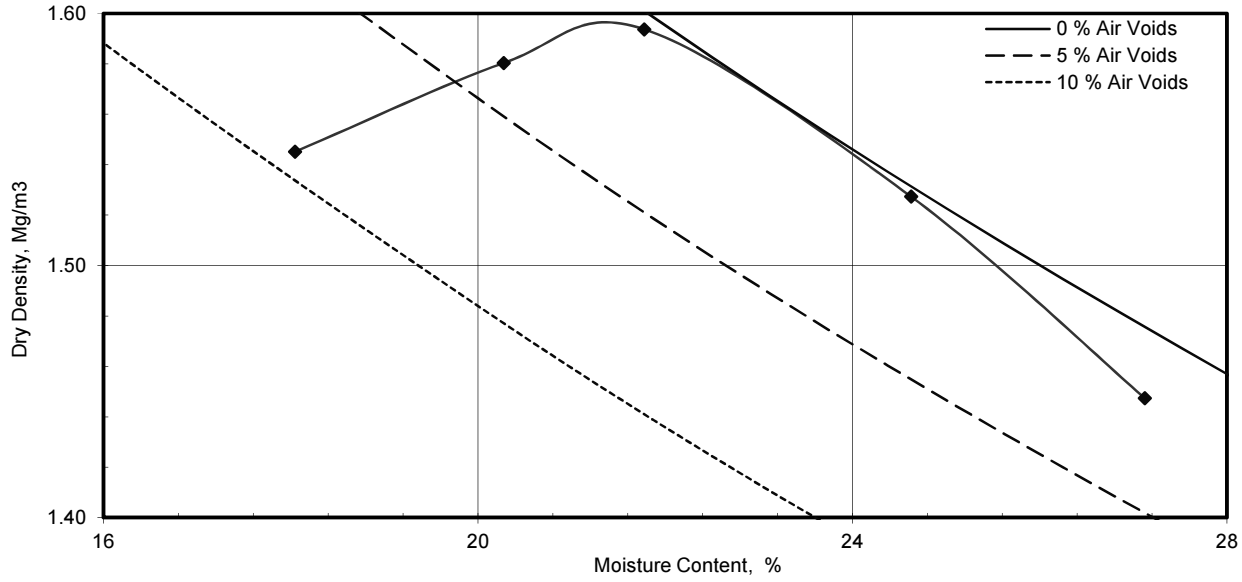
4041

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
		Date Tested:	16/01/2017
Contact:	Emma Small	Sampled By:	ES/EDH
Site Name:	Meadow School		
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682198		
Hole No.:	WS03	Depth Top [m]:	0.5
Sample Reference:	Not Given	Depth Base [m]:	0.7
Sample Description:	brown slightly gravelly clayey SAND	Sample Type:	B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Composite specimens tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	2
Particle Density - Assumed	Mg/m³	2.46
As received Moisture Content	%	25
Maximum Dry Density	Mg/m³	**1.59**

Optimum Moisture Content	%	**22**

Remarks

Aproved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Dry Density / Moisture Content Relationship
Light Compaction

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

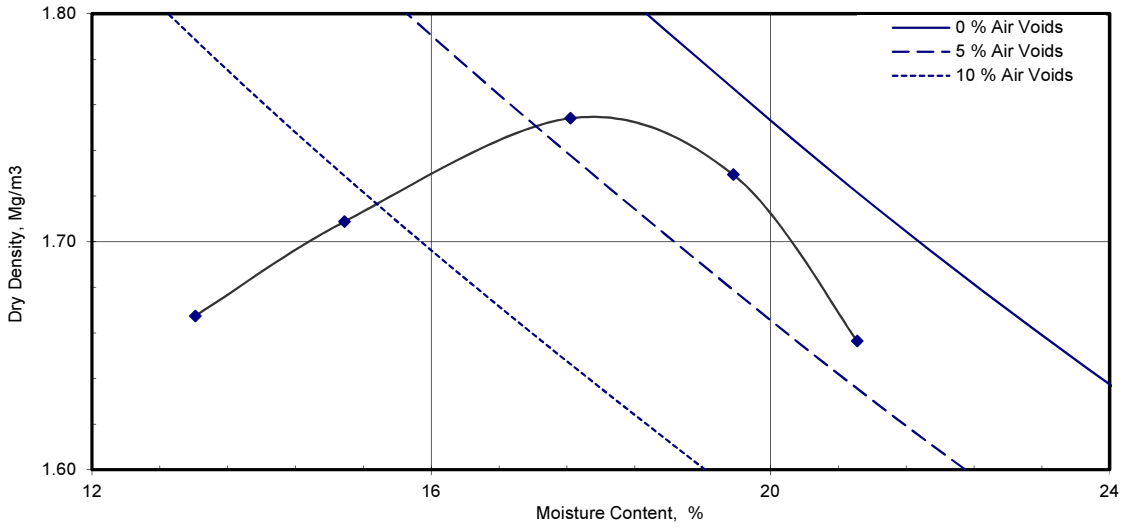
4041

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
		Date Tested:	16/117
Contact:	Emma Small	Sampled By:	ES/EDH
Site Name:	Meadow School		
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682200		
Hole No.:	WS04	Depth Top [m]:	0.4
Sample Reference:	Not Given	Depth Base [m]:	0.7
Sample Description:	brown slightly gravelly slightly sandy CLAY	Sample Type:	B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Composite specimens tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	3
Particle Density - Assumed	Mg/m³	2.70
As received Moisture Content	%	20
Maximum Dry Density	Mg/m³	**1.75**

Optimum Moisture Content	%	**18**

Remarks

Aproved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Dry Density / Moisture Content Relationship
Light Compaction

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

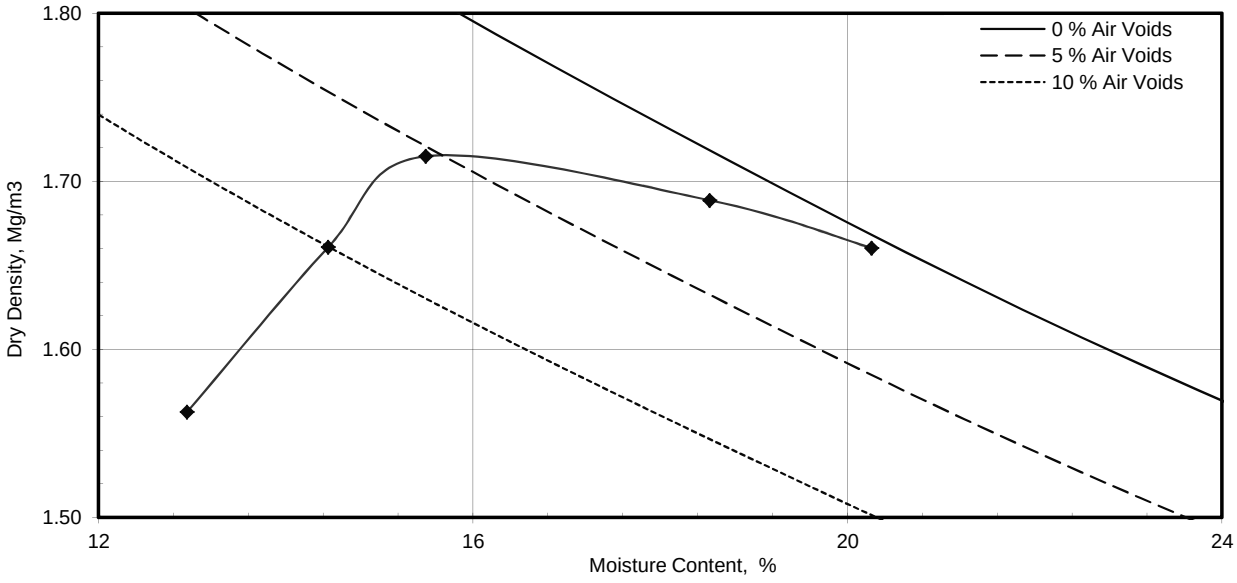
UKAS TESTING 4041

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
		Date Tested:	25/01/2017
Contact:	Emma Small	Sampled By:	ES/EDH
Site Name:	Meadow School		
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference:	682186		
Hole No.:	BH04	Depth Top [m]:	0.4
Sample Reference:	Not Given	Depth Base [m]:	0.7
Sample Description:	Yellowish brown slightly sandy slightly gravelly CLAY	Sample Type:	B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Composite specimens tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	4
Particle Density - Assumed	Mg/m³	2.52
As received Moisture Content	%	19
Maximum Dry Density	Mg/m³	**1.71**

Optimum Moisture Content	%	**15**

Remarks

Aproved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

Date Reported: 18/01/2017

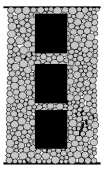
for and on behalf of i2 Analytical Ltd

Total Stress Triaxial Compression

Unconsolidated Undrained (Multiple Specimen)

Summary Report

Sample Details



sketch showing specimen location in original sample

Depth	6.60 - 7.00				
Description	Brown CLAY				
Type	U				
			Spm. 1	2	3
Initial Sample Length	L_0	(mm)	77.4	76.5	77.2
Initial Sample Diameter	D_0	(mm)	37.4	36.6	37.3
Initial Sample Weight	W_0	(gr)	161.1	152.9	165.9
Bulk Density	ρ_0	(Mg/m3)	1.89	1.90	1.97
Particle Density	ρ_s	(Mg/m3)	2.65	2.65	2.65

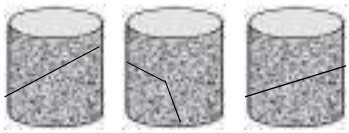
Initial Conditions

Specimen			Spm. 1	2	3
Initial Cell Pressure	σ_3	(kPa)	66	132	264
Strain Rate	m_s	(mm/min)	1.54700	1.53020	1.54340
MembraneThickness	m_b	(mm)	0.18	0.18	0.20
Displacement Input	L_{IP}	(mm)	CH 2	CH 2	CH 2
Load Input	N_{IP}	(N)	CH 1	CH 1	CH 1
Initial Moisture	$\omega_i\%$	(%)	27	27	27
Initial Dry Density	ρ_{d0}	(Mg/m3)	1.49	1.50	1.55
Initial Voids Ratio	e_0	.	0.77	0.77	0.71
Initial Degree of Saturation	S_o	(%)	92	93	100

Final Conditions

			Spm. 1	2	3
Max Deviator Stress	$(\sigma_1-\sigma_3)_f$	(kPa)	208.67	313.22	340.25
MembraneCorrection	m_c	(kPa)	1.307	1.405	0.867
Strain At Max Stress	$\varepsilon_f\%$	(%)	8.60	10.13	4.73
Shear Strength	c_u	(kPa)	104.34	156.61	170.12
Final Moisture	$\omega_f\%$	(%)	27	27	27
Final Dry Density	ρ_{df}	(Mg/m3)	1.49	1.50	1.55
Final Voids Ratio	e_f	.	0.77	0.77	0.71
Final Degree of Saturation	S_f	(%)	91.9	92.5	100.0

Notes



Failure Sketch

(surface inclination)

Test Method	BS1377-7 : 1990 Clause 8	Test Name	682151
Database: .\SQLEXPRESS \ 6171-I2 Analytical		Test Date	18/01/2017
Site Reference	Meadow School	Borehole	BH01
Jobfile	17-36655	Sample	682151
Client	Opus International Consultants Ltd	Depth	6.60 - 7.00

Operator palmowskia Checked pytlikm Approved pytlikm

i2 Analytical Limited, 7 Woodshots Meadow, Croxley Green Business Park, Herts WD18 8YS

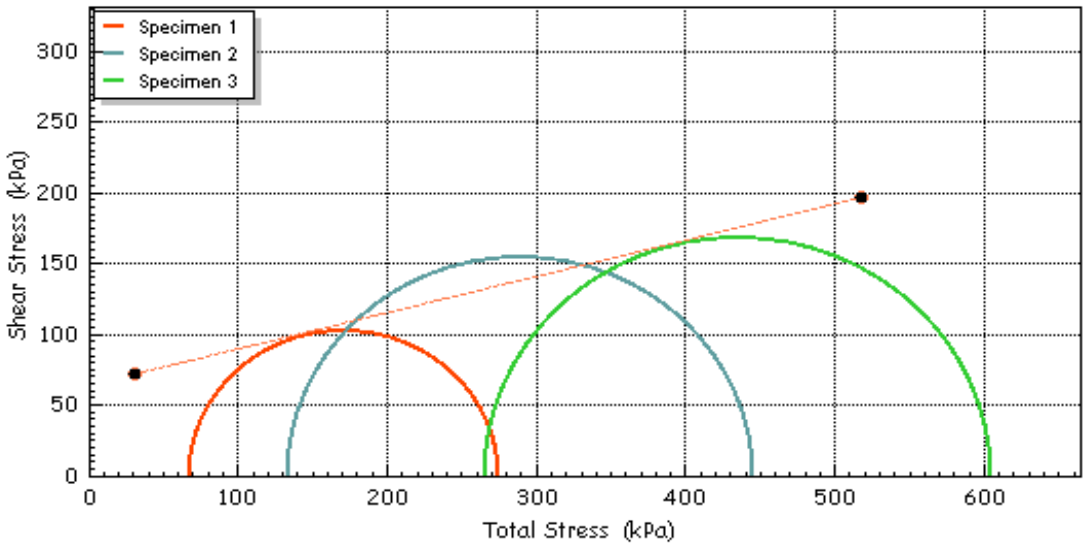
i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

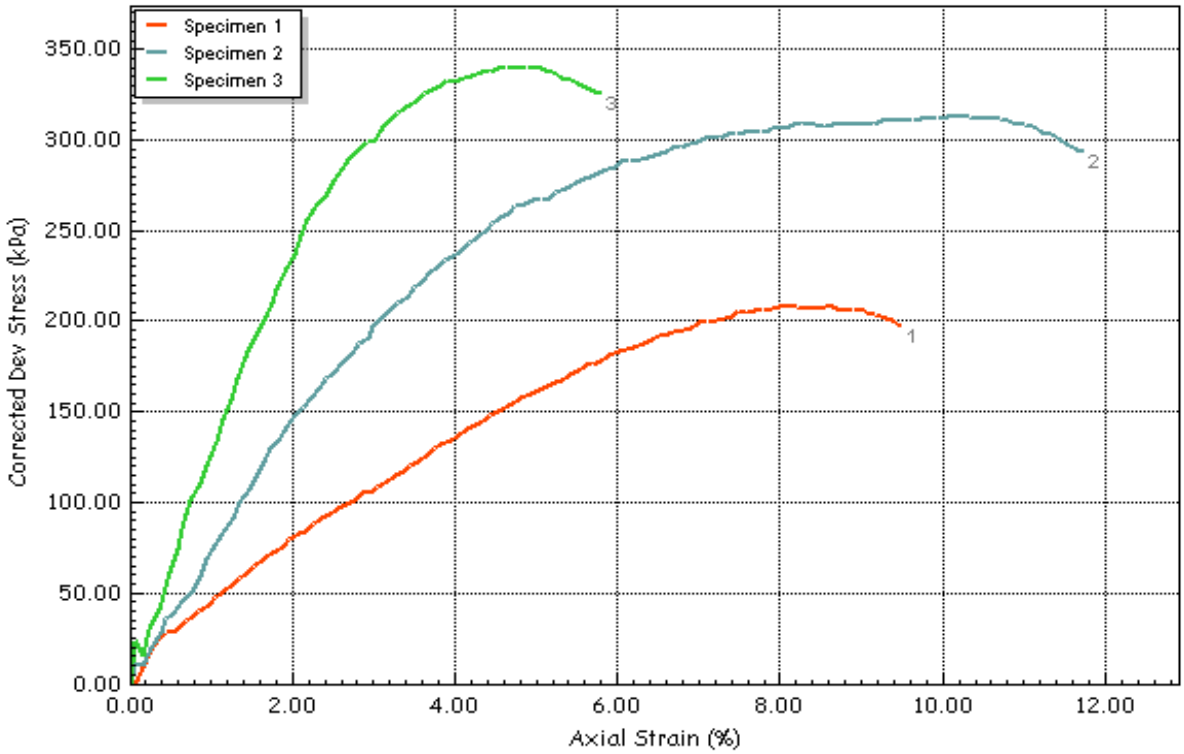
Total Stress Triaxial Compression

Unconsolidated Undrained (Multiple Specimen)

Test Results Plots

Cohesion Level	c	(kPa)	63.8
Friction Angle	ϕ	(deg)	14.4





Test Method	BS1377-7 : 1990 Clause 8			Test Name	682151
Database: .\SQLEXPRESS \ 6171-I2 Analytical				Test Date	18/01/2017
Site Reference	Meadow School			Borehole	BH01
Jobfile	17-36655			Sample	682151
Client	Opus International Consultants Ltd			Depth	6.60 - 7.00
Operator	palmowskia	Checked	pytlikm	Approved	pytlikm

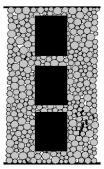
i2 Analytical Limited, 7 Woodshots Meadow, Croxley Green Business Park, Herts WD18 8YS
i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Total Stress Triaxial Compression

Unconsolidated Undrained (Multiple Specimen)

Summary Report

Sample Details



sketch showing specimen location in original sample

Depth	4.00 - 4.40				
Description	Brown CLAY				
Type	U				
			Spm. 1	2	3
Initial Sample Length	L_0	(mm)	76.5	76.6	76.9
Initial Sample Diameter	D_0	(mm)	36.5	36.6	36.7
Initial Sample Weight	W_0	(gr)	162.2	162.5	161.0
Bulk Density	ρ_0	(Mg/m3)	2.03	2.02	1.98
Particle Density	ρ_s	(Mg/m3)	2.65	2.65	2.65

Initial Conditions

Specimen			Spm. 1	2	3
Initial Cell Pressure	σ_3	(kPa)	40	80	160
Strain Rate	m_s	(mm/min)	1.52980	1.53160	1.53860
MembraneThickness	m_b	(mm)	0.23	0.22	0.20
Displacement Input	L_{IP}	(mm)	CH 2	CH 2	CH 2
Load Input	N_{IP}	(N)	CH 1	CH 1	CH 1
Initial Moisture	$\omega_i\%$	(%)	27	27	27
Initial Dry Density	ρ_{d0}	(Mg/m3)	1.59	1.59	1.56
Initial Voids Ratio	e_0	.	0.66	0.67	0.70
Initial Degree of Saturation	S_o	(%)	100	100	100

Final Conditions

			Spm. 1	2	3
Max Deviator Stress	$(\sigma_1-\sigma_3)_f$	(kPa)	211.98	224.81	246.43
MembraneCorrection	m_c	(kPa)	2.048	1.308	1.394
Strain At Max Stress	$\varepsilon_f\%$	(%)	14.90	8.88	8.14
Shear Strength	c_u	(kPa)	105.99	112.40	123.21
Final Moisture	$\omega_f\%$	(%)	27	27	27
Final Dry Density	ρ_{df}	(Mg/m3)	1.59	1.59	1.56
Final Voids Ratio	e_f	.	0.66	0.67	0.70
Final Degree of Saturation	S_f	(%)	100.0	100.0	100.0

Notes

Failure Sketch

(surface inclination)

Test Method	BS1377-7 : 1990 Clause 8	Test Name	682163
Database: .\SQLEXPRESS \ 6171-I2 Analytical		Test Date	18/01/2017
Site Reference	Meadow School	Borehole	BH02
Jobfile	17-36655	Sample	682163
Client	Opus International Consultants Ltd	Depth	4.00 - 4.40

Operator palmowskia Checked pytlikm Approved pytlikm

i2 Analytical Limited, 7 Woodshots Meadow, Croxley Green Business Park, Herts WD18 8YS

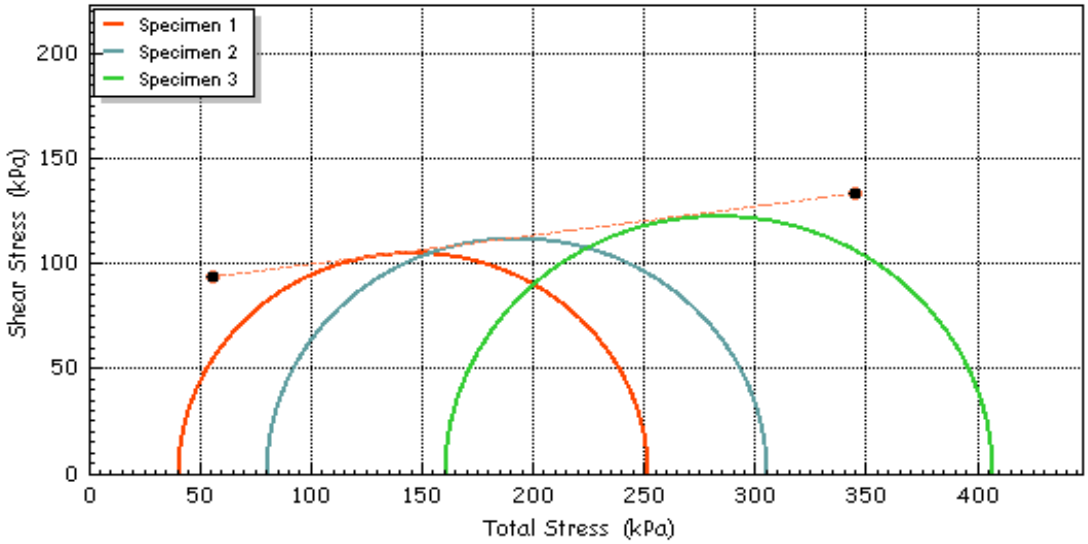
i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

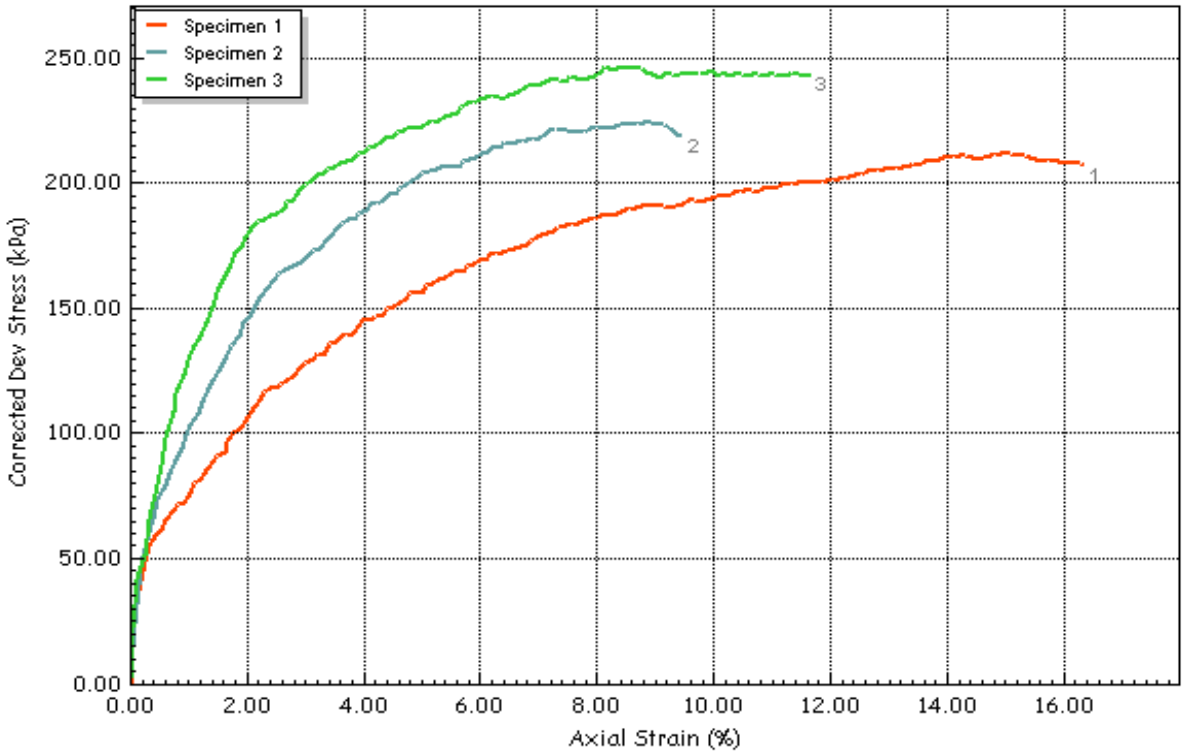
Total Stress Triaxial Compression

Unconsolidated Undrained (Multiple Specimen)

Test Results Plots

Cohesion Level	c	(kPa)	86.4
Friction Angle	ϕ	(deg)	7.7





Test Method	BS1377-7 : 1990 Clause 8			Test Name	682163
Database: .\SQLEXPRESS \ 6171-I2 Analytical				Test Date	18/01/2017
Site Reference	Meadow School			Borehole	BH02
Jobfile	17-36655			Sample	682163
Client	Opus International Consultants Ltd			Depth	4.00 - 4.40
Operator	palmowskia	Checked	pytlikm	Approved	pytlikm

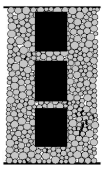
i2 Analytical Limited, 7 Woodshots Meadow, Croxley Green Business Park, Herts WD18 8YS
i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Total Stress Triaxial Compression

Unconsolidated Undrained (Multiple Specimen)

Summary Report

Sample Details



sketch showing specimen location in original sample

Depth	8.00 - 8.40				
Description	Brown CLAY				
Type	U				
			Spm. 1	2	3
Initial Sample Length	L_0	(mm)	75.5	75.1	77.3
Initial Sample Diameter	D_0	(mm)	36.7	36.5	36.5
Initial Sample Weight	W_0	(gr)	156.5	164.3	160.2
Bulk Density	ρ_0	(Mg/m3)	1.96	2.09	1.98
Particle Density	ρ_s	(Mg/m3)	2.65	2.65	2.65

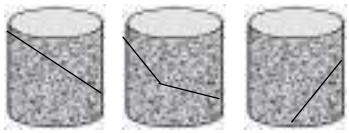
Initial Conditions

Specimen			Spm. 1	2	3
Initial Cell Pressure	σ_3	(kPa)	80	160	320
Strain Rate	m_s	(mm/min)	1.51060	1.50260	1.54580
MembraneThickness	m_b	(mm)	0.23	0.24	0.28
Displacement Input	L_{IP}	(mm)	CH 2	CH 2	CH 2
Load Input	N_{IP}	(N)	CH 1	CH 1	CH 1
Initial Moisture	$\omega_i\%$	(%)	27	27	27
Initial Dry Density	ρ_{d0}	(Mg/m3)	1.54	1.64	1.55
Initial Voids Ratio	e_0	.	0.72	0.61	0.71
Initial Degree of Saturation	S_o	(%)	100	100	100

Final Conditions

			Spm. 1	2	3
Max Deviator Stress	$(\sigma_1-\sigma_3)_f$	(kPa)	217.28	296.78	406.53
MembraneCorrection	m_c	(kPa)	0.765	0.972	1.485
Strain At Max Stress	$\varepsilon_f\%$	(%)	3.56	5.33	7.22
Shear Strength	c_u	(kPa)	108.64	148.39	203.27
Final Moisture	$\omega_f\%$	(%)	27	27	27
Final Dry Density	ρ_{df}	(Mg/m3)	1.54	1.64	1.55
Final Voids Ratio	e_f	.	0.72	0.61	0.71
Final Degree of Saturation	S_f	(%)	100.0	100.0	100.0

Notes



Failure Sketch

(surface inclination)

Test Method	BS1377-7 : 1990 Clause 8	Test Name	682174
Database: .\SQLEXPRESS \ 6171-I2 Analytical		Test Date	18/01/2017
Site Reference	Meadow School	Borehole	BH03
Jobfile	17-36655	Sample	682174
Client	Opus International Consultants Ltd	Depth	8.00 - 8.40

Operator palmowskia Checked pytlikm Approved pytlikm

i2 Analytical Limited, 7 Woodshots Meadow, Croxley Green Business Park, Herts WD18 8YS

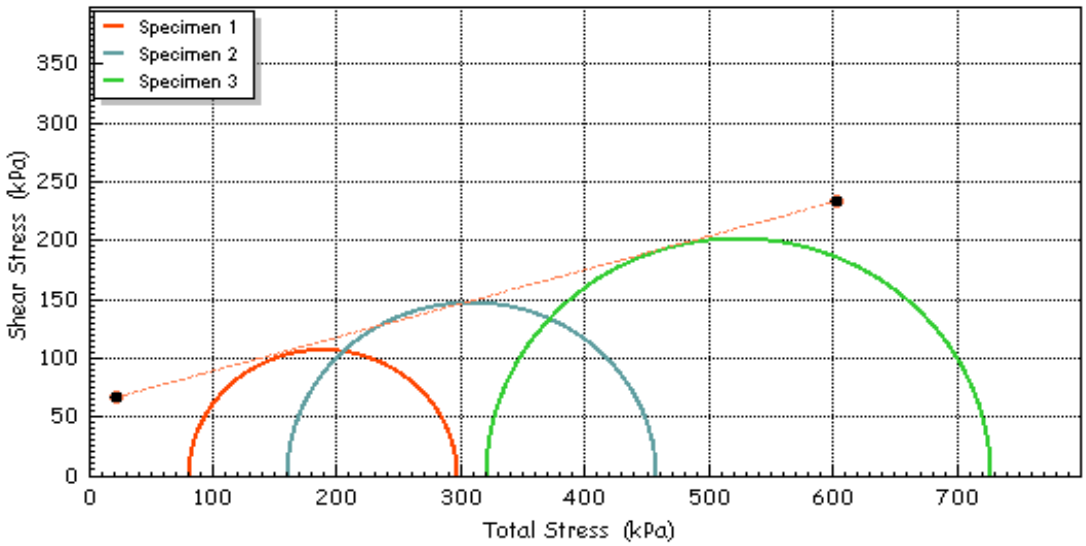
i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

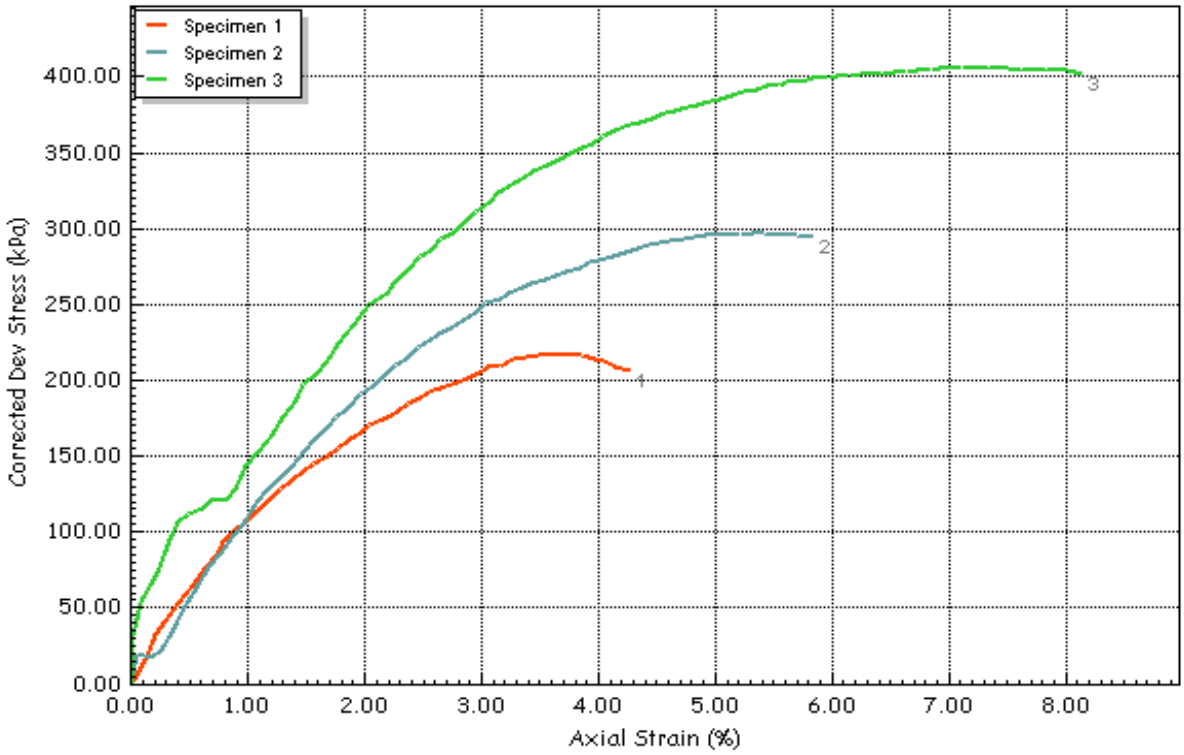
Total Stress Triaxial Compression

Unconsolidated Undrained (Multiple Specimen)

Test Results Plots

Cohesion Level	c	(kPa)	59.9
Friction Angle	ϕ	(deg)	16.1





Test Method	BS1377-7 : 1990 Clause 8			Test Name	682174
Database: .\SQLEXPRESS \ 6171-I2 Analytical				Test Date	18/01/2017
Site Reference	Meadow School			Borehole	BH03
Jobfile	17-36655			Sample	682174
Client	Opus International Consultants Ltd			Depth	8.00 - 8.40
Operator	palmowskia	Checked	pytlikm	Approved	pytlikm

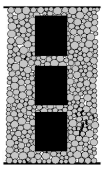
i2 Analytical Limited, 7 Woodshots Meadow, Croxley Green Business Park, Herts WD18 8YS
i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Total Stress Triaxial Compression

Unconsolidated Undrained (Multiple Specimen)

Summary Report

Sample Details



sketch showing specimen location in original sample

Depth	6.50 - 6.90				
Description	Brown CLAY				
Type	U				
			Spm. 1	2	3
Initial Sample Length	L_0	(mm)	76.1	76.9	77.1
Initial Sample Diameter	D_0	(mm)	37.0	36.9	36.8
Initial Sample Weight	W_0	(gr)	163.9	157.2	162.9
Bulk Density	ρ_0	(Mg/m3)	2.00	1.91	1.99
Particle Density	ρ_s	(Mg/m3)	2.65	2.65	2.65

Initial Conditions

Specimen			Spm. 1	2	3
Initial Cell Pressure	σ_3	(kPa)	65	130	260
Strain Rate	m_s	(mm/min)	1.52120	1.53720	1.54220
MembraneThickness	m_b	(mm)	0.20	0.20	0.19
Displacement Input	L_{IP}	(mm)	CH 2	CH 2	CH 2
Load Input	N_{IP}	(N)	CH 1	CH 1	CH 1
Initial Moisture	$\omega_i\%$	(%)	29	29	29
Initial Dry Density	ρ_{d0}	(Mg/m3)	1.55	1.48	1.54
Initial Voids Ratio	e_0	.	0.70	0.79	0.72
Initial Degree of Saturation	S_o	(%)	100	97	100

Final Conditions

			Spm. 1	2	3
Max Deviator Stress	$(\sigma_1-\sigma_3)_f$	(kPa)	259.78	297.00	323.95
MembraneCorrection	m_c	(kPa)	1.159	0.973	0.943
Strain At Max Stress	$\varepsilon_f\%$	(%)	8.06	6.58	7.12
Shear Strength	c_u	(kPa)	129.89	148.50	161.97
Final Moisture	$\omega_f\%$	(%)	29	29	29
Final Dry Density	ρ_{df}	(Mg/m3)	1.55	1.48	1.54
Final Voids Ratio	e_f	.	0.70	0.79	0.72
Final Degree of Saturation	S_f	(%)	100.0	97.2	100.0

Notes

Failure Sketch

(surface inclination)

Test Method	BS1377-7 : 1990 Clause 8	Test Name	682184
Database: .\SQLEXPRESS \ 6171-I2 Analytical		Test Date	18/01/2017
Site Reference	Meadow School	Borehole	BH04
Jobfile	17-36655	Sample	682184
Client	Opus International Consultants Ltd	Depth	6.50 - 6.90

Operator palmowskia Checked pytlikm Approved pytlikm

i2 Analytical Limited, 7 Woodshots Meadow, Croxley Green Business Park, Herts WD18 8YS

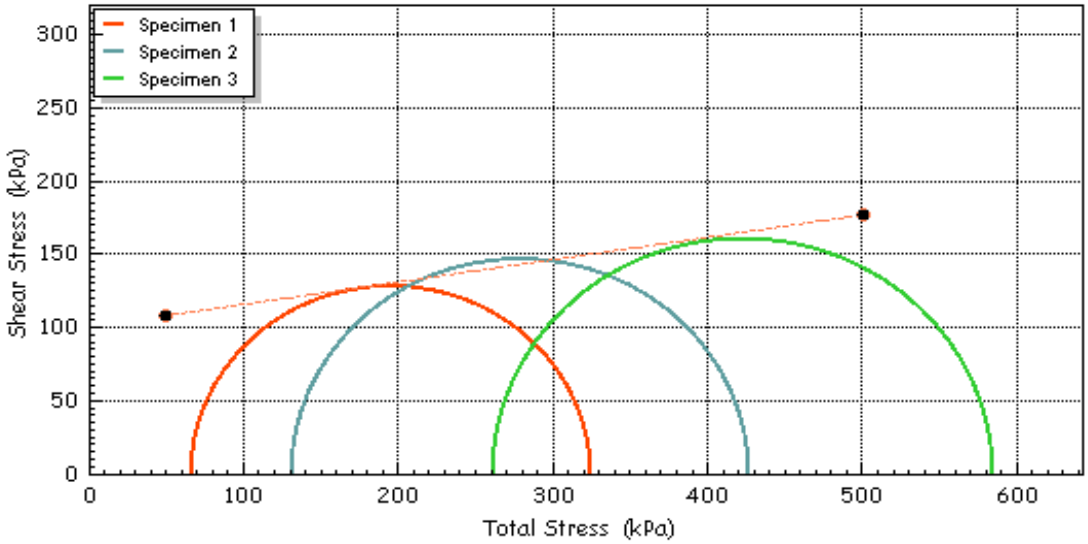
i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

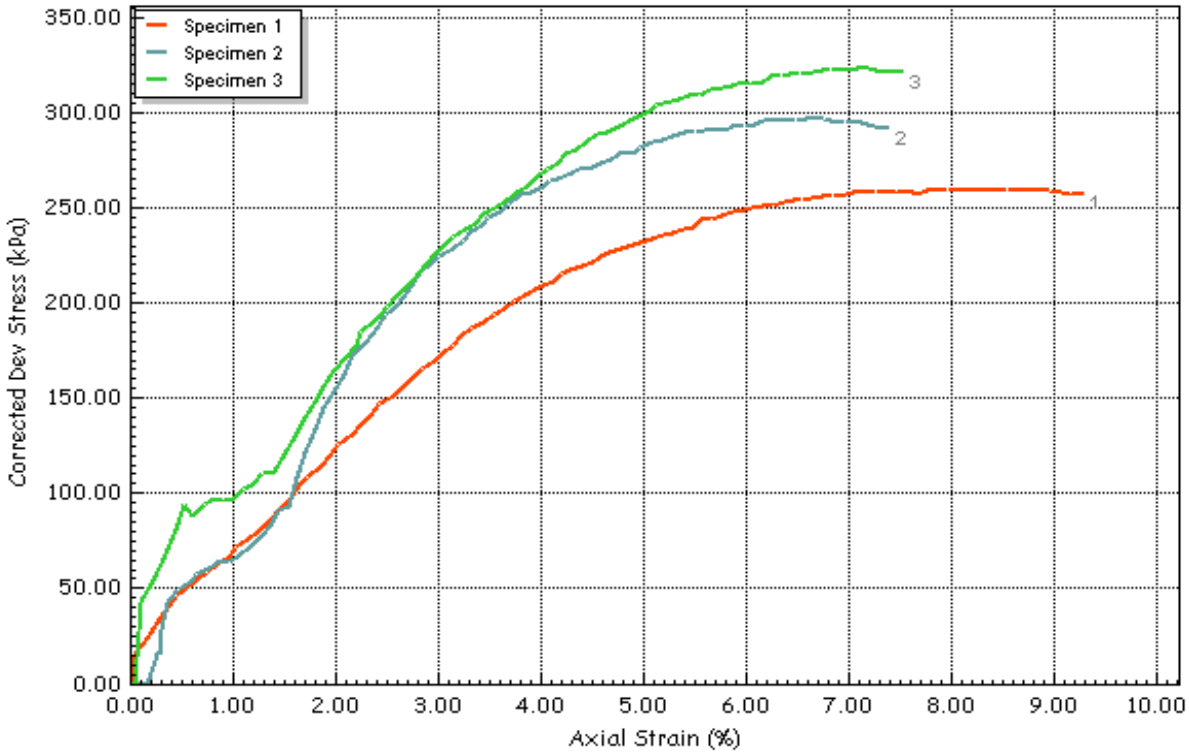
Total Stress Triaxial Compression

Unconsolidated Undrained (Multiple Specimen)

Test Results Plots

Cohesion Level	c	(kPa)	101.2
Friction Angle	ϕ	(deg)	8.6





Test Method	BS1377-7 : 1990 Clause 8			Test Name	682184
Database: .\SQLEXPRESS \ 6171-I2 Analytical				Test Date	18/01/2017
Site Reference	Meadow School			Borehole	BH04
Jobfile	17-36655			Sample	682184
Client	Opus International Consultants Ltd			Depth	6.50 - 6.90
Operator	palmowskia	Checked	pytlikm	Approved	pytlikm

i2 Analytical Limited, 7 Woodshots Meadow, Croxley Green Business Park, Herts WD18 8YS
i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

TEST CERTIFICATE

One Dimensional Consolidation Test

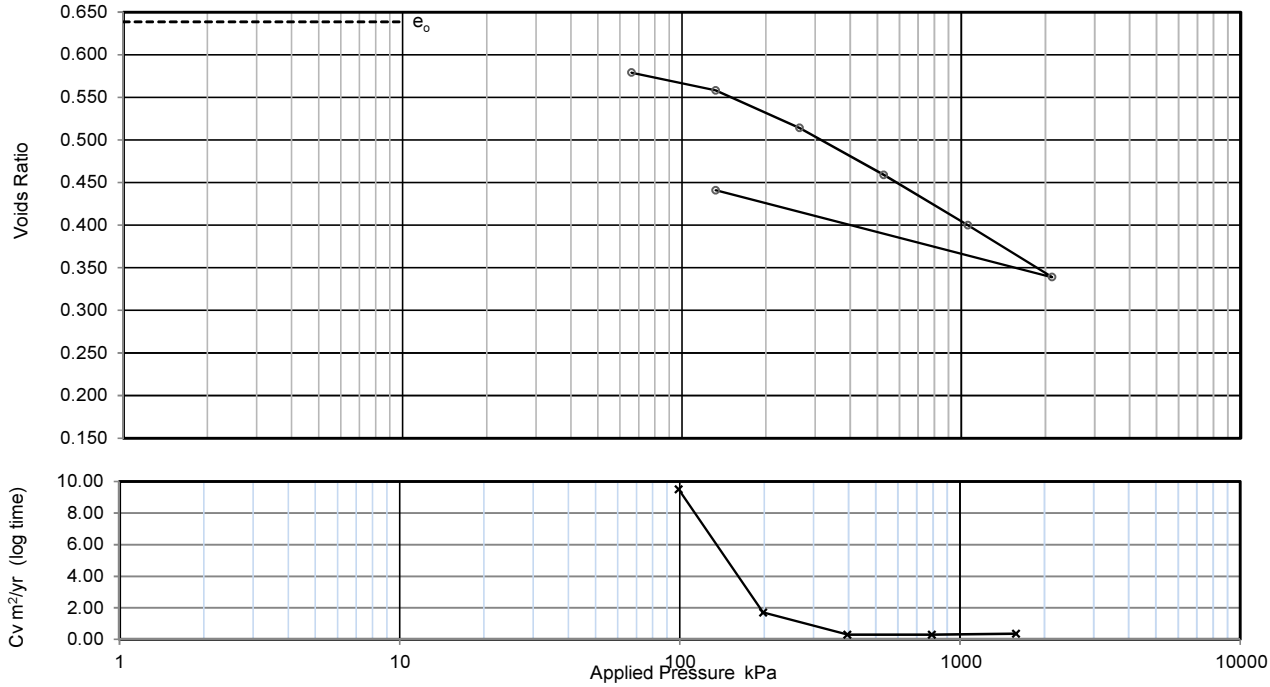
Tested in Accordance with BS1377: Part 5: 1990 Clause 3

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	23/01/2017
Site Name:	Meadow School	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	682151	Depth Top [m]:	6.6
Hole No.:	BH01	Depth Base [m]:	7
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.639	-	-	-	-
66	0.579	Swelling			
132	0.558	0.2	9.5	43	0.00065
264	0.514	0.21	1.7	28	0.0015
528	0.459	0.14	0.3	1.6	0.0023
1 056	0.400	0.076	0.3	1.1	0.0027
2 112	0.339	0.041	0.36	1.3	0.0027
132	0.441	0.039			

Note: Final values should be used with caution, Cv plotted at mid point of load increments, Cv corrected to 20°C

Preparation

Index tests	Liquid limit:	N/A	%	Plastic limit:	N/A %
Orientation of the sample				Vertical	
Particle density		assumed		2.65	Mg/m3

Specimen details	Initial	Final	
Diameter	50.00	-	mm
Height	19.94	17.54	mm
Moisture Content	24.0	23.0	%
Bulk density	2.01	2.26	Mg/m3
Dry density	1.62	1.84	Mg/m3
Voids Ratio	0.639	0.441	
Saturation	101	136	%
Average temperature for test	20.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%
Remarks			

Comments:

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 30/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

One Dimensional Consolidation Test

Tested in Accordance with BS1377: Part 5: 1990 Clause 3

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

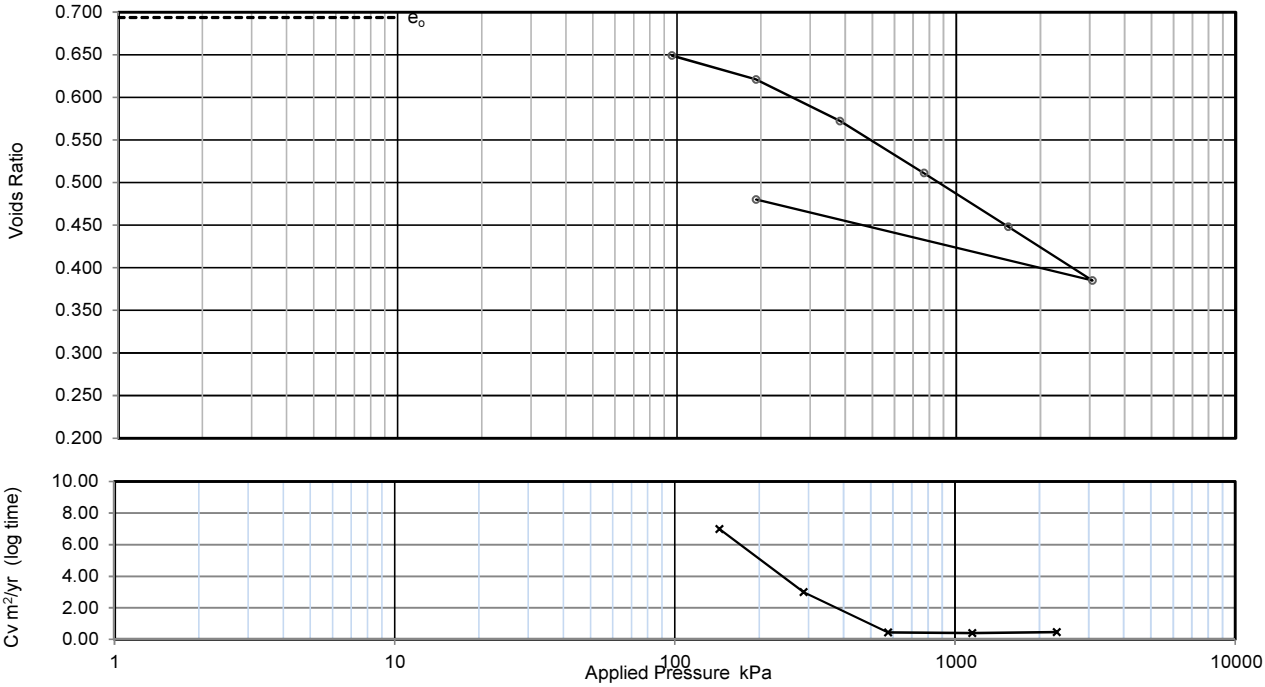
Client:	Opus International Consultants (UK) Ltd
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW
Contact:	Emma Small
Site Name:	Meadow School
Site Address:	Not Given

Client Reference:	J-M3932.12
Job Number:	17-36655
Date Sampled:	20/12/2016
Date Received:	04/01/2017
Date Tested:	23/01/2017
Sampled By:	Not Given

Test Results

Laboratory Reference:	682152
Hole No.:	BH01
Sample Reference:	Not Given
Sample Description:	Greyish brown CLAY

Depth Top [m]:	9.6
Depth Base [m]:	10
Sample Type:	U



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.694	-	-	-	-
96	0.649	Swelling			
192	0.621	0.18	7	79	0.00087
384	0.572	0.16	3	78	0.0015
768	0.511	0.1	0.44	2	0.002
1 536	0.448	0.054	0.4	1.8	0.0029
3 072	0.385	0.028	0.47	0.7	0.0031
192	0.480	0.024			

Note: Final values should be used with caution, Cv plotted at mid point of load increments, Cv corrected to 20°C

Preparation

Index tests	Liquid limit:	61	%	Plastic limit:	27 %
Orientation of the sample				Vertical	
Particle density		assumed		2.65	Mg/m3

Specimen details	Initial	Final	
Diameter	50.00	-	mm
Height	19.92	17.41	mm
Moisture Content	26.0	24.0	%
Bulk density	1.97	2.22	Mg/m3
Dry density	1.56	1.79	Mg/m3
Voids Ratio	0.694	0.480	
Saturation	98	132	%
Average temperature for test	20.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%
Remarks			

Comments:

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 30/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

One Dimensional Consolidation Test

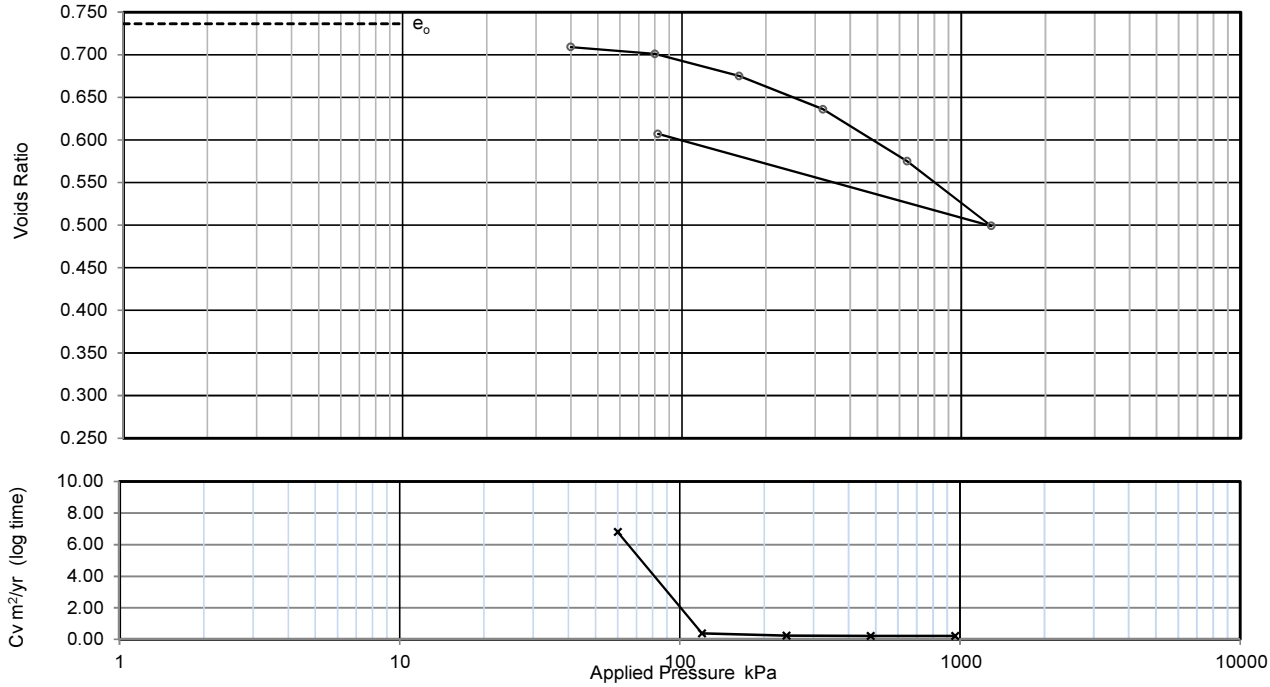
Tested in Accordance with BS1377: Part 5: 1990 Clause 3

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	23/01/2017
Site Name:	Meadow School	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	682163	Depth Top [m]:	4
Hole No.:	BH02	Depth Base [m]:	4.4
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.736	-	-	-	-
40	0.709	Swelling			
80	0.701	0.12	6.8	14	N/A
160	0.675	0.19	0.39	2	0.0015
320	0.636	0.15	0.24	1.5	0.0023
640	0.575	0.12	0.22	0.5	0.0048
1 280	0.499	0.075	0.22	0.47	0.0036
80	0.607	0.06			

Preparation

Index tests Liquid limit: N/A % Plastic limit: N/A %

Orientation of the sample: Vertical

Particle density: assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	50.00	-	mm
Height	20.18	18.68	mm
Moisture Content	31.0	29.0	%
Bulk density	1.99	2.13	Mg/m3
Dry density	1.53	1.65	Mg/m3
Voids Ratio	0.736	0.607	
Saturation	110	127	%
Average temperature for test	20.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%
Remarks			

Note: Final values should be used with caution, Cv plotted at mid point of load increments, Cv corrected to 20°C

Comments:

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 30/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

One Dimensional Consolidation Test

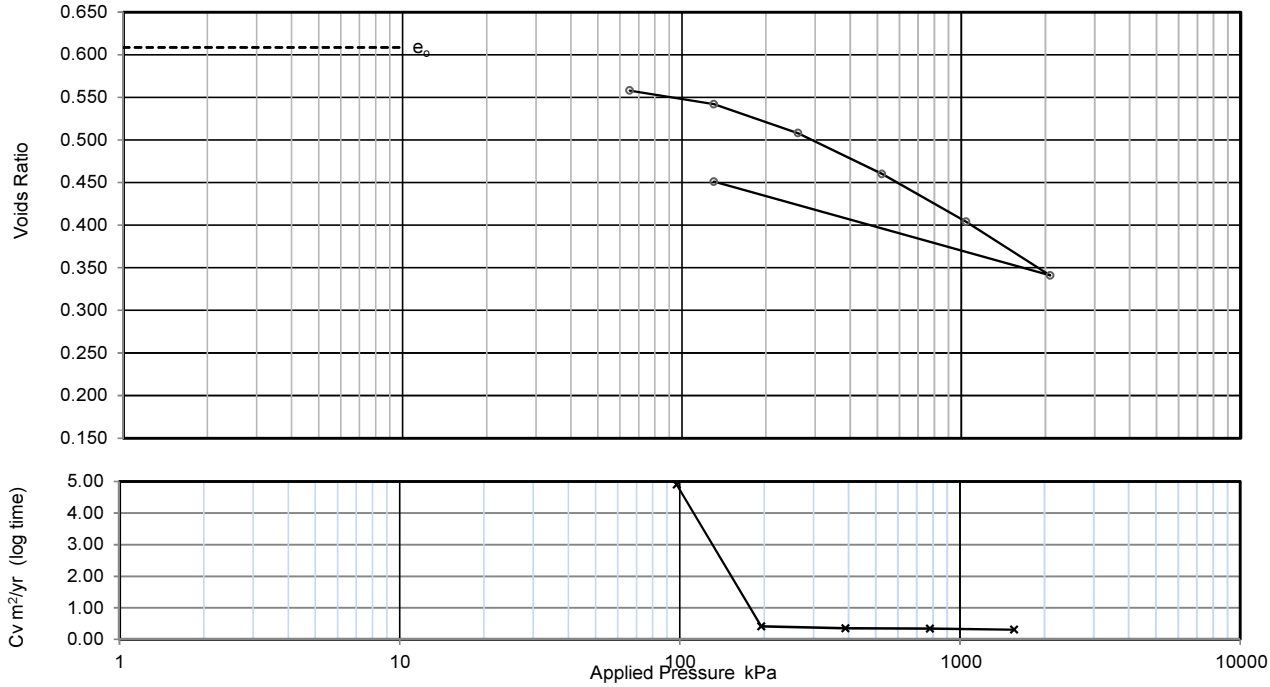
Tested in Accordance with BS1377: Part 5: 1990 Clause 3

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	20/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	23/01/2017
Site Name:	Meadow School	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	682164	Depth Top [m]:	6.5
Hole No.:	BH02	Depth Base [m]:	6.9
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Grey CLAY		



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.609	-	-	-	-
65	0.558	Swelling			
130	0.542	0.16	4.9	11	0.00043
260	0.508	0.17	0.41	2.1	0.0015
520	0.460	0.12	0.35	0.92	0.0024
1 040	0.404	0.074	0.34	0.76	0.0027
2 080	0.341	0.043	0.31	0.94	0.0027
130	0.451	0.042			

Note: Final values should be used with caution, Cv plotted at mid point of load increments, Cv corrected to 20°C

Preparation

Index tests	Liquid limit:	N/A	%	Plastic limit:	N/A %
Orientation of the sample				Vertical	
Particle density		assumed		2.65	Mg/m3

Specimen details	Initial	Final	
Diameter	50.02	-	mm
Height	19.94	17.98	mm
Moisture Content	25.0	23.0	%
Bulk density	2.07	2.25	Mg/m3
Dry density	1.65	1.83	Mg/m3
Voids Ratio	0.609	0.451	
Saturation	111	135	%
Average temperature for test	20.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%
Remarks			

Comments:

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 30/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

One Dimensional Consolidation Test

Tested in Accordance with BS1377: Part 5: 1990 Clause 3

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

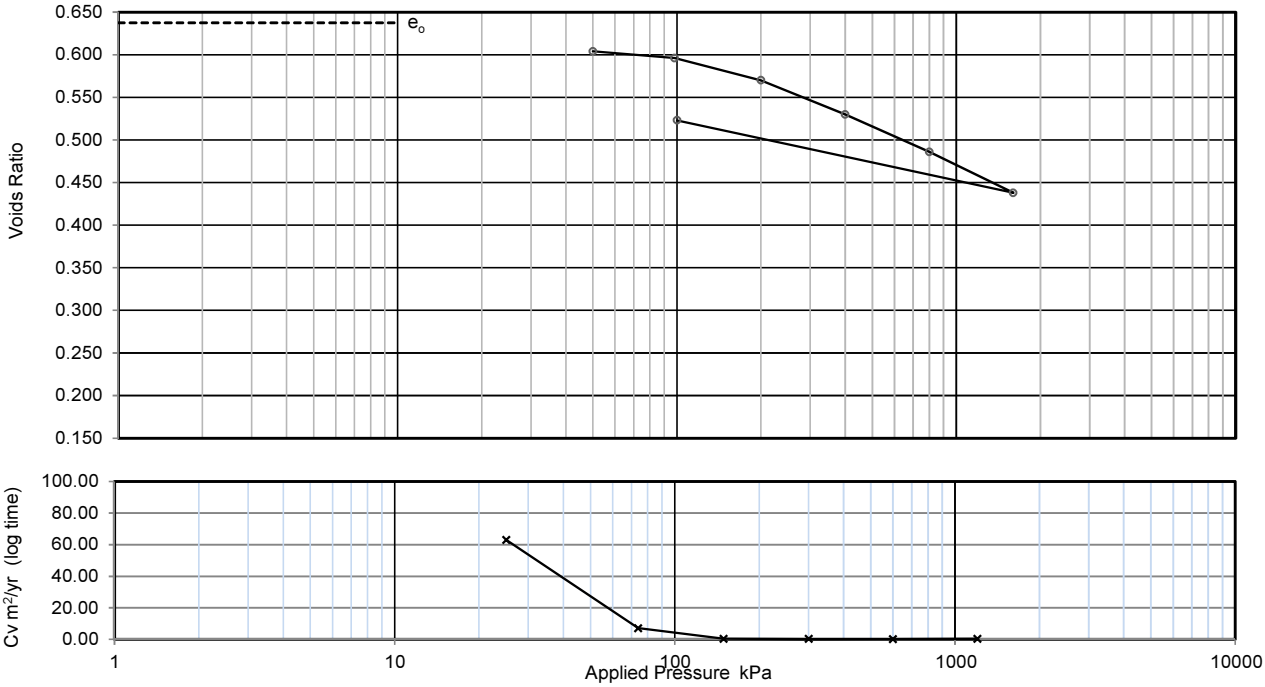
Client:	Opus International Consultants (UK) Ltd
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW
Contact:	Emma Small
Site Name:	Meadow School
Site Address:	Not Given

Client Reference:	J-M3932.12
Job Number:	17-36655
Date Sampled:	16/12/2016
Date Received:	04/01/2017
Date Tested:	23/01/2017
Sampled By:	Not Given

Test Results

Laboratory Reference:	682173
Hole No.:	BH03
Sample Reference:	Not Given
Sample Description:	Grey CLAY

Depth Top [m]:	5
Depth Base [m]:	5.4
Sample Type:	U



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.637	-	-	-	-
50	0.604	Swelling			
100	0.596	0.12	7.1	48	N/A
200	0.570	0.16	0.39	6.6	0.00097
400	0.530	0.13	0.26	2	0.0019
800	0.486	0.072	0.24	0.86	0.0027
1 600	0.438	0.04	0.32	0.72	0.0023
100	0.523	0.039			

Note: Final values should be used with caution, Cv plotted at mid point of load increments, Cv corrected to 20°C

Preparation

Index tests	Liquid limit:	N/A	%	Plastic limit:	N/A %
Orientation of the sample				Vertical	
Particle density		assumed		2.65	Mg/m3

Specimen details	Initial	Final	
Diameter	50.00	-	mm
Height	20.14	18.74	mm
Moisture Content	25.0	26.0	%
Bulk density	2.02	2.18	Mg/m3
Dry density	1.62	1.74	Mg/m3
Voids Ratio	0.637	0.523	
Saturation	104	129	%
Average temperature for test	20.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%
Remarks			

Comments:

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 30/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

One Dimensional Consolidation Test

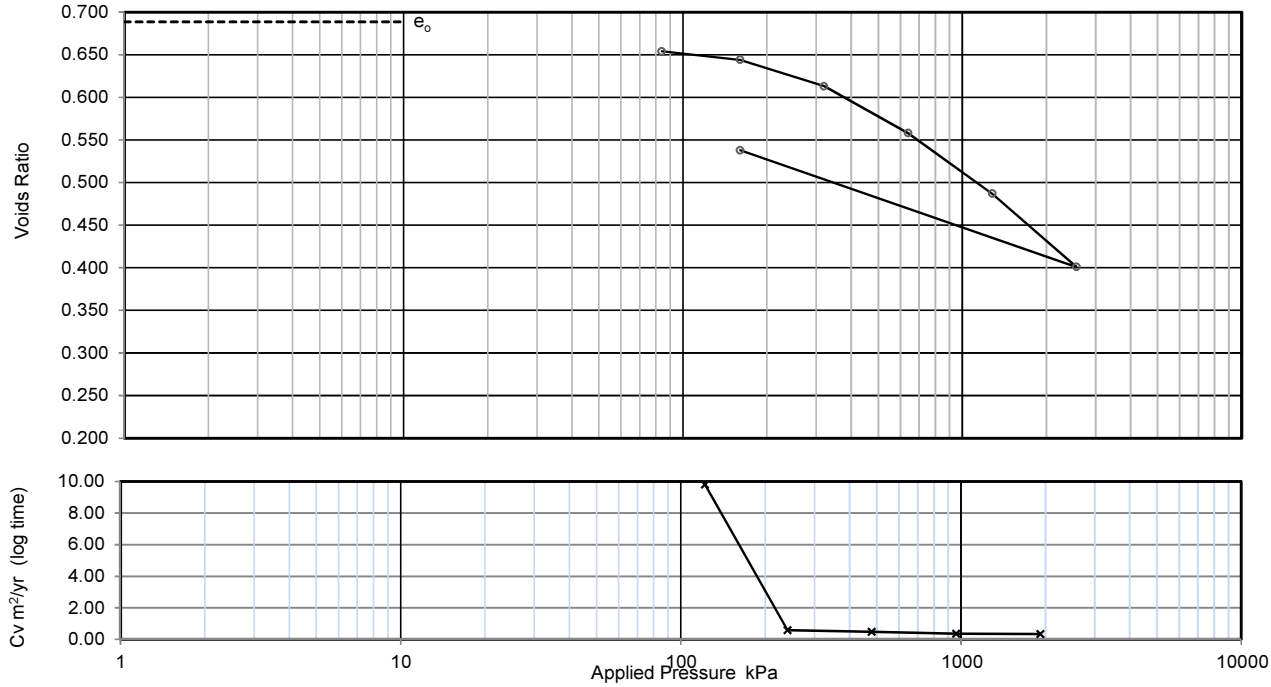
Tested in Accordance with BS1377: Part 5: 1990 Clause 3

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	16/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	23/01/2017
Site Name:	Meadow School	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	682174	Depth Top [m]:	8
Hole No.:	BH03	Depth Base [m]:	8.4
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown CLAY		



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.689	-	-	-	-
80	0.654	Swelling			
160	0.644	0.073	9.8	42	N/A
320	0.613	0.12	0.58	2.7	0.00097
640	0.558	0.11	0.48	2.5	0.0024
1 280	0.487	0.072	0.37	1	0.0029
2 560	0.401	0.045	0.34	1.2	0.0031
160	0.538	0.04			

Preparation

Index tests Liquid limit: N/A % Plastic limit: N/A %

Orientation of the sample: Vertical

Particle density: assumed 2.65 Mg/m3

Specimen details	Initial	Final	
Diameter	50.00	-	mm
Height	20.11	18.31	mm
Moisture Content	26.0	27.0	%
Bulk density	1.98	2.19	Mg/m3
Dry density	1.57	1.72	Mg/m3
Voids Ratio	0.689	0.538	
Saturation	101	134	%
Average temperature for test	20.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%
Remarks			

Note: Final values should be used with caution, Cv plotted at mid point of load increments, Cv corrected to 20°C

Comments:

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 30/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

One Dimensional Consolidation Test

Tested in Accordance with BS1377: Part 5: 1990 Clause 3

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

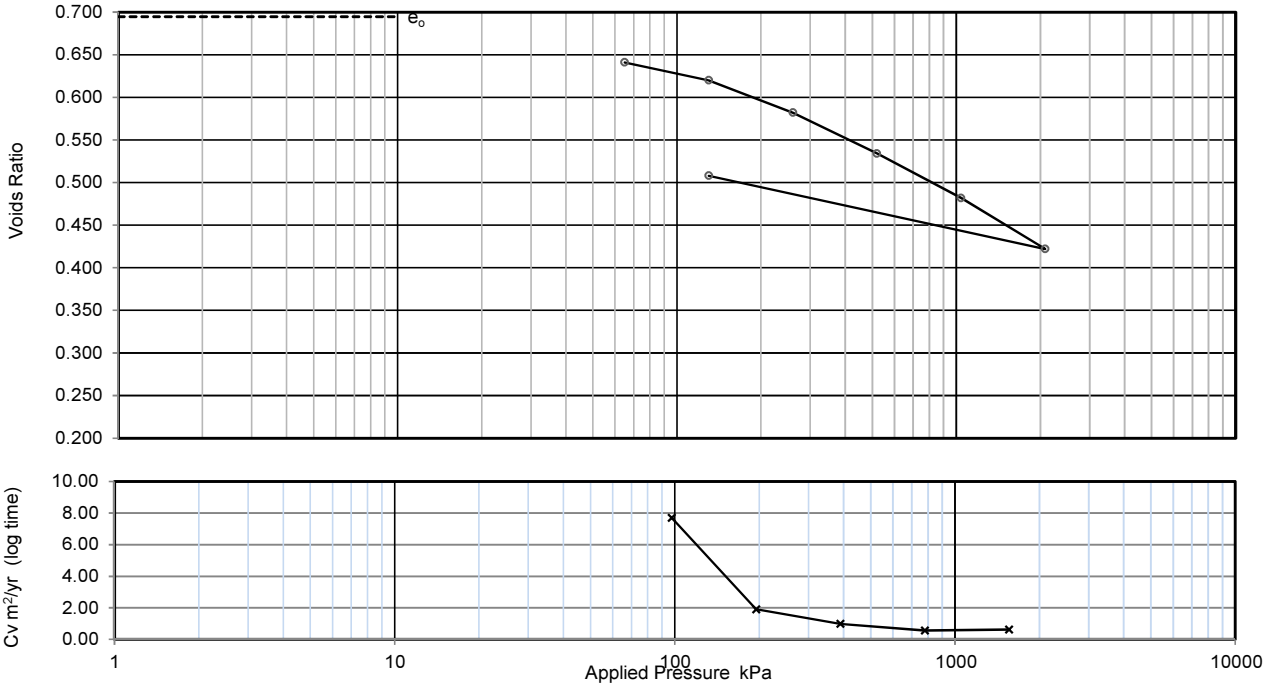
Client:	Opus International Consultants (UK) Ltd
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW
Contact:	Emma Small
Site Name:	Meadow School
Site Address:	Not Given

Client Reference:	J-M3932.12
Job Number:	17-36655
Date Sampled:	19/12/2016
Date Received:	04/01/2017
Date Tested:	23/01/2017
Sampled By:	Not Given

Test Results

Laboratory Reference:	682184
Hole No.:	BH04
Sample Reference:	Not Given
Sample Description:	Brown CLAY

Depth Top [m]:	6.5
Depth Base [m]:	6.9
Sample Type:	U



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.695	-	-	-	-
65	0.641	Swelling			
130	0.620	0.2	7.7	22	0.00064
260	0.582	0.18	1.9	5.5	0.0013
520	0.534	0.11	0.98	3	0.0019
1 040	0.482	0.066	0.56	2.5	0.0027
2 080	0.422	0.039	0.63	1.9	0.0027
130	0.508	0.031			

Note: Final values should be used with caution, Cv plotted at mid point of load increments, Cv corrected to 20°C

Preparation

Index tests	Liquid limit:	N/A	%	Plastic limit:	N/A %
Orientation of the sample				Vertical	
Particle density		assumed		2.65	Mg/m3

Specimen details	Initial	Final	
Diameter	50.09	-	mm
Height	19.91	17.72	mm
Moisture Content	27.0	25.0	%
Bulk density	1.99	2.20	Mg/m3
Dry density	1.56	1.76	Mg/m3
Voids Ratio	0.695	0.508	
Saturation	104	130	%
Average temperature for test	20.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%
Remarks			

Comments:

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 30/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

One Dimensional Consolidation Test

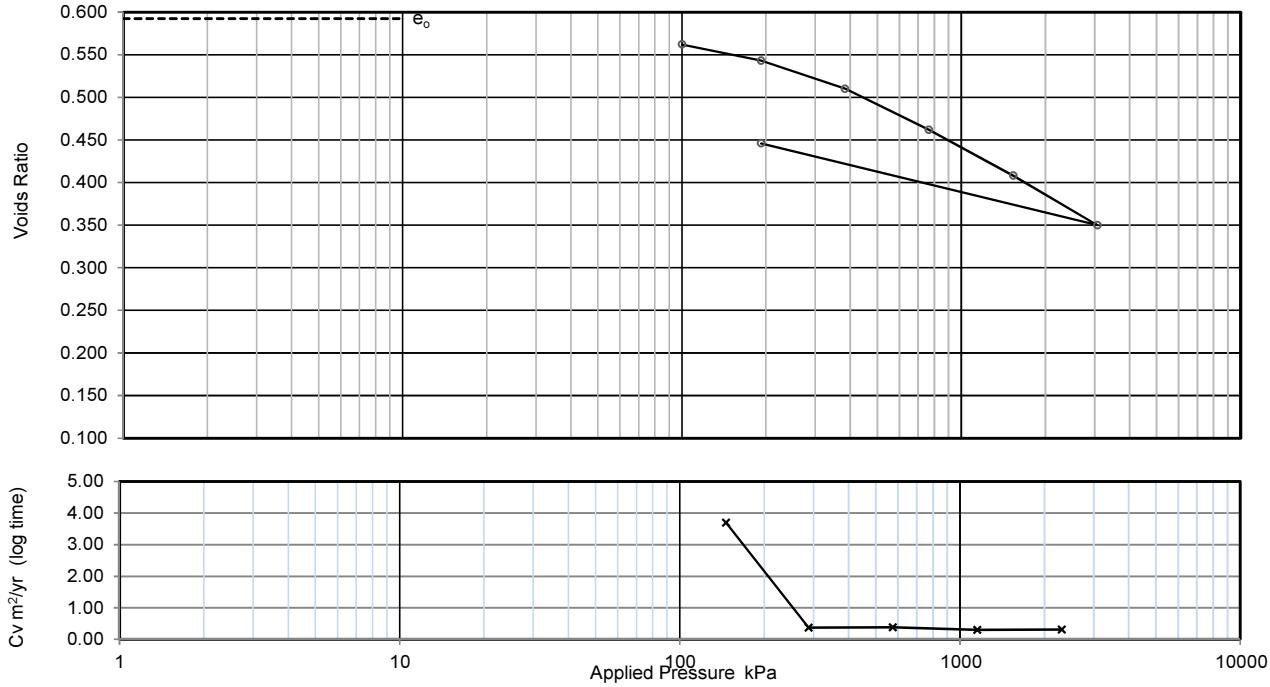
Tested in Accordance with BS1377: Part 5: 1990 Clause 3

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Opus International Consultants (UK) Ltd	Client Reference:	J-M3932.12
Client Address:	1 South House Bond Avenue Milton Keynes MK1 1SW	Job Number:	17-36655
		Date Sampled:	19/12/2016
		Date Received:	04/01/2017
Contact:	Emma Small	Date Tested:	23/01/2017
Site Name:	Meadow School	Sampled By:	Not Given
Site Address:	Not Given		

Test Results

Laboratory Reference:	682185	Depth Top [m]:	9.6
Hole No.:	BH04	Depth Base [m]:	10
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Grey CLAY		



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec
0.0	0.593	-	-	-	-
96	0.562	Swelling			
192	0.543	0.13	3.7	62	0.00061
384	0.510	0.11	0.37	1.7	0.0015
766	0.462	0.083	0.38	1.3	0.0029
1 536	0.408	0.048	0.3	0.44	0.0029
3 072	0.350	0.027	0.31	0.43	0.0032
192	0.446	0.025			

Note: Final values should be used with caution, Cv plotted at mid point of load increments, Cv corrected to 20°C

Preparation

Index tests	Liquid limit:	N/A	%	Plastic limit:	N/A %
Orientation of the sample				Vertical	
Particle density		assumed		2.65	Mg/m3

Specimen details	Initial	Final	
Diameter	50.05	-	mm
Height	19.92	18.08	mm
Moisture Content	25.0	22.0	%
Bulk density	2.08	2.23	Mg/m3
Dry density	1.66	1.83	Mg/m3
Voids Ratio	0.593	0.446	
Saturation	111	130	%
Average temperature for test	20.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%
Remarks			

Comments:

Approved:

Mirosława Pytlik
PL Head of
Geotechnical Section

Date Reported: 30/01/2017

Signed:

Sushil Sharda
Technical Manager
(Geotechnical Division)

for and on behalf of i2 Analytical Ltd

APPENDIX F

Human Health Generic Assessment Criteria

Human Health Generic Screening Assessment

Client	Mace Group Limited
Project Ref	J-M3932.12
Site Name	Meadow High School, Hillingdon
Contaminants	Metals/PAH/TPH/BTEX
End Use Scenario	Residential Without Homegrown Produce
Date	16.01.17
Assessed	LJE
Checked/Approved	RP/NM

Project Name:	Meadow High School, Hillingdon
Project Reference:	J-M3932.12

Metals Screening Suite - Human Health Residential Without Homegrown Produce				TP / BH No	BH03	WS01	WS01	WS02	WS02	WS03	WS03	WS04	WS04	BH01	BH01	BH04	BH04
				Additional Refs		ES2	ES3	ES1	ES2	ES2	ES3	ES1	ES2	ES1	ES2	ES1	ES2
				Depth (m)	0.10	0.50	1.00	0.30	0.90	0.50	1.20	0.20	0.6	0.1	0.5	0.2	0.5
Determinand	**Screening Value**	**Source**	**Units**														
Antimony	550	ATRISKsoil (EIC/AGS/CL:AIRE*)	mg/kg	< 1.0	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	40	C4SL	mg/kg	15	11	10	7.9	11	12	13	5	9.3	12	15	9.6	14
Barium	1300	ATRISKsoil (EIC/AGS/CL:AIRE*)	mg/kg	67	120	90	83	77	58	85	89	76	84	100	88	66
Beryllium	1.7	S4UL	mg/kg	0.58	0.84	0.91	1.1	0.7	0.51	0.96	< 0.06	0.66	0.72	1.3	0.63	0.79
Boron	11000	S4UL	mg/kg	1.3	1.2	7.2	0.6	0.4	0.7	0.5	0.6	1.2	1.4	1.4	3.8	0.6
Cadmium	150	C4SL	mg/kg	< 0.2	0.2	< 0.2	< 0.2	0.4	11	< 0.2	0.3	< 0.2	0.2	< 0.2	0.3	< 0.2
Chromium (hexavalent)	21	C4SL	mg/kg	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (III)	910	S4UL	mg/kg	21	22	26	21	29	23	36	11	25	24	34	27	37
Copper	7100	S4UL	mg/kg	22	69	44	100	13	19	18	13	19	25	22	30	18
Iron*		Opus IHSV	mg/kg	20000	21000	20000	17000	27000	17000	35000	10000	23000	22000	34000	23000	37000
Lead	310	C4SL	mg/kg	52	320	87	38	14	45	15	9	40	72	27	68	17
Mercury	56	S4UL	mg/kg	0.6	< 0.3	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Molybdenum	670	ATRISKsoil (EIC/AGS/CL:AIRE*)	mg/kg	0.95	2.1	1.3	4.3	0.79	0.89	0.91	0.54	0.74	0.95	0.85	0.95	0.52
Nickel	180	S4UL	mg/kg	13	30	21	41	14	15	22	6	15	15	26	16	19
Selenium	430	S4UL	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium	1200	S4UL	mg/kg	31	48	42	45	53	37	53	18	40	40	57	37	52
Zinc	40000	S4UL	mg/kg	48	90	67	32	32	57	48	39	45	65	60	86	74
Cyanide (free)	34	ATRISKsoil	mg/kg	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

Highlighted concentrations have exceeded their generic screening value

*no GAC

Project Name:	Meadow High School, Hillingdon
Project Reference:	J-M3932.12

PAH Screening Suite - Human Health	TP / BH No	BH03	WS01	WS01	WS02	WS02	WS03	WS03	WS04	WS04	BH01	BH01	BH04	BH04
Residential Without Homegrown Produce	Additional Refs		ES2	ES3	ES1	ES2	ES2	ES3	ES1	ES2	ES1	ES2	ES1	ES2
1% SOM	Depth (m)	0.1	0.5	1	0.3	0.9	0.5	1.2	0.2	0.6	0.1	0.5	0.2	0.5

Determinand	Screening Value	Source	Units												
Naphthalene	2.3	S4UL	mg/kg		0.31	0.23	**3.9**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Acenaphthylene	170	S4UL	mg/kg		0.2	< 0.10	0.37	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Acenaphthene	210	S4UL	mg/kg		< 0.10	< 0.10	0.36	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Fluorene	170	S4UL	mg/kg		< 0.10	< 0.10	0.65	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Phenanthrene	95	S4UL	mg/kg		1.8	0.5	4.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.3		< 0.10	
Anthracene	2400	S4UL	mg/kg		0.47	< 0.10	0.82	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Fluoranthene	280	S4UL	mg/kg		4.1	0.95	6.3	< 0.10	0.54	< 0.10	< 0.10	< 0.10	0.76		< 0.10	
Pyrene	620	S4UL	mg/kg		4.7	0.94	7.3	< 0.10	0.55	< 0.10	< 0.10	< 0.10	0.65		< 0.10	
Benzo(a)anthracene	7.2	S4UL	mg/kg		2.1	0.42	2	< 0.10	0.4	< 0.10	< 0.10	< 0.10	0.41		< 0.10	
Chrysene	15	S4UL	mg/kg		2	0.37	2.3	< 0.05	0.4	< 0.05	< 0.05	< 0.05	0.35		< 0.05	
Benzo(b)fluoranthene	2.6	S4UL	mg/kg		**4.1**	0.61	**3.2**	< 0.10	0.48	< 0.10	< 0.10	< 0.10	0.4		< 0.10	
Benzo(k)fluoranthene	77	S4UL	mg/kg		2.5	0.31	2.2	< 0.10	0.44	< 0.10	< 0.10	< 0.10	0.22		< 0.10	
Benzo(a)pyrene	5.0	S4UL	mg/kg		**5**	0.58	3.8	< 0.10	0.51	< 0.10	< 0.10	< 0.10	0.36		< 0.10	
Indeno(1,2,3-cd)pyrene	27	S4UL	mg/kg		3.9	0.54	3.2	< 0.10	0.45	< 0.10	< 0.10	< 0.10	0.27		< 0.10	
Dibenz(a,h)anthracene	0.24	S4UL	mg/kg		**0.43**	< 0.10	**0.34**	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Benzo(ghi)perylene	320	S4UL	mg/kg		4.9	0.68	4.5	< 0.05	0.48	< 0.05	< 0.05	< 0.05	0.32		< 0.05	
Total Phenols (monohydric)	120	S4UL	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Highlighted concentrations have exceeded their generic screening value

Project Name:	Meadow High School, Hillingdon
Project Reference:	J-M3932.12

TPH Screening Suite - Human Health Residential Without Homegrown Produce 1% SOM			TP / BH No	BH03	WS01	WS01	WS02	WS02	WS03	WS03	WS04	WS04	BH01	BH01	BH04	BH04
			Additional Refs		ES2	ES3	ES1	ES2	ES2	ES3	ES1	ES2	ES1	ES2	ES1	ES2
			Depth (m)	0.1	0.5	1	0.3	0.9	0.5	1.2	0.2	0.6	0.1	0.5	0.2	0.5
Determinand	**Screening Value**	**Source**	**Units**													
Aliphatic >C5 - C6	42	S4UL	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic >C6 - C8	100	S4UL	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic >C8 - C10	27	S4UL	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic >C10 - C12	130	S4UL	mg/kg	< 1.0	1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic >C12 - C16	1100	S4UL	mg/kg	< 2.0	8.5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	5.3	< 2.0	< 2.0	< 2.0	2	< 2.0
Aliphatic >C16 - C21	65000	S4UL	mg/kg	< 8.0	26	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	17	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Aliphatic >C21 - C34	65000	S4UL	mg/kg	< 8.0	130	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	90	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Aromatic >C5 - C7	0.2	C4SL Benzene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic >C7 - C8	130	C4SL Toluene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic >C8 - C10	34	S4UL	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic >C10 - C12	74	S4UL	mg/kg	< 1.0	< 1.0	< 1.0	4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.7
Aromatic >C12 - C16	140	S4UL	mg/kg	< 2.0	7.3	< 2.0	6.4	< 2.0	3.3	< 2.0	7.1	< 2.0	< 2.0	< 2.0	3.3	5.9
Aromatic >C16 - C21	260	S4UL	mg/kg	< 10	41	< 10	19	< 10	< 10	< 10	26	< 10	< 10	< 10	15	< 10
Aromatic >C21 - C35	1100	S4UL	mg/kg	< 10	240	17	24	< 10	15	< 10	190	< 10	< 10	< 10	17	< 10

Highlighted concentrations have exceeded their generic screening value

Project Name:	**Meadow High School, Hillingdon**
Project Reference:	**J-M3932.12**

BTEX Screening Suite - Human Health			**TP / BH No**	BH03	WS01	WS01	WS02	WS02	WS03	WS03	WS04	WS04	BH01	BH01	BH04	BH04
Residential Without Homegrown Produce			**Additional Refs**		ES2	ES3	ES1	ES2	ES2	ES3	ES1	ES2	ES1	ES2	ES1	ES2
1% SOM			**Depth (m)**	0.1	0.5	1	0.3	0.9	0.5	1.2	0.2	0.6	0.1	0.5	0.2	0.5
Determinand	**Screening Value**	**Source**	**Units**													
Benzene	0.2	C4SL	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	130	S4UL	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	47	S4UL	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	59	S4UL	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	60	S4UL	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	49	EIC/AGX/CL:AIRE	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Highlighted concentrations have exceeded their generic screening value

APPENDIX G

Human Health Statistical Analysis Results

Client/client ref	Mace
Project ref	J-M3932.12
Site ref	Meadow High School
Data description	Made Ground
Contaminant(s)	Lead
Test scenario	Planning: is true mean lower than critical concentration (μ < Cc)?
Date	16.01.17
User details	Opus International Consultants (UK) Ltd

Statistics calculator (version 1)

Input data

This spreadsheet has been produced based on the document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration (CIEH/CL:AIRE, 2008)'. Users of this spreadsheet should always refer to this guidance, the User Manual and to relevant guidance on UK legislation and policy, in order to understand how the procedure should be applied in an appropriate context.

Go to summary

Data sheet

Project details

Easting	Northing	Sample ID	Lead															
	WS01	0.5	320															
	WS01	1	87															
	WS02	0.3	38															
	WS02	0.9	14															
	WS03	0.5	45															
	WS04	0.2	9															
	WS04	0.6	40															

Client/client ref: Mace
Project ref: J-M3932.12
Site ref: Meadow High School
Data description: Made Ground
Contaminant(s): Lead
Test scenario: Planning
Date: 16.01.17
User details: Opus International Consultants

	Lead															
Critical concentration, C_c	**310**															
Notes																
Sample size, n	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample mean, $\bar{x}$	79	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Standard deviation, s	109.261155															
Number of non-detects	0															
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?	Yes															
Distribution	Non-normal															
Statistical approach	Auto: Chebychev	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto

Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?				**Evidence level required:**		**95%**	Use Normal distribution to test for outliers								
t statistic, t_0 (or k_0)	-5.593649021															
Upper confidence limit (on true mean concentration, μ)	259.00873															
Evidence level	**97%**															
Base decision on:	evidence level															
Result	**μ < Cc**															

Client/client ref	Mace
Project ref	J-M3932.12
Site ref	Meadow High School
Data description	Made Ground
Contaminant(s)	PAHs
Test scenario	Planning: is true mean lower than critical concentration (μ < Cc)?
Date	17.01.17
User details	Opus International Consultants (UK) Ltd

Statistics calculator (version 1)

Input data

This spreadsheet has been produced based on the document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration (CIEH/CL:AIRE, 2008)'. Users of this spreadsheet should always refer to this guidance, the User Manual and to relevant guidance on UK legislation and policy, in order to understand how the procedure should be applied in an appropriate context.

Go to summary

Data sheet

Project details

Easting	Northing	Sample ID	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	WS01	0.5	0.31	0.2	0.1	0.1	1.8	0.47	4.1	4.7	2.1	2	4.1	2.5	5	3.9	0.43	4.9
	WS01	1	0.23	0.1	0.1	0.1	0.5	0.1	0.95	0.94	0.42	0.37	0.61	0.31	0.58	0.54	0.1	0.68
	WS02	0.3	3.9	0.37	0.36	0.65	4.1	0.82	6.3	7.3	2	2.3	3.2	2.2	3.8	3.2	0.34	4.5
	WS02	0.9	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.05
	WS03	0.5	0.05	0.1	0.1	0.1	0.1	0.1	0.54	0.55	0.4	0.4	0.48	0.44	0.51	0.45	0.1	0.48
	WS04	0.2	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.05
	WS04	0.6	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.05

Client/client ref: Mace
Project ref: J-M3932.05
Site ref: Claverham School
Data description: Made Ground
Contaminant(s): PAHs
Test scenario: Planning
Date: 11.01.17
User details: Opus International Consultants

	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
Critical concentration, C_c	**2.3**	**2900**	**3000**	**2800**	**1300**	**3100**	**1500**	**3700**	**11**	**30**	**3.9**	**110**	**5.3**	**45**	**0.31**	**360**
Notes																
Sample size, n	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Sample mean, $\bar{x}$	0.66285714	0.15285714	0.13714286	0.17857143	0.97142857	0.25571429	1.74142857	1.97	0.74571429	0.74571429	1.24142857	0.82142857	1.45571429	1.19857143	0.18142857	1.53
Standard deviation, s	1.43139459	0.10274796	0.09827076	0.20788046	1.51295989	0.28447947	2.46630918	2.87024389	0.90219837	0.97483088	1.67801896	1.05565822	2.05072229	1.62880763	0.14147185	2.1822771
Number of non-detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No
Distribution	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal
Statistical approach	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev
Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?				**Evidence level required:**		**95%**	Use Normal distribution to test for outliers								
t statistic, t_0 (or k_0)	-3.026050879	-74670.82106	-80765.53846	-35634.09091	-2271.644196	-28828.62646	-1607.267904	-3408.793151	-30.07131322	-79.39794136	-4.191799392	-273.6296104	-4.959727617	-71.14878709	-2.404492583	-434.6022204
Upper confidence limit (on true mean concentration, μ)	3.02109253	0.32213532	0.29904482	0.52105635	3.46404351	0.72439676	5.80469499	6.69875248	2.23209417	2.35175687	4.00597981	2.56063494	4.83429759	3.88204656	0.41450472	5.12532103
Evidence level	**90%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**95%**	**100%**	**96%**	**100%**	**85%**	**100%**
Base decision on:	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level
Result	**μ ≈≥ Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ ≈≥ Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ ≈≥ Cc**	**μ < Cc**

APPENDIX H

Gas Monitoring Results

Client	Mace Group Ltd
Site	Meadow Special School
Our Ref	J-M3932.12
Gas Probe Ref	HDG5-GA5059
Date	04/01/2017
Weather	Cloudy
Atmospheric Pressure (mb)	Start 1016 End 1016

Drawn: ES
Checked: RP
Approved: NM

Gas Monitoring Point	Methane Peak/Steady (% by volume)	Carbon Dioxide Peak/Steady (% by volume)	Oxygen Minimum/Steady (% by volume)	Hydrogen Sulphide Peak/Steady (ppm)	Carbon Monoxide Peak/Steady (ppm)	Flow Peak/Steady (l/h)	Depth to Groundwater (m)	Comments
Start	<0.1	<0.1	20.0	<1	<1	*	*	
BH02	<0.1	0.4	19.7	<1	<1	<0.1	1.43	
	(<0.1)	(0.4)	(19.7)	(<1)	(<1)	(<0.1)		
BH04	<0.1	1.6	17.2	<1	<1	<0.1	1.64	
	(<0.1)	(1.5)	(17.2)	(<1)	(<1)	(<0.1)		
WS01	<0.1	0.3	18.4	<1	<1	10.2	0.55	
	(<0.1)	(0.3)	(18.4)	(<1)	(<1)	(<0.1)		
WS04	<0.1	1.7	5.7	<1	<1	<0.1	NGW	
	(<0.1)	(1.7)	(5.7)	(<1)	(<1)	(<0.1)		
End	<0.1	<0.1	20.1	0	0	*	*	

KEY

Text shown in Bold and Italic indicates either:
a) Carbon Dioxide equal to or above 5.00% by volume or
b) Methane equal to or above 1.00% by volume

Notes

UW	indicates that monitoring point was under water
*	indicates that no measurement was taken
NA	indicates that data was unavailable
NGW	indicates no groundwater was present in standpipe
( )	steady reading taken approximately 1 minute after initial peak reading

Client	Mace Group Ltd
Site	Meadow Special School
Our Ref	J-M3932.12
Gas Probe Ref	HDG5-GA5059
Date	23/01/2017
Weather	Cloudy
Atmospheric Pressure (mb)	Start 1020 / End 1019

Drawn: EDH
Checked: RP
Approved: NM

Gas Monitoring Point	Methane Peak/Steady (% by volume)	Carbon Dioxide Peak/Steady (% by volume)	Oxygen Minimum/Steady (% by volume)	Hydrogen Sulphide Peak/Steady (ppm)	Carbon Monoxide Peak/Steady (ppm)	Flow Peak/Steady (l/h)	Depth to Groundwater (m)	Comments
Start	<0.1	<0.1	20.0	<1	<1	*	*	
BH02	<0.1	<0.1	18.9	<1	<1	-5.0	1.53	
	(<0.1)	(<0.1)	(19.5)	(<1)	(<1)	(<0.1)		
BH04	<0.1	2.3	14.7	<1	<1	<0.1	1.63	
	(<0.1)	(2.3)	(14.7)	(<1)	(<1)	(<0.1)		
WS01	<0.1	0.7	18.1	<1	<1	<0.1	0.82	
	(<0.1)	(0.7)	(18.1)	(<1)	(<1)	(<0.1)		
WS04	<0.1	1.7	0.6	<1	<1	<0.1	1.06	
	(<0.1)	(1.7)	(0.6)	(<1)	(<1)	(<0.1)		
End	<0.1	<0.1	19.8	0	0	*	*	

KEY

Text shown in Bold and Italic indicates either:
a) Carbon Dioxide equal to or above 5.00% by volume or
b) Methane equal to or above 1.00% by volume

Notes

UW	indicates that monitoring point was under water
*	indicates that no measurement was taken
NA	indicates that data was unavailable
NGW	indicates no groundwater was present in standpipe
( )	steady reading taken approximately 1 minute after initial peak reading

Client	Mace Group Ltd
Site	Meadow Special School
Our Ref	J-M3932.12
Gas Probe Ref	HDG5-GA5059
Date	27/01/2017
Weather	Cloudy with sunny spells
Atmospheric Pressure (mb)	Start 1002 / End 1001

Drawn: EDH
Checked: RP
Approved: NM

Gas Monitoring Point	Methane Peak/Steady (% by volume)	Carbon Dioxide Peak/Steady (% by volume)	Oxygen Minimum/Steady (% by volume)	Hydrogen Sulphide Peak/Steady (ppm)	Carbon Monoxide Peak/Steady (ppm)	Flow Peak/Steady (l/h)	Depth to Groundwater (m)	Comments
Start	<0.1	<0.1	20.1	<1	<1	*	*	
BH02	<0.1	1.7	18.3	<1	<1	-5.0	1.61	
	(<0.1)	(0.2)	(19.8)	(<1)	(<1)	(<0.1)		
BH04	<0.1	2.2	14.8	<1	<1	<0.1	1.69	
	(<0.1)	(2.2)	(14.8)	(<1)	(<1)	(<0.1)		
WS01	<0.1	0.8	17.4	<1	<1	<0.1	0.91	
	(<0.1)	(0.8)	(17.5)	(<1)	(<1)	(<0.1)		
WS04	<0.1	2.2	<0.1	<1	<1	<0.1	1.18	
	(<0.1)	(2.2)	(<0.1)	(<1)	(<1)	(<0.1)		
End	<0.1	<0.1	19.8	0	0	*	*	

KEY

Text shown in Bold and Italic indicates either:
a) Carbon Dioxide equal to or above 5.00% by volume or
b) Methane equal to or above 1.00% by volume

Notes

UW	indicates that monitoring point was under water
*	indicates that no measurement was taken
NA	indicates that data was unavailable
NGW	indicates no groundwater was present in standpipe
( )	steady reading taken approximately 1 minute after initial peak reading

APPENDIX I

Conditions and Limitations

OPUS INTERNATIONAL CONSULTANTS (UK) LTD

SITE INVESTIGATIONS

CONDITIONS AND LIMITATIONS

1. The report is confidential to the clients stated in the report and has been prepared to their instructions for their own purposes and it is not permitted to disclose this report to other parties (except NHBC, Local Authority, the Client's own Solicitors and Professional Advisers) without the prior consent of Opus International Consultants (UK) Ltd.

2. The copyright of this report remains the property of Opus International Consultants (UK) Ltd.

3. No liability for the contents of this report is accepted to any parties other than the client stated in the report. No parties other than the client stated in the report should rely upon this report.

4. Attention is drawn to the fact that, whilst every effort is made to ensure the accuracy of the data and any conclusions derived from it, the possibility exists of variations in ground conditions around and between trial pits. No liability can be accepted for such variations or for agreed sampling rates/trial hole frequency.

5. Unless specifically stated otherwise in the report, any recommendations for works given in the report are outline only and are to be confirmed or modified as appropriate at detailed design stage.

6. No liability can be accepted for any services or other below ground items unless clearly shown on a plan to us in advance of any site works.

7. In accepting instructions to carry out site investigations it is assumed by us that our clients have all necessary permissions from existing owners and/or other authorities for such works to proceed. No liability is accepted for any claims arising as a result of anything contrary to this.

8. It is also assumed that a suitable clear access to the site is available for the required equipment and plant.

9. All holes are normally back-filled with excavated material compacted by its own weight only. Any excess spoil will be spread evenly around the direct area of excavation.

10. No chemical analysis of samples will be carried out unless specifically stated otherwise in the text of this report. Where fill, disturbed soil or an unfavourable earlier land usage is identified by the investigation the client is advised to have chemical analysis carried out subsequently. In any event no liability is accepted in respect of pollution. Similarly for radon and naturally occurring chemicals and gases.

11. Unless stated otherwise any desk study into the site history will be limited to information readily available at the Local Reference Library.

12. Under the Construction (Design & Management) Regulations latest edition, the Client has obligations for ensuring Health and Safety arising from any construction work. If it is proposed to proceed with construction work based upon information or recommendations contained in this report, these regulations probably apply. Further details of any issues arising from our report or the Clients obligations generally are available on request.

13. Unless dealt with more specifically above the Association of Consulting Engineers Conditions of Engagement, Short Form Agreement 2002 applies.

14. Laboratory testing where carried out is usually undertaken by sub-contract laboratories. No liability is accepted arising from any errors or omissions on the part of such laboratories.

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Independent Gas Verification & Validation Services

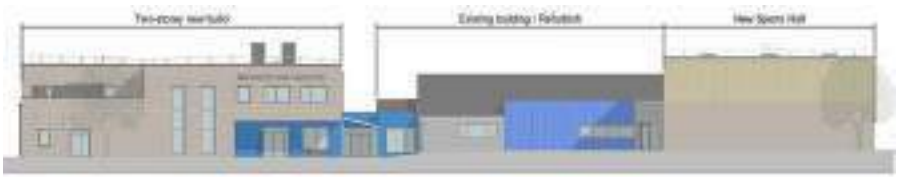
Project Design & Specification
Site Inspection & Reporting

CARTER PARTNERSHIP LIMITED

Verification & Strategy Plan

Project: G201101

Project Name: Meadow High Sch & Sports hall



CPL have prepared this report in accordance with the instructions of the main contractor under the terms of its appointment for the Verification Plan & Validation Report.

This report is limited to the information provided by the main contractor, its content is based on the information provided, the Geotechnical Report referenced and the design work already produced for the gas protection system by the manufacturer has been adopted to provide a strategy of inspection to monitor the installation throughout the build process.

CPL
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BERKS, RG31 5AH
E: INFO@CPL-UK.NET

It should be noted whatever plan of inspection is in place, it is incumbent of the site management to ensure installation is properly protected and that any on-coming trades are made aware of need to avoid damage or to report should damage occur, this should form part of the site induction.
It is advisable and good practise for CPL to meet with the nominated installer (Groundworker) before installation begins to run through the design & gas systems involved, to understand the level of experience & competence of the persons actually installing.

Gas Regime
The following has been extracted from the Geotechnical Report:
Project Name: Proposed Redevelopment Meadow High School, Uxbridge
Project Ref: STS5093 Rev01
Compiled by Soiltechnics Dated: November 2020

The site is located within a predominantly residential area and accessed via Royal Lane (east boundary).
The ground to be constructed upon is in the main made ground between 0.5to1.35m in depth.
The proposed construction is of a new sports hall, library, classrooms, assembly hall & entrance lobby.
Exploratory holes were used to monitor ground conditions, groundwater was encountered at an average of 2.8to3.0mtrs.
In-situ gas monitoring results indicated levels of Carbon Dioxide with a calculated gas screening value of 0.24GSV the report identified the site to have a Characteristic Situation CS2.

Based on the ground floor layout proposed for the building it will comprise of a mix of room sizes, using this information and referring to BS8485:2015 Table 3 the buildings would be identified as a Type B Building and a Sport Hall Type C Building.

BS8485:2015 Table 4 provides a minimum score of 3.5 points for a Type B building in a CS2 situation and 2.5 points for a Type C building.

The proposed design/construction will include
1.5 point = Cast in-situ RC suspended slab well reinforced to control cracking
2.0 point = Gas Resistant Membrane.
Giving a total 3.5 points as defined in BS8485:2015.

Building Design
Type B- Classrooms - Foundations for the structure involve and various pad foundations between 1.0to1.8m deep perimeter strip foundation 1.0to2.2m deep. The pad foundations supporting steel columns which form the basis for the structure. RC Concrete Lift pit within the slab.
Slab 275mm thick RC slab with 550mm edge thickening

Type C – Sports Hall – Foundations for the structure involve interconnecting strip foundations with slab battered to meet surrounding foundations. The strip foundations supporting steel columns which form the basis for the structure.

Gas Barrier System
1x Lift Pit wrapped using self-adhesive gas barrier
Pad Foundations & Perimeter Strip Footings – Continuity using liquid gas membrane.
Membrane onto RC Slab poured in three stages
See Solco Design Details & Product Technical Data Sheets Attached.

Inspection Regime
Based on the information listed and with reference to CIRIA Report C735:2014 Table A2 the project is a low risk (CS2), so the installation validation with be a combination of site visits by independent verification (pick & probe) by CPL & report via photographic evidence provided by the site manager/engineer. A Certificate of Conformance will be issued at each stage inspected, this will identify location of installation, photographic evidence will be included in the final report. Photographic evidence may be used to identify areas requiring immediate rectification or areas of concern
During inspection attention should be made to overall site conditions, management, build programme & weather conditions which all have an effect on the finished installation.
It is expected that the gas protection system will be installed by the ground works contractor, whom do not have an NVQ2 qualified member.

Points of Inspection

1. Foundations - Lift Pit walls & base, Steel columns, Pad & strip footing
2. Slab Membrane + (Pipe penetrations)
3. Slab Edge Detail
4. Perimeter detail (DPM + GR Cavity Tray).

Bench Mark Areas Requiring Site Attendance for Validation

1. Pad Foundation- Substrate condition & LGB application
2. 1x wrapped foundation base membrane installation (Lift Pits)
3. Slab Membrane (Perimeter detail & pipe penetrations & internal foundation detail-
4. Slab membrane should be validated after steel reinforcing installation & just before concrete placement.

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Some Bench marks areas can be completed on the same day of visit as agreed with site according to program.
Following satisfactory bench mark areas involving a repeat detail (e.g. steel column detail) can be validated via photographic evidence provided by suitably competent site member (site manager/engineer) to CPL for comment & validation.
Work should only proceed once Validator has provided comment on each stage of inspection.

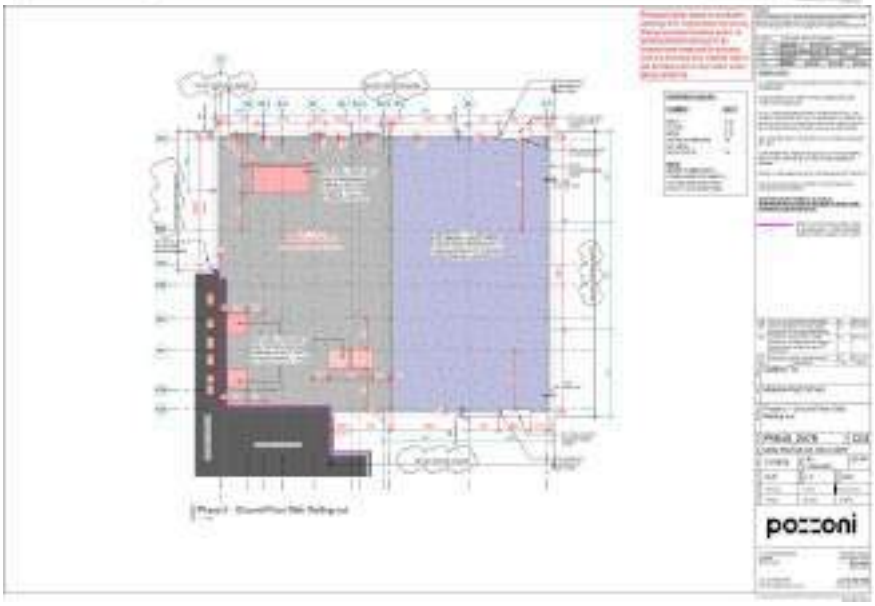
Inspections will be recorded as either Pass, In Progress or Fail for which a Certificate of Conformance will be issued.
Pass = In Accordance with project design & manufacturer technical information
In Progress = Area in complete & requiring further validation.
Fail = Not in accordance with project design, requiring rectification & requiring further validation.
Depending on the level of failure it may be required to revisit an area for a second inspection, if repairs (eg.slab membrane punctures) can be carried out during an inspection whilst CPL are still present then this would be acceptable.
Areas of installation should remain un-covered until it is considered a Pass and be properly protected by site management.
Note: The slab detailing will have a involve increased attention, hence whole slab is inspected via CPL site attendance.

In terms of the risk-based approach
Complexity of Design = simple to complex (Amber/Red)
Note: Risks increases as:
Internal foundation detail increases detailing through slab membrane.
Installation Work Force = Non specialist (Groundworker)(Red)
Number of Plots/Building = 2(Green)
Gas Regime = Low Risk(Green)

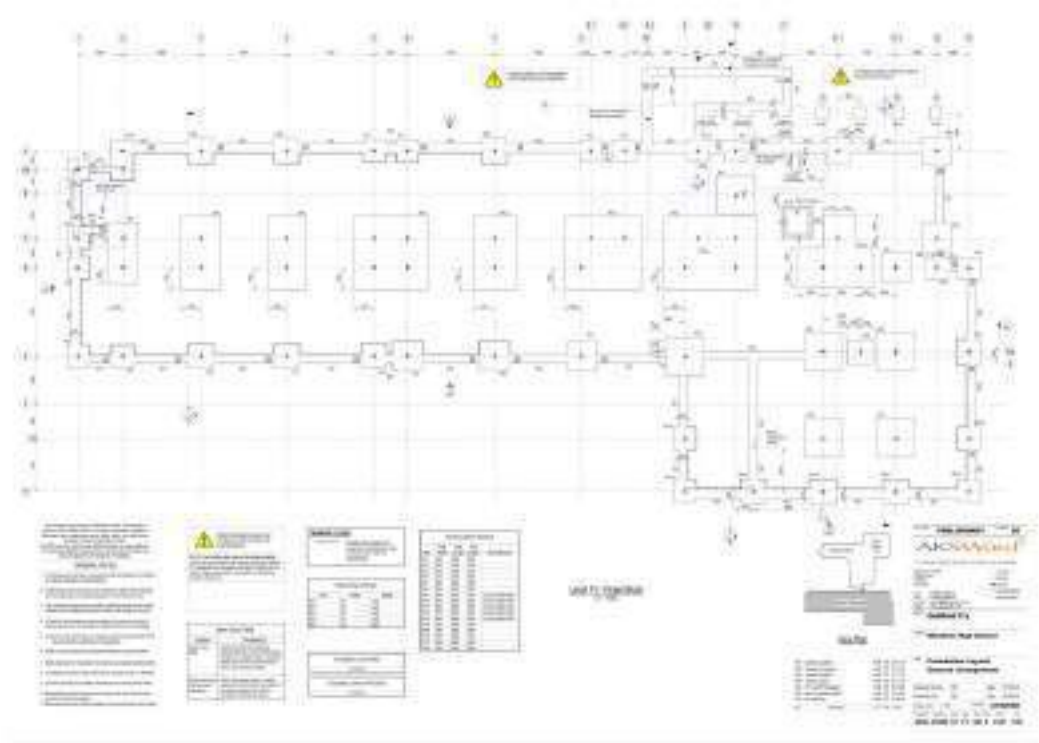
Verification/Validator Competence
CPL (Ray Carter) Ray Carter has been specifying, designing and inspecting membrane installations for over 25 years.
Has passed the ABBE Level 4 NVQ Diploma in Verification of Ground Gas Protection Systems.
He has been employed by a number of the leading UK manufacturers of gas & waterproofing systems (Ruberoid, RIW & CETCO), during this time has developed a full understanding in the issues and risks involved with installation on both residential and large industrial sites.
Ray Carter is also a Certified Surveyor in Structural Waterproofing (CSSW) and a member of the Institute for Concrete Technology.
For Continued Professional Development he can access both British Verification Membership (BVC), Property Care Association (PCA) membership and CLAIRE.

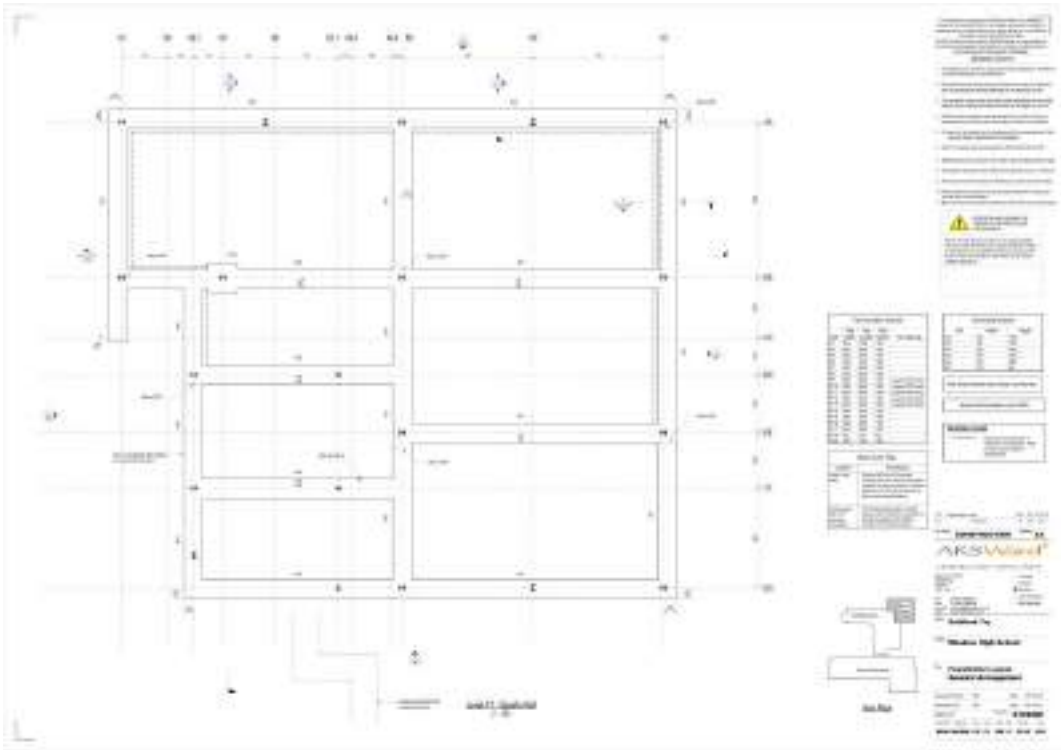
Site Plan

Ground Slab Layout: General Classrooms & Sports Hall



Foundation Plan: Classrooms & Sports Hall





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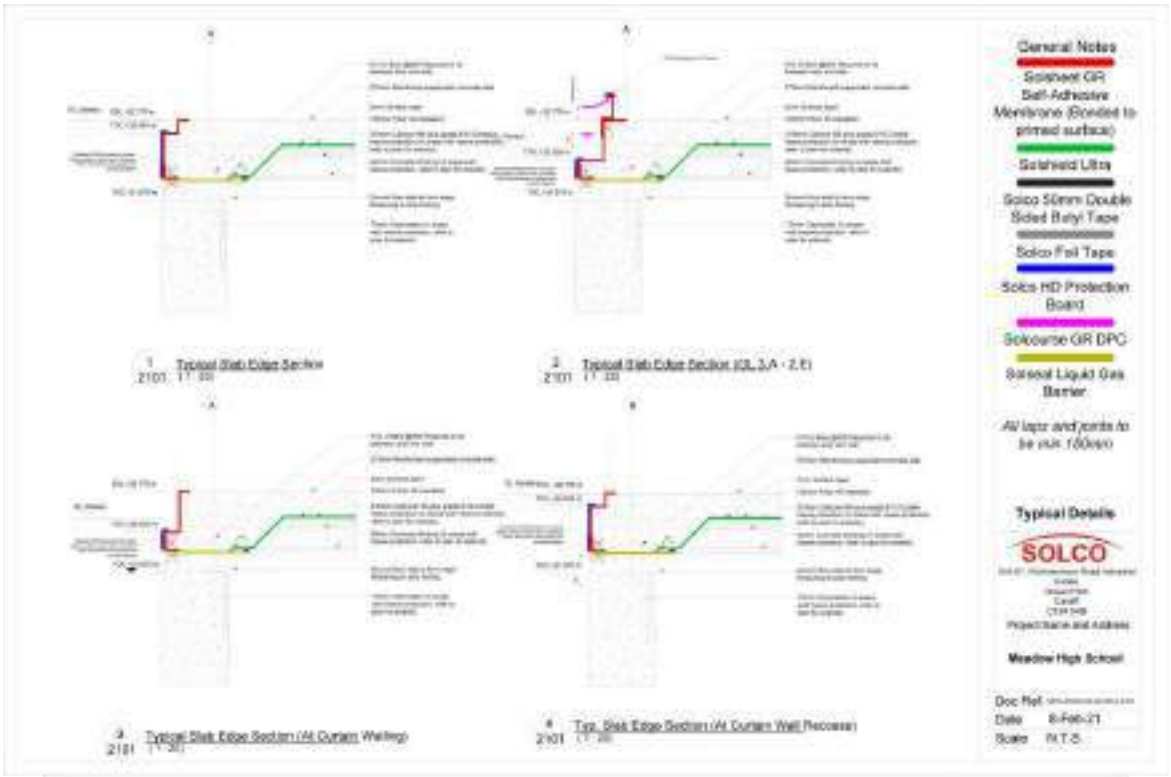
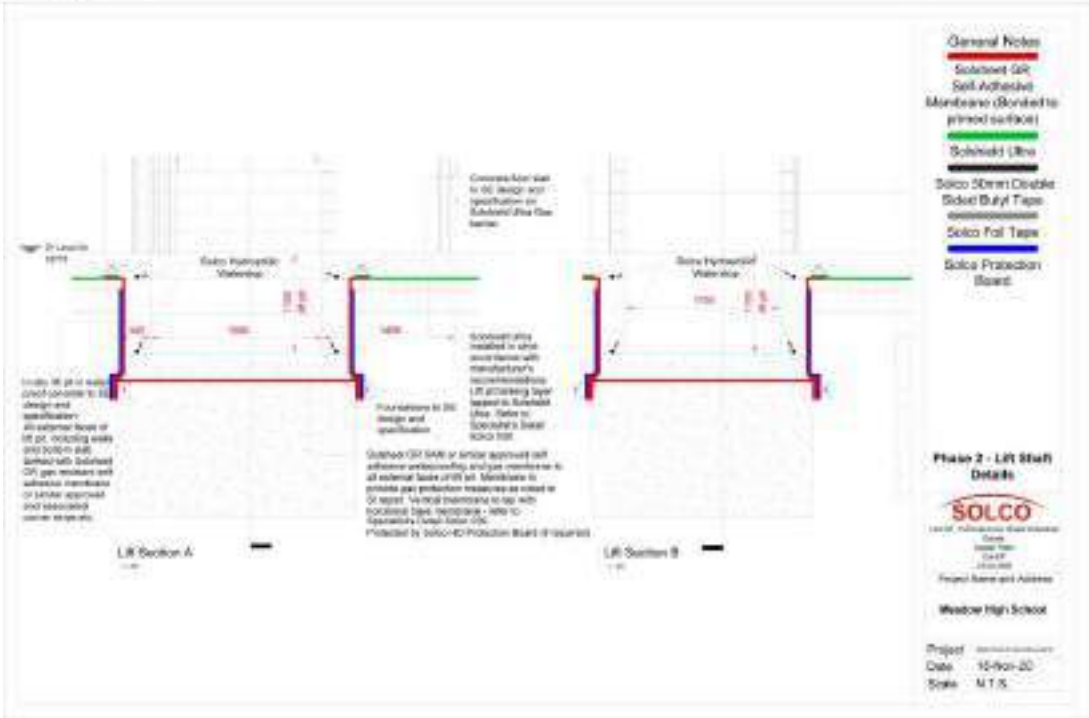
Project Details





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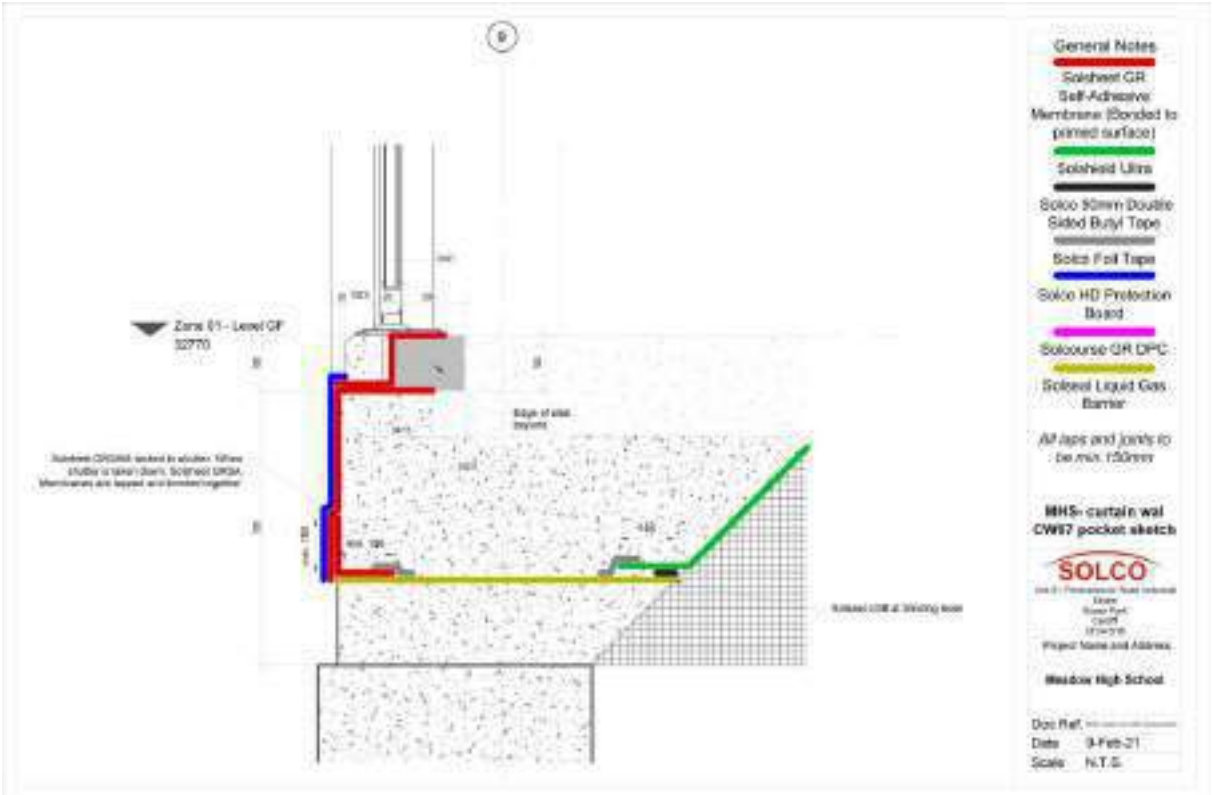
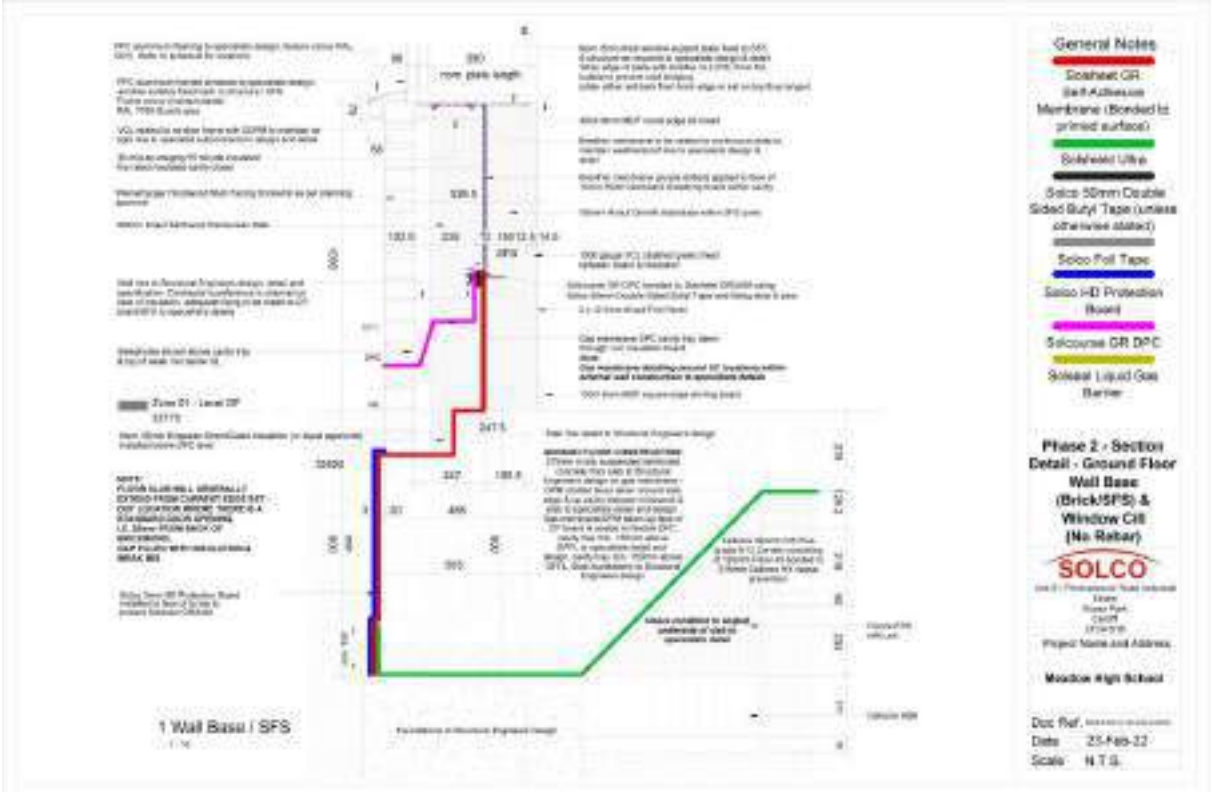
Independent Gas Verification & Validation Services

Project Design & Specification
Site Inspection & Reporting

CARTER PARTNERSHIP LIMITED





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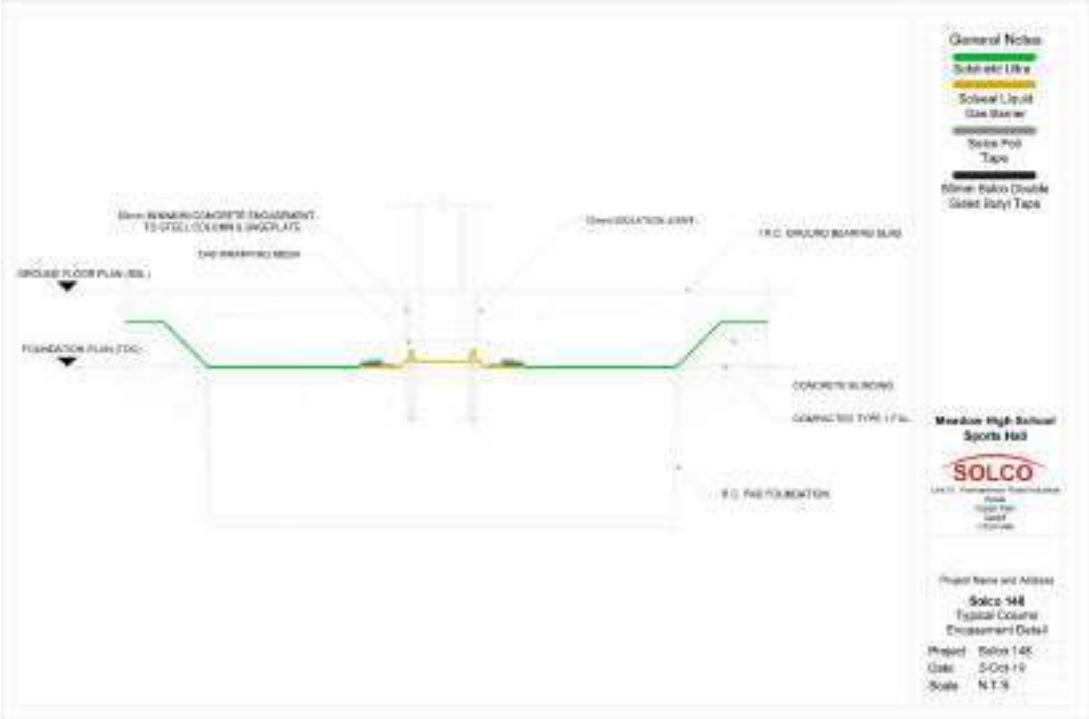

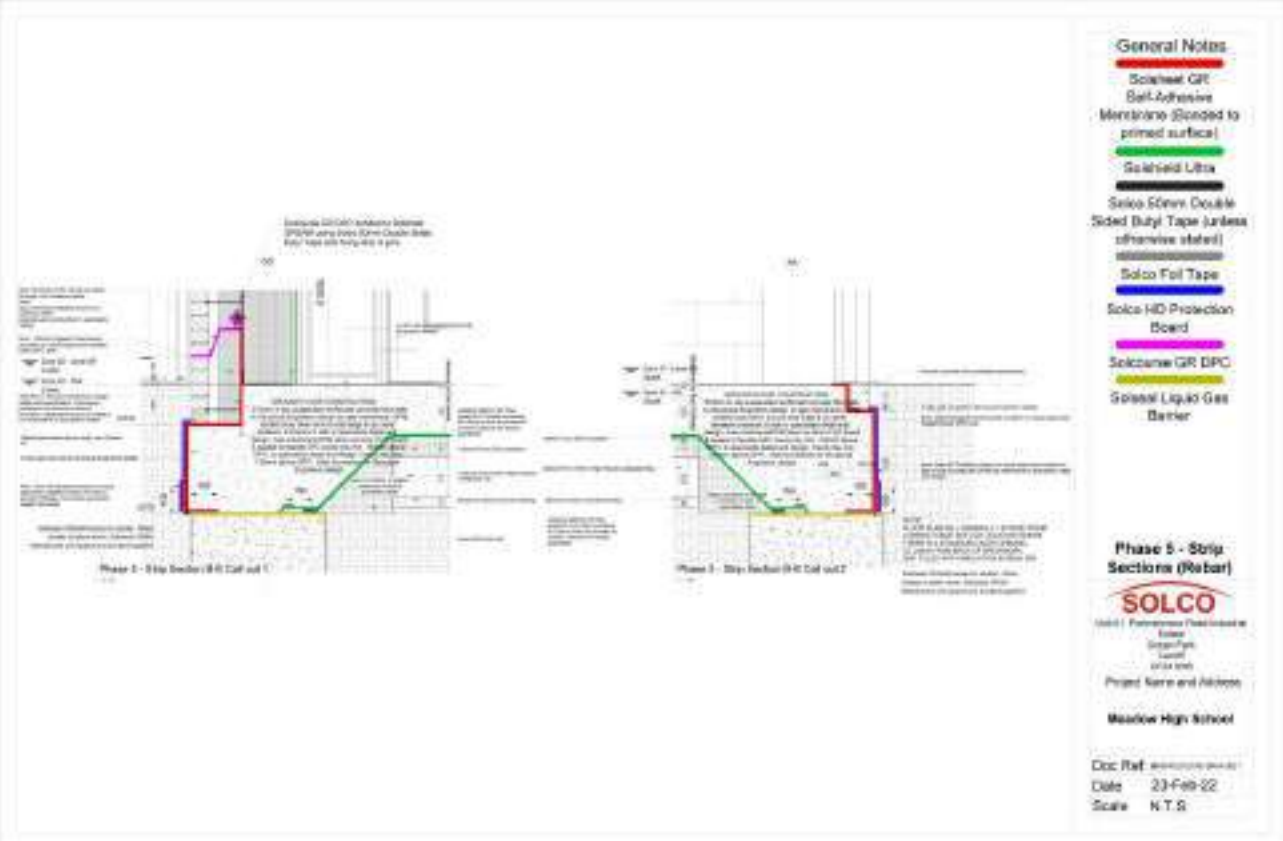

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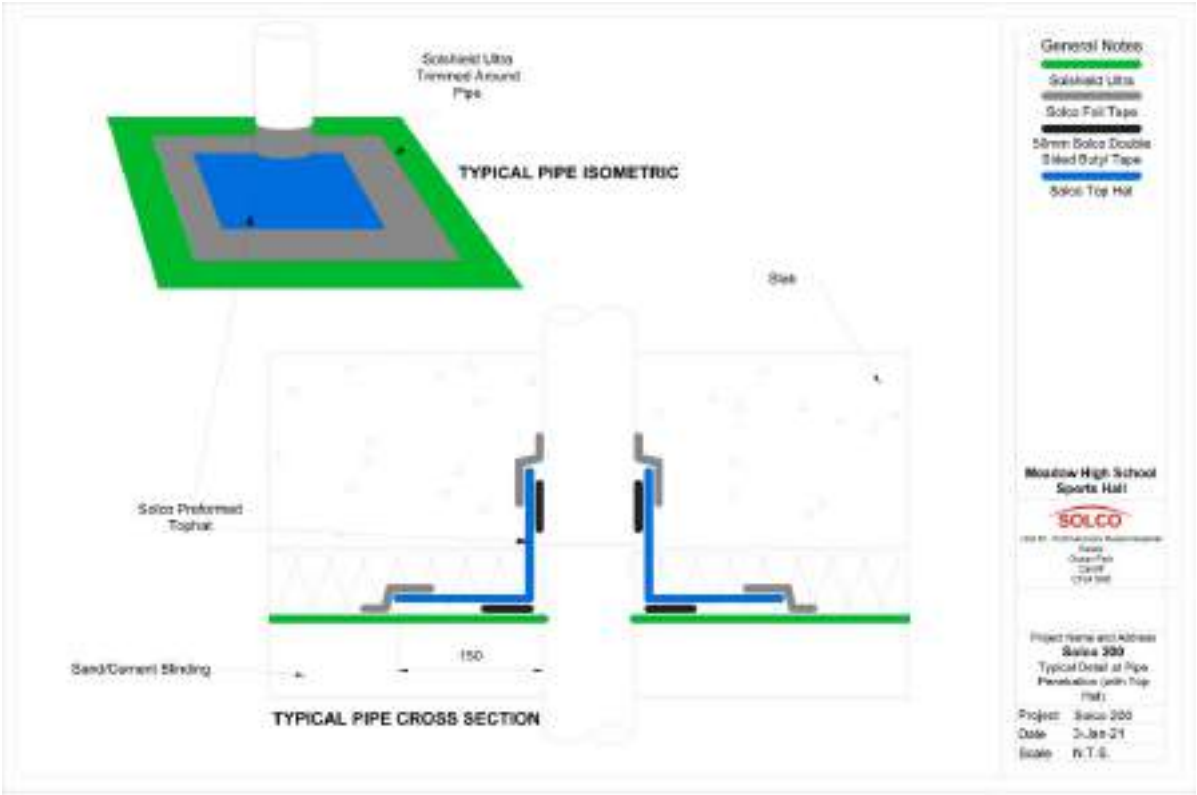

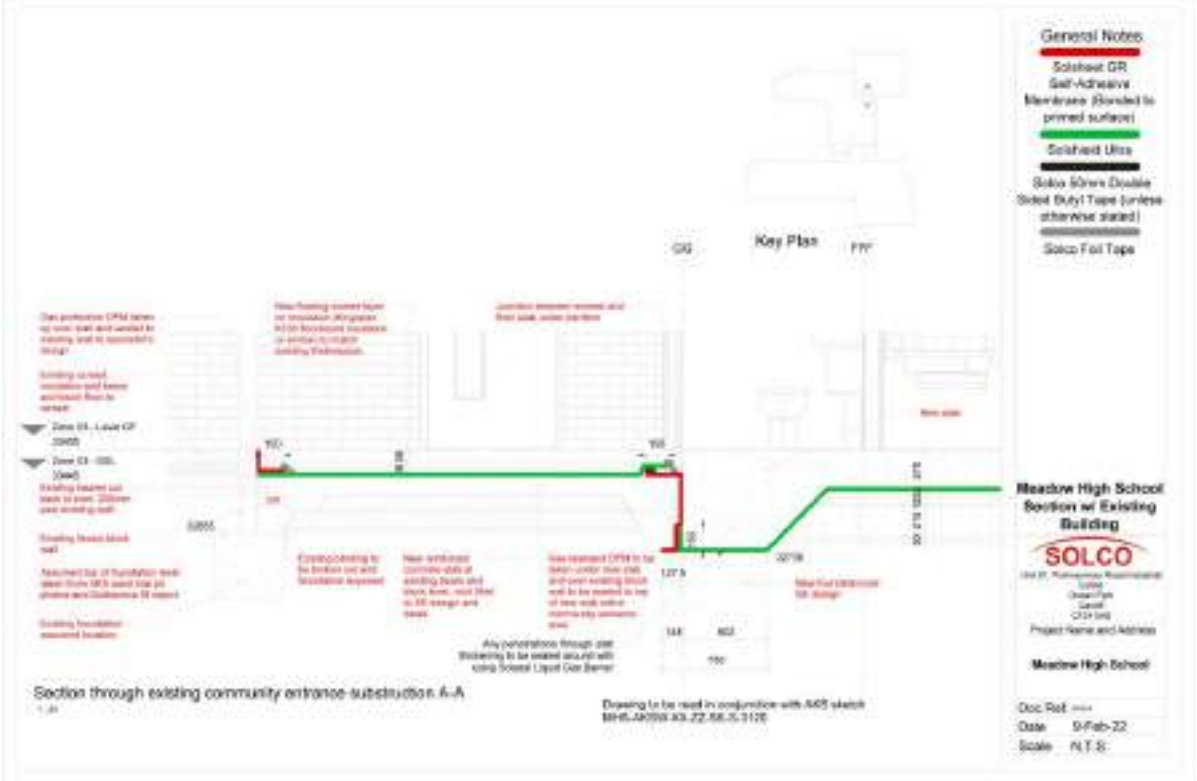

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Yours Sincerely

Ray Carter
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M:07961-062069

Certificate of Achievement

(Full Award)

This is to certify that

Ray Carter

has been assessed as meeting the required level of competence for all the units necessary to achieve the full award

ABBE Level 4 NVQ Diploma in Verification of Ground Gas Protection Systems

603/3266/9

Units achieved: Mandatory Units K/617/0687, M/617/0688, K/617/0690, M/617/0691, A/617/0693, F/617/0694, J/617/0695

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Signed :

Professor Julian Beer, Chair of ABBE Board

Date: 13/10/2022

Candidate Registration No : 0000039210 Certificate Issue No : 152765