Soil Consultants
Ground Investigation
Geotechnical Analysis
Contamination Assessment

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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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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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	
				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	0.60		0.80	32.43		Soft, locally firm, brown/orangish brown/grey mottled slightly gravelly silty CLAY with occasional black staining. Gravel subangular fine flint	
	D	0.90						
	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

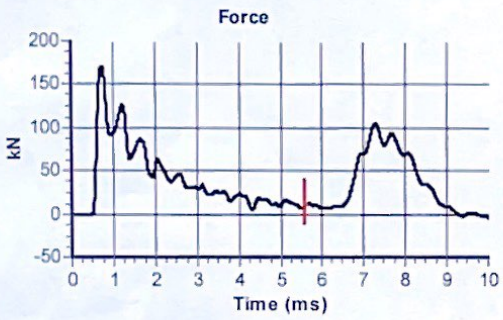
Instrumented Rod Data

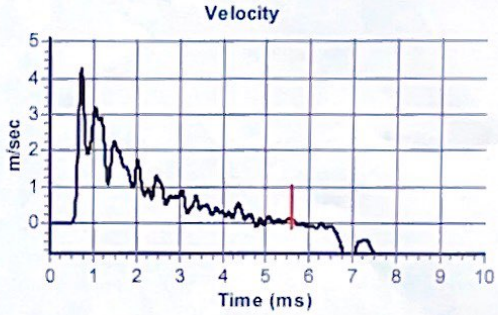
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.6
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	64786
Accelerometer No.2:	64789

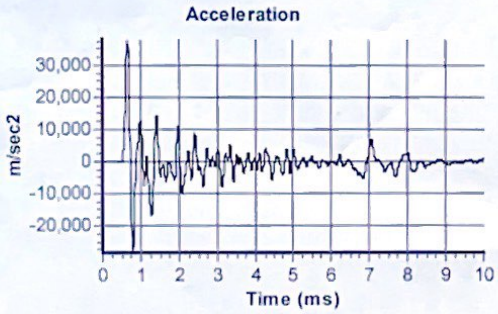
SPT Hammer Information

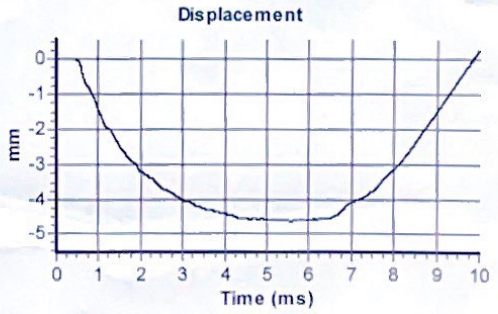
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	14.5

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

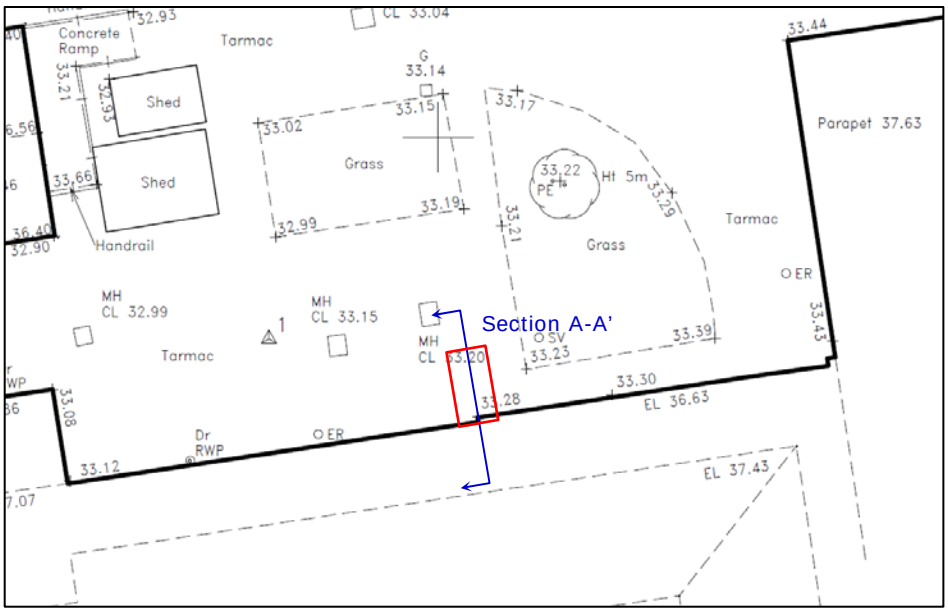
b) Where full penetration was not achieved, the total test blow-counts are reported

c) Hammer Energy Ratio, Er = 81%

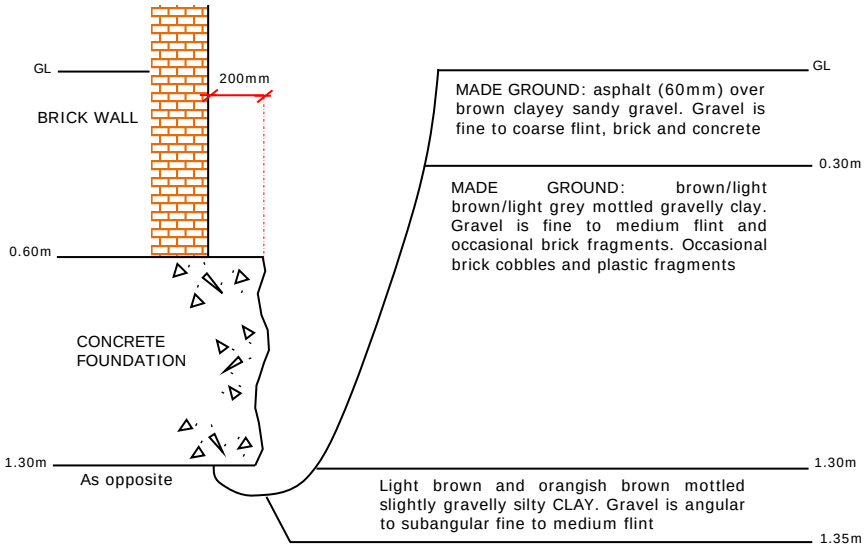
Soil Consultants

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:

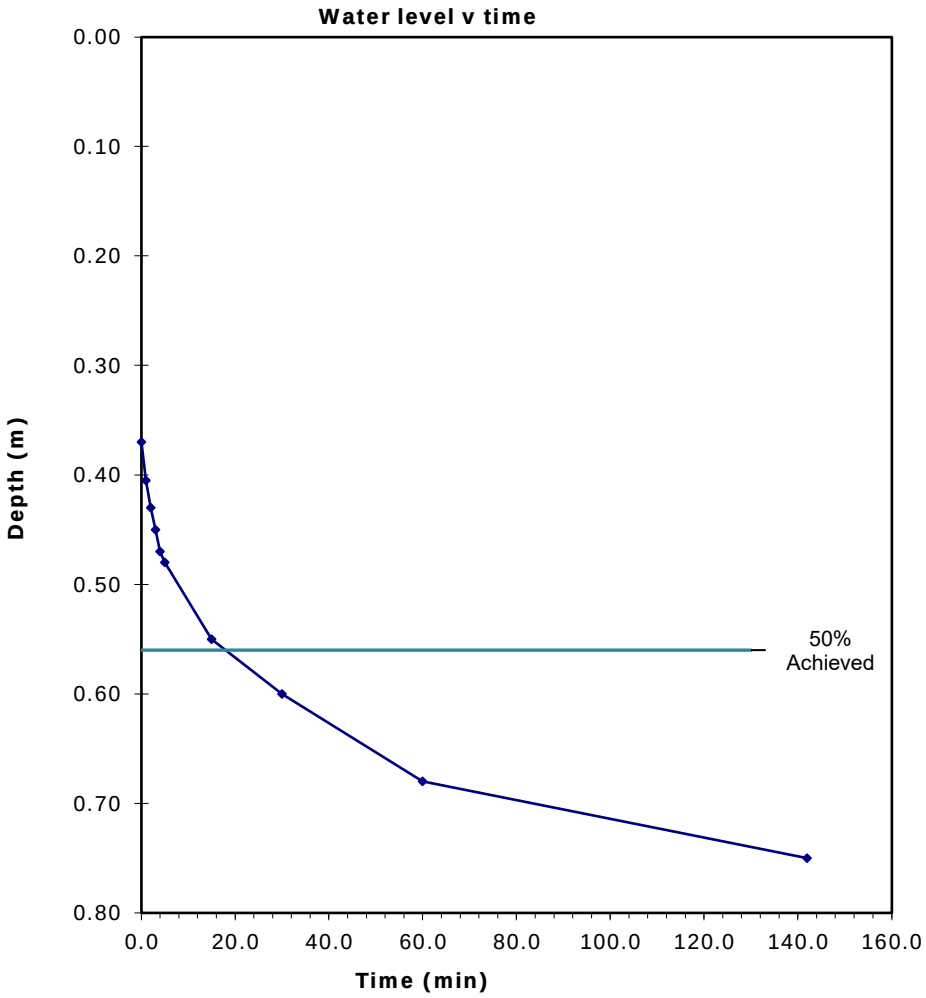
BH Diameter = 0.085 m

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:

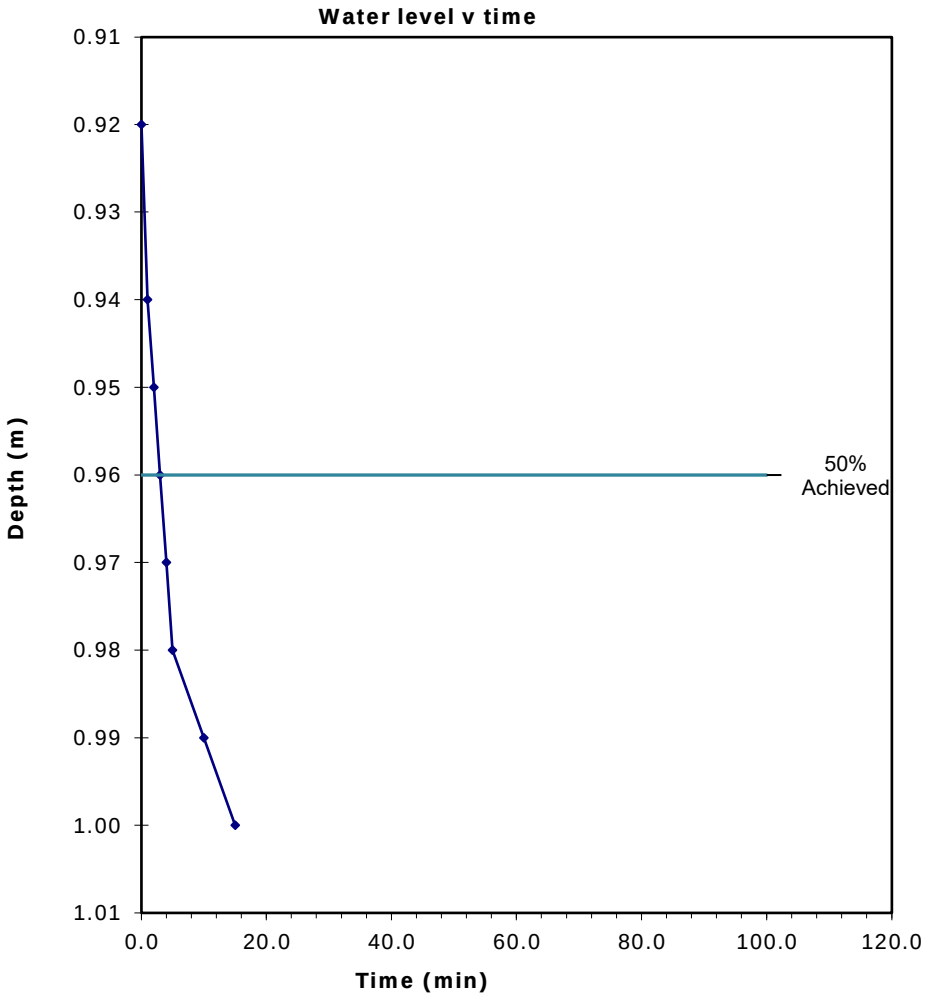
BH Diameter = 0.085 m

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")

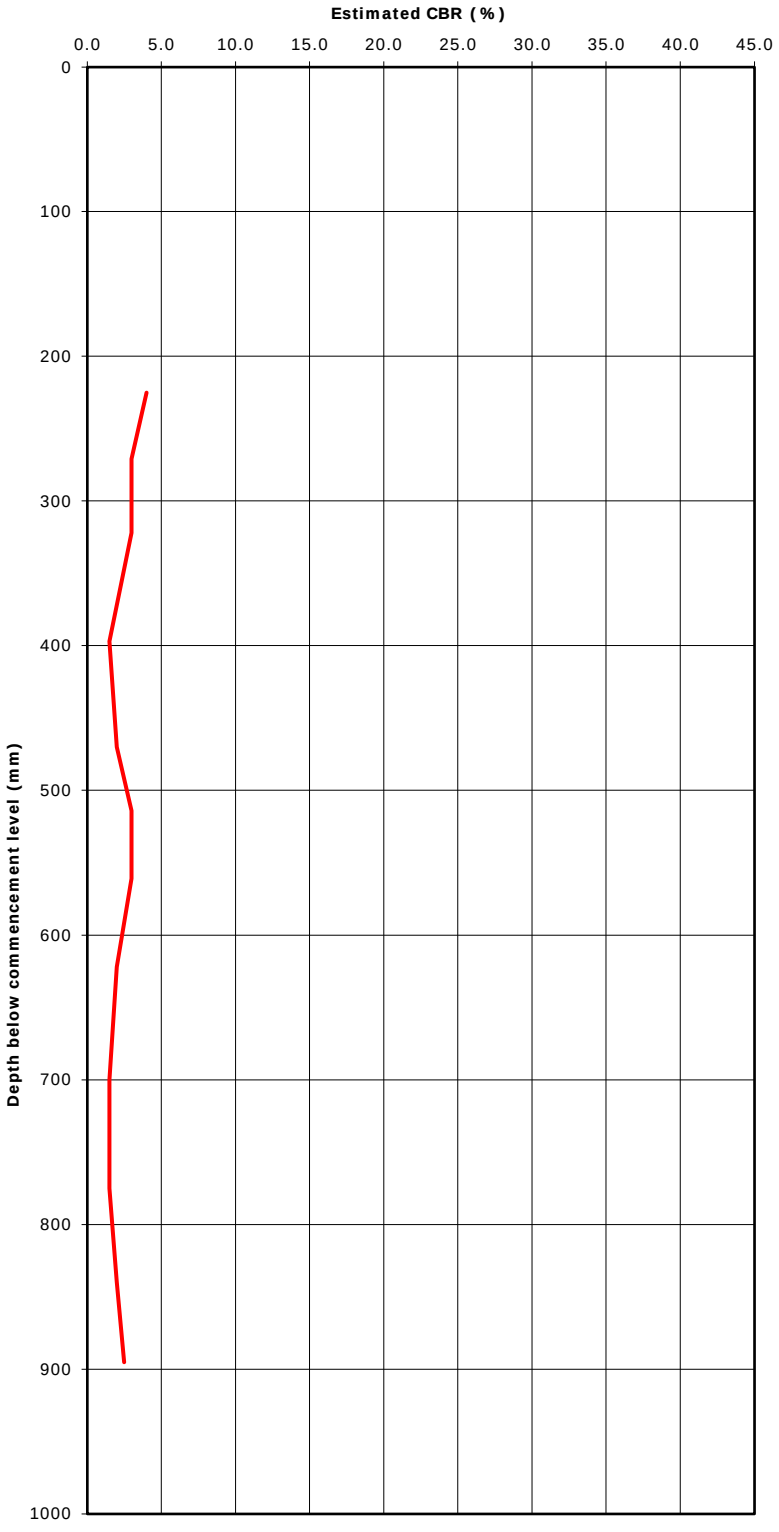
Soil Consultants

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:

Soil Consultants

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 (^{o}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**
Barometric pressure:	
a) Trend (24hrs):	**Rising**
b) At start (mB):	**1010**
Recorded by:	**NB**
Surface ground conditions:	**Dry**
Weather conditions:	**Sunny**
Ambient air temp (°C):	**18**

Monitoring equipment	
Instrument:	GA5000. No. G505055
Calibration check details:	See note 2 below
Next calibration date:	Feb 2023

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

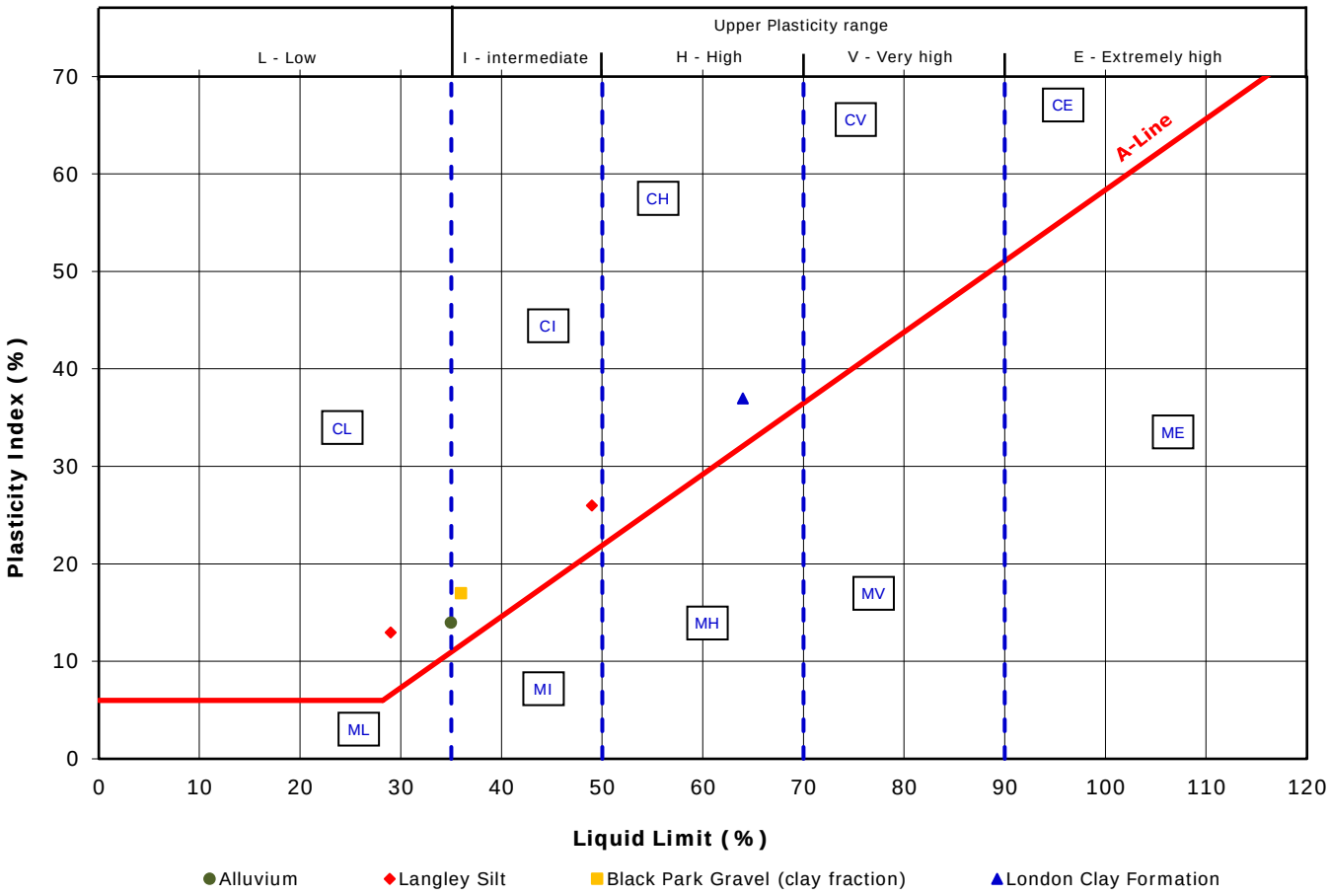
Modified Plasticity Index calculated in accordance with NHBC Standards Chapter 4.2 (reported if %passing 425mm <95%)

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}

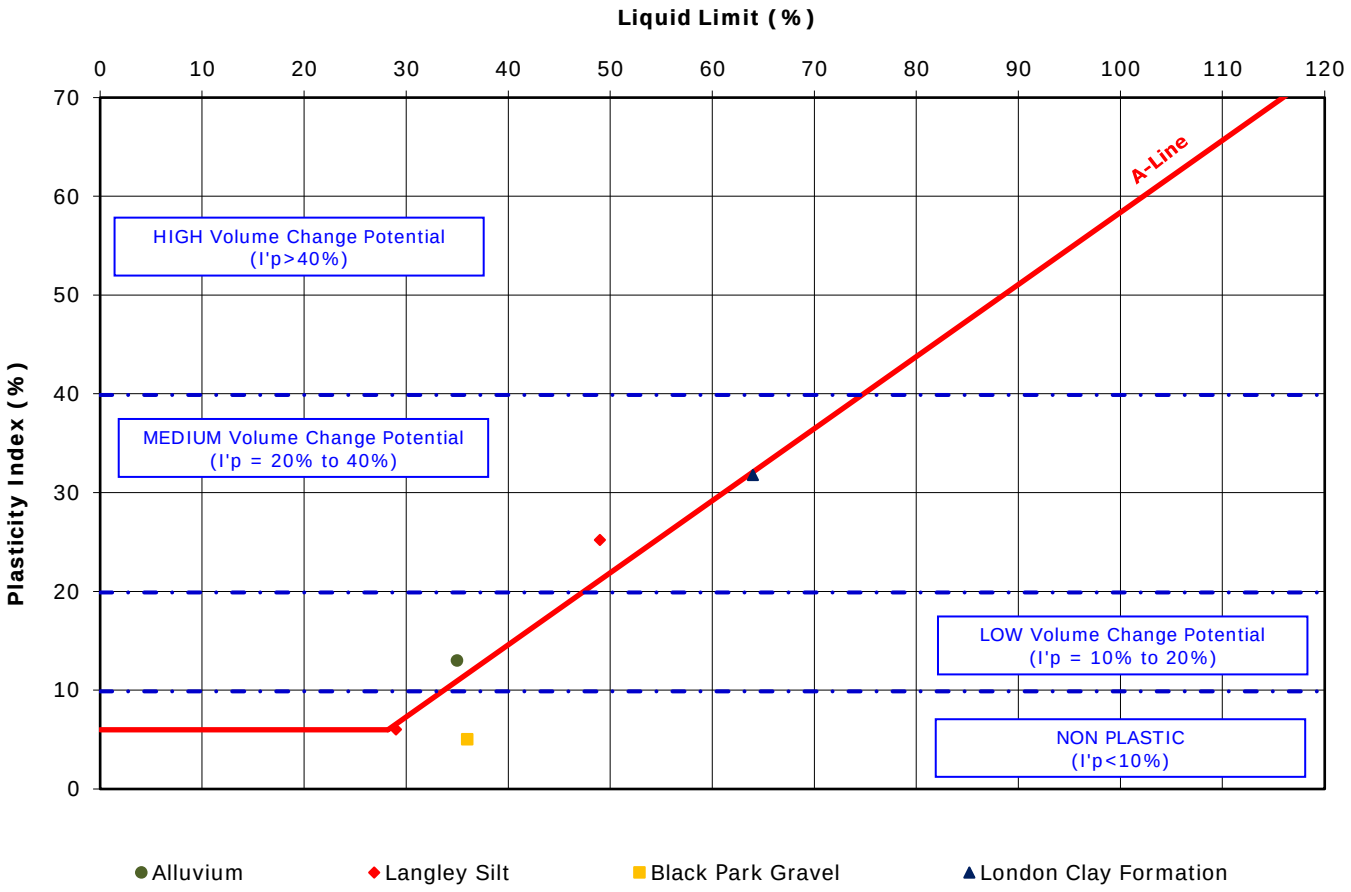
C - CLAY [plots above the A-Line]

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

Soil Consultants

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)

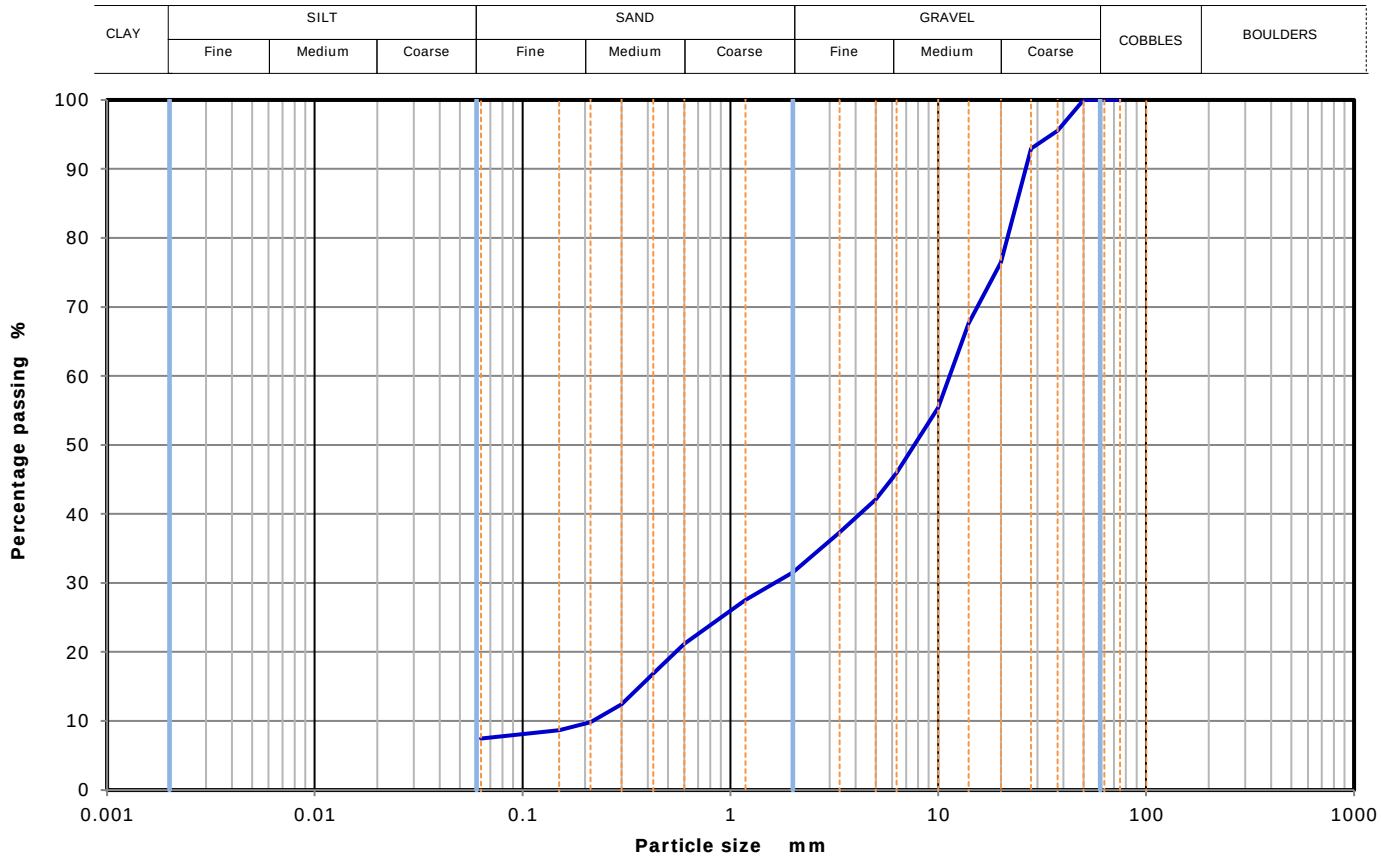
Classification in accordance with NHBC Standards, Part 4 'Foundations', Chapter 4.2 'Building near trees'

Soil Consultants

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

Particle size distribution

Hole ID: WS01 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	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

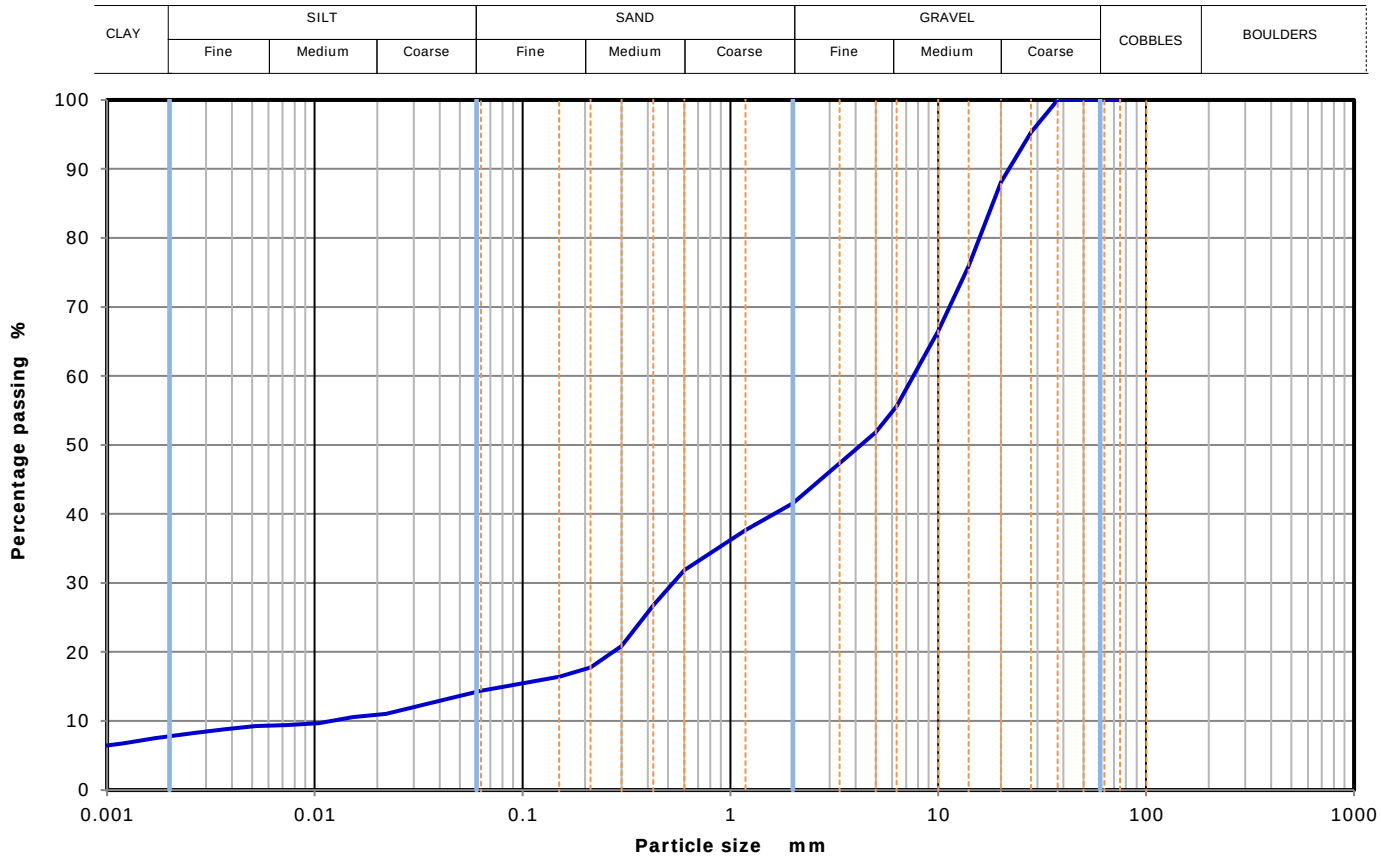
Test method and date	
Method: BS EN ISO 17892-4:2016	
- Wet sieving method	
Reporting date:	11 Nov 22

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

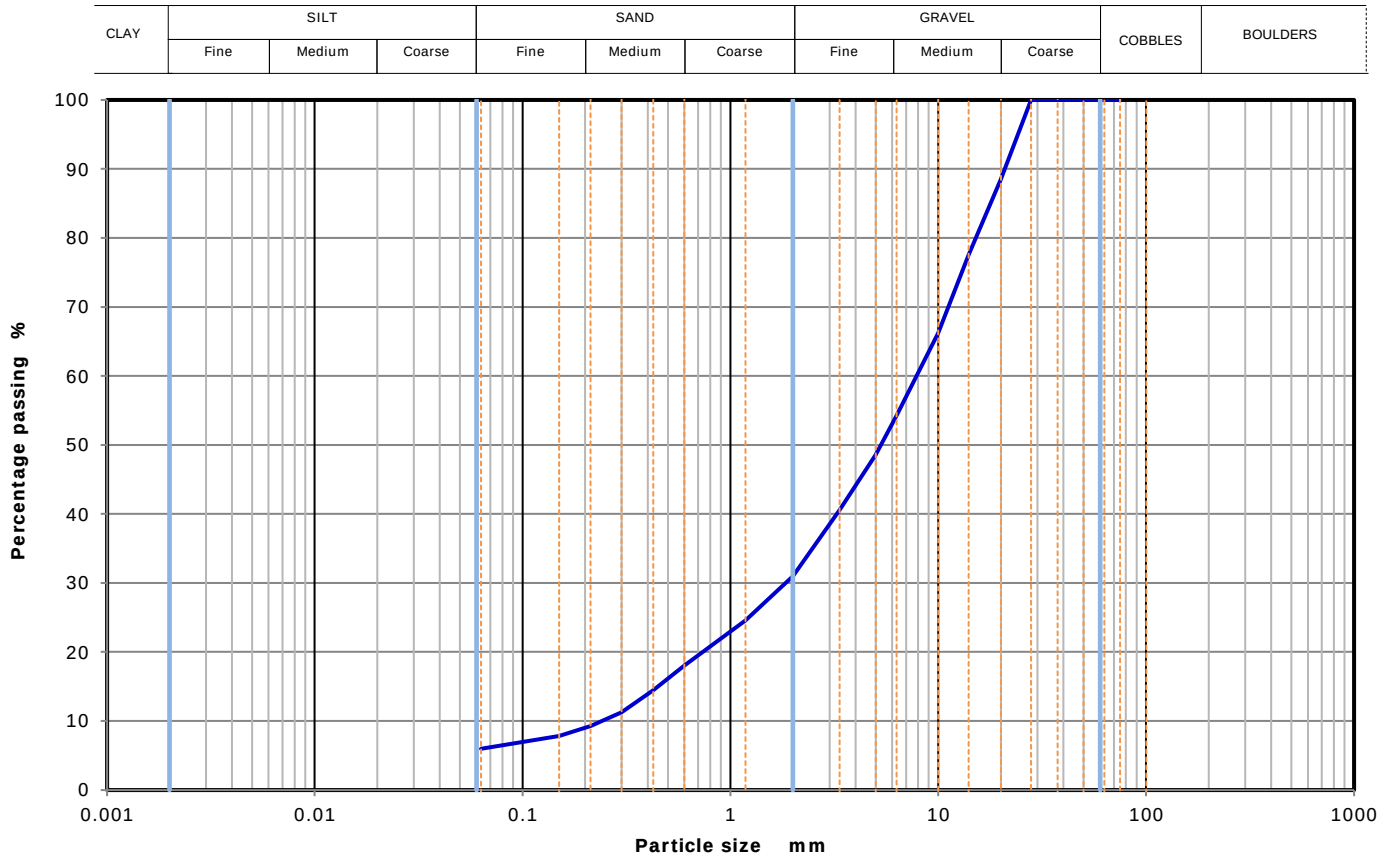
Test method and date	
Method: BS EN ISO 17892-4:2016	
- Wet sieving method	
- Hydrometer method	
Reporting date:	11 Nov 22

Soil Consultants

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

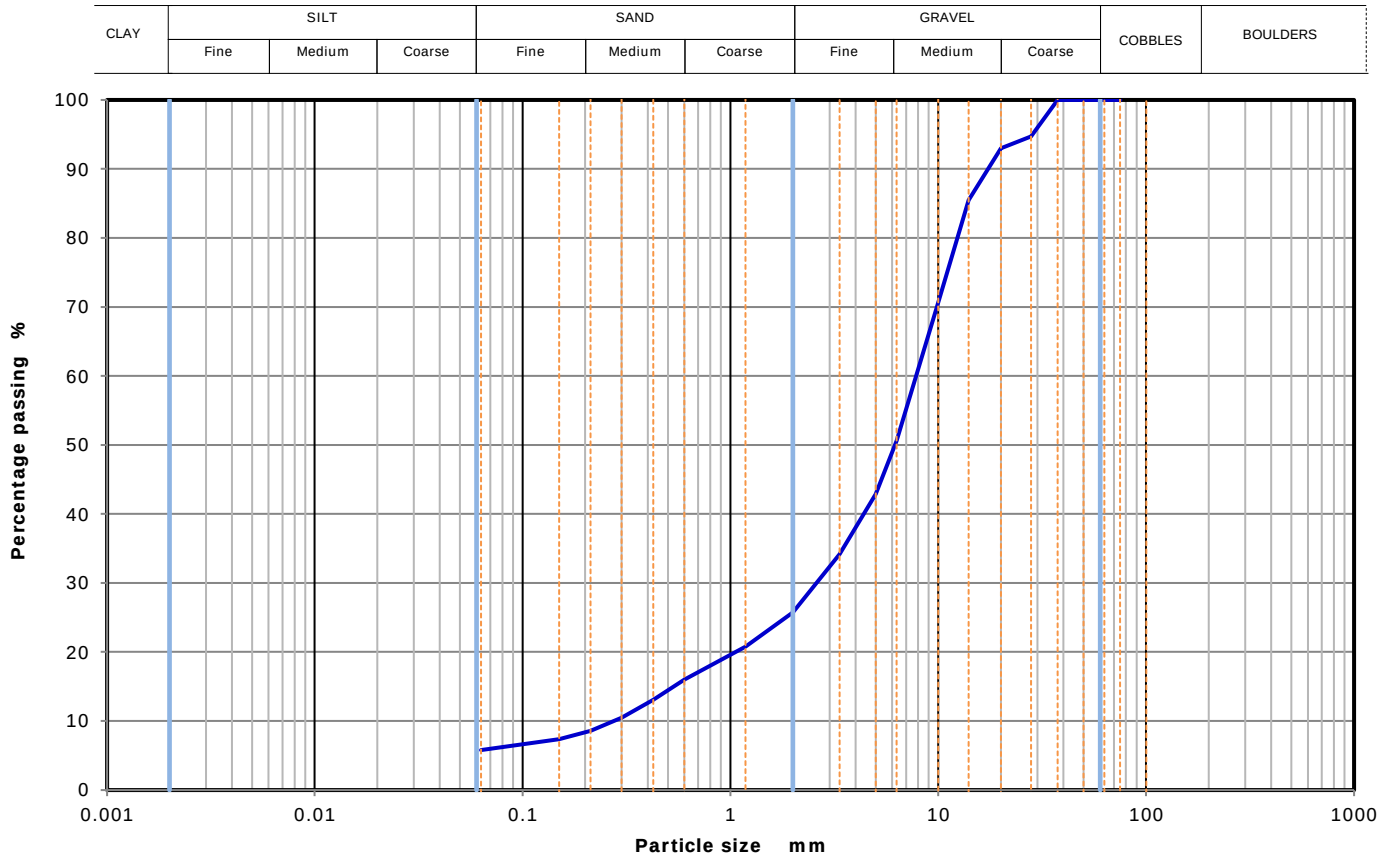
Test method and date	
Method: BS EN ISO 17892-4:2016	
- Wet sieving method	
Reporting date:	11 Nov 22

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

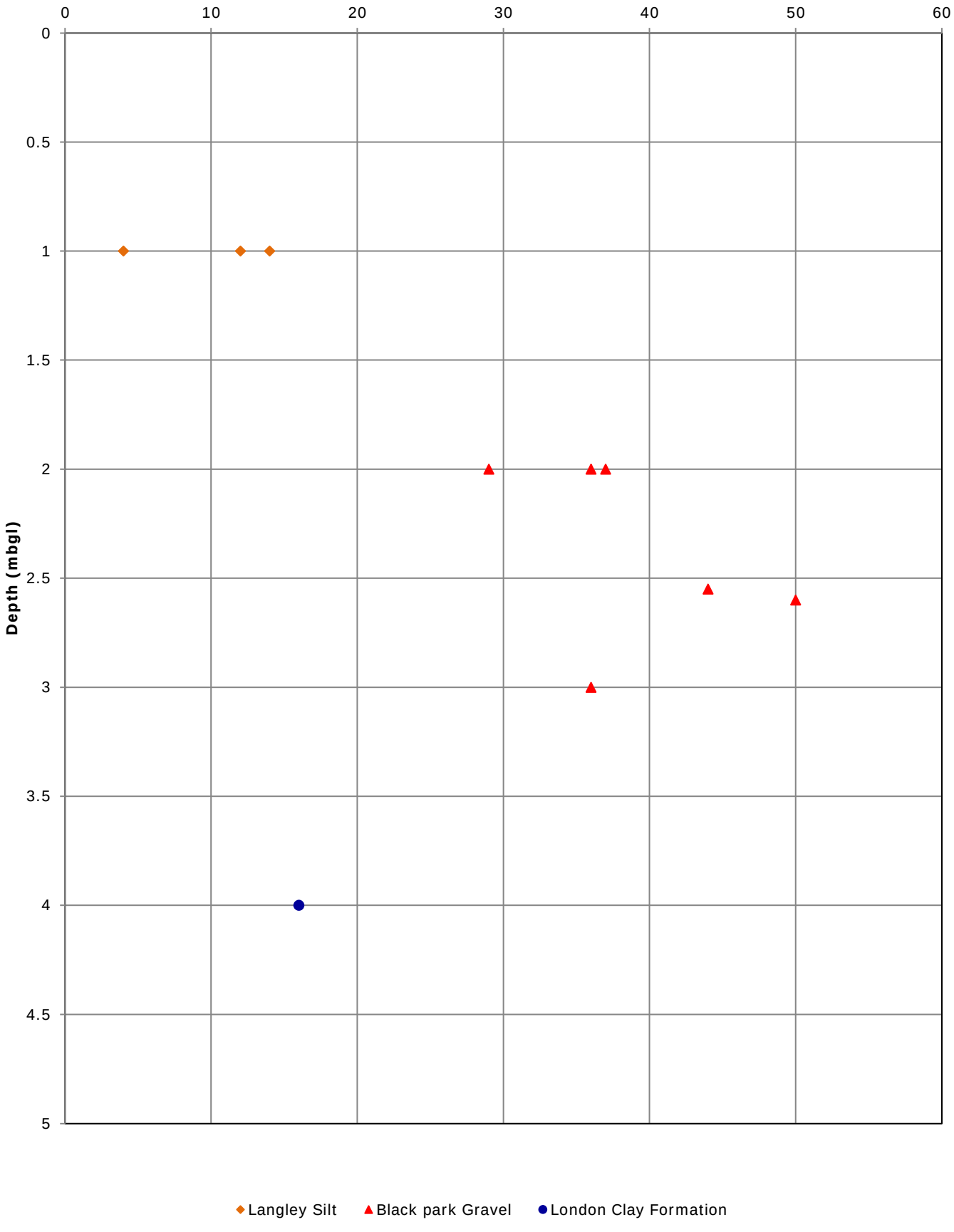
Sample proportions	%
Cobbles	0
Gravel	74
Sand	20
Fines (<0.063mm)	6

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

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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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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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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4480

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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4480

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

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

4480

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

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

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

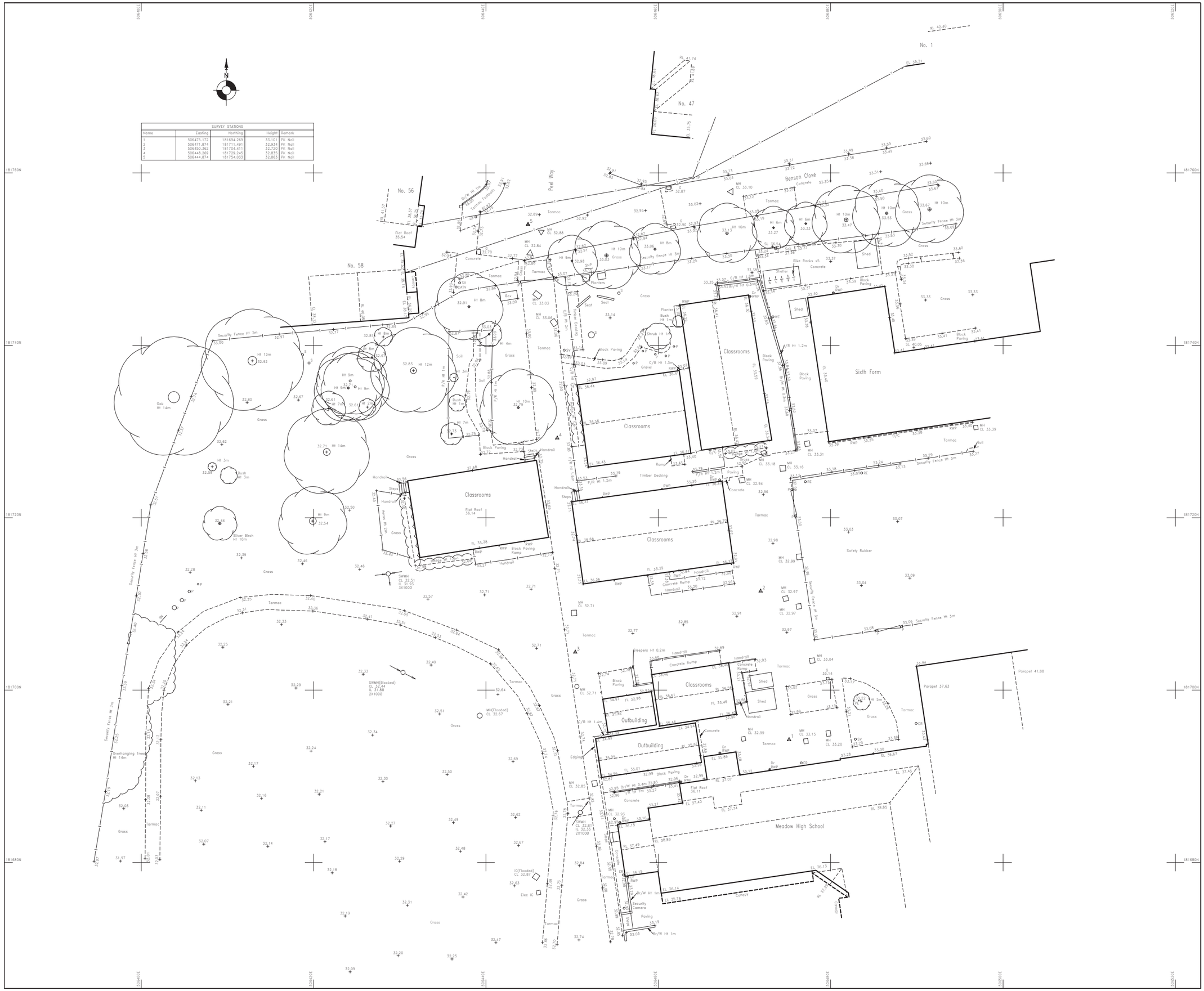
Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 22-08762
Soil Consultants Ltd
Site Reference: Meadow School
Project / Job Ref: 10776/JW
Order No: None Supplied
Reporting Date: 27/10/2022

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 · CHAS · THE SURVEY ASSOCIATION · chartered ices · smas

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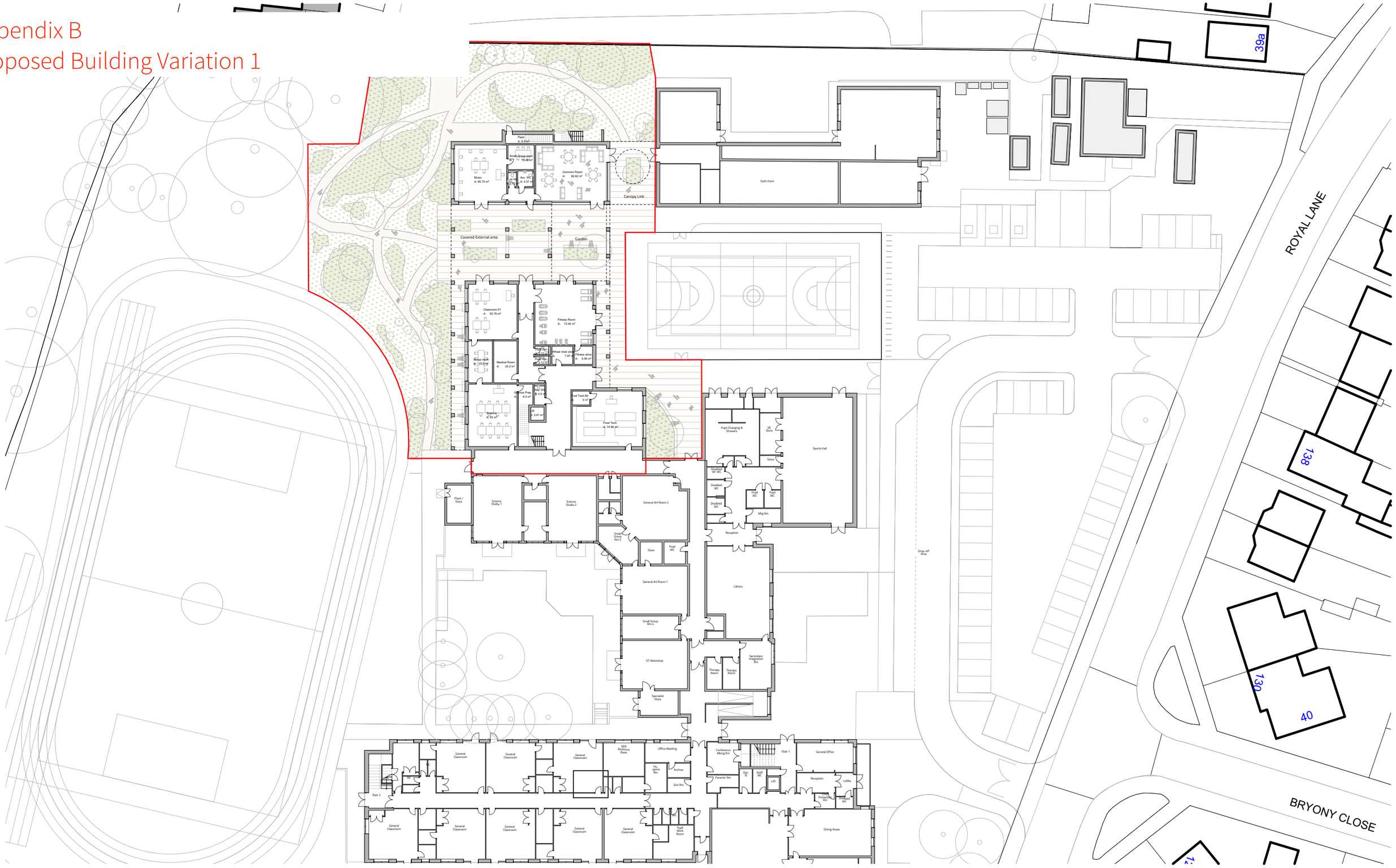
Tel: 01604 491543
Email: info@globalsurveys.co.uk

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

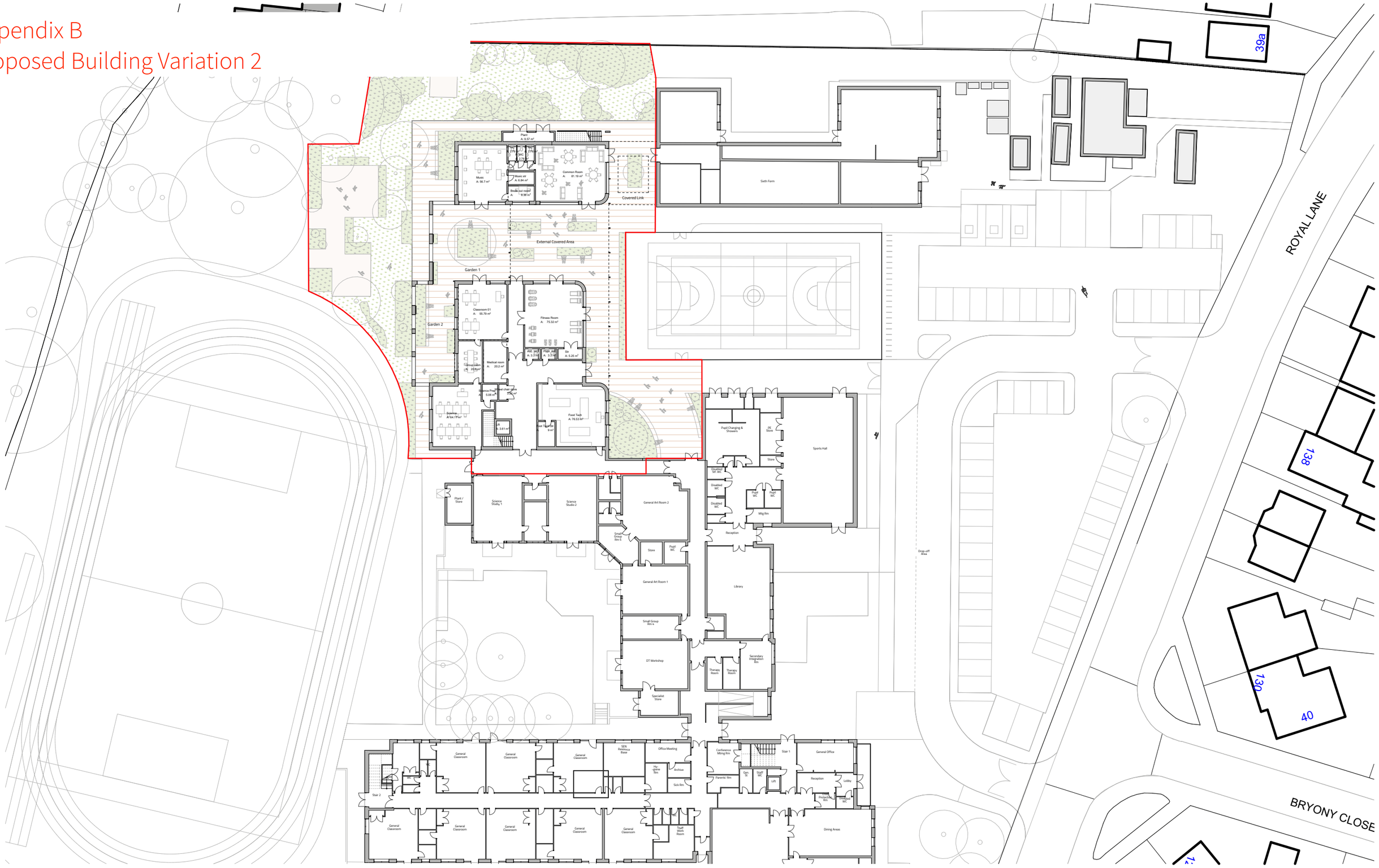
chadwickdryerclarke studio
architects + designers

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
DRAFT	01/06/2022	Stage 2 Issue of Information to QS

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5-7 TANNER ST, LONDON SE1 3LE
info@chadwickdryerclarke.co.uk T. 01223 262413

chadwickdryerclarke studio
architects + designers

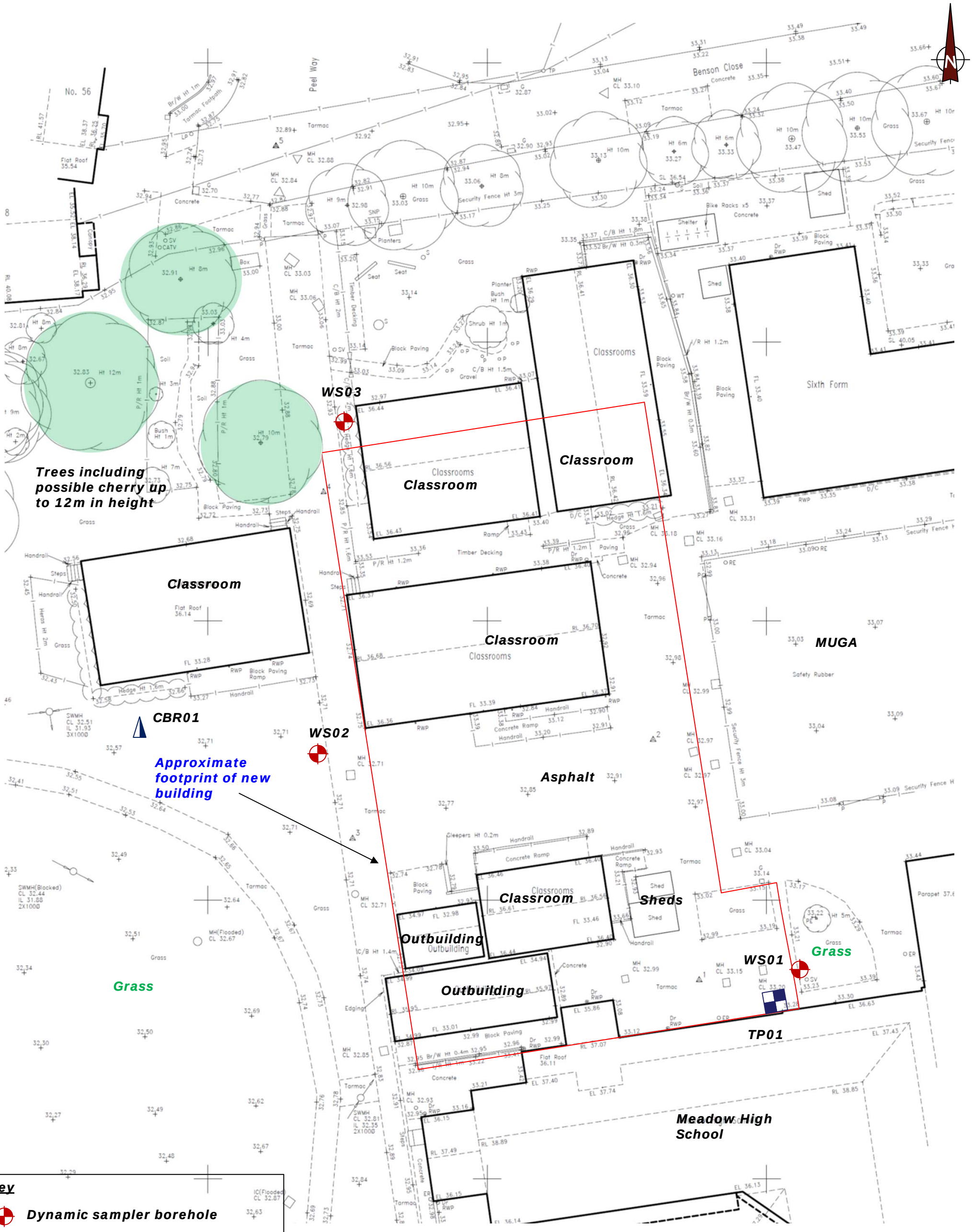
CLIENT: London Borough if Hillingdon
ADDRESS: Royal Ln Uxbridge UB8 3QU
PROJECT: Meadow School New Building

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	--

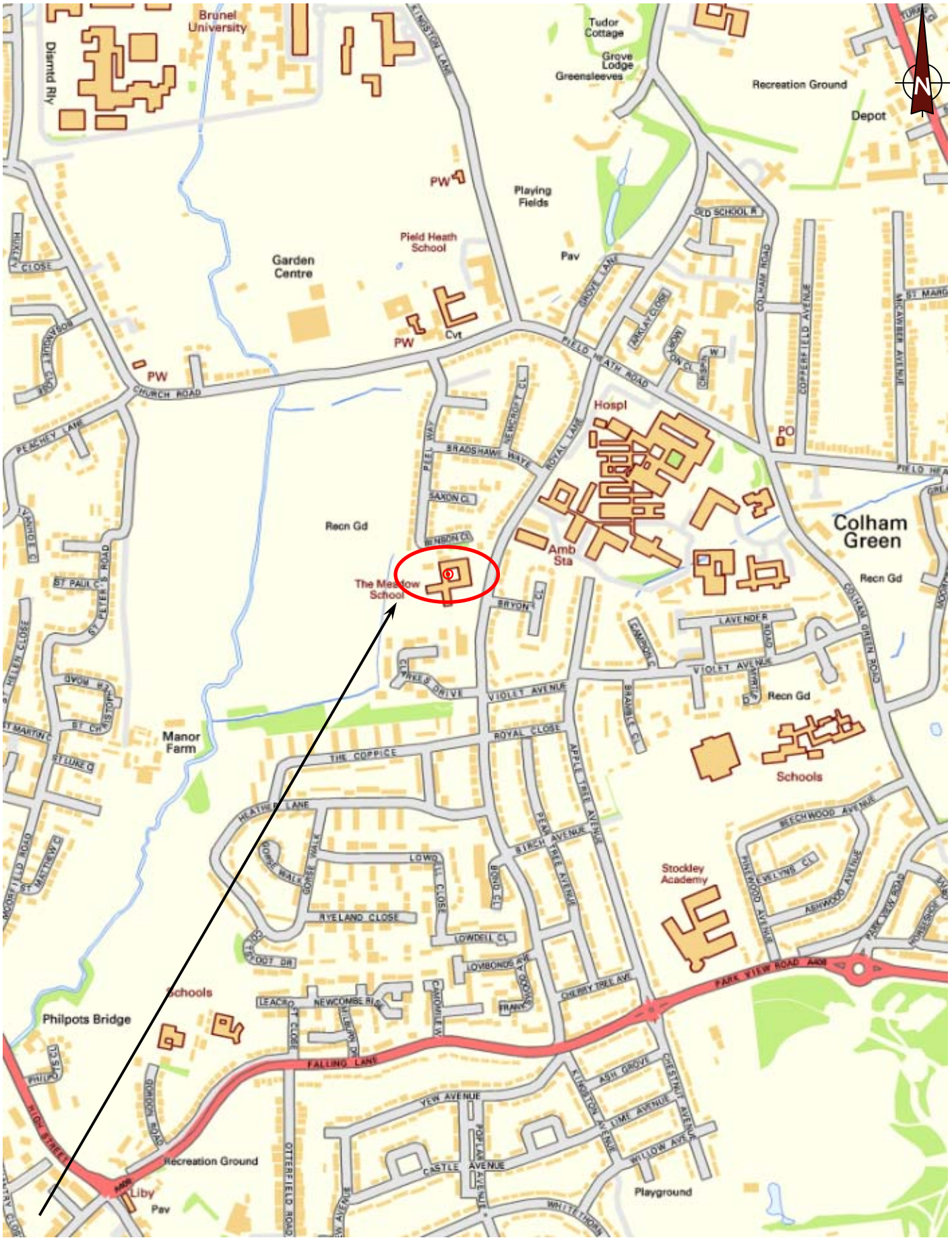
Site & Location	**Meadow Special School, Royal Lane, Uxbridge UB8 3QU**	Report No: **10776/JW**

Site Plan



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

Location Plan



SITE LOCATION

Soil Consultants