Phase 2 Interpretative Ground Investigation Report

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1 Introduction

In September 2022, Hydrock Consultants Limited (Hydrock) was commissioned by Mace Group (the Client) to undertake a site investigation, comprising a Phase 2 supplementary ground investigation at St Illtyd's Catholic High School. The site is located at St Illtyd's Catholic High School, Newport Road, Rumney, Cardiff, CF3 1XQ.

The area of proposed development is currently comprised of a grass playing field and a Red-Gra pitch.

Hydrock understands that the proposed development is to comprise a 3G pitch to the north-west of the main building at St Illtyd's Catholic High School. A proposed development layout (Mace Group Drawing Ref: 38678 - Proposed Site Plan, dated 8 September 2022), is presented in Appendix A. Through discussions with Mace, it is likely there will be floodlights constructed as part of the development of the 3G pitch.

Existing site levels within the proposed footprint vary by 2.0m - 2.5m and it is likely that significant earthworks or retaining structures will be required to facilitate the pitch construction. Proposed site levels have not been provided at the time of writing, and detailed recommendations for earthworks and retaining walls are therefore beyond the scope of this report.

The investigation works have been undertaken in accordance with Hydrock's proposal referenced (Ref: C-20700-E- St Illtyd Additional Geo Works Option B, 28 September 2022) and the Client's instructions to proceed (email from Caroline Fazakerly, Mace Group 20 October 2022, Original PO has been extended).

The works have been commissioned to assist with the design of the 3G pitch and associated infrastructure as the proposed development location was altered and the previous site investigation did not cover this new area of the site.

The investigation work has been carried out in general compliance with recognised best practice, including (but not limited to) BS 5930:2015, BS 10175:2011+A2:2017 and the AGS (2006) 'Good Practice Guidelines for Site Investigations'.

Professional judgement is then used to evaluate the findings of the risk assessments and to provide recommendations for the development.

This report does not include a geo-environmental assessment at the request of the Client. Limited geo-environmental testing has been completed for initial waste classification/ off-site disposal purposes.

2 Site Information

2.1 Site description

Table 2.1: Site description

Item	Brief Description
Site access	The site is accessible from Newport Road (B4487). There is only one access for the site.
Site area	The site area roughly follows the extent of the proposed 3G pitch (126m x 80m) and is located within the north-west portion of the St Illtyd's Catholic High School grounds. The area of proposed development currently consists of grass playing fields and a gravel Red-Gra pitch.
Elevation, topography and any geomorphic features	The site gently slopes towards the south-east/south ranging from 54.8m Above Ordnance Datum (AOD) in the northern corner close to the site entrance and 52.8m AOD in the southern corner. The Red-Gra pitch ranges from 54.0m AOD to 53.2m AOD, while the playing fields range from 54.9m AOD to 52.9m AOD. The Red-Gra pitch is set at a slightly lower elevation compared with the adjacent playing fields, and slopes towards the south-east at a shallower gradient compared with the surrounding playing fields. Along the south-eastern boundary of the Red-Gra pitch, the ground abruptly slopes at approximately 16° where the grass boundaries meet the main road into the school.
Vegetation	There is minimal vegetation, other than grass, within the proposed site boundaries. Approximately ~2m beyond the north-western boundary there is some dense vegetation including mature trees.
General site sensitivity	The site is within a residential area and of low sensitivity, with the land to the southwest of the site undeveloped, this was the previous Rumney High School.
Site boundaries and surrounding land	Along the north-eastern boundary of the site the Red-Gra pitch is surrounded by grass and steeply slopes towards the main access road into the school. The south-eastern boundary crosses close to the main access road into the school where the grassy boundary of the Red-Gra pitch steeply slopes south-east. Further south along this boundary the grass playing fields extend south-east and gently meet the hardstanding ground surrounding the main school building. To the south-west the grass playing fields extend 50m. Along the north-western boundary the ground is grassy before abruptly transitioning into dense vegetation.

2.2 Geology

Table 2.2: Geology

Ref. for Figures	Location	Stratigraphic Name	Description
Solid Geology			
RM	Whole site	Raglan Mudstone Formation	Red silty mudstones with calcretes and sandstone with a recorded dip of 8° to the northeast.

During the previous site investigation (Ref: 20700-HYD-XX-04-RP-GE-1001, dated 25 March 2022) 3 trial pits were dug to 1.00m - 1.05m below ground level (bgl) close to the south-west border of the

proposed 3G pitch (trial pit SA01 is located within the proposed 3G pitch site). The geology was recorded as 0.20m of topsoil overlying stiff reddish slightly gravelly clay, likely to be representative of the Raglan Mudstone Formation.

It should be noted that no superficial deposits have been recorded on site.

3 Ground Investigations

3.1 Site works

The ground investigation works, including the rationale, which was based on the findings of the preliminary risk assessment and previous ground investigation is summarised in **Error! Reference source not found.**3.1.

The fieldwork took place on the 21st November 2022 by a specialist Ground Investigation Contractor (CJ Associates). These works were specified by Hydrock but not supervised by Hydrock. The ground investigation locations were surveyed in using a Total Station GPS survey instrument and are shown on the Exploratory Hole Location Plan (Hydrock Drawing Ref: 20700-HYD-XX-04-DR-GE-1003, dated 9 November 2022) in **Error! Reference source not found.**.

The logs, including details of ground conditions, soil sampling, in situ testing and any installations, are also presented within the CJ Associates Factual Report in **Error! Reference source not found.**B.

The weather conditions during the fieldwork and for the previous week were scattered clouds with occasional light rain.

Table 3.1: Summary of site works

Activity	Method	No.	Name	Depth (m bgl)	In situ tests	Rationale
Drilling, Pitting and Probing						
Boreholes	Window sampling	4	WS01-04	Max: 3.00m Range: 2.80-3.00m	-	To determine the geology below the site, and the extent of potential Made Ground.
Probes	TRL DCP	5	DCP1-5	Max: 1.04m	California Bearing Ratio (CBR)	To investigate strength profile of the material overlying the Raglan Mudstone Formation.

3.2 Laboratory Testing

The chemical test certificates for testing undertaken as part of Hydrock's investigation are provided in **Error! Reference source not found.** and summarised in Table 3.2. below. Wherever possible, UKAS and MCERTS accredited procedures have been used.

The geo-environmental analyses undertaken on soils are summarised in Table 3.2.

Table 3.2: Geo-environmental analyses of soils

Determinand Suite	Raglan Mudstone Formation	Made Ground
Hydrock minimum suite of determinands for solids*	3	1

*Hydrock minimum soil suite comprises: As, B (water soluble), Be, Cd, Cr (total), Cr (VI), Cu, Hg, Ni, Pb, S (elemental), Se, V, Zn, cyanide (total), sulfide, pH, asbestos fibres, speciated polynuclear aromatic hydrocarbons (PAH, by GC-FID), total phenols and fraction of organic carbon

The geotechnical laboratory tests undertaken by CJ Associates are summarised in Table 3.3.3 and the test certificates are provided in **Error! Reference source not found.**C. Wherever possible, UKAS accredited procedures have been used.

Table 3.3: Summary of sample numbers for geotechnical tests

Test	Raglan Mudstone Formation	Made Ground
Natural moisture content	2	-
Atterberg limits	2	-
Particle size distribution (sieve)	3	-

3.3 Constraints

There were no constraints during this site investigation.

4 Ground Conditions

The following presents a summary of the properties of the ground and groundwater conditions encountered, based on field observations, interpretation of the field data and laboratory test results, taking into account drilling, excavation and sampling methods, transport, handling and specimen preparation.

Details of the CJ Associates ground investigation works are provided in the logs in **Error! Reference source not found.**B. A summary of the Ground Model is presented in Table 4.1 and the individual strata are described in the sections below.

Table 4.1: Strata encountered

Stratum	Depth to top (m bgl)	Depth to base (m bgl)	Thickness (m) (range)	Thickness (m) (average)
Topsoil	0.00	0.20	0.20	0.20
Made Ground (WS02 only)	0.00	1.10	1.10	1.10
Raglan Mudstone Formation (clay)	0.20-1.10	>3.00	>2.80	-

Topsoil was typically encountered from the ground surface, with the exception of the position (WS02) within the existing Red-Gra pitch, located within the north of the site. The topsoil comprises dark brown silty CLAY.

Made Ground was encountered at the surface within the east of the Red-Gra pitch within the north of the development area (WS02 only). At the surface, coarse SAND was encountered, underlain by stiff gravelly CLAY with a low cobble content. It is anticipated that the Made Ground was historically placed beneath the eastern half of the Red-Gra pitch to provide a level area.

Weathered soils of the **Raglan Mudstone Formation** were encountered underlying the Made Ground and Topsoil across the whole site. It was generally described as very stiff gravelly CLAY; however, in the north of the site adjacent to the west of the Red-Gra pitch (WS01), the dominant material was described as clayey SILT.

4.1 Obstructions

No obstructions were encountered during the ground investigation.

4.2 Groundwater

Groundwater was not encountered during the ground investigation.

4.3 Plasticity

The volume change potentials in terms of NHBC Standard (Chapter 4.2) [OR] BRE Digest 298 with respect to building near trees have been determined from the results of plasticity index tests on samples of soil. These are summarised in Table 4.2.

Table 4.2: Volume change potential

Stratum	No. of tests	Plasticity Index			Modified Plasticity Index			Plasticity designation	Volume Change Potential
		Min.	Max.	Av.	Min.	Max.	Av.		
Raglan Mudstone Formation	2	11	12	11.5	11	12	11.5	Low	Low

4.4 Particle size distribution

Particle Size Distribution test (PSDs) results are summarised in Table 4.3.

Table 4.3: PSD results summary

Stratum	No. of tests	Silt/Clay %	Sand %	Gravel %	General description
Raglan Mudstone Formation	3	40-55	32-59	1-15	sandy slightly gravelly clay.

4.5 Subgrade Stiffness

The subgrade stiffness (CBR) results are summarised in Table 4.4.

Table 4.4: CBR results and derived values

Stratum	**No. tests**	**Method**	**CBR (%) (Range)**
Raglan Mudstone Formation	5	In-situ Transport Research Laboratory (TRL)-Dynamic Cone Penetrometer (DCP).	1 - 30
	2	Equilibrium subgrade CBR estimation using plasticity indices; The Highways Agency Interim Advice Note; IAN 73/06.	2.5

5 Geotechnical Assessment

The proposed development is to comprise a 3G pitch with associated floodlights.

A review of Mace's proposed site plan indicates that the change in existing ground levels across the breadth of the proposed 3G pitch (from east to west) varies by 2.0 - 2.5m; therefore, to create a level pitch, significant earthworks, possibly involving retaining structures, or an embankment, will be required. At the time of writing, Hydrock have no further information regarding the proposals, but it is likely earthworks will be required and that an Earthworks Specification and Materials Management Plan will be needed to facilitate this.

Based on the above, for the purposes of this investigation, the proposed structures have been classed as Geotechnical Category 1. However, if retaining walls above 2m in height are required then they are considered to be Category 2 structures and further geotechnical design will need to be considered.

For design of Category 1 structures in accordance with BS EN ISO 1997-1 (EC 7), the geotechnical parameters given in Table 5.1 can be used for design. However, for Category 2 structures these parameters should be used as characteristic values and not for design.

These values have been determined from laboratory testing, in situ testing and by professional judgement using published data together with knowledge and experience of the ground conditions. Care should be exercised in using these assumed soil strength parameters for any purpose beyond the scope of this report because it may be that additional sampling and testing is required for certain purposes. The reader should refer to the original test results provided in **Error! Reference source not found.**C.

Table 5.1: Geotechnical parameters recommended for design of Geotechnical Category 1 Structures (EC7)

Parameter Stratum	Bulk unit weight kN/m³ □ a	Effective angle of internal friction ° φ' b c	Effective cohesion kN/m² c' d	Undrained shear strength kN/m² cu e
Made Ground	18	30	0	-
Raglan Mudstone Formation	20	27	0	50-100

a. Bulk unit weight (kN/m³) values derived from the plasticity index (PL) and BS 8004-2015.

b. Internal friction (φ') values for the granular in situ material derived from BS 8004-2015, where φ'ang is derived from the borehole logs, and φ'PSD and φ'dil are derived from BS EN ISO 14688.

c. Internal friction (φ') values for the cohesive in-situ material derived from BS 8004-2015, where φcv' is derived from plasticity index. The use of φcv' in the analysis is considered to provide a conservative estimate of φ'.

d. BS 8002:1994 Code of practice for Earth retaining structures, British Standards institution.

e. In-situ test data.

The site is previously undeveloped and no buried obstructions were encountered by this investigation. However, utility maps and surveying shows there are several utilities running beneath the proposed development area, at roughly 0.40m to 2.50m depth.

Topsoil should be removed from beneath all hardstanding areas.

Temporary trench support, or battering of excavation sides, is recommended for all excavations that are to be left open for any length of time and will definitely be required where man entry is required.

A risk assessment of the stability of any open excavation should be undertaken by a competent person and appropriate measures adopted to ensure safe working practise in and around open excavations. Further guidance on responsibilities and requirements for working near, and in, excavations can be obtained from the Construction Design and Management Regulations (2015); Construction Information Sheet 47: Inspections and Reports (2005) and HSG47: Avoiding Danger from Underground Services.

To ensure no loads are imposed on the sides of the excavation, spoil should not be placed immediately adjacent to the excavation. Spoil should be placed a suitable distance from the side of the excavation (as assessed by a competent person).

5.1 Earthworks

A review of Mace's proposed site plan indicates that the change in existing ground levels across the breadth of the proposed 3G pitch (from east to west) varies by 2.0-2.5m; therefore to create a level pitch, significant earthworks, possibly involving retaining structures, or an embankment, would be required.

At the time of writing, Hydrock have no further information regarding the proposals, but it is likely earthworks will be required and that an Earthworks Specification and Materials Management Plan would be required to facilitate this.

Supplementary earthworks testing and an Earthworks Specification will be necessary to ensure the appropriate management and reuse of the existing soils, where proposed.

If significant earthworks are required, the works may be Category 2 in accordance with BS EN ISO 1997-1 (EC 7) and further geotechnical design may be necessary. Once site proposals have been further defined more specific consideration will need to be given to the reuse of materials and reference should be made back to this office.

5.2 Foundations

In accordance with EC7, BS EN 1997-1+A1 (2013), the proposed floodlights are considered to be Geotechnical Category 1.

The Made Ground, encountered within the footprint of the existing Red-Gra pitch, is considered unsuitable in its present condition for use as a founding stratum on the basis of its unpredictable nature and likely deposition in an uncontrolled manner and should be fully penetrated by all new foundations or excavated, screened, processed and re-engineered to create the development platform.

The Raglan Mudstone Formation will provide a suitable founding stratum for the proposed floodlights. A permissible bearing capacity of 150kN/m^2 may be assumed for pad foundations up to 1m x 1m in size, with total and/or differential settlements unlikely to exceed 25mm.

The pad foundations should be founded at least 300mm into the stiff clay of the Raglan Mudstone Formation.

Where building near trees, foundations should be deepened for soils of low volume change potential.

If trees are to be removed, the roots should be grubbed out and foundations extended to below the zone of disturbance created by this activity and to below any remaining root hairs.

Foundation formations should be inspected by a geotechnical engineer or other suitably competent person to ensure the founding conditions are suitable and as indicated in this report. Any formation materials deemed as unsuitable should be excavated and replaced with lean mix concrete or deepened to suitable strata.

Foundation excavations should be protected from rain and snow and inflow of surface water, frost and freezing conditions. They should also be protected from drying out in hot dry weather.

Any water that collects at the base of the foundation excavations should be removed by pumping from a sump in the base.

5.3 Roads and Pavements

Based on the test results and subject to in situ testing during construction, it is considered likely an equilibrium CBR of 2.5% will be achievable over the majority of the site so long as the upper topsoil is removed.

For areas of the 3G pitch constructed on fill (subject to proposed site levels), the earthworks will need to be designed to provide an appropriate CBR for the construction of the 3G pitch. Verification testing of the earthworks should be undertaken to confirm the design CBR has been met, prior to 3G pitch construction.

Proof rolling of the formation level will be required and any loose or soft spots should be removed and replaced with an engineered fill, in accordance with a suitable Specification. The formation level will also need to be protected during inclement weather from deterioration; all slopes should be trimmed to falls to shed rain water and the surface sealed to limit infiltration.

Prior to the placement of the founding materials and the construction of the 3G pitch, the sub-formation and formation will need to be inspected and checked in accordance with a suitable specification to ensure the ground conditions are as expected. All testing should be carried out in accordance with DMRB IAN 73/06 to confirm that the ground conditions at time of construction are consistent with the previous design parameters.

5.4 Drainage

Infiltration testing was conducted during a previous site investigation by Hydrock (Ref: 20700-HYD-XX-04-RP-GE-1001, dated 25 March 2022).

3 trial pits were tested and 2 of these showed negligible infiltration, and the other showed 15mm of infiltration over 4 hours.

Hence, infiltration is extremely slow and the ground is considered unlikely to be suitably permeable for permeable paving or conventional soakaway drains.

5.5 Buried Concrete

Based on guidelines provided in BRE Special Digest 1 (BRE 2005) and the information presented in Appendix C:

- The shallow soils (Made Ground and Raglan Mudstone Formation) can be classified as Design Sulphate Class DS-1 and ACEC Class AC-1.

The designer should check and confirm the classification of concrete using the information presented in **Error! Reference source not found.**B and **Error! Reference source not found.**C during the design.

6 Waste Management

6.1 Introduction

The Waste Framework Directive (WFD) (2009/98/EC) defines waste as 'any substance which the holder discards or intends to discard.' In a geo-environmental context, the waste is most often 'soil' and the two main scenarios are offsite disposal of the material as a waste and/or reuse of the material on site. For cost and sustainability reasons, reuse is preferred to off-site disposal.

Section 6.2 below describes the key issues relating to off-site disposal to landfill and Section 6.3 considers requirements relating to reuse of soils and materials management.

6.2 Waste disposal

6.2.1 Principles

Based on the WFD, any material excavated on site may be classified as waste and it is the responsibility of the producer of a material to determine whether or not it is waste. Where off-site disposal is undertaken, the following guidance applies.

Classification is a staged process:

- A hazardous waste is defined under the WFD as one which possesses one or more of fifteen defined hazardous properties. If a waste is not defined as hazardous, then it is non-hazardous.
- Where the materials are soil, it is then be assigned using the 'List of Waste Codes', which classifies the material as either:
  - hazardous (17-05-03), which is defined as "soil and stones containing hazardous substances"; or
  - non-hazardous (17-05-04), which is defined as "soil and stones other than those mentioned in 17-05-03".
  - Hydrock utilise the proprietary assessment tool, HazWasteOnline™ to undertake this assessment.
- Waste Acceptance Criteria (WAC) testing is then undertaken if required, and are only applicable following classification of the waste, and only where the waste is destined for disposal to landfill. The WAC are both qualitative and quantitative. The WAC and the associated laboratory analyses (leaching tests) are not suitable for use in the determination of whether a waste is hazardous or non-hazardous.

It should be noted that some non-hazardous wastes may be suitable for disposal at an inert landfill as non-hazardous waste, subject to meeting the appropriate waste acceptance criteria.

It should be noted that classification must be undertaken on the waste produced, by the waste producer. Necessary sampling frequency to adequately characterise a soil population is defined within WM3.

Further discussion with regards to the characterisation process for different scenarios and waste types is provided below.

Topsoil and Peat

Topsoil and peat are biodegradable, therefore if they are surplus to requirements and cannot be re-used in accordance with a Materials Management Plan, they cannot be classified as inert. As such,

topsoil and peat need to be classified by a staged assessment and sampling process and would either be classified as hazardous or non-hazardous, depending upon the results of the assessment.

Greenfield sites

Waste from completely greenfield sites may be accepted at a landfill as inert waste if it meets the requirements of paragraph 10 (wastes acceptable without testing at landfills for inert waste) of the Landfill (England and Wales) (Amendment) Regulations (2005) ('the Regulations') can be met. Paragraph 10 of the Regulations states, "soils may be able to be classified as inert waste without testing, if:

- they are single stream waste of a single waste type;
- there is no suspicion of contamination and they do not contain other material or substances such as metals, asbestos, plastics, chemicals, etc….."

As such, where the site is greenfield and the waste producer is confident about the quality of a soil (i.e. naturally occurring and uncontaminated), further sampling and laboratory testing is not necessary for the Basic Characterisation and this can be undertaken on qualitative Waste Acceptance Criteria testing.

In this instance the waste producer can characterise the waste based on visual assessment and written description of the waste in addition to supporting evidence such as a desk study assessment of the greenfield status. However, it should be noted this characterisation is subject to agreement by the landfill operator who may require testing to be undertaken to confirm classification.

Contaminated or potentially contaminated sites

If the site is brownfield, contaminated or potentially contaminated, the waste must undergo an initial waste classification exercise using background information on the source and origin of the waste and assessment of chemical test data in accordance with Environment Agency Technical Guidance WM3.

If following the initial waste classification exercise, the soils are acceptable for disposal to a non-hazardous landfill, further qualitative Waste Acceptance Criteria (WAC) testing is not required.

However, if soils are potentially able to be disposed to an inert landfill as non-hazardous waste, or require testing to determine if they can be disposed of to a stable non-reactive hazardous or hazardous class of landfill, the next stage of assessment is to undertake qualitative WAC testing. This will determine the Basic Characterisation and the landfill category at which the soils can be accepted.

Hazardous material must be subjected to WAC testing to determine whether it requires treatment before it can be accepted at the hazardous landfill, while non-hazardous material can be tested to determine whether it may be suitable for placement in an inert landfill.

6.2.2 HazWasteOnline™ assessment

As the site is brownfield, in order to inform the preliminary waste characterisation process, Hydrock has undertaken an exercise using the proprietary web-based tool HazWasteOnline™. The output of the HazWasteOnline™ assessment is provided in **Error! Reference source not found.**D and a summary of the preliminary waste classification is provided below in Section 6.2.3.

6.2.3 Preliminary waste disposal options

The site is brownfield and based on the site history, the HazWasteOnline™ assessment, if suitable segregation of different types of waste is put in place, for soils to be disposed of, it is considered that:

- The natural uncontaminated Raglan Mudstone Formation is likely to be classified as non-hazardous, but may be classified as 'inert' following WAC testing.
- The 'General' Made Ground is likely to be classified as non-hazardous waste.
- Any soils containing > 0.1% asbestos or visible asbestos containing materials would be considered as hazardous.

6.2.4 General waste comments

It should be noted that:

- It is the waste producer's responsibility to segregate the waste at source and waste producers must not mix waste materials/streams or dilute hazardous components, for example by mixing with less or non-hazardous waste on site to meet WAC limit values.
- The above preliminary assessment has been made on the basis of the soils tested as part of the ground investigation, using the HazWasteOnline™ assessment. However, the formal classification of waste can only be undertaken on the material to be disposed of, and by the waste producer and the receiving landfill as license conditions vary from landfill to landfill.
- Basic Characterisation should be undertaken in accordance with Environment Agency guidance by the waste producer. Hydrock can assist if required and this report will assist the characterisation. However, Basic Characterisation does not form part of the current commission and would require further assessment and testing on the wastes actually to be disposed.
- Once the waste producer has undertaken an initial Basic Characterisation on each waste stream, they can manage the soils as part of the on-site processing programme (for example, stockpiling, treatment, screening and separation). The waste producer and landfill operator will then need to agree the suite of compliance testing for regularly generated waste to demonstrate compliance with the initial Basic Characterisation prior to disposal.
- At the time of disposal, additional testing on the excavated soils to be disposed of, will likely be necessary.
- Non-hazardous and hazardous soils require pre-treatment (separation, sorting and screening) prior to disposal.
- The costs for disposal of non-hazardous and hazardous soils are significant compared to disposal of inert material.
- In addition to disposal costs, landfill tax will be applicable. Non-hazardous and hazardous waste will generally be subject to the Standard Rate Landfill Tax. Inert or inactive waste will generally be subject to the Lower Rate Landfill Tax. The landfill tax value changes each April and can be found at https://www.gov.uk/government/publications/rates-and-allowances-landfill-tax/landfill-tax-rates-from-1-april-2013.

- Before a waste producer can move waste to a landfill site for disposal, they need to check the landfill site has the appropriate permit and must have completed the following[1]:
  - Duty of care transfer note / Hazardous Waste consignment note, including comment as to if pre-treatment has been undertaken; and
  - Basic Characterisation of the waste, to include: description of the waste; waste code (using list of wastes); composition of the waste (by testing, if necessary) and; WAC testing (if required).

6.3 Materials management

6.3.1 Introduction

Soils that are to remain on site, should be managed and reused in accordance with a Materials Management Plan (MMP), prepared in accordance with 'The Definition of Waste: Development Industry Code of Practice', Version 2 (CL:AIRE), known as the DoWCoP. Where all aspects of the DoWCoP are followed the soils are considered not to be waste, because they were never discarded in the first place.

Version 2 of the DoWCoP clearly sets out the principles and an outline of the requirements of a MMP. The following compliance criteria must be seen to apply to the MMP for the site:

Factor 1: Protection of human health and protection of the environment.
Factor 2: Suitability for use, without further treatment.
Factor 3: Certainty of Use.
Factor 4: Fixed Quantity of Material.

The reuse of soils at sites should be considered during the planning and development design process so that compliance with issues such as fixed quantity and certainty of use clearly relate to agreed site levels. Suitability of Use is normally evident from the remediation strategy or the design statement, which form an integral part of a MMP. However, some soils may need to be tested post-excavation to prove they are suitable for use.

Once the MMP is finalised, it must be declared by a Qualified Person (QP). The Declaration is an on-line submission as part of which the QP is required to confirm that the declaration is being made before the relevant works have commenced (i.e. it is not a retrospective application).

Once all material movements have been completed in accordance with the MMP a verification report must be produced, kept for 2 years and provided to the EA on request.

It should be noted that failure to comply with the requirements of the DoWCoP when re-using materials has potentially significant consequences for the waste holder. The risk is that the reused materials are still regarded as a waste that has been illegally deposited. From 1 April 2018, the scope of Landfill Tax has been extended to sites operating without the appropriate environmental disposal permit, and operators of illegal waste sites will now be liable for Landfill Tax. Further information is available at: **https://www.gov.uk/government/publications/landfill-tax-disposals-not-made-at-landfill-sites/landfill-tax-disposals-not-made-at-landfill-sites**.

If soils are excavated and reused on sites (or moved to another site) without a MMP, exemption, or appropriate Permit in place, anyone who knowingly facilitates the disposal may be 'jointly and severally liable' to any assessment of tax, fines or prosecution.

[1] ENVIRONMENT AGENCY. November 2010. Guidance on waste acceptance procedures and criteria. Waste acceptance at landfills. The Environment Agency.

6.3.2 Materials management scenarios

To facilitate the construction of the proposed 3G pitch, significant earthworks are likely to be required.

At the time of writing, detailed proposals have not been made available, but it is considered likely that material import will be required to attain the proposed site levels.

A Materials Management Plan would be required to facilitate this.

The materials management scenarios present on site are discussed below.

It should be noted that more than one scenario may apply, dependent upon where the soils are proposed for reuse.

6.3.2.1 Clean, naturally occurring materials – reused on the site of origin

Where soils are naturally occurring, uncontaminated and are reused on the site they are excavated (i.e., greenfield site with documented site history, with no Made Ground), they will fall outside the Waste Framework Directive (WFD) (i.e., they will not be a waste when reused on the site of origin).

However, there needs to be certainty of that reuse, and evidence is necessary to support this strategy, for example through information provided during the planning process. The onus is on the developer to demonstrate that the materials are not a waste and will never become a waste. As such, a Materials Re-use Strategy is recommended to show certainty. Alternatively, if the volume of material is under 1,000 tonnes, then a U1 waste exemption may be applied for from the Environment Agency.

It may be noted that some 'clean naturally occurring materials' may still fail the 'suitable for use' test, for example, soils with a naturally high organic content may not be suitable for use because of their propensity to produce ground gases such as methane. Rules regarding other more unusual circumstances such as where natural soils contain an unacceptably high mineral content are described in the DoWCoP.

6.3.2.2 Clean, naturally occurring materials – transferred to other sites

Where soils are naturally occurring, uncontaminated and are transferred to other sites (i.e., direct transfer), they will not become waste as long as the transfer is undertaken in accordance with the DoWCoP. A MMP must be prepared for the receiving site and the materials movement must be noted in the MMP of the Donor site. This movement must have been declared to CL:AIRE prior to the works commencing.

6.3.2.3 Made Ground and other contaminated soils

On sites where Made Ground or contaminated soils are present, any soils excavated will be a waste as soon as they are excavated (even if they are clean, naturally occurring materials), unless they are subject to reuse in accordance with the DoWCoP. As such, for any brownfield site or a site where Made Ground is present and soils are being moved and reused, the materials could be deemed a waste, subject to either:

- a Materials Management Plan (MMP), to prevent the material being classified as a waste following reuse; or
- an exemption (for limited volumes); or
- an environmental permit, dependant on its status.

6.3.2.4 Made Ground and other contaminated soils

All recycled materials (6F2 etc.) must be produced under the 2013 WRAP 'Quality Protocol: Aggregates from inert waste', whether on site or off-site. If they are not, they will be deemed a

waste and can only be used on site under a permit. More information can be found at **https://www.gov.uk/government/publications/quality-protocol-production-of-aggregates-frm-inert-waste.**

6.3.2.5 Geotechnical improvement requirements

Construction activities carried out on uncontaminated soils solely for the purpose of improving geotechnical properties e.g., lime / cement modification, are not generally regarded as waste treatment operations and do not require a permit.

However, should processing be needed (such as screening, treatment or improvement), that would constitute a waste activity and require a mobile treatment permit. This may be as simple as removing oversize material with an excavator bucket, to using a riddle bucket to remove hardcore to full mechanical screening.

7 Uncertainties and limitations

7.1 General comments

Hydrock Consultants Limited (Hydrock) has prepared this report in accordance with the instructions of Mace Group (the Client), by e-mail dated October 2022 under the terms of appointment for Hydrock, for the sole and specific use of the Client and parties commissioned by them to undertake work where reliance is placed on this report. Any third parties who use the information contained herein do so at their own risk. Hydrock shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared or for use of the report by any parties not defined in Hydrock's appointment.

This report details the findings of work carried out on 21 November 2022. The report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, not all potential environmental constraints or liabilities associated with the site may have been revealed.

Hydrock has used reasonable skill, care and diligence in the design of the investigation of the site and in its interpretation of the information obtained. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths of trial pits and boreholes at the time of the investigation. At intermediate locations, conditions can only be inferred.

Plans that provide assessment of foundation types and depths are indicative and subject to further design. This design should incorporate a detailed assessment of the influence of trees, influence of cut to fill proposals and geological conditions.

Unless otherwise stated, the recommendations in this report assume that ground levels will remain as existing. If there is to be any re-profiling (e.g., to create development platforms or for flood alleviation) then the recommendations may not apply.

Information provided by third parties has been used in good faith and is taken at face value; however, Hydrock cannot guarantee its accuracy or completeness.

Where the existing report(s) prepared by others have been provided by the Client, it is assumed that these have been either commissioned by the Client, or can be assigned to the Client, and can be relied upon by Hydrock. Should this not be the case Hydrock should be informed immediately as additional work may be required. Hydrock is not responsible for any factual errors or omissions in the supplied data, or for the opinions and recommendations of others. It is possible that the conditions described may have since changed through natural processes or later activities.

The work has been carried out in general accordance with recognised best practice. Unless otherwise stated, no assessment has been made for the presence of radioactive substances or unexploded ordnance. Where the phrase 'suitable for use' is used in this report, it is in keeping with the terminology used in planning control and does not imply any specific warranty or guarantee offered by Hydrock.

Discussion and comment with regards to waste classification are preliminary and do not form the requirements of 'Basic Characterisation' as required.

Unless otherwise stated, at the time of this investigation the future routes of water supply pipes had not been established. This investigation and sampling strategy may not be fully compliant with UKWIR recommendations. Consequently, a targeted investigation and specific sampling and chemical testing may be required at a later date once the routes of the supply pipes are known. In addition, it is recommended that the relevant water supply company be contacted at an early stage to confirm its requirements for assessment, which may not necessarily be the same as those recommended by UKWIR.

Please note that notwithstanding any site observations concerning the presence or otherwise of archaeological sites, asbestos-containing materials or invasive weeds, this report does not constitute a formal survey of these potential constraints and specialist advice should be sought.

Any site boundary line depicted on plans does not imply legal ownership of land.

8 Recommendations for further work

Following the ground investigation works undertaken to date, the following further works will be required:

- WAC testing of natural and Made Ground soils to determine final waste disposal criteria;
- Review of the earthworks strategy/proposed levels for the site, and production of a site-specific earthworks specification;
- Review of any proposed retaining structures or slopes to accommodate the proposed site levels, with appropriate geotechnical design checks;
- production of a Materials Management Plan (MMP) relating to reuse of (site-won) soils at the site, or to facilitate the import of material to the site, to meet proposed development levels; and
- Supervision and verification of the earthworks prior to construction of the 3G pitch.

9 References

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Appendix A Drawings

N

Hard
Informal

Existing
parking

Existing Building

Hard Informal

Existing
Building

Pastoral
Resources
Centre

Chapel
(private)

Trees

Trees

Key

- Boundary line
- Site Ownership Boundary line
- Proposed Pitch
- Trees
- Existing Building

Rev	By	Description	Date	CHK'D
A	JHD	PITCH SIZE CORRECT PITCH LOCATION CHANGED	13/09/22	HA

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PROJECT
CARDIFF
SUFFICIENCY SCHEMES
ST ILLTYDS

DRAWING TITLE
PROPOSED SITE PLAN
ADULT RUGBY PITCH OPTION B
126 X 80m

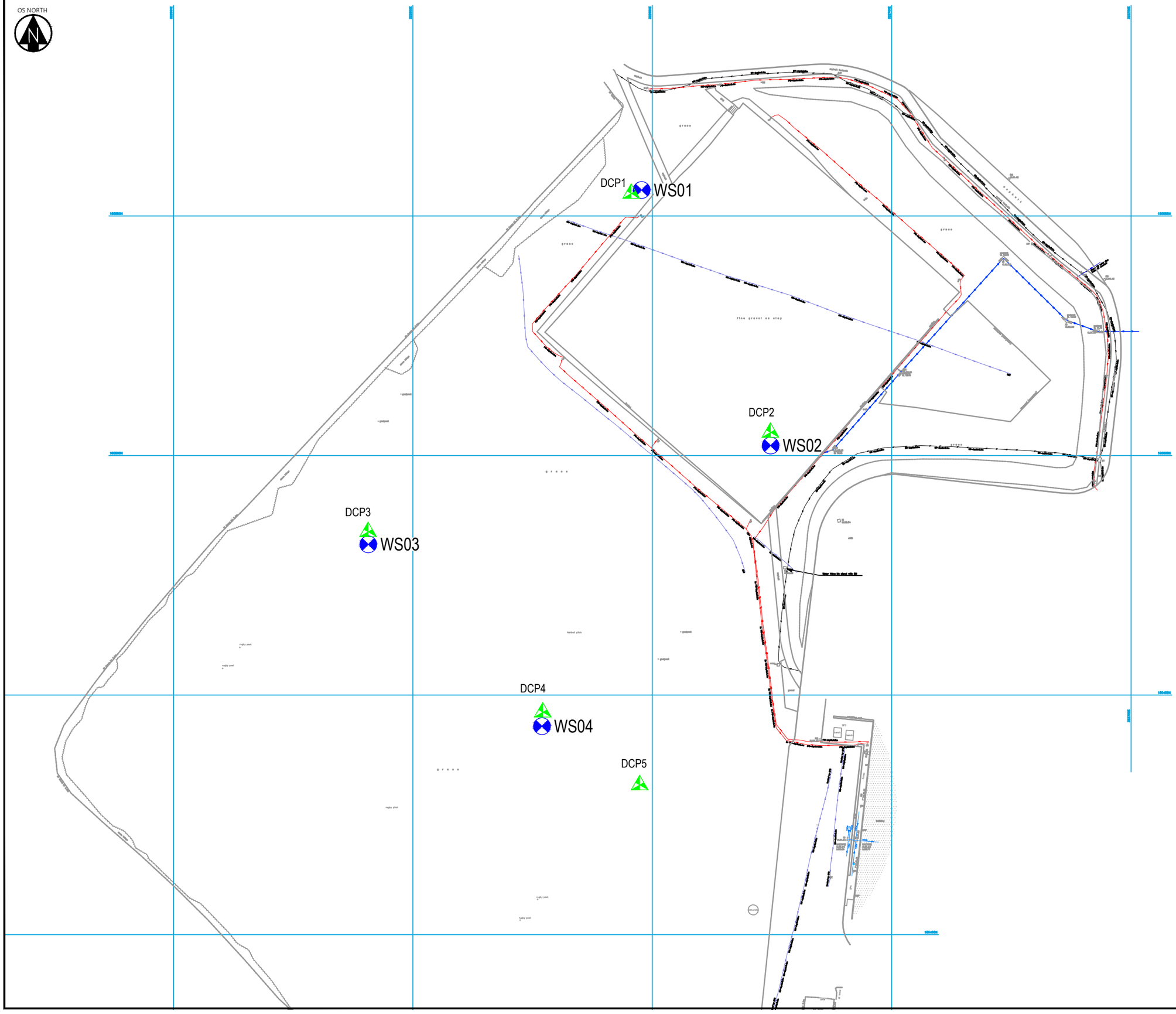
DRAWN BY	GO	DATE	08/09/2022
CHECKED	HA	SCALE	1:500 @ A1

PROJECT No.	DISCI. Code.	SEQ. No.	REV.
38678	A	A	-

HCC ASSET CODE -

FILED ON AUTOCAD AS:R:\Projects\Live\2000005994 Cardiff 22 Sufficiency Schemes\04 - St Illtyd\01 - Architect\02 - CAD & BIM\01 - AutoCAD\38678_St Illtyds_Pitch Option outlines.dwg

OS NORTH



KEY

Window sample hole

Cone penetration test

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing has been based on the following drawings and information:
Utility survey at St Illtyd's Catholic High School, HY4058-10A_Scale: 1:200@A0, Date: November 2022.

REV.						
P2	09/11/22					
	MH	09/11/22	JW	17/01/23	AE	30/01/23
P1	FIRST ISSUE					
	MW	20/01/22	MH	20/01/22	AE	20/01/22
	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT

MACE GROUP

PROJECT

CARDIFF SUFFICIENCY SCHEMES '22 - ST ILLTYDS

TITLE

EXPLORATORY HOLE LOCATION PLAN

HYDROCK PROJECT NO.	SCALE @ A3
C-20700-C	1:750
PURPOSE OF ISSUE: SUITABLE FOR INFORMATION	STATUS: S2
DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER): 20700-HYD-XX-04-DR-GE-1003	REVISION: P2

Appendix B Factual Reports

St Illtyd's Catholic High School

Ground Investigation Factual Report

2072123B Final

CJAssociates

CJ ASSOCIATES CONTROL SHEET

Project No.: 2072123B

Title: St Illtyd's Catholic High School

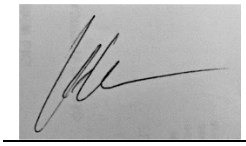
Client: Hydrock Group

Issue Date: January 23

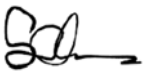
Office: CJ Associates Limited, Portview Road, Avonmouth, Bristol. BS11 9JE

Version: 2072123B-FAC-02

Ian Garstang
Senior Geo-Environmental Engineer



Shaun O'Farrell
Project Manager



VERSION CONTROL SHEET

Reference	Date	Status	Amended by	Approved by
FAC-01	17/01/2023	Draft	n/a	n/a
FAC-02	29/01/2023	Final	IG	SOF

CJAssociates

CONTENTS

DRAWING(S)

TABLES

APPENDICES

1 INTRODUCTION

1.1 Commissioning

CJ Associates Limited (CJ Associates, CJA) was instructed by Hydrock Group (Hydrock) to undertake intrusive ground investigation at their site in Rumney, Cardiff. CJ Associates was commissioned to provide the following for the project:

- A factual description of the work undertaken
- Exploratory hole logs
- Laboratory testing results

1.2 Objectives

The objective of the ground investigation was to obtain geological data across the site, to establish geotechnical properties and investigate presence of below ground contamination to aid in the design and completion of the Clients proposed works.

1.3 Scope of works

The scope of the investigation was designed by Hydrock as provided within the received specification document.

The scope included:

- 4No. windowless sample holes to maximum depth of 3m bgl
- 5No. TRL-DCP Tests

Final exploratory hole locations were agreed on site between the Client and CJ Associates, following consideration of the existing site conditions and site access restrictions. Details of the works completed, including any deviation from the scope of work, is identified in **Section 3.**

1.4 Limitations

This report presents a description of the site at the time of the fieldwork, results of the fieldwork, in-situ testing undertaken, strata encountered and geotechnical and chemical test results.

There may be other conditions prevailing at the site which have not been disclosed by this investigation and which have not been considered by this report. Responsibility cannot be accepted for conditions at the site not revealed by the investigation and confirmation of intermediate ground conditions between exploratory holes should be considered if deemed necessary.

Unless instructed by the Client, CJ Associates is not obliged to and disclaims any obligation to update the report for events taking place after the date on which this investigation was undertaken.

2 SITE DETAILS

2.1 Site Location

The site is located on the playing fields of St Illyd's Catholic High School in Rumney, Cardiff immediately west of the school buildings. The site is approximately 1.5km south of Junction 1 of the A48(M) and the nearest postcode is CF3 1XQ.

Site location details are presented in **Table 1** and satellite imagery of the area is presented in **Figure .**

Table 1 - Site Location

Site name	St Illtyd's Catholic High School
Full site address and postcode	Newport Road, Rumney, Cardiff. CF3 1XQ
National Grid reference	ST226804

Figure 1: Site location (Google Earth©, 2023)

2.2 Site Description

The site comprises level grassed playing fields immediately to the north and west of the school buildings with a portion given over to a Red-Gra pitch. The site is further bounded on all sides by residential areas.

2.3 Site Geology

2.3.1 Made Ground

Made Ground is not indicated to be present at the location; however, due to the nature of the site, deposits associated with construction are likely to be encountered.

2.3.2 Anticipated geological sequence

Published records (British Geological Survey, BGS) for the area indicate the geology of the site to be characterised by the strata recorded in **Tables 2** and **3**, seen below.

Table 2 - Site Geology (Superficial)

Strata	Description
None Shown	
Relevant information sources: BGS Geoindex ☒ BGS borehole logs ☐ Previous SI reports ☐	

Table 3 - Site Geology (Solid Geology)

Strata	Description
Raglan Mudstone Formation	Red mudstones and silty mudstones with calcretes and sandstones.
Relevant information sources: BGS Geoindex ☒ BGS borehole logs ☐ Previous SI reports ☐	

3 FIELDWORK

3.1 General Fieldwork Information

The ground investigation works were completed on the 21st November 2022 with works completed during normal weekday shifts.

The fieldwork was carried out in general accordance with Eurocode 7, BS5930:2015+A1:2020 - 'Code of Practice for Ground Investigations'; BS10175 'Investigation of potentially contaminated sites – Code of Practice' (2001); Association of Geotechnical and Geo-environmental Specialist Guidelines for Good Practice in Site Investigations (August 1998) and logged in accordance with BS EN ISO 14688-1:2018 and BS EN ISO 14688-2:2018.

The final locations of exploratory holes were determined by the presence of underground services, practicalities, and any site access restrictions. The locations of exploratory holes are provided on drawing 20700-HYD-XX-04-DR-GE-1003 with coordinates and levels recorded on the individual exploratory hole logs presented as Appendix A.

3.2 Exploratory Holes

The exploratory holes were completed using windowless sampling and TRL DCP techniques. The logging, sampling and subsampling of the exploratory holes were completed by a suitably qualified Geo-Environmental Engineer provided by CJ Associates.

The completed scope of works was as follows:

- 4No. windowless sample holes to a maximum depth of 3.00m bgl
- 5No. TRL-DCP tests to a maximum depth of 1.04m bgl

For full details of the strata encountered, groundwater strikes, samples taken, in-situ testing, logging legend sheet, and calibration certificates please refer to the individual exploratory hole records presented as Appendix A.

3.3 Monitoring Installations

Instrumentation was not installed as part of this investigation.

4 LABORATORY TESTING

4.1 Geotechnical Laboratory Testing

Laboratory testing was scheduled by Hydrock on selected soil samples recovered during the investigation. The samples were tested at CJ Associates' testing facility in Bridgend.

All testing has been carried out in accordance with the laboratory's UKAS accreditation following lab standards set out in BS EN INO 17892.

Geotechnical laboratory testing results are presented as Appendix B.

4.2 Chemical Laboratory Testing

Chemical testing was scheduled by Hydrock on selected samples recovered during the ground investigation. The samples were sent to Envirolab at their laboratory in Hyde, Chester.

All testing was carried out in accordance with the laboratory's UKAS accreditation.

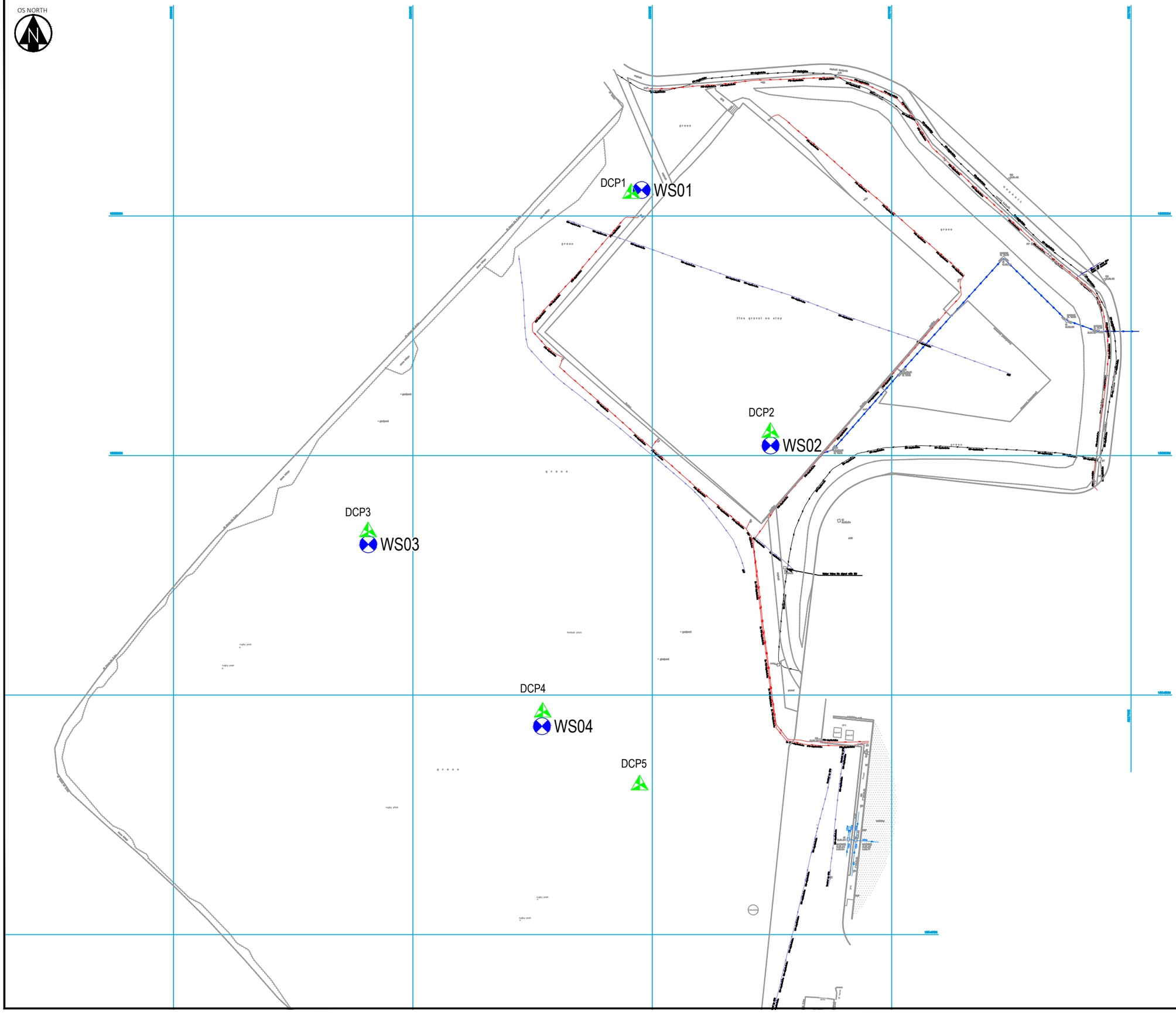
Chemical laboratory testing results are presented as Appendix C.

CJAssociates

DRAWING(S)

Appendix A
Exploratory Hole Logs

OS NORTH



KEY

Window sample hole

Cone penetration test

NOTES

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2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing has been based on the following drawings and information:
Utility survey at St Illtyd's Catholic High School, HY4058-10A_Scale: 1:200@A0, Date: November 2022.

REV.						
P2	09/11/22					
	MH	09/11/22	JW	17/01/23	AE	30/01/23
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	MW	20/01/22	MH	20/01/22	AE	20/01/22
	REVISION NOTES/COMMENTS					
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E-Mail: cardiff@hydrock.com
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CLIENT

MACE GROUP

PROJECT

CARDIFF SUFFICIENCY SCHEMES '22 - ST ILLTYDS

TITLE

EXPLORATORY HOLE LOCATION PLAN

HYDROCK PROJECT NO.	SCALE @ A3
C-20700-C	1:750
PURPOSE OF ISSUE: SUITABLE FOR INFORMATION	STATUS: S2
DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER): 20700-HYD-XX-04-DR-GE-1003	REVISION: P2

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www.cjageo.co.uk

Start Date:	21/11/2022	Checked:	ME
End Date:	21/11/2022	Approved:	SOF

Location ID: **WS01**

FINAL

Methodology & Plant

Depth (m)	Method	Plant Used
0.00 - 1.20	Inspection Pit	Hand Tools
1.20 - 3.00	Dynamic Sampling	Dando Terrier

Project No:	**2072123 B**
Name:	**St Illtyd's Catholic High School**
Location:	**Cardiff**
Client:	**Hydrock**

Location Details

Easting:	**322640.87**	Northing:	**180553.18**
Elevation:	**54.65mAOD**	Final Depth:	**3.00m**
Logged By:	**MC**	Grid System:	**OSGB**
Orientation:	**N/A**	Inclination:	**90°**

Log Type: **Dynamic Sampling**

Scale: 1:50

Sheet 1 of 1

Strata Description	Legend	Depth (m) (Stratum Thickness)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
Grass over soft dark brown silty CLAY. (TOPSOIL)		(0.20)							
Very stiff reddish brown to light brown sandy slightly gravelly clayey SILT with medium cobble content. Gravel is angular fine to coarse of siltstone. (Possible weathered mudstone)		0.20	54.45				1.00	ES	
							1.00 - 2.00	B	
							1.20	D	SPT(S) 1.20m, N=9 (1,2/2,2,2,3)
							1.20 - 2.00	L	
							1.21 - 1.65	D	
		(2.80)					1.65	D	
							1.70 - 1.80	D	
							2.00	D	SPT(S) 2.00m, N=21 (3,4/6,6,5,4)
							2.00	ES	
							2.00 - 3.00	L	
							2.45	D	
EOH at 3.00m -		3.00	51.65				3.00	D	SPT(S) 3.00m, 50 (11,13/50 for 220mm)
							3.00	ES	

Observations / Remarks

Misc.

No Groundwater Encountered
Hole Not Cased
No Monitoring Point/s Installed

Backfill

Depth (m)	Material
0.00 - 3.00	Arisings

Hammer Ref & Energy Ratio (%)

A7001023 (74%)

Dynamic Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks
1.20	2.00	102	100	
2.00	3.00	78	100	

Installations

Instrument Details	Resp. Zone	Depth (m)	Diameter

Groundwater Strikes

Strike (m)	Casing (m)	Sealed (m)	Rises To (m)	Time (min)	Remarks

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Start Date:	21/11/2022	Checked:	ME
End Date:	21/11/2022	Approved:	SOF

Location ID: **WS02**

FINAL

Methodology & Plant

Depth (m)	Method	Plant Used
0.00 - 1.20	Inspection Pit	Hand Tools
1.20 - 2.90	Dynamic Sampling	Dando Terrier

Project No:	**2072123 B**
Name:	**St Illtyd's Catholic High School**
Location:	**Cardiff**
Client:	**Hydrock**

Location Details

Easting:	**322672.55**	Northing:	**180500.73**
Elevation:	**53.26mAOD**	Final Depth:	**2.90m**
Logged By:	**MC**	Grid System:	**OSGB**
Orientation:	**N/A**	Inclination:	**90°**

Log Type: **Dynamic Sampling**

Scale: 1:50

Sheet 1 of 1

Strata Description	Legend	Depth (m) (Stratum Thickness)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
MADE GROUND: Grey coarse SAND.		(0.20)							
MADE GROUND: Stiff reddish brown to light brown gravelly CLAY with low cobble content. Gravel is angular to sub-rounded fine to coarse of siltstone. Cobbles are sub-angular siltstone.		0.20 (0.90)	53.06				0.25 - 0.50	D	
Soft greyish brown slightly gravelly silty CLAY with many rootlets. Gravel is sub-angular fine to medium of siltstone.		1.10 (0.10)	52.16 52.06				1.00 1.20	ES D	SPT(S) 1.20m, N=4 (1,1/1,1,1,1)
Stiff to very stiff reddish brown to light brown gravelly clayey SILT. Gravel is angular fine to coarse of mudstone and siltstone. (Possible weathered mudstone)		1.20 (1.70)					1.20 - 2.00 2.00 2.00 - 2.45 2.00 - 2.45 2.00 - 2.90 2.01 - 2.90 2.45 - 2.90	L ES D 11 D L D D	SPT(S) 2.00m, N=18 (1,2/3,4,5,6)
EOH at 2.90m -		2.90	50.36				2.90 2.90	D ES	SPT(S) 2.90m, 50 (25 for 115mm/50 for 90mm)

Observations / Remarks

Misc.

No Groundwater Encountered
Hole Not Cased
No Monitoring Point/s Installed

Backfill

Depth (m)	Material
0.00 - 2.90	Arisings

Hammer Ref & Energy Ratio (%)

A7001023 (74%)

Dynamic Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks
1.20	2.00	102	100	
2.00	2.90	78	100	

Installations

Instrument Details	Resp. Zone	Depth (m)	Diameter

Groundwater Strikes

Strike (m)	Casing (m)	Sealed (m)	Rises To (m)	Time (min)	Remarks

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Start Date:	21/11/2022	Checked:	ME
End Date:	21/11/2022	Approved:	SOF

Location ID: **WS03**

FINAL

Methodology & Plant

Depth (m)	Method	Plant Used
0.00 - 1.20	Inspection Pit	Hand Tools
1.20 - 3.00	Dynamic Sampling	Dando Terrier

Project No:	**2072123 B**
Name:	**St Illtyd's Catholic High School**
Location:	**Cardiff**
Client:	**Hydrock**

Location Details

Easting:	**322596.89**	Northing:	**180497.36**
Elevation:	**54.70mAOD**	Final Depth:	**3.00m**
Logged By:	**MC**	Grid System:	**OSGB**
Orientation:	**N/A**	Inclination:	**90°**

Log Type: **Dynamic Sampling**

Scale: 1:50

Sheet 1 of 1

Strata Description	Legend	Depth (m) (Stratum Thickness)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
Grass over soft dark brown silty CLAY. (TOPSOIL)		(0.20)							
Stiff reddish brown to light brown gravelly CLAY. Gravel is angular fine to coarse of mudstone and siltstone. (Possible weathered mudstone)		0.20	54.50				1.00	ES	
Between 1.20m and 2.00m, very clayey SAND.							1.20	D	SPT(S) 1.20m, N=18 (2,3/3,5,5,5)
							1.20 - 2.00	B	
		(2.80)					1.65	D	
							2.00	D	SPT(S) 2.00m, N=34 (4,5/7,8,9,10)
							2.00	ES	
							2.00 - 3.00	B	
							2.00 - 3.00	L	
							2.25	D	
EOH at 3.00m -		3.00	51.70				3.00	D	SPT(S) 3.00m, 50 (8,10/50 for 170mm)
							3.00	ES	

Observations / Remarks

Misc.

No Groundwater Encountered
Hole Not Cased
No Monitoring Point/s Installed

Backfill

Depth (m)	Material
0.00 - 3.00	Arisings

Hammer Ref & Energy Ratio (%)

A7001023 (74%)

Dynamic Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks
1.20	2.00	102	100	
2.00	3.00	78	100	

Installations

Instrument Details	Resp. Zone	Depth (m)	Diameter

Groundwater Strikes

Strike (m)	Casing (m)	Sealed (m)	Rises To (m)	Time (min)	Remarks

CJAssociates

CJ Associates Geotechnical Ltd
Portview Road, Avonmouth
Bristol, BS11 9JE
+44(0)117 9821 473
www.cjageo.co.uk

Start Date:	21/11/2022	Checked:	ME
End Date:	21/11/2022	Approved:	SOF

Location ID: **WS04**

FINAL

Methodology & Plant

Depth (m)	Method	Plant Used
0.00 - 1.20	Inspection Pit	Hand Tools
1.20 - 2.80	Dynamic Sampling	Dando Terrier

Project No:	**2072123 B**
Name:	**St Illtyd's Catholic High School**
Location:	**Cardiff**
Client:	**Hydrock**

Location Details

Easting:	**322649.31**	Northing:	**180452.30**
Elevation:	**52.97mAOD**	Final Depth:	**2.80m**
Logged By:	**MC**	Grid System:	**OSGB**
Orientation:	**N/A**	Inclination:	**90°**

Log Type: **Dynamic Sampling**

Scale: 1:50

Sheet 1 of 1

Strata Description	Legend	Depth (m) (Stratum Thickness)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
Grass over dark brown silty CLAY. (TOPSOIL)		(0.20)							
		0.20	52.77						
Stiff reddish brown to light brown slightly sandy slightly gravelly CLAY. Gravel is angular fine to coarse of mudstone and siltstone. (Possible weathered mudstone)							1.00	ES	
							1.00 - 2.00	B	
							1.20	D	SPT(S) 1.20m, N=8 (1,2/2,2,2,2)
							1.20 - 2.00	L	
		(2.60)							
							1.80 - 2.00	D	
							2.00	D	SPT(S) 2.00m, N=23 (3,3/4,4,4,11)
							2.00	ES	
							2.00 - 2.80	L	
							2.20 - 2.30	D	
EOH at 2.80m -		2.80	50.17				2.80	D	SPT(S) 2.80m, 50 (8,11/50 for 275mm)
							2.80	ES	

Observations / Remarks

Misc.

No Groundwater Encountered
Hole Not Cased
No Monitoring Point/s Installed

Backfill

Depth (m)	Material
0.00 - 2.80	Arisings

Hammer Ref & Energy Ratio (%)

A7001023 (74%)

Dynamic Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks
1.20	2.00	102	100	
2.00	2.80	78	100	

Installations

Instrument Details	Resp. Zone	Depth (m)	Diameter

Groundwater Strikes

Strike (m)	Casing (m)	Sealed (m)	Rises To (m)	Time (min)	Remarks

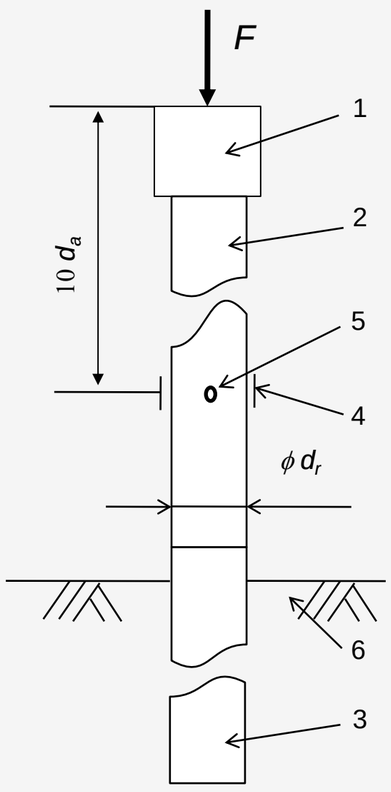
SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		TERRIER
Test No		EQU2022_218
Client		CJ ASSOCIATES
Test Depth (m)		15.80
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod

Diameter	d_r =	0.052 m
Length of instrumented rod		0.558 m
Area	A =	11.61 cm²
Modulus	E_a =	206843 MPa



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

F Force
d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

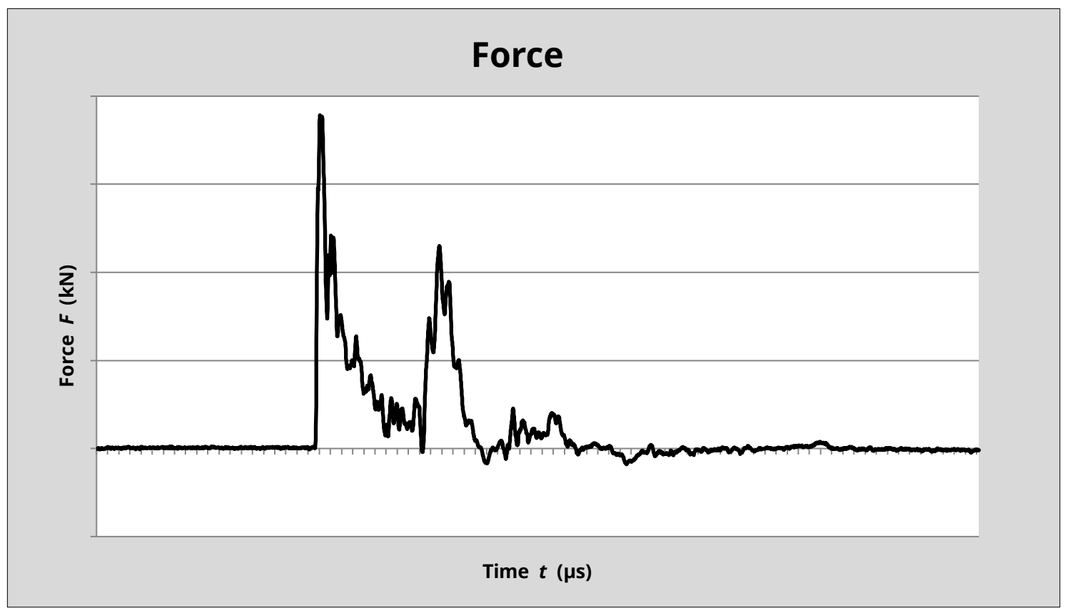
DATE OF TEST	VALID UNTIL	HAMMER ID
15/07/2022	15/07/2023	A7001023

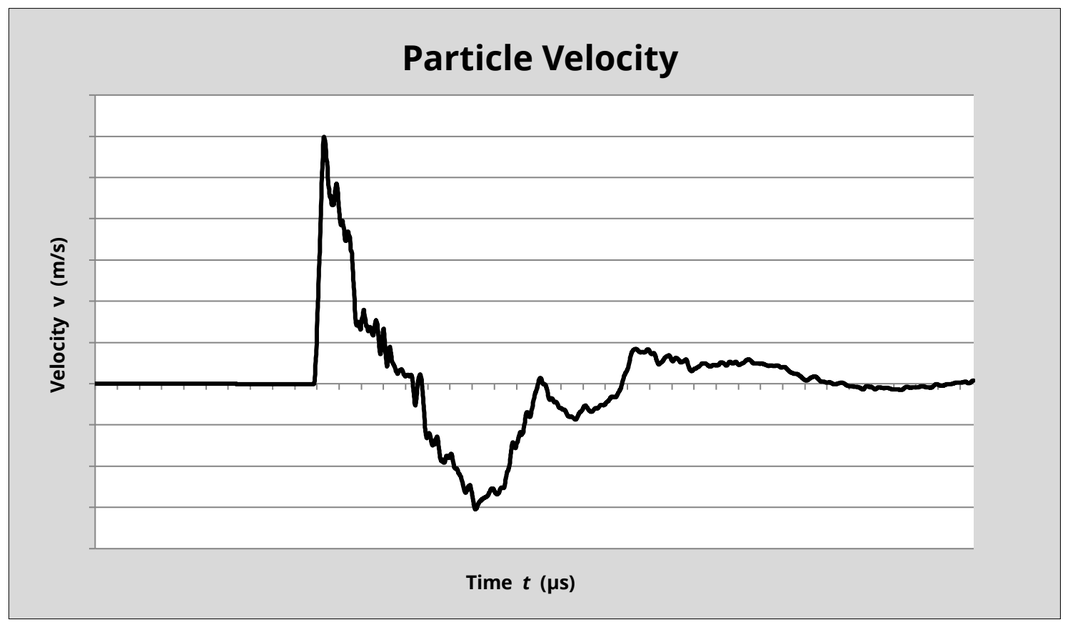
E_{meas} = **0.350** kN-m

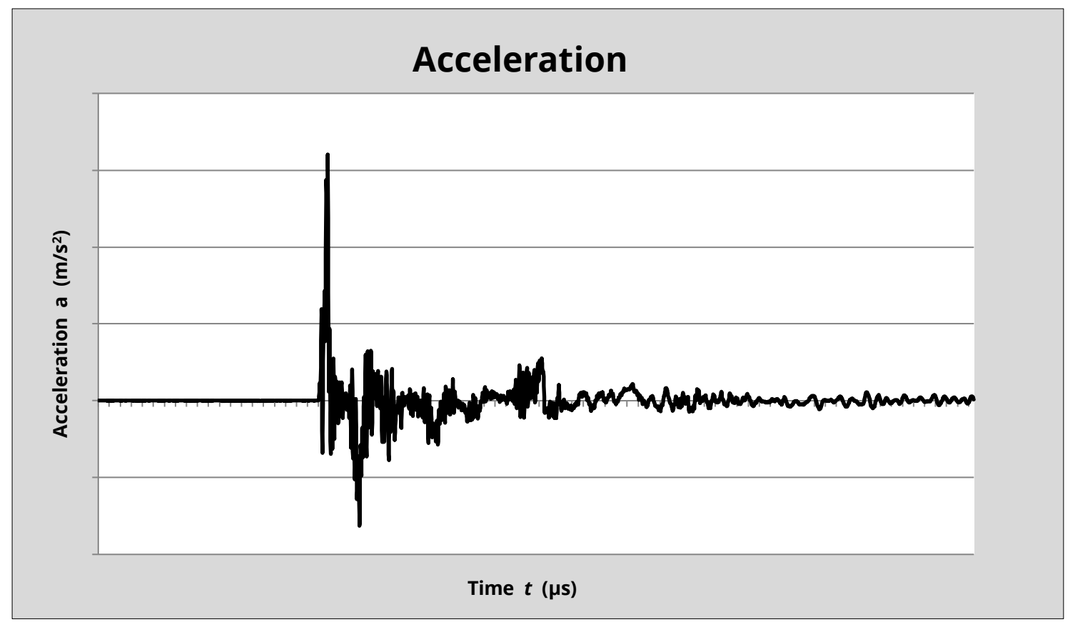
E_{theor} = **0.473** kN-m

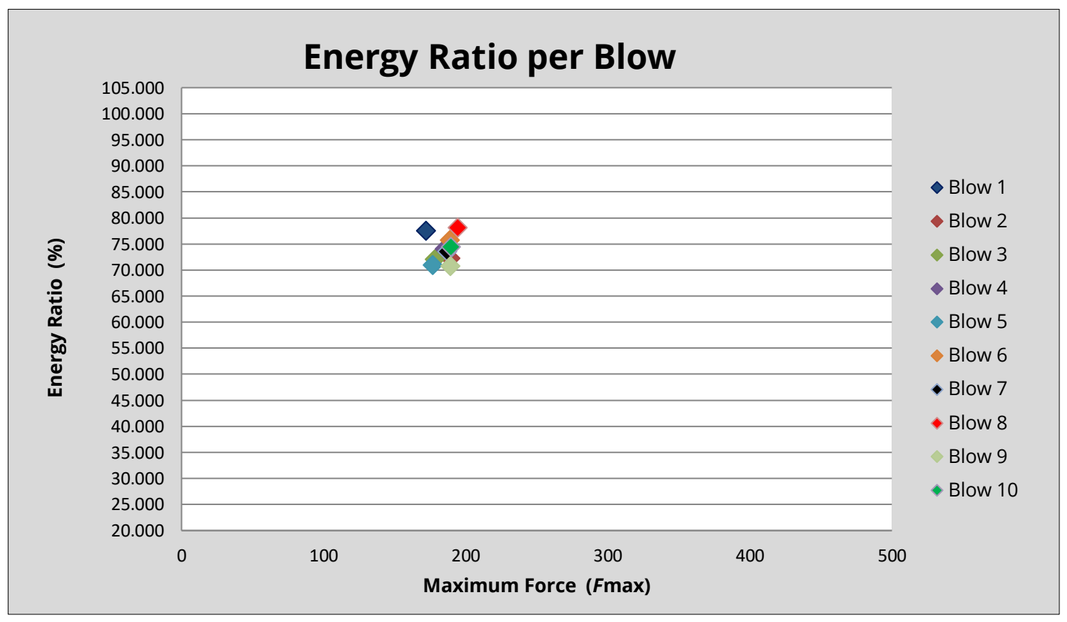
Comments

Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$ **74.01%**









Equipe SPT Analyzer Operator	Certificate prepared by	Certificate checked by	Certificate date
JL	25/07/2022	25/07/2022	25/07/2022

 Equipe Group, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU
Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

CJAssociates

Portview Road,
Avonmouth, Bristol,
BS11 9JE

Phone:
Bridgend: 01656 657710
Bristol: 0117 9821473

REPORT No.	:	2072123
Ref	:	CPT01
Location of testing:	:	On site: St Illyds School
CLIENT	:	Hydrock
SITE	:	St Illyds
MATERIAL DESCRIPTION	:	See individual tests
DATE TESTED	:	21 November 2022
TESTING REQUIRED	:	5 No. TRL DCP Tests
TEST METHOD	:	BS1377, DMRB & TRL
RELEVANT SPECIFICATION	:	For information
TEST LOCATION	:	At locations as directed by Client and detailed on Client's records
DEPTH (m)	:	See individual tests Various
TEST RESULTS	:	See Pages 2 – 6

COMMENTS
Weather - Wet

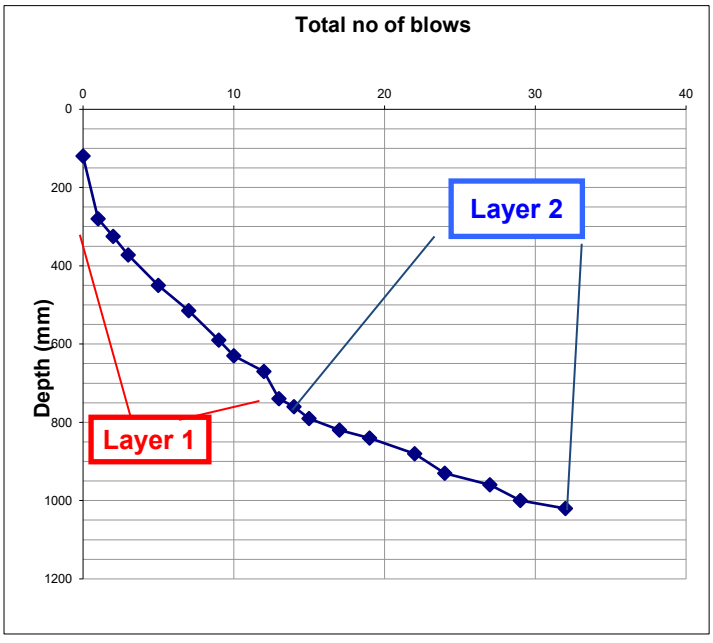
The results shown in this report only relate to the location tested.
Testing carried out in accordance with documented standard,
so measurement of uncertainty has not been applied to the statement of conformity.

CHECKED BY: MC **DATE:** 09/12/2022

DYNAMIC CONE PENETRATION TEST RESULTS

Client Name	Hydrock	Date	21.11.2022	CJAssociates	
Job Name	St Illyds	Report Ref.	2072123		
Where commenced: eg existing level, core hole etc	Base of inspection pit	Zero Readings - Hard standing	120	Commencing depth Initial	120
		Settled in soil		Settled	120
		Test No.	1		
Test location:	DCP1	Marker:			
Material description:	Clay				

Total No. of Blows	Equiv Depth Rdg (mm)	Total depth (mm)	Penetration per blow (mm)	Layer	Top of layer (mm)	Base of layer (mm)	Blows at top of layer	Blows at base of layer	Mean penetration per blow (mm)	CBR of layer (%)
0	170	120	0							
1	330	280	160.00	Layer 1	120	670	0	12	45.8	**5**
2	375	325	45.00							
3	422	372	47.00							
5	500	450	39.00	Layer 2	670	1020	12	27	23.3	**10.8**
7	565	515	32.50							
9	640	590	37.50							
10	680	630	40.00							
12	720	670	20.00							
13	790	740	70.00							
14	810	760	20.00	Overall Mean	120	1020	0	12	75.0	**3**
15	840	790	30.00							
17	870	820	15.00							
19	890	840	10.00							
22	930	880	13.33							
24	980	930	25.00							
27	1010	960	10.00							
29	1050	1000	20.00							
32	1070	1020	6.67							



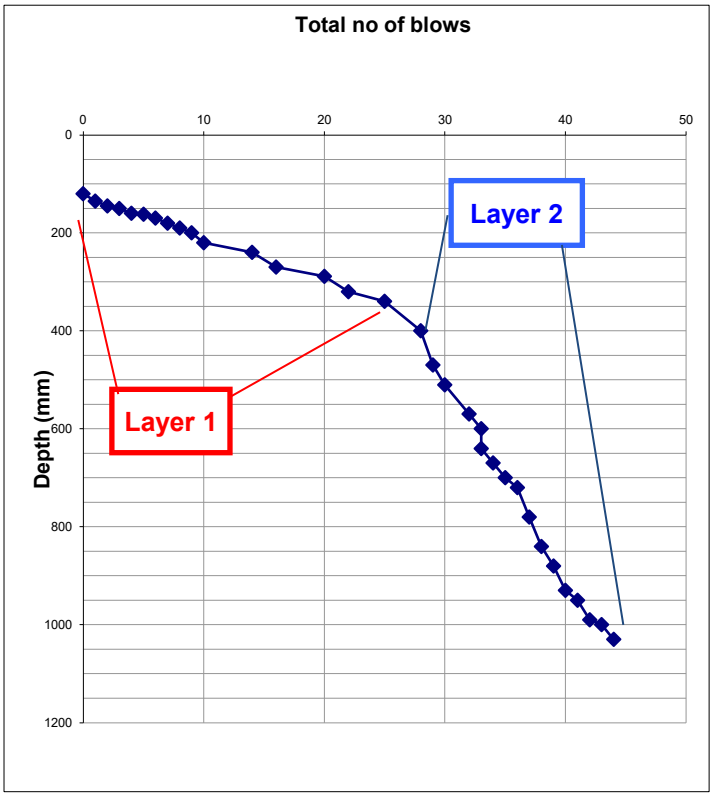
Remarks:

Particles >20mm	Yes				
Operators	CF/MC	Sheet	2	of	6

DYNAMIC CONE PENETRATION TEST RESULTS

Client Name	Hydrock	Date	21.11.2022	CJAssociates
Job Name	St Illyds	Report Ref.	2072123	
Where commenced: eg existing level, core hole etc	Base of inspection pit	Zero Readings - Hard standing / Settled in soil		Commencing depth: Initial 120, Settled 120
		Test No.	2	
Test location:	DCP2	Marker:		
Material description:	Clay			

Total No. of Blows	Equiv Depth Rdg (mm)	Total depth (mm)	Penetration per blow (mm)	Layer	Top of layer (mm)	Base of layer (mm)	Blows at top of layer	Blows at base of layer	Mean penetration per blow (mm)	CBR of layer (%)
0	190	120	0							
1	205	135	15.00	Layer 1	120	340	0	25	8.8	**30**
2	215	145	10.00							
3	220	150	5.00							
4	230	160	10.00	Layer 2	340	1030	25	44	36.3	**6.8**
5	232	162	2.00							
6	240	170	8.00							
7	250	180	10.00							
8	260	190	10.00							
9	270	200	10.00							
10	290	220	20.00	Overall Mean	120	1030	0	44	20.7	**12**
14	310	240	5.00							
16	340	270	15.00							
20	359	289	4.75							
22	390	320	15.50							
25	410	340	6.67							
28	470	400	20.00							
29	540	470	70.00							
30	580	510	40.00							
32	640	570	30.00							
33	670	600	30.00							
33	710	640	40.00							
34	740	670	30.00							
35	770	700	30.00							
36	790	720	20.00							
37	850	780	60.00							
38	910	840	60.00							
39	950	880	40.00							
40	1000	930	50.00							
41	1020	950	20.00							
42	1060	990	40.00							
43	1070	1000	10.00							
44	1100	1030	30.00							



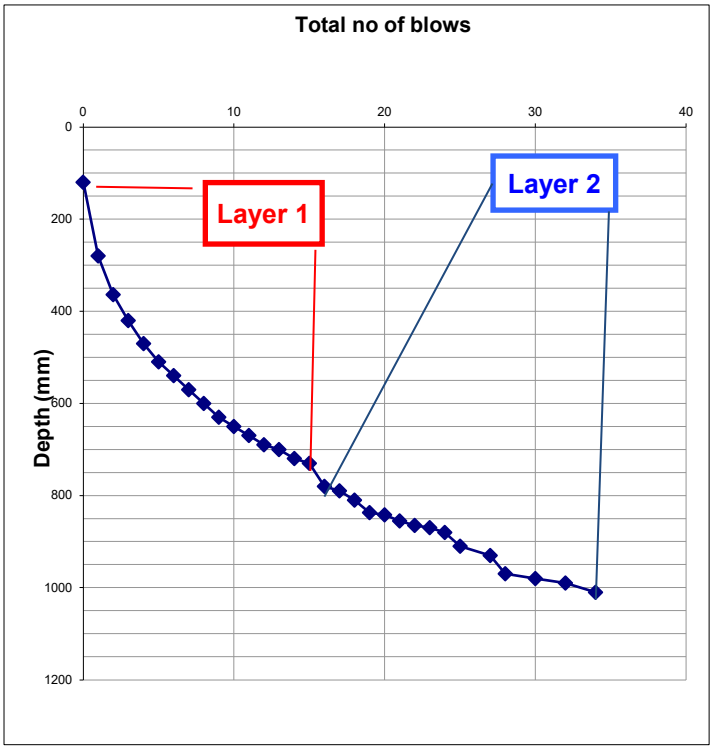
Remarks:

Particles >20mm	Yes		
Operators	CF/MC	Sheet	3 of 6

DYNAMIC CONE PENETRATION TEST RESULTS

Client Name	Hydrock	Date	21.11.2022	CJAssociates
Job Name	St Illyds	Report Ref.	2072123	
Where commenced: eg existing level, core hole etc	Base of inspection pit	Zero Readings - Hard standing		Commencing depth Initial 120
		Settled in soil	30	Settled 120
		Test No.	3	
Test location:	DCP3	Marker:		
Material description:	Clay			

Total No. of Blows	Equiv Depth Rdg (mm)	Total depth (mm)	Penetration per blow (mm)	Layer	Top of layer (mm)	Base of layer (mm)	Blows at top of layer	Blows at base of layer	Mean penetration per blow (mm)	CBR of layer (%)
0	180	120	0							
1	340	280	160.00	Layer 1	120	730	0	15	40.7	**6**
2	424	364	84.00							
3	480	420	56.00							
4	530	470	50.00	Layer 2	730	1010	15	34	14.7	**17.6**
5	570	510	40.00							
6	600	540	30.00							
7	630	570	30.00							
8	660	600	30.00							
9	690	630	30.00							
10	710	650	20.00	Overall Mean	120	1010	0	34	26.2	**10**
11	730	670	20.00							
12	750	690	20.00							
13	760	700	10.00							
14	780	720	20.00							
15	790	730	10.00							
16	840	780	50.00							
17	850	790	10.00							
18	870	810	20.00							
19	897	837	27.00							
20	902	842	5.00							
21	915	855	13.00							
22	925	865	10.00							
23	930	870	5.00							
24	940	880	10.00							
25	970	910	30.00							
27	990	930	10.00							
28	1030	970	40.00							
30	1040	980	5.00							
32	1050	990	5.00							
34	1070	1010	10.00							



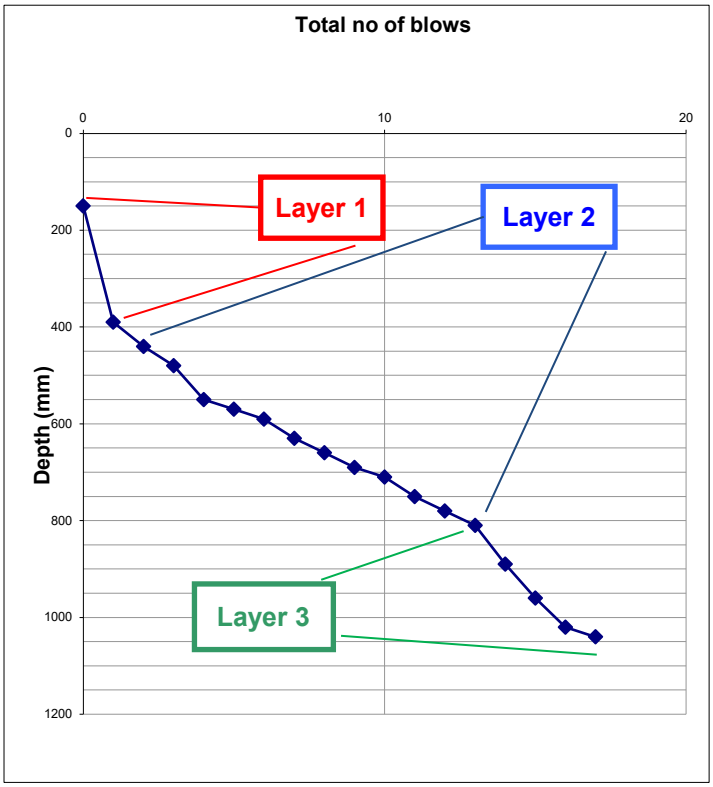
Remarks: Refused on obstructon

Particles >20mm	Yes		
Operators	CF/MC	Sheet	4 of 6

DYNAMIC CONE PENETRATION TEST RESULTS

		Date	21.11.2022	CJAssociates	
		Report Ref.	2072123		
Client Name	Hydrock	Zero Readings -		Commencing depth	
Job Name	St Illyds	Hard standing		Initial	150
Where commenced: eg existing level, core hole etc	Base of inspection pit	Settled in soil	56	Settled	150
		Test No.	4		
Test location:	DCP4	Marker:			
Material description:	Clay				

Total No. of Blows	Equiv Depth Rdg (mm)	Total depth (mm)	Penetration per blow (mm)	Layer	Top of layer (mm)	Base of layer (mm)	Blows at top of layer	Blows at base of layer	Mean penetration per blow (mm)	CBR of layer (%)
0	210	150	0							
1	450	390	240.00	Layer 1	150	390	0	1	240.0	**1**
2	500	440	50.00							
3	540	480	40.00							
4	610	550	70.00	Layer 2	390	810	1	13	35.0	**7.0**
5	630	570	20.00							
6	650	590	20.00							
7	690	630	40.00	Layer 3	810	1040	13	17	57.5	**4**
8	720	660	30.00							
9	750	690	30.00							
10	770	710	20.00	Overall Mean	150	1040	0	17	52.4	**5**
11	810	750	40.00							
12	840	780	30.00							
13	870	810	30.00							
14	950	890	80.00							
15	1020	960	70.00							
16	1080	1020	60.00							
17	1100	1040	20.00							



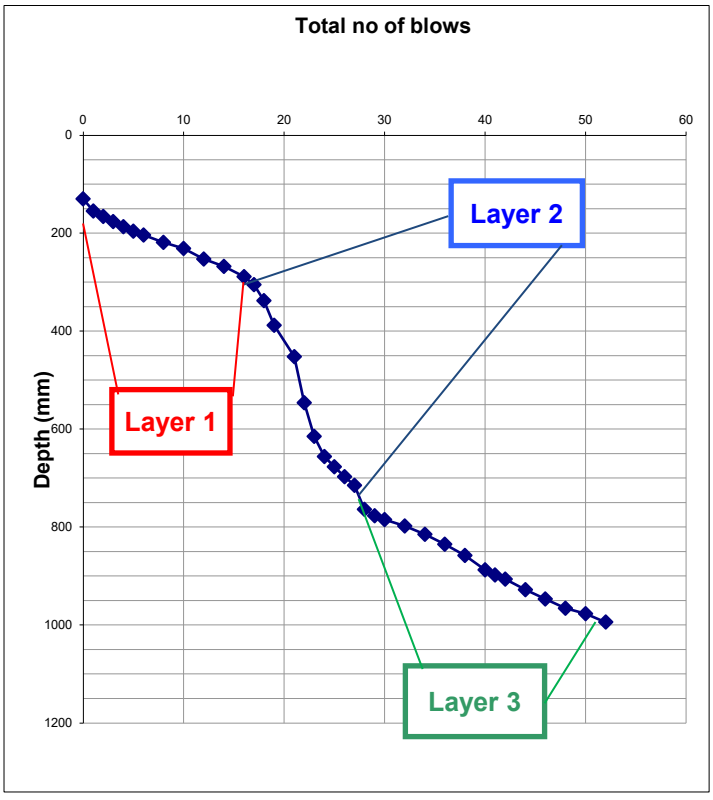
Remarks: Refused on obstruction

Particles >20mm	Yes					
Operators	CF/MC	Sheet	5	of	6	

DYNAMIC CONE PENETRATION TEST RESULTS

Client Name	Hydrock	Date	21.11.2022	CJAssociates
Job Name	St Illyds	Report Ref.	2072123	
Where commenced: eg existing level, core hole etc	Base of inspection pit	Zero Readings - Hard standing		Commencing depth
		Settled in soil		Initial 130
				Settled 130
		Test No.	5	
Test location:	DCP5	Marker:		
Material description:	Clay			

Total No. of Blows	Equiv Depth Rdg (mm)	Total depth (mm)	Penetration per blow (mm)	Layer	Top of layer (mm)	Base of layer (mm)	Blows at top of layer	Blows at base of layer	Mean penetration per blow (mm)	CBR of layer (%)
0	175	130	0							
1	200	155	25.00	Layer 1	130	289	0	16	9.9	**27**
2	211	166	11.00							
3	221	176	10.00							
4	232	187	11.00	Layer 2	289	715	16	27	38.7	**6.3**
5	241	196	9.00							
6	249	204	8.00							
8	264	219	7.50	Layer 3	715	994	28	52	11.6	**23**
10	276	231	6.00							
12	298	253	11.00							
14	313	268	7.50	Overall Mean	130	994	0	52	16.6	**15**
16	334	289	10.50							
17	350	305	16.00							
18	383	338	33.00							
19	433	388	50.00							
21	497	452	32.00							
22	591	546	94.00							
23	660	615	69.00							
24	701	656	41.00							
25	722	677	21.00							
26	742	697	20.00							
27	760	715	18.00							
28	809	764	49.00							
29	822	777	13.00							
30	830	785	8.00							
32	843	798	6.50							
34	860	815	8.50							
36	880	835	10.00							
38	903	858	11.50							
40	932	887	14.50							
41	943	898	11.00							
42	951	906	8.00							
44	973	928	11.00							
46	992	947	9.50							
48	1011	966	9.50							
50	1022	977	5.50							
52	1039	994	8.50							



Remarks: Refused on obstructon

Particles >20mm	Yes				
Operators	CF/MC	Sheet	6	of	6

Appendix B
Geotechnical Laboratory Testing Results

Laboratory Test Certificate

CJAssociates

Site	St Illyds
Client	Hydrock Ltd
Job Number	2072123
Lab Number	L15965
Order Number	-
F.A.O.	Shaun O'Farrell

Number of samples submitted for testing:	5	sample (s)

Natural Water Content	2	test(s)
Atterberg Limits	2	test(s)
Coarse Particle Size Distribution	3	test(s)

* Non UKAS Accredited Test

Date (s) sample (s) received at laboratory:	22	Nov-22
Date of receipt of testing instructions	9	Dec-22
Date testing started:	9	Dec-22
Date of issue:	23	Dec-22

Please note that we will keep the sample (s) for one month after submission of our report and will then dispose of them without notice unless you ask us to store them. We will then make a separate charge for this.

UKAS TESTING

1429

Approved by :
Lorna Logan

C.J. Associates Geotechnical Ltd
Portview Road
Avonmouth - Bristol BS11 9JE
Tel: 0117 982 1473 Fax: 0117 982 8200

Time [10:40] Date [23/12/2022]

CJAssociates

Summary of Classification Test Results

Project No.	Project Name
2072123	St Illyds

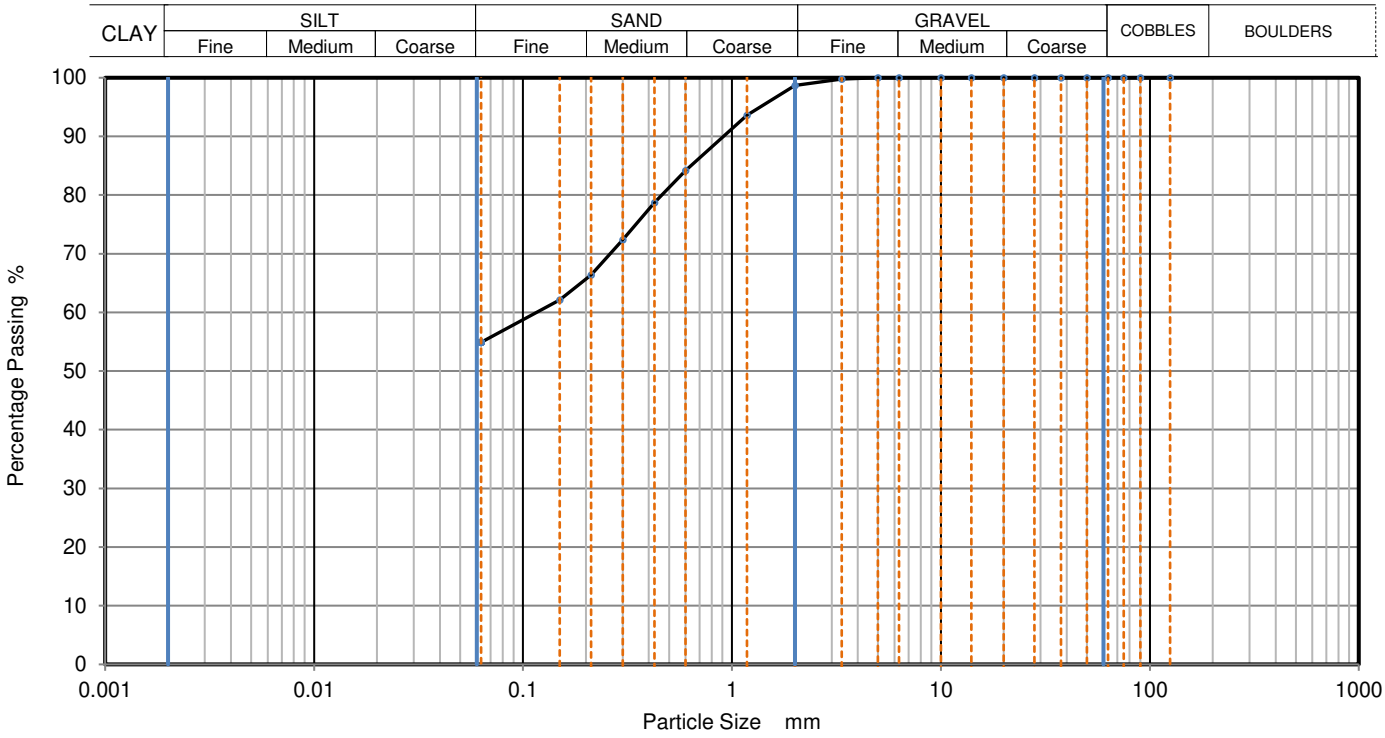
Hole No.	Sample				Soil Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Remarks
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
WS02		1.20		D	Refer to Logs			21.2	100	36	25	11		AL Prep:1
WS02		2.00	2.45	D	Refer to Logs			22.1	100	34 -1pt	22	12		AL Prep:1

All tests performed in accordance with BS1377:1990 unless specified otherwise
Water Content Performed in accordance with BS EN ISO 17892-1 : 2014

Key			
Density test	Liquid Limit	Atterberg Prep	Particle density
Linear measurement unless	4pt cone unless :	1. in natural condition	sp - small pyknom
wd - water displacement	cas - Casagrande method	2. after >425um removed by hand	gj - gas jar
wi - immersion in water	1pt - single point test	3. after washing to remove >425um	

Date Printed	Approved By	Table
22/12/2022	Lisa Maiden	1
		sheet 1

CJAssociates	PARTICLE SIZE DISTRIBUTION			Job Ref	2072123
				Borehole/Pit No.	WS01
Site Name	St Illyds			Sample No.	
Soil Description				Depth, m	1.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	CJA_2022121419



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	94		
0.6	84		
0.425	79		
0.3	72		
0.212	66		
0.15	62		
0.063	55		

Dry Mass of sample, g	1922

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	44
Fines <0.063mm	55

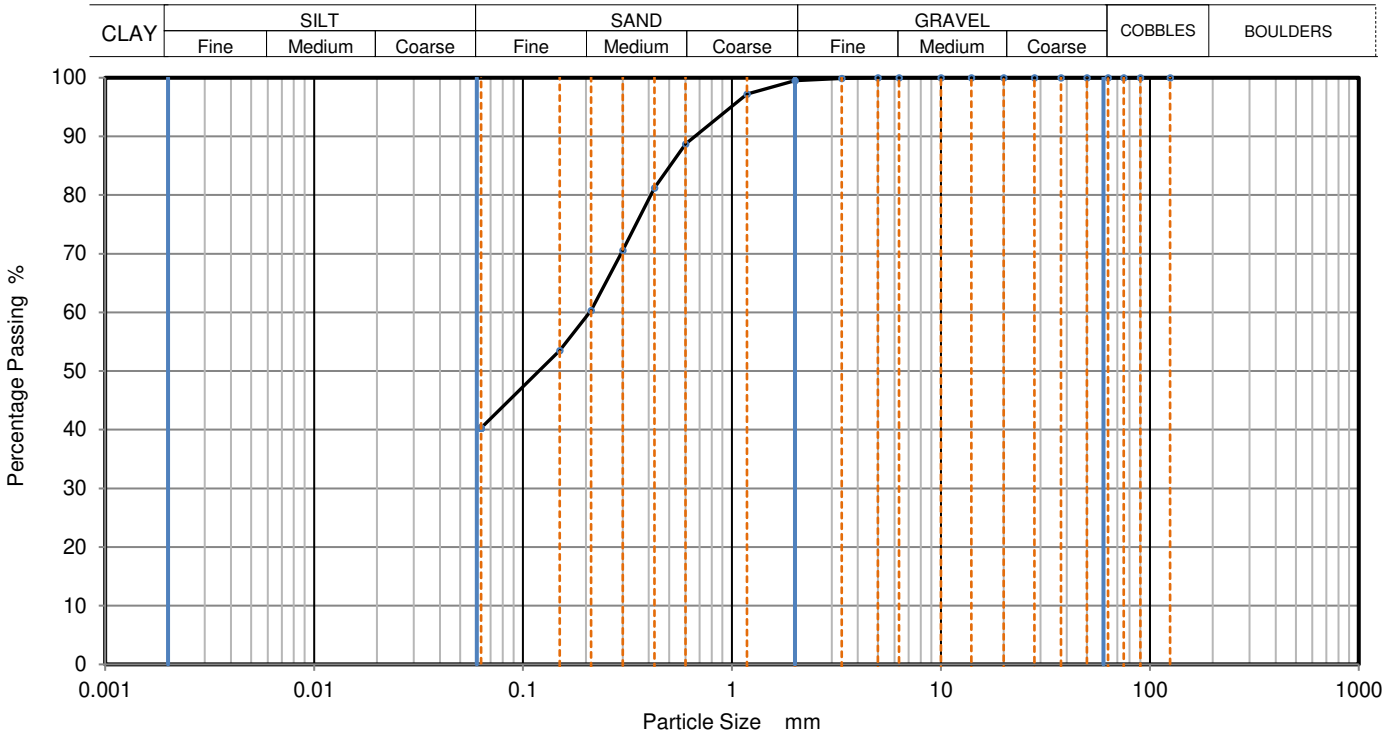
Grading Analysis		
D100	mm	
D60	mm	0.116
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1
		Lisa Maiden	22/12/2022 10:45	Sheet

CJAssociates	PARTICLE SIZE DISTRIBUTION			Job Ref	2072123
				Borehole/Pit No.	WS03
Site Name	St Illyds			Sample No.	
Soil Description				Depth, m	1.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	CJA_2022121422



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	97		
0.6	89		
0.425	81		
0.3	71		
0.212	60		
0.15	54		
0.063	40		

Dry Mass of sample, g	1636

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	59
Fines <0.063mm	40

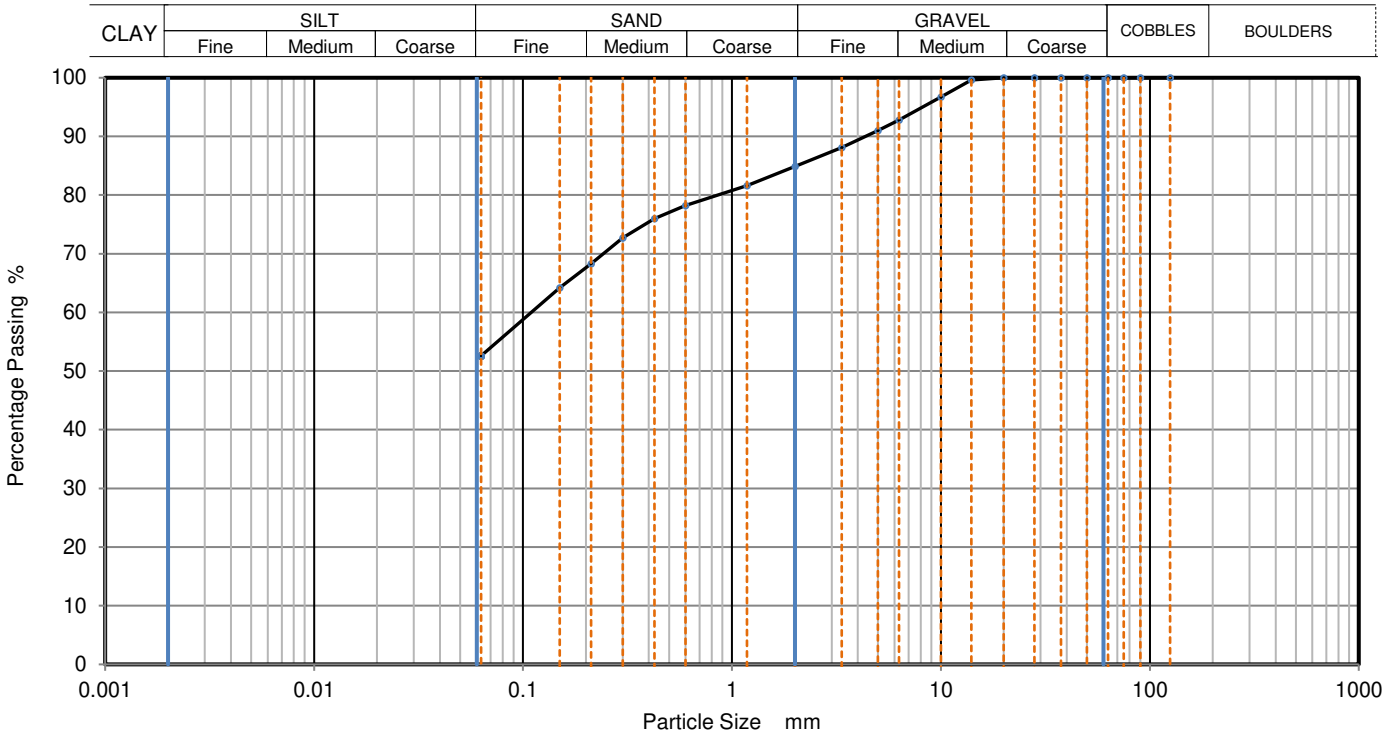
Grading Analysis		
D100	mm	
D60	mm	0.208
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1
		Lisa Maiden	22/12/2022 10:45	Sheet

CJAssociates	PARTICLE SIZE DISTRIBUTION			Job Ref	2072123
				Borehole/Pit No.	WS04
Site Name	St Illyds			Sample No.	
Soil Description				Depth, m	1.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	CJA_2022121423



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	97		
6.3	93		
5	91		
3.35	88		
2	85		
1.18	82		
0.6	78		
0.425	76		
0.3	73		
0.212	68		
0.15	64		
0.063	53		

Dry Mass of sample, g	1654

Sample Proportions	% dry mass
Very coarse	0
Gravel	15
Sand	32
Fines <0.063mm	53

Grading Analysis		
D100	mm	
D60	mm	0.109
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1
		Lisa Maiden	22/12/2022 10:45	Sheet

Appendix C
Chemical Laboratory Testing Results

Laboratory Test Certificate

CJAssociates

Site	St Illyds
Client	Hydrock Ltd
Job Number	2072123
Lab Number	L15953
Order Number	-
F.A.O.	Shaun O'Farrell

Number of samples submitted for testing:	4	sample (s)
Hydrock Default Contamination Suite	4	test(s)

* Non UKAS Accredited Test

Date (s) sample (s) received at laboratory:	24	Nov-22
Date of receipt of testing instructions	5	Dec-22
Date testing started:	5	Dec-22
Date of issue:	13	Dec-22

Please note that we will keep the sample (s) for one month after submission of our report and will then dispose of them without notice unless you ask us to store them. We will then make a separate charge for this.

UKAS TESTING

1429

Approved by :
Lorna Logan

Time [11:39] Date [13/12/2022]

C.J. Associates Geotechnical Ltd
Portview Road
Avonmouth - Bristol BS11 9JE
Tel: 0117 982 1473 Fax: 0117 982 8200

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 22/11960
Issue Number: 1 **Date:** 12 December, 2022

Client:
CJ Associates
Portview Road
Avonmouth
Bristol
BS11 9JE

Project Manager: Admin/Lorna Logan
Project Name: St Illyds
Project Ref: 2072123 - L15953 - S9552
Order No: N/A
Date Samples Received: 21/11/22
Date Instructions Received: 06/12/22
Date Analysis Completed: 12/12/22

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 22/11960

Client Project Name: St Illyds

Client Project Ref: 2072123 - L15953 - S9552

Lab Sample ID	22/11960/1	22/11960/4	22/11960/7	22/11960/10				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS02	WS03	WS04						
Depth to Top	1.00	1.00	1.00	1.00						
Depth To Bottom	1.20	1.20	1.70							
Date Sampled	21-Nov-22	21-Nov-22	21-Nov-22	21-Nov-22						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6A	6AE	6AE	6A						
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1				% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	8.39	8.36	8.20	8.53				pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	<0.01	<0.01	<0.01	<0.01				g/l	0.01	A-T-026s
Cyanide (total)$_A$$^{M\#}$	<1	<1	<1	<1				mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2				mg/kg	0.2	A-T-050s
Organic Matter$_D$$^{M\#}$	0.8	1.2	0.7	0.8				% w/w	0.1	A-T-032 OM
Arsenic$_D$$^{M\#}$	<1	<1	<1	<1				mg/kg	1	A-T-024s
Beryllium$_D$	1.5	1.6	1.6	1.5				mg/kg	0.5	A-T-024s
Boron (water soluble)$_D$	<1.0	<1.0	1.0	<1.0				mg/kg	1	A-T-027s
Cadmium$_D$$^{M\#}$	0.7	0.7	0.7	0.7				mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	15	16	15	15				mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	42	46	45	39				mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1				mg/kg	1	A-T-040s
Chromium (trivalent)	42	46	45	39				mg/kg	1	Calc
Lead$_D$$^{M\#}$	15	12	14	14				mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17				mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	31	42	53	31				mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1	<1	<1	<1				mg/kg	1	A-T-024s
Vanadium$_D$$^{M\#}$	30	46	30	28				mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	155	141	140	137				mg/kg	5	A-T-024s

Envirolab Job Number: 22/11960

Client Project Name: St Illyds

Client Project Ref: 2072123 - L15953 - S9552

Lab Sample ID	22/11960/1	22/11960/4	22/11960/7	22/11960/10				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS02	WS03	WS04						
Depth to Top	1.00	1.00	1.00	1.00						
Depth To Bottom	1.20	1.20	1.70							
Date Sampled	21-Nov-22	21-Nov-22	21-Nov-22	21-Nov-22						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6A	6AE	6AE	6A						
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	NAD	NAD	NAD	NAD						A-T-045
Asbestos Matrix (visual)$_{D}$	-	-	-	-						A-T-045
Asbestos Matrix (microscope)$_{D}$	-	-	-	-						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	N/A	N/A	N/A	N/A						A-T-045

Envirolab Job Number: 22/11960

Client Project Name: St Illyds

Client Project Ref: 2072123 - L15953 - S9552

Lab Sample ID	22/11960/1	22/11960/4	22/11960/7	22/11960/10				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS02	WS03	WS04						
Depth to Top	1.00	1.00	1.00	1.00						
Depth To Bottom	1.20	1.20	1.70							
Date Sampled	21-Nov-22	21-Nov-22	21-Nov-22	21-Nov-22						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6A	6AE	6AE	6A						
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02				mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04				mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04				mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05				mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05				mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07				mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	<0.06	<0.06				mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04				mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	<0.08	<0.08				mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01				mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03				mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	<0.03	<0.03				mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03				mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07				mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	<0.08	<0.08	<0.08				mg/kg	0.01	A-T-019s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve
Subscript "^" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.
EPH CWG results have humics mathematically subtracted through instrument calculation
TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

v2

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: CJ Associates, Portview Road, Avonmouth, Bristol, BS11 9JE

Project No: 22/11960

Date Received: 06/12/2022 (am)

Project: St Illyds

Cool Box Temperatures (°C): 9.0 & 9.5

Clients Project No: 2072123 - L15953 - S9552

Lab Sample ID	22/11960/1	22/11960/4	22/11960/7	22/11960/10
Client Sample No				
Client Sample ID/Depth	WS01 1.00-1.20m	WS02 1.00-1.20m	WS03 1.00-1.70m	WS04 1.00m
Date Sampled	21/11/22	21/11/22	21/11/22	21/11/22
Deviation Code				
F	✓	✓	✓	✓

Key

F ***Maximum holding time exceeded between sampling date and analysis for analytes listed below***

HOLDING TIME EXCEEDANCES

Lab Sample ID	22/11960/1	22/11960/4	22/11960/7	22/11960/10
Client Sample No				
Client Sample ID/Depth	WS01 1.00-1.20m	WS02 1.00-1.20m	WS03 1.00-1.70m	WS04 1.00m
Date Sampled	21/11/22	21/11/22	21/11/22	21/11/22
Cyanide (total)	✓	✓	✓	✓
PAH-16MS	✓	✓	✓	✓

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	22/11960/1	22/11960/4	22/11960/7	22/11960/10
Client Sample No				
Client Sample ID/Depth	WS01 1.00-1.20m	WS02 1.00-1.20m	WS03 1.00-1.70m	WS04 1.00m
Date Sampled	21/11/22	21/11/22	21/11/22	21/11/22
A-T-019s	09/12/2022	09/12/2022	09/12/2022	09/12/2022
A-T-024s	12/12/2022	12/12/2022	12/12/2022	12/12/2022
A-T-026s	09/12/2022	09/12/2022	09/12/2022	09/12/2022
A-T-027s	12/12/2022	12/12/2022	12/12/2022	12/12/2022
A-T-031s	12/12/2022	12/12/2022	12/12/2022	12/12/2022
A-T-032 OM	09/12/2022	09/12/2022	09/12/2022	09/12/2022
A-T-040s	09/12/2022	09/12/2022	09/12/2022	09/12/2022
A-T-042sTCN	08/12/2022	08/12/2022	08/12/2022	08/12/2022
A-T-044	12/12/2022	12/12/2022	12/12/2022	12/12/2022
A-T-045	07/12/2022	07/12/2022	07/12/2022	07/12/2022
A-T-050s	08/12/2022	08/12/2022	08/12/2022	08/12/2022
Calc	12/12/2022	12/12/2022	12/12/2022	12/12/2022

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

Appendix C Geotechnical Assessment

Hydrock

Client	Location or material to which this assessment applies
Mace Group	Made Ground
Project	
St Illtyd School, Cardiff	
Job number	
20700-04	

Concrete in aggressive ground

After BRE Special Digest 1, 2005

Soil data

	(Adjusted) water soluble sulfate (mg/l)	Total potential sulfate (%)	Water soluble magnesium (mg/l)
Number of tests	1	0	0
No. tests in 20% data set	0		
No. tests with suspected pyrite		0	
Maximum value	0.01		
Mean of highest two values	0		
Mean of highest 20%			
Characteristic Value	**0.01**		

Mg not required

	[no pyrite]	**[pyrite suspected]**
DS Class	**DS-1**	

If pyrite suspected, DS Class limited to

Is pyrite assumed to be present? No **Adopted DS Class =** **DS-1**

Water data

	(Adjusted) soluble sulfate (mg/l)	Soluble magnesium (mg/l)
Characteristic Value (Maximum Level)	0	0

DS Class

pH data

	Soil	Water
Number of tests	1	0
No. tests in 20% data set	0	
Lowest pH	8.4	
Mean of lowest 20%		
Characteristic value	**8.4**	
Design value	**8.4**	

Number of soil pH results less than 5.5: 0

DS Class design value

Based on higher of soil and water data **DS-1**

ACEC Class design value

Brownfield

Mobile groundwater **AC-1**

Client	Location or material to which this assessment applies
Mace Group	Natural soils
Project	
St Illtyd School, Cardiff	
Job number	
20700-04	

Concrete in aggressive ground

After BRE Special Digest 1, 2005

Soil data

	(Adjusted) water soluble sulfate (mg/l)	Total potential sulfate (%)	Water soluble magnesium (mg/l)
Number of tests	3	0	0
No. tests in 20% data set	1		
No. tests with suspected pyrite		0	
Maximum value	0.01		
Mean of highest two values	0		
Mean of highest 20%			
Characteristic Value	**0.01**		

Mg not required

	[no pyrite]	**[pyrite suspected]**
DS Class	**DS-1**	

If pyrite suspected, DS Class limited to

Is pyrite assumed to be present? No **Adopted DS Class =** **DS-1**

Water data

	(Adjusted) soluble sulfate (mg/l)	Soluble magnesium (mg/l)
Characteristic Value (Maximum Level)	0	0
DS Class		

pH data

	Soil	Water
Number of tests	3	0
No. tests in 20% data set	1	
Lowest pH	8.2	
Mean of lowest 20%	8.2	
Characteristic value	**8.2**	
Design value	**8.2**	

Number of soil pH results less than 5.5: 0

DS Class design value

Based on higher of soil and water data **DS-1**

ACEC Class design value

Brownfield

Mobile groundwater **AC-1**

Appendix D HazWaste Assessment

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

2QANH-085UF-MMBV6

Job name

Envirolab cert: 22-11960

Description/Comments

Envirolab cert: 22-11960

Project

20700

Site

St Illtyds, Cardiff

Classified by

Name:
Alison Holland
Date:
04 Jan 2023 15:30 GMT
Telephone:

Company:
Hydrock Consultants Ltd

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	Date
Hazardous Waste Classification	08 Sep 2020

Next 3 year Refresher due by Sep 2023

Purpose of classification

2 - Material Characterisation

Address of the waste

St Illtyds, Newport Rd, Rumney, Cardiff **Post Code** CF3 1XQ

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

School fields/Redgra hardstanding - installation of 3G sports pitch with associated fencing/lighting.

Description of the specific process, sub-process and/or activity that created the waste

Excavation of school fields/Redgra hardstanding for installation of 3G sports pitch with associated fencing/lighting.

Description of the waste

School fields and Redgra hardstanding underlain by Raglan Mudstone. Made Ground of sand and clay down to 1.10m below Redgra hardstanding.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01	1.00-1.20	Non Hazardous		3
2	WS02	1.00-1.20	Non Hazardous		5
3	WS03	1.00-1.70	Non Hazardous		7
4	WS04	1	Non Hazardous		9

Related documents

#	Name	Description
1	Hydrock Standard plus Cresol (ammended Lead)	waste stream template used to create this Job

Report

Created by: Alison Holland

Created date: 04 Jan 2023 15:30 GMT

Classification of sample: WS01

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
WS01	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1.00-1.20 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<1 mg/kg	1.32	<1.32 mg/kg	<0.000132 %		<LOD
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
8	benzo[ghi]perylene		205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.5 mg/kg	2.775	4.163 mg/kg	0.000416 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		<1 mg/kg	13.43	<13.43 mg/kg	<0.00134 %		<LOD
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.7 mg/kg	1.285	0.9 mg/kg	0.00007 %		
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		42 mg/kg	1.462	61.385 mg/kg	0.00614 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15	mg/kg	1.126	16.888	mg/kg	0.00169 %		
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
18		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
19		fluoranthene		205-912-4	206-44-0		<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<**LOD**
20		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
21		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	15	mg/kg		15	mg/kg	0.0015 %		
23		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		<**LOD**
24		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
25		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		31	mg/kg	1.579	48.964	mg/kg	0.0049 %		
26		pH			PH		8.39	pH		8.39	pH	8.39 pH		
27		phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
28		phenol	604-001-00-2	203-632-7	108-95-2		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
29		pyrene		204-927-3	129-00-0		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<**LOD**
30		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		155	mg/kg	1.245	192.931	mg/kg	0.0193 %		
											Total:	0.036 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS02

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
WS02	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1.00-1.20 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<1	mg/kg	1.32	<1.32	mg/kg	<0.000132 %		<LOD
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
8	benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.6	mg/kg	2.775	4.441	mg/kg	0.000444 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		<1	mg/kg	13.43	<13.43	mg/kg	<0.00134 %		<LOD
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.7	mg/kg	1.285	0.9	mg/kg	0.00007 %		
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		46	mg/kg	1.462	67.232	mg/kg	0.00672 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				16	mg/kg	1.126	18.014	mg/kg	0.0018 %		
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<**LOD**
			205-912-4	206-44-0									
20		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	12	mg/kg		12	mg/kg	0.0012 %		
		082-001-00-6											
23		mercury { mercury dichloride }				<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				42	mg/kg	1.579	66.339	mg/kg	0.00663 %		
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				8.36	pH		8.36	pH	8.36 pH		
				PH									
27		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			201-581-5	85-01-8									
28		phenol				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
29		pyrene				<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<**LOD**
			204-927-3	129-00-0									
30		zinc { zinc oxide }				141	mg/kg	1.245	175.505	mg/kg	0.0176 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0364 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS03

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
WS03	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1.00-1.70 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<1	mg/kg	1.32	<1.32	mg/kg	<0.000132 %		<LOD
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
8	benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.6	mg/kg	2.775	4.441	mg/kg	0.000444 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		<1	mg/kg	13.43	<13.43	mg/kg	<0.00134 %		<LOD
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.7	mg/kg	1.285	0.9	mg/kg	0.00007 %		
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		45	mg/kg	1.462	65.77	mg/kg	0.00658 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				15	mg/kg	1.126	16.888	mg/kg	0.00169 %		
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<**LOD**
			205-912-4	206-44-0									
20		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	14	mg/kg		14	mg/kg	0.0014 %		
		082-001-00-6											
23		mercury { mercury dichloride }				<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				53	mg/kg	1.579	83.713	mg/kg	0.00837 %		
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				8.2	pH		8.2	pH	8.2 pH		
				PH									
27		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			201-581-5	85-01-8									
28		phenol				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
29		pyrene				<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<**LOD**
			204-927-3	129-00-0									
30		zinc { zinc oxide }				140	mg/kg	1.245	174.26	mg/kg	0.0174 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0379 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS04

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
WS04	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<1 mg/kg	1.32	<1.32 mg/kg	<0.000132 %		<LOD
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
8	benzo[ghi]perylene		205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.5 mg/kg	2.775	4.163 mg/kg	0.000416 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		<1 mg/kg	13.43	<13.43 mg/kg	<0.00134 %		<LOD
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.7 mg/kg	1.285	0.9 mg/kg	0.00007 %		
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		39 mg/kg	1.462	57.001 mg/kg	0.0057 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				15	mg/kg	1.126	16.888	mg/kg	0.00169 %		
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				<0.08	mg/kg		<0.08	mg/kg	<0.000008 %		<**LOD**
			205-912-4	206-44-0									
20		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	14	mg/kg		14	mg/kg	0.0014 %		
		082-001-00-6											
23		mercury { mercury dichloride }				<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				31	mg/kg	1.579	48.964	mg/kg	0.0049 %		
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				8.53	pH		8.53	pH	8.53 pH		
				PH									
27		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			201-581-5	85-01-8									
28		phenol				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
29		pyrene				<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<**LOD**
			204-927-3	129-00-0									
30		zinc { zinc oxide }				137	mg/kg	1.245	170.526	mg/kg	0.0171 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0332 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

boron tribromide/trichloride/trifluoride (combined) (CAS Number: 10294-33-4, 10294-34-5, 7637-07-2)

Description/Comments: Combines the hazard statements and the average of the conversion factors for boron tribromide, boron trichloride and boron trifluoride
Data source: N/A
Data source date: 06 Aug 2015
Hazard Statements: EUH014 , Acute Tox. 2; H330 , Acute Tox. 2; H300 , Skin Corr. 1A; H314 , Skin Corr. 1B; H314

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

lead compounds with the exception of those specified elsewhere in this Annex

GB MCL index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

beryllium {beryllium oxide}

Worst case species based on hazard statements

boron {boron tribromide/trichloride/trifluoride (combined)}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case species based on hazard statements

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Worst case species based on hazard statements

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

zinc {zinc oxide}

Worst case species based on hazard statements

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2022.364.5467.10136 (30 Dec 2022)
HazWasteOnline Database: 2022.364.5467.10136 (30 Dec 2022)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021

Appendix E Geotechnical Risk Register

Geotechnical Hazard Identification – Following Ground Investigation

The preliminary Geotechnical Risk Register following Ground Investigation is set out in Table E.2.

The probability and impact of a hazard have been judged on a qualitative scale as set out in Table E.1. The degree of risk (R) is determined by combining tan assessment of the probability (P) of the hazard occurring with an assessment of the impact (I) of the hazard and associated mitigation it will require if it occurs (R = P x I).

Table E.1: Qualitative assessment of hazards and risks

P = Probability		I = Impact		R = Risk Rating (P x I)	
1	Very unlikely (VU)	1	Very Low	1 – 4	None / negligible
2	Unlikely (U)	2	Low	5 – 9	Minor
3	Plausible (P)	3	Medium	10 – 14	Moderate
4	Likely (Lk)	4	High	15 – 19	Substantial
5	Very Likely (VLk)	5	Very High	20 - 25	Severe

Table E.2: Preliminary geotechnical risk register.

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
Uncontrolled Made Ground (variable strength and compressibility).	There is Made Ground due to the construction of the Red-Gra pitch in the north of the site. Borehole WS02 shows the Made Ground was 1.10m thick beginning at the surface.	Structures (floodlights).	Bearing capacity failure, settlement (total and differential).	4	4	16	Design foundations to found below Made Ground into the firm to stiff clay of the Raglan Mudstone Formation.
		Pavements.	Settlement (total and differential) of pavements.	3	2	6	Design pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate.
		Services.	Settlement (differential), causing damage to services.	2	2	4	Anticipated settlements are not significant with regard to services.
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	3	3	9	Where soft spots encountered, over-excavation and replacement with suitable fill.
Soft / loose ground (Low strength and high settlement potential).	Made Ground beneath the Red-Gra pitch may contain areas of loose material.	Structures (floodlights).	Foundation bearing capacity failure, settlement (total and differential).	3	4	12	Design foundations to found below any loose Made Ground.
		Pavements.	Settlement (total and differential), of pavements.	3	3	9	Design pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate.

							If anticipated settlements are significant, and cannot be mitigated by design, over-excavate and replace loose soils.
		Services.	Settlement (differential), causing damage to services.	2	3	6	Ground levels are remaining at approximately current levels. Settlements are not anticipated to be significant. No additional design requirements envisaged.
		3G pitch	Settlement (differential), on pitch.	2	3	6	
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	2	3	6	Where loose spots encountered, over-excavate and replace with suitable fill. Design working platform to suit the ground conditions. Outline design of working platform to include geo-grid if necessary. Site inspection and watching brief by Contractor to review working platform frequently and regularly.
Variable lateral and vertical changes in ground conditions.	The Made Ground soils may vary laterally and vertically, both in composition and strength.	Structures (floodlights).	Foundation bearing capacity failure, settlement (total and differential).	4	4	16	Design foundations to found below Made Ground and into the firm to stiff clay of the Raglan Mudstone Formation.
		Pavements.	Settlement (total and differential), of pavements.	2	3	6	Design pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate. If anticipated settlements are significant, and cannot be mitigated by design, over-excavate and replace soft soils.
		Services.	Settlement (differential), causing damage to services.	2	3	6	Settlements are not anticipated to be significant with regard to services. No additional design requirements envisaged.

		3G pitch.	Settlement (differential), in gardens.	2	3	6	It is unlikely that settlements will be significant with respect to the pitch.
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	3	3	9	Where soft spots encountered, over-excavate and replace with suitable fill. Design working platform to suit the ground conditions. Outline design of working platform to include geo-grid if necessary. Site inspection and watching brief by Contractor to review working platform frequently and regularly.
Sulphates present in the soils.	The ground investigation has proven that sulphates in the soils present a low risk.	Attack of buried concrete.	Damage to concrete and reduction in strength.	2	4	8	Classify concrete in accordance with BRE SD1 and design concrete accordingly.
Obstructions.	Obstructions have not been proven by the investigation, but there is potential for obstructions to be present due to historical construction activity, or unknown fill in Made Ground.	Construction staff, vehicles and plant operators.	Risk of collapse of excavation as obstructions are pulled out.	2	3	6	Allow for a breaker to be present during construction and remove obstructions where encountered during construction.
		Roads and Pavements.	Hard spots in externals and pavements.	2	2	4	
Shallow groundwater.	Ground investigations	Construction staff, vehicles	Difficulty with excavation.	3	2	6	

	encountered no groundwater inflow.	and plant operators.	Limit state failure, excessive deformation, trafficking of site plant, inability to place and compact fill.				Contractor to appoint competent Temporary Works Designer to design temporary works, in accordance with BS 5975:2008+A1:2011. Temporary Works Designer to consider in their analysis the impact of, and requirements for, de-watering of excavations. Any water that collects at the base of excavations to be removed as soon as practicable.
Changing groundwater conditions.	Whilst the current investigation encountered no groundwater, a nearby historical BGS borehole recorded groundwater at a depth of 1.50m bgl. Groundwater conditions may vary through time.	Construction staff, vehicles and plant operators.	Difficulty with excavation. Limit state failure, excessive deformation, trafficking of site plant, inability to place and compact fill.	3	2	6	Contractor to appoint competent Temporary Works Designer to design temporary works as required, in accordance with BS 5975:2008+A1:2011. Temporary Works Designer to consider in their analysis the impact of a variable water table.
Loose Made Ground, leading to difficulty with excavation and collapse of side walls.	The ground investigation has indicated that Made Ground is present at the site. There is potential for loose Made Ground to be present.	Construction staff, vehicles and plant operators.	Ground failure, instability of plant and machinery.	2	4	8	The Made Ground encountered was stiff and coherent. Further actions are not required unless loose Made Ground is encountered during further works.
			Risk of collapse of excavation.	2	3	6	
Slope stability issues – General Slopes.	The proposed 3G pitch lies at a higher elevation	The proposed 3G pitch.	Damage to structures and services.	2	4	8	The slope is considered to be too shallow to warrant a geotechnical slope assessment and is not considered to present a significant risk.

	to the main school building and along the southern border of the proposed development is a gentle slope.						
Slope stability issues – retaining walls.	The site gently slopes towards the south-east and the proposed development is expected to require retaining walls to be constructed to create a level area.	The proposed 3G pitch.	Serviceability issues.	3	3	9	Design of the retaining to be undertaken in accordance with EC7. Adequate drainage to be designed behind the structure, or for water seepage through the face of the wall. Lateral earth pressure parameters to be characterised during investigation and design. Engineered fill requirements to be defined at outline design stage.
Earthworks – poor bearing capacity and / or settlement of new fill.	It is expected that there will be a requirement for cut and fill to create a level surface for the proposed 3G pitch. This will require reuse of soils excavated from the site.	Proposed 3G pitch	Settlement (differential) across the pitch.	2	4	8	Site testing to be undertaken to confirm the works are in accordance with the design. A suitable watching brief and independent verification.
		Structures (proposed floodlights).	Settlement (total and differential).	2	3	6	Design foundations to found below any fill material and into the firm to stiff Raglan Mudstone Formation.
		Pavements.	Settlement (total and differential).	2	3	6	Minimum engineering performance to be defined in an Earthworks Specification.
		Services.	Settlement (differential), causing damage to services.	2	3	6	Earthworks to be designed in accordance with 1) Manual of Contract Documents for Highway Works (MCHW), Volume 1; 2) Specification for Highway Works (SHW) Series 600;

							3) 6031:2009, Code of practice for earthworks; and 4) BS 8000-1, workmanship on building sites.
		Construction staff, vehicles, and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	3	3	9	Site testing to be undertaken to confirm the works are in accordance with the design. A suitable watching brief and independent verification.
Earthworks – Unsuitability of site won material to be reused as fill.	It is expected that there will be a requirement for cut and fill to create a level surface for the proposed rugby pitch. This will require reuse of soils excavated from the site.	Earthworks control, inability to place and compact fill.	Service limit state failure, excessive and intolerable total and differential settlement.	2	3	6	The design is to describe the processes required to produce suitable fill for reuse. Contractor to design site control measures, plant, equipment and arrangement to comply with processing requirements. Site testing to be undertaken to confirm the works are in accordance with the design. A suitable watching brief and independent verification. Adequate investigation required of soil types and characterisation of the soils to be undertaken during investigation. Some fill may be unsuitable for use.
		Earthworks control, inability to place and compact fill.	Service limit state failure, excessive and intolerable total and differential settlement.	2	3	6	The design is to describe the processes required to produce suitable fill for reuse. Contractor to design site control measures, plant, equipment and arrangement to comply with processing requirements. Site testing to be undertaken to confirm the works are in accordance with the design. A suitable watching brief and independent verification.

							Adequate investigation required of soil types and characterisation of the soils to be undertaken during investigation. Some fill may be unsuitable for use.
Unforeseen ground conditions – risk associated with limited data.	Ground investigation has been undertaken. However, additional information will be obtained during construction. Ground conditions are only defined at exploratory hole locations.	All aspects of the development		3	4	12	Designers to be contacted if conditions encountered are different to those identified during investigation. Regular inspections of excavations and earthworks for evidence of stability. Adequate investigation required to characterise the site and understand the potential risks.

Whilst the probability and impact of the hazard occurring can be reduced to a minimum by geotechnical design, the impact cannot be reduced below very low. The risk register will need to be up-dated, as necessary, to reflect design, additional information, data and experience as it is gained through the construction process.

Impacts of the design with regard to health and Safety considerations will need to be included by the designer at design stage.