

Phase 1 & 2 Desk Study & Ground Investigation

New Canopy & New Extension at, Abraham Moss Community School, Crumpsall



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Produced for The Dean Trust

AG Geo-Consultants Ltd

Report Title
Phase 1 & 2 Desk Study & Ground Investigation

Project	Project No./Report Type
New Canopy & New Extension at, Abraham Moss Community School, Crumpsall	23-075/P1&P2

Client Name
The Dean Trust

Issue Date/Version	Status	Comments, Description of Amendments
7 th December 2023	Preliminary	3no. gas monitoring visits remain to be undertaken.
27 th December 2023/V2	Final	-
5 th January 2024/V2a	Final	Advice added for workers on school site. Extra foundation pit sections added.

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Specialist In Land Condition (SiLC) No. A1201 [Qualified Person \(QP\)](#), No.086 (CL:AIRE Definition of Waste, Industry Code of Practice, DoWCoP)

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Executive Summary

Client	The Dean Trust																														
Site and Location	New Canopy & New Extension at, Abraham Moss Community School, Crumpsall Approximate postcode = M8 5UF																														
Proposed Development	Erection of a large free-standing canopy in the playground and at another location on site, a small single-storey extension to form a new classroom.																														
Client Brief	Fee proposal for ground investigation surveys and reporting for both projects.																														
History of Site & Surroundings – Canopy Area	On Site Originally allotments. Currently hardstanding area (playground). In the Surroundings The remainder of the school, a railway, parkland (former landfill) to the east and residential areas.																														
History of Site & Surroundings – Extension Area	On Site Currently paths/hardstanding. In the Surroundings The remainder of the school, a railway, parkland (former landfill) to the east and residential areas.																														
Ground Conditions	BGS Mapping Suggests: • Fault Lines: One crosses through the school buildings in an E/W direction. • Made ground (MG): None >1m thickness shown on site. • Drift Deposits: Glaciofluvial Sheet Deposits, Devensian (Sand and gravel). • Solid Geology: Chester Formation (Sandstone) in the NE ½ of the entire school site and Collyhurst Sandstone Formation (Sandstone) in the SW ½ of the entire school site, both separated by a fault line. In the SE of the school site lies Pennine Middle Coal Measures Formation (Mudstone, siltstone and sandstone). • The nearest BGS boreholes (the previous investigation nearby) suggest: - 0m to 1-2m: made ground, over - 1-2m to >10m: CLAY with varying sand content, or SAND with varying clay content . Our Investigation Found: <table border="1"> <thead> <tr> <th rowspan="2">Strata</th><th colspan="2">Depth Encountered (mBGL)</th><th rowspan="2">Typical Thickness (m)</th><th rowspan="2">Description & Comments</th></tr> <tr> <th>Top</th><th>Bottom</th></tr> </thead> <tbody> <tr> <td>MG: Paving slabs or tarmac and sub-base, over gravelly sand</td><td>0</td><td>0.5 1.0</td><td>0.5 1.0</td><td>Extension area. Canopy area</td></tr> <tr> <td>SAND</td><td>0.5 1.0</td><td>3.4 to 4.0</td><td></td><td>Extension area. Canopy area</td></tr> <tr> <td>Stiff CLAY</td><td>3.4 & 3.8</td><td>4.0 & 4.25</td><td>0.5</td><td>Canopy area only</td></tr> <tr> <td>Silty SAND</td><td>4.0</td><td>>5.0</td><td>-</td><td>Fine</td></tr> </tbody> </table>				Strata	Depth Encountered (mBGL)		Typical Thickness (m)	Description & Comments	Top	Bottom	MG: Paving slabs or tarmac and sub-base, over gravelly sand	0	0.5 1.0	0.5 1.0	Extension area. Canopy area	SAND	0.5 1.0	3.4 to 4.0		Extension area. Canopy area	Stiff CLAY	3.4 & 3.8	4.0 & 4.25	0.5	Canopy area only	Silty SAND	4.0	>5.0	-	Fine
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Hydrogeology & Hydrology	• Watercourses, Aquifers, Source Protection Zones (SPZ), Abstractions: Not checked as unlikely to be at significant risk from the site. • Groundwater (GW): encountered in nearby boreholes at >6.5m depth, rose to 1.2-5m depth (confined water table). Our work found groundwater to lie at >5m depth (with occasional shallower seepages).																														
Geotechnical Considerations	• The site is not at risk from coal mining. • Details of existing foundations are given herein. Excavations • Should remain dry. Seepages may occur which should be controllable by sump pumping. • Given the granular nature of the soils, then excavations are likely to require shoring or battering to overcome instability. • Should be possible with conventional earthmoving plant. • A previous Unexploded Ordnance (UXO) assessment found the site to have a <i>low/moderate probability of UXO encounter</i>. Foundations & Ground Floor Slabs • The soils at and below probable founding depths are granular and so (subject the LABC) foundations could found as shallow as 0.5m depth.																														

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	- The made ground is granular and so suitable to bear within. - The allowable bearing capacity for 0.45m wide strip foundations used on the extension is $Q_a(0.5\text{mBGL}) = 265\text{kN/m}^2$. - At the canopy, for 1m and 2m pads the allowable bearing capacity is $Q_a(0.5\text{mBGL}) > 235$ and $> 175\text{kN/m}^2$, respectively. The canopy foundations will probably need to be deepened and enlarged to provide enough weight to overcome wind uplift forces. - The above capacities require and are based on the shallow sands being medium dense, the same as the sands below 1.35m depth. - Ground-bearing floor slabs may be used, but suspended slabs would be prudent for gas protection. Ground Aggressivity to Buried Concrete - Design Sulphate Class DS-1 and ACEC classes AC-1s and AC-1 above and below groundwater (>5m depth) respectively.
Contamination Considerations	The council provided some records relating to the adjacent landfill site, and we found numerous more ground investigation reports for the site and surroundings, on the planning portal. Significant points from those are: - The site was used for mineral (sand) extraction from the 1920's to 1940's, before then becoming a tip used by ICI, the nature of the fill being unknown. - There were refuse heaps shown, mostly ~100m east of the school, but <u>some do seem to lie under where the current tennis courts lie</u>. These appear to be associated with the Victoria Works to the east and north east. - The land east of the school buildings (i.e. the tennis courts etc) is a licensed landfill site used by ICI as a chemical waste tip. <i>The exact nature of the fill materials is not known</i>. The edge of the landfill is recorded as very close to the school buildings - The LA purchased the landfill site from ICI. Just E of where the new canopy is proposed, there used to be a possibly 20m deep pit with sides sloping down to a small pond at the base and an access track down to the base. There seems no reason for the hole and so the cynic would say that the hole was used to deeply dispose of hazardous waste. - One report found that no gas protection was required for new buildings, but they recommended basic (CS2) gas protection. The Part 2a assessment states that gas monitoring found CS1 (no risk) and CS2 (low risk) conditions within the landfill area. - The playing fields and the allotments were <u>not</u> "determined" as contaminated land under Part 2a. The boundary for the Part 2a assessment <u>excluded</u> the school land. - Deep investigation of the landfill found VOCs, SVOCs and dyestuffs. - For the Part 2a assessment, chemical concentrations were assessed against limits for <i>playing fields and open land</i>. Allotments also occupy part of the landfill. - For the allotments...only the maximum concentrations of Cadmium and Vinyl Chloride exceeded the allotments limits. For soils >0.2m depth in the open space, mean concentrations of Arsenic, Chromium and some PAHs exceeded the open space limits. Elevated concentrations of total cyanide also occurred at >0.2m depth. For soils <0.2m depth in the open space, there were no elevated (mean) concentrations, although there were 22no. samples at >0.2m and <0.2m depth that individually had concentrations of Lead exceeding the guidelines. In the playing fields and open land a thin veneer of topsoil overlaid a granular layer and then a geotextile membrane lay at 0.35-0.6m depth, below which was the landfill deposits extending to a maximum depth of 5.3m. That landfill material had visual & olfactory indications of chemicals and dyes and solvents. - The client supplied an investigation report (Jan 2017) for the dining room extension and that showed no contamination or gas risks to end users. - Potential contamination-type risks were: soil contact and gas and chemical vapour risk to groundworkers, at both locations; gas and chemical vapour risk to site end-users in the new extension. - Anthropogenic components of the made ground comprise only brick.

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	- We tested soil samples for heavy metals (inc Boron, Beryllium and Vanadium), VOCs, TPH and PAHs and the only exceedances were 2no. Lead results in the canopy area which could pose risks to groundworkers. - If any school site maintenance staff form excavations east of the school buildings and encounter a granular layer underlain by a geo-fabric/membrane, then the soils beneath that are the landfill waste and that is where most of the risk lies. That said, that granular layer showed elevated Lead concentrations. - No other significant risks to human health, nor groundwater have been found on site. - There were no visual or olfactory indications of contamination. - PE and PVC water supply pipes should be acceptable. Ground Gases, Radon and Chemical Vapours - No risks have been found that require protection against Radon, ground gas and chemical vapours.
Strategy for Remediation & Risk Reduction	The investigation has revealed the development site to only exhibit a risk from soil contamination, with such contamination being the same type and degree as found on most urban brownfield sites. Such risks are easily remedied and therefore this report concludes that the principle of development is a suitable use for the site in terms of contamination. • No remediation is required. • No long-term monitoring and maintenance of remediation is required. • To remove the human health risks: ○ Site, landscape and maintenance workers should wear gloves, boots and overalls and wash their hands before eating, drinking and smoking. Excessive dust generation should be avoided. ○ Excavations or below ground voids should be checked for the presence of harmful gases and vapours prior to personnel entry. • The gas monitoring finds no gas protection to be required for the new extension (i.e. CS1 risk), but we'd suggest some basic measures (<u>which would be part of a normal build</u>) to provide CS2 protection. • No other risk reduction measures are required (e.g. special water supply pipe materials, etc). • A watching brief should be kept during siteworks for any unforeseen/unsuspected contamination. If such is found, then work should stop and a competent person should be contacted for advice and assessment. Also watch for potential UXO. • Any recycled aggregates that are planned to be imported to site, should be assessed for contamination (especially asbestos) prior to import and relevant records retained for validation purposes. • Topsoil and subsoil should be assessed for contamination prior to import.

This is only a summary and should not be read in isolation from the main text.

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1 Introduction

1.1 Introduction and Brief

AG Geo-Consultants Ltd (AGGC) were commissioned by and on behalf of *The Dean Trust* (the Client) to produce a Phase I & II Desk Study and Site Investigation report for a new canopy and new extension at site known as, Abraham Moss Community School, Crumpsall, M8 5UF (the "Site").

The client's brief was to provide a *fee proposal for ground investigation surveys and reporting for both projects*. After completion of Dynamic Sampling, the client then added (existing) foundation exposure pits.

1.2 Proposed Development

The proposed development (see location plan in Appendix A) comprises 2no. projects/developments, namely:

- the erection of a large free-standing **canopy** in the playground and
- also a small **single-storey extension** to form a new classroom.

No gardens or landscaping areas are proposed.

1.3 Scope of Works

The client accepted AGGC's proposed detailed scope of work for a Phase 1 Desk Study, followed by a Phase 2 investigation (based on the findings of the desk study). The scope was designed to primarily identify foundation requirements and if any significant contamination could exist across the site, with recommendations on remediation measures considered necessary should any material contamination risks be identified. Despite there being no contaminated land planning conditions, there can still be risks such as made ground, which we recommended be checked for.

The objectives of the work were to determine the sub-surface conditions in respect of:

Contamination/Environmental Aspects:

- Contamination assessment to consider potential significant pollutant linkages arising from historic and current land uses, on and off site. This includes:
 - Local Authority (LA) **Environmental Search** (for records that only the LA hold).
- Gas monitoring to consider risk of gas migration from the adjacent landfill.

Geotechnical Aspects:

- Likely foundations for proposed structures.
- Likely ground floor slab types.

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1.4 Limitations

Until all invoices associated with the production of this report have been paid in full, then it remains the property of AGGC and not the client, and AGGC do not grant legal reliance upon it to satisfy (or remove) planning permission conditions, or to be used for engineering design, etc.

This report is provided for the benefit only of the party to whom it is addressed and their advisors. No other developer or party may use it without our express written permission (i.e. reassignment). We do not accept responsibility to any other third party for the whole or any part of the contents and we exercise no duty of care in relation to this report to any third party.

Where intrusive investigations have been completed, information, comments and opinions given in this report are based on the ground conditions encountered during the site work and on the results of laboratory and field tests performed during the investigation. However, subsoils are inherently variable and hidden from view such that no investigation can be exhaustive to the extent that all soil conditions are revealed. Conditions may therefore be present beneath the site that were not apparent in the data reviewed as part of this assessment. In particular, it should be noted that groundwater levels vary due to seasonal and other effects and may at times differ to those measured during the investigation.

This assessment has been based to some extent on data acquired from Third Parties. This data has been accepted as correct and has not been subjected to any additional validation.

Unless specifically noted to the contrary, it should be assumed that this report has not been submitted to any other regulatory authorities for approval. Redevelopment sites in particular may have planning conditions attached in respect of contaminated land assessment. Where we are made aware of such conditions in advance of scoping the works, we can tailor the report to the regulatory authority requirements. Where we are not made aware of any such requirements there can be no certainty that our investigation will meet any or all of the regulatory authority requirements.

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2 Phase 1 Desk Study (Inc Preliminary Risk Assessment)

2.1 Introduction

The following research has been undertaken in order to aid accurate design of the subsequent **Phase 2 ground investigation** (which is always recommended).

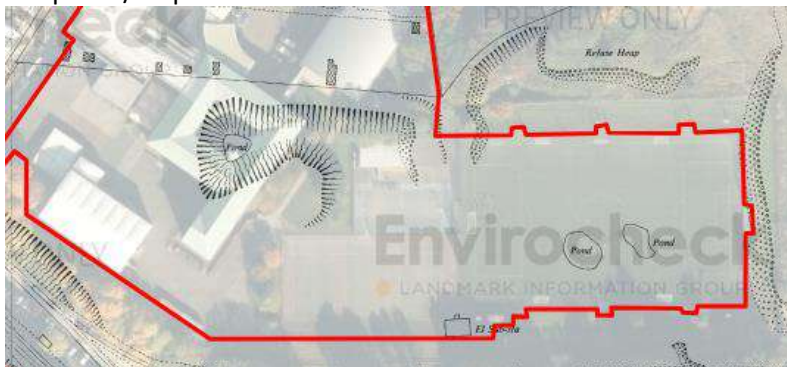
2.2 Desk Study

Table 2.1: Desk Study

Planning conditions	We have inspected the planning portal for 138442/FO/2023 (Canopy). The extension has no planning application yet. There are no planning conditions for this site yet, but the NPPF reminds developers (CI 184) that they are responsible for providing developments that are free of significant risks (both contamination and geotechnical). Furthermore, there are ground assessment requirements within Building Regulations. Potential risks to groundworkers should also be considered.
Current Use of Site and Surroundings	On Site Canopy area: hardstanding area (playground). New extension area: paths/hardstanding. In the Surroundings The remainder of the school, a railway, parkland (former landfill) to the east and residential areas.
Local Authority (LA) Environmental Records	Environmental data was requested from the LA Environmental Health Officer (EHO) and they provided a Part 2a Environmental Risk Assessment report (by SKM, Draft V2#, March 2010) for which significant points (from a brief review) are summarized below (#: they advised that there is no final report). • The LA purchased the landfill site from ICI. • The boundary for the Part 2a assessment <u>excluded</u> the school land. • The site was used for mineral (sand) extraction from the 1920's to 1940's, before then becoming a tip used by ICI, the nature of the fill being unknown. • Deep investigation of the landfill found VOCs, SVOCs and dyestuffs. • Chemical concentrations were assessed against limits for <i>playing fields and open land</i>. Allotments also occupy part of the landfill. • For the allotments...only the maximum concentrations of Cadmium and Vinyl Chloride exceeded the allotments limits. • For soils >0.2m depth in the open space, mean concentrations of Arsenic, Chromium and some PAHs exceeded the open space limits. Elevated concentrations of total cyanide also occurred at >0.2m depth. • For soils <0.2m depth in the open space, there were no elevated (mean) concentrations, although there were 22no. samples at >0.2m and <0.2m depth that individually had concentrations of Lead exceeding the guidelines. • In the playing fields and open land a thin veneer of topsoil overlaid a granular layer and then a geotextile membrane lay at 0.35-0.6m depth, below which was the landfill deposits extending to a maximum depth of 5.3m. That landfill material had visual & olfactory indications of chemicals and dyes and solvents. • Gas monitoring found CS1 (no risk) and CS2 (low risk) conditions within the landfill area.

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	The report concludes that there was <i>insufficient evidence to indicate that exposures to existing concentrations of contaminants will result of unacceptable risks to site users</i> (i.e. significant possibility of significant harm (SPOSH)).
Other	There is a lot of contamination-type information in some of the ground investigations previously undertaken on the school site and in the surroundings (see plans in Appendix I). A very brief look through has revealed: - The northern part of the school used to be allotments. - There were refuse heaps shown, mostly ~100m east of the school, but some do seem to lie <i>under where the current tennis courts lie</i>. These appear to be associated (due to a railway siding into the site) with the Victoria Works to the east and north east. The land east of the school buildings (i.e. the tennis courts etc) is a licensed landfill site (see Landfill section overleaf), but the Envirocheck records unusually contain no information about it. - Just E of where the new canopy is proposed, there used to be a large (possibly 20m deep) pit with sides sloping down to a small pond at the base and an access track down to the base. There seems no reason for the hole and so the cynic would say that the hole was used to deeply dispose of hazardous waste. See photo/map below.  - One report found that <i>Following 12 monitoring rounds and a CS1 gas risk classification, upgraded gas protection measures</i> (i.e. CS2 gas risk protection) <i>were still recommended</i>. - An email from the LA EHO on 13th Oct 2016 (in response to 3no. questions by a consultant) states: <i>Please see my responses below</i> <i>has this site been assessed as part of the Council's Statutory Contaminated Land Inspection Strategy. - No</i> <i>If so is the site designated as Contaminated Land and - n/a</i> <i>what is the priority level of the site within the Council's contaminated land inspection strategy - The Environmental Protection Group is aware of past industrial use adjacent to the study site (former landfill site) that may be potential sources of contamination. The site therefore remains on our list of sites to investigate under our Part 2A inspection strategy. We are unable to provide a time scale for when this will be done or provide a priority level. Our priority sites for inspection at this time are the landfill sites in Manchester.</i> <i>In addition to the above we have investigated the former Abraham Moss playing fields and the allotments under our contaminated land strategy. The</i>

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	<i>playing fields are located on a former landfill site, which was originally a depression in the landscape which was used as a chemical waste tip by the ICI Blackley factory, part of ICI Dyestuffs (later Zeneca). This site was filled prior to the Control of Pollution Act 1974 (which required that the disposal of all controlled wastes onto land be licensed); therefore the exact nature of the fill materials is not known. Several site investigations have been conducted on the perimeter of the tip and beneath the footprint of the Abraham Moss Centre. The playing fields and the allotments were not determined as contaminated land following the investigation although elevated levels of contamination were found in the ground beneath the playing fields.</i> Having completed the main investigation, the client then located and supplied 1no. previous site investigation report (Investigation for dining room extension. Report by Geotechnics, January 2017, Ref PN163568). Significant aspects from that comprise: • No contamination that posed risk to end-users of the school was found. • No gas risk was found.
Anticipated Ground Conditions	<u>BGS Mapping Suggests:</u> • Fault Lines: One crosses through the school buildings in an E/W direction. See maps overleaf. • Made ground (MG): None >1m thickness shown on site but a spoil tip/landfill is shown from the tennis courts eastwards (see hatching on last map overleaf). • Drift Deposits: Glaciofluvial Sheet Deposits, Devensian (Sand and gravel). • Solid Geology: Chester Formation (Sandstone) in the NE ½ of the entire school site and Collyhurst Sandstone Formation (Sandstone) in the SW ½ of the entire school site, both separated by a fault line. In the SE of the school site lies Pennine Middle Coal Measures Formation (Mudstone, siltstone and sandstone). • The nearest BGS boreholes (the previous investigation nearby) suggest: - 0m to 1-2m: made ground, over - 1-2m to >10m: CLAY with varying sand content, or SAND with varying clay content. 

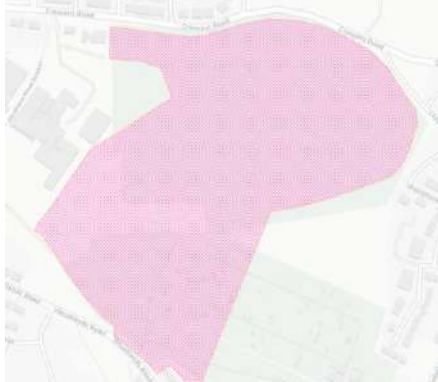
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Hydrology and Hydrogeology	Watercourses, Aquifers, Source Protection Zones (SPZ), Abstractions: Not checked as unlikely to be at significant risk from the site. Groundwater (GW): encountered in nearby boreholes at >6.5m depth, rose to 1.2-5m depth (confined water table).
Historical Land Uses (see Appendix H)	On Site See "other" above. The site was originally (1909) farmland and a pond. Between 1932 and 1951 the aforementioned refuse heaps and ponds had mostly all appeared, in the non-allotment area, along with an electricity sub-station in the very south of the site. Between 1952 and 1968 the ponds were infilled and the landfilling seems to extend under about the SSE ½ of the site. Between 1969 and 1978 the school appeared and the sub-station vanished. In the Surroundings In 1909 there were fields and scattered housing in the immediate surrounds, plus a railway line just SSW. between 1932 and 1951 some houses to the east vanished and numerous refuse heaps appeared to the E (just east of the school's current tennis courts) and S, with some served by a small railway line off of the main (mineral) railway line. By 1968 the small railway line serving the refuse heaps had vanished and some of the heaps have been levelled. Between 1969 and 1978 the refuse heaps have been levelled further and become playing fields. The mineral railway just south has also gone. By 1987 the playing fields are no longer labelled and the whole area appears to be public open space .
Aerial Photographs	On Site Show nothing extra or significant. In the Surroundings Show little extra or significant, except a square (pond or contaminated impacted area?) on the tip site.
Environmental Datasheets (see Appendix G)	Flood risk data is contained herein, but a drainage engineer should be consulted to assess and comment upon flood risk. The site appears not at risk of flooding from rivers, but has scattered surface water flooding risk on site and limited groundwater flooding risk.

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	Other potentially significant aspects are: On Site • Historic Landfill which comes up to the end of the school buildings and for which there is no information supplied. • In the Surroundings • An opencast sand quarry is recorded east of the site (Mineral site)(presumably then infilled with “refuse” and/or ICI waste). • Historic landfill immediately to the east.
Landfills?	Discussed elsewhere herein. The area of the adjacent licensed landfill is shown below, i.e. it comes under the entirety of the school’s tennis courts and almost to the school buildings. 
Area Affected by Coal Mining?	Unlikely , as the Site falls within a Coal Mining Reporting Area, however, outside of a Development High Risk Area.
Potential UXO Risk?	A preliminary UXO threat assessment for the school site (in one of the site investigation reports) states that the <i>UXO probability assessment= 2 rating, indication a low/moderate probability of UXO encounter.</i>
Potential Ground Risks	The following Contaminated Land Type risks could exist, which we recommend further assessment of: • Ground gas and chemical vapours risks due to proximity to the historic landfill. This would be at the canopy area (being closer to the landfill) but the canopy is open and so will have no gas risk. There is unlikely to be a risk at the extension area. • Made ground. For both areas, ...but for the canopy area previous investigations found Beryllium. One should also check for boron, vanadium, VOCs, SVOCs, etc. Possibility of PFAS(Per- and Polyfluoroalkyl substances). For the extension, there is no significant recorded Radon risk (<1% properties exceed action level). There could also be Geotechnical Risks (e.g. to foundations, etc) to both areas which one should consider assessment of: • Shrink/swell risks especially from removal or retention of trees (a tree survey is recommended and especially before any are removed), • Possible soft ground, • Possible sulphate attack on buried concrete.

2.3 Preliminary Conceptual Model & Risk Assessment

2.3.1 General

The assessment of contamination risks and other environmental risks uses the **Source-Pathway-Receptor** principle.

The site characterisation attempts to identify potential previous and existing **sources** of contamination (or environmental risk) on-site, as well as off-site ones sufficiently close to the site to potentially affect it. The conceptual model links the identified sources likely to cause harm, via **pathways** to identified critical **receptors**.

In the event of a change of land use to a more sensitive use, the town planning regime will require assessment of the new site development layout within the context of the sources of risk and introducing new exposure pathways. The assessment is also used to determine if the site, once developed, would be classed as “contaminated land” under the definition provided by the Part 2A of the Environment Act 1990 as defined in the Environment Protection Act 1995.

The conceptual model is therefore based on a number of identified source-pathway-receptor scenarios. For land to pose a risk (or be classified as “contaminated” under Part 2a) a significant pollutant linkage between source and receptor needs to be identified, which will include each component of the conceptual model.

The absence or removal of a source, or interception of a pathway, will ‘break’ the pollutant linkage and remove the risk.

The conceptual model is characterised by identification of plausible pathways between the following:

- **On-site** sources, which may impact **on-site** receptors.
- **On-site** sources, which may impact **off-site** receptors.
- **Off-site** sources, which may impact **on-site** receptors.

The hazard, consequence and degree of risk all remain as ‘potential’ until assessed by intrusive investigation.

2.3.2 Preliminary Conceptual Model & Risks

Table 2.2: Potential Risks – New Extension

Feature	Potential Risks and Contaminants of Concern [#] (CoC)
On-Site	
Made ground.	Heavy Metals, hydrocarbons (TPH, PAHs), asbestos.
Unexploded Ordnance.	The slight potential for UXO poses a low risk to construction workers forming excavations.
Off-Site	
Proximity to the historic landfill .	Ground gas and chemical vapours risks to ground workers in excavations and to site end-users.

[#]: From industry profiles, etc.

For the extension there is no Radon risk.

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Table 2.3: Potential Risks – New Canopy

Feature	Potential Risks and Contaminants of Concern# (CoC)
On-Site	
Made ground.	Heavy Metals, hydrocarbons (TPH, PAHs), asbestos. The nearby landfill might have extended this far into the school site. Previous investigations of that landfill area found Beryllium. One should also check for boron, vanadium, VOCs, SVOCs, etc.
Unexploded Ordnance.	The slight potential for UXO poses a low risk to construction workers forming excavations.
Off-Site	
Proximity to the historic landfill.	Ground gas and chemical vapours risks to ground workers in excavations.

#: From industry profiles, etc.

Since the canopy is open, then there is no gas, Radon, or chemical vapour risk, to site end-users.

A **preliminary** conceptual model is indicated in the following tables (the model is finalised following intrusive site investigation, see Section 6).

Table 2.4: On-Site to the On-Site Source – Pathway – Receptor Model – Both Locations

Source		Pathway	Receptor	Potential Linkage?
General	Hazard			
Total soils concentrations (e.g. heavy metals and hydrocarbons): General impact (made ground) from former site usage.	Contamination of groundwater.	Migration of leachate through unsaturated zone; Then Migration through saturated zone/groundwater.	Groundwater	Yes, but unlikely
	Impact on Human health.	Ingestion of and dermal contact with soil & household dust; Inhalation of dust (indoor household and outdoor fugitive).	Construction workers.	Yes
		Growing then eating food crops.	Site end-users.	No
	Vegetation poisoning.	Plant root uptake.	Plants.	No
UXO.	Explosion.	Hit during excavations.	Construction workers	Yes, but Unlikely

There are not considered to be any significant **on-site to off-site** pathways or risks.

Table 2.5: Off-Site to On-Site Source – Pathway – Receptor Model – New Extension

Source		Pathway	Receptor	Potential Linkage?
General	Hazard			
Ground/landfill Gases & chemical vapours from: - landfill	Explosion (accumulation of methane and volatiles). Asphyxiation (resulting from elevated levels of carbon dioxide, methane etc).	Preferential flow paths into buildings through unsaturated zone Inhalation of indoor vapours/gases and possible explosion.	Human beings.	Yes

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3 Phase 2 Site Investigation

3.1 General

An intrusive site investigation was carried out on 22nd and 23rd November 2023, and employed Dynamic (windowless) Sampling (DS).

The holes are summarised as follows (there were no point-contamination-sources and so exploratory holes were not targeted at any such).

Table 3.1: Exploratory Hole Details

Exploratory Hole ID	Technique	Hole Depth (mBGL)		Well Depth (mBGL)	Comments & Reasons for Holes
		Target	Actual		
DS1	Dynamic (windowless) sampling	5	5	-	Extension area, General site coverage
DS2		5	5	3m	
DS3		5	5	-	
DS4		5	5	-	Canopy area, General site coverage
DS5		5	5	4m	
TP1	Hand dug foundation exposure pit	1.2	1.2	-	To exposure foundations to the existing school building at the planned new extension.
TP2			0.46	-	
TP2a			0.6	-	

A plan showing the exploratory hole locations is presented as Appendix B. Final hole locations are measured or estimated and were not surveyed.

3.2 Dynamic Sampling

5no. dynamic sample holes (DS)(windowless, WS), designated DS1 to DS5 inclusive, were advanced using a tracked drilling rig.

The dynamic sampling retrieved continuous soil samples from the holes, which were logged by an onsite engineer. In addition, SPT/SPT(c) tests were taken at regular intervals to give an indication of the strength/density profile of the underlying strata.

Representative samples were taken for geotechnical and chemical laboratory analysis.

Detailed log sheets for the dynamic sample holes are included in Appendix C.

3.3 Trial Pitting

3no. trial pits, designated TP1, TP2 and TP2a, were excavated by hand to determine the depth and size of existing foundations at the location of the proposed extension. The trial pits were logged by an onsite engineer. On completion the pits were backfilled with excavated spoil and compacted.

Photographs of the trial pits are included in Appendix B. Details of their findings are given in Section 5.2.

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3.4 Backfilling and Installations

On completion, holes DS2 and DS5 were fitted with gas and groundwater monitoring standpipes. For each well, the standpipe comprised a 50mm internal diameter (ID) UPVC riser pipe with screw connectors. The lower part (the “response zone”) is slotted to allow the free ingress of water and gas. The annulus between the riser pipe and the borehole wall was filled with pea gravel. Above the gravel and slotted pipe, the annulus was filled with a cement bentonite grout and a lockable flush stopcock cover was installed at ground level. Details are shown on the logs. For all wells, the tops of the response zones lie at 1m depth.

On completion the remaining holes were backfilled with a mix of arisings and cement bentonite grout, as shown on the logs.

3.5 Sample Collection and Laboratory Analysis

Samples obtained during the investigation were subjected to a range of geotechnical and chemical testing at appropriate UKAS accredited laboratories.

Samples were submitted for **geotechnical laboratory testing** to characterise the engineering properties of the soil. The following testing was scheduled:

- Moisture Content.
- Classification tests (Atterberg Limits).

Geotechnical laboratory test data is presented in Appendix E.

Soil samples were sent for **chemical laboratory analysis** to be analysed for:

Table 3.2: Soil Sample Chemical Tests

Testing:	Number of Samples Tested	
	Made Ground	Natural Soils
AGGC Full suite comprising: arsenic, cadmium, copper, total chromium, chromium VI, lead, mercury, nickel, selenium, zinc, Speciated Polyaromatic Hydrocarbons (PAH), speciated Total Petroleum Hydrocarbons (TPH-CWG), soil organic matter content (SOM), pH and soluble sulphate.	5	2
Boron, Beryllium, Vanadium	4	2
Asbestos Screen & ID.	4	0
VOCs (Target + TICS)	4	1
pH, total sulphur, soluble sulphate and total sulphate (for buried concrete design).	0	6

All soil samples were collected using either clean stainless steel utensils or clean disposable gloves and placed directly into clean containers provided by the laboratory.

The chemical laboratory test results are presented in Appendix F.

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4 Ground Conditions

4.1 General

The following table provides a summary of the strata encountered in the exploratory holes and the depth to the base of each stratum. MG = man-made ground.

Table 4.1: Typical Strata - Extension (DS1, DS2, DS3)

Strata	Depth Encountered (mBGL)		Typical Thickness (m)	Description & Comments
	Top	Bottom		
MG: Very gravelly sand	0	0.5 to 0.6	0.5	Paving slabs over. Light grey.
SAND	0.5 to 0.6	4.0	3.5	Fine to coarse
Silty SAND	4.0	>5.0	-	Fine

Table 4.2: Typical Strata – Canopy (DS4, DS5)

Strata	Depth Encountered (mBGL)		Typical Thickness (m)	Description & Comments
	Top	Bottom		
MG: Tarmac	0	0.2	0.2	-
MG: Sub-base	0.2	0.5	0.3	
MG: Gravelly sand	0.5	1.0	0.5	Gravel is brick and limestone
SAND	1.0	1.7 & 1.8	1.75	Fine and silty
Silty SAND	1.7 & 1.8	3.4 & 3.8	1.85	Slightly Silty and very silty, with occasional organic matter laminations
Stiff CLAY	3.4 & 3.8	4.0 & 4.25	0.5	Brown silty
SAND	4.0 & 4.25	>5.0	-	Brown and occasionally silty

Anthropogenic components of the made ground comprised brick only.

Groundwater observations are detailed in Section 4.3.

4.2 Geotechnical Parameters

The only clay found, lies at >3.4m depth in the canopy area and it is **low** plasticity. The plasticity indices (PI) was 19% and the modified plasticity indices (MPI) indicate that deep layer to generally possess **low** volume change potentials with changes in moisture content, according to the criteria of NHBC Standards, Chapter 4.2 (2023) Building Near Trees.

Standard Penetration Tests (SPT) were carried out at regular intervals, in accordance with BS EN ISO 22476-3. The recorded SPT N-values are given on the borehole logs.

The majority of design calculations have previously used N values direct from the field, then compared these un-normalised results with similar, uncorrected, published results and correlations available in the technical literature. The SPT hammers used were calibrated for efficiency. A calibration certificate for each hammer used is included in Appendix C. The SPT results are given in the table below on which the normalised N_{60} values are reported (equivalent N-value for a hammer delivering 60% of the theoretical drop energy).

$$N_{60} = (\text{measured hammer energy ratio}/60) \times (N \text{ value})$$

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The N_{60} conversions for the rigs and hammers used on site are as follows:

Dynamic Sampling Rig: $N_{60} = 74/60 \times N = 1.23N$

Table 4.3: SPT N_{60} Blow Counts - Sands

Extension Area			
Test depth (mbgl)	DS1	DS2	DS3
1.35-1.60m	15	12	-
2.15-2.45m	11	10	-
3.15-3.45m	10	10	-
4.15-4.45m	9	6	-
5.15-5.45m	6	7	-
6.15-6.45m	-	-	-
Canopy Area			
Test depth (mbgl)	DS4	DS5	
1.35-1.60m	23	-	
2.15-2.45m	14	-	
3.15-3.45m	43	-	
4.15-4.45m	39#	-	
5.15-5.45m	23	-	
6.15-6.45m	-	-	

#: a small part of this result is the clay layer.

4.3 Groundwater

Groundwater observations were as follows (most holes were dry for the short hour or so during their formation):

Table 4.4: Groundwater Observations

Exploratory Hole	Depth to Groundwater (mbgl)	
	During site works	Standing Depths Post-site works
DS1	Slight seepage in the silty sand section (4.00m)	-
DS2	Dry to hole base at 5m.	Dry to 2.58m/2.59m# for 4no. visits.
DS3	Dry to hole base at 5m.	-
DS4	Dry to hole base at 5m.	-
DS5	Dry to hole base at 5m.	Dry to 3.52m/3.55m/3.56m# for 4no. visits.

#: considered to be base of well

4.4 Contamination Indications

There were no visual or olfactory indications of contamination noted in the soils during the site works.

5 Geotechnical Assessment

5.1 Introduction

The current development proposals are discussed in Section 1.2.

Likely wall loadings are currently unknown, but a standard construction is assumed, for which wall loadings could be as follows.

Table 5.1: Building Loads

House Size	Potential Maximum Line Load (kN per m run of wall)	Corresponding Max' Bearing Pressure (kPa) for Footing Widths of:		
		0.45m	0.6m	1.0m
2-storey detached	47	105	78	47

5.2 Existing Foundations

TP1 and TP2 were instructed, to expose existing foundations and we added TP2a to provide extra data. Photographs and sections are given in Appendix C.

TP1

- There was **0.3m of brickwork founding on 0.3m of concrete**, sitting on what appeared to be a 0.08m thick slab (which looked like a paving slab) lying at 0.4mbegl and protruding 0.3m from the building face.
- That seemed wrong and so we broke part of the slab and there is a pad footing beneath which **founds at >1.0mbegl and it protrudes 0.15m from the building face**.

TP2

- There was a utility cover that we had to work around.
- There is **0.3m of brickwork founding onto 0.08m of concrete** (no protrusion). That concrete spans over (a separate) utility pipe (brown plastic and entering the building, see photo) and then **deepens to the side of the utility**.
- We then dug TP2a around the corner to try and find the pad footing.

TP2a

- This pit had **0.3m of brickwork onto 0.3m of concrete** and then a 0.08m thick concrete pad/slab (?) protruding from the building face by 0.3m.
- **We assume this is hiding the same 0.15m protruding, pad footing (that founded at >1m depth) as TP01.**

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5.3 Excavations

Excavations should be suitable with conventional earthmoving plant, although pneumatic tools are likely to be required to break out existing foundations and masonry obstructions.

It is unlikely that shallow excavations will encounter significant groundwater. Groundwater could occur as seepages and should this happen, then it should be possible to keep excavations dry by pumping from a conveniently located sump to a nearby sewer. If this is required, a temporary discharge licence will be required from the water authority.

Casing was used to support our drill holes and so we did not observe any instability. Temporary excavations are **not expected** to stand unsupported in the short term, either vertically, or with steep cut gradients, and therefore may require shoring or to be battered back to a safe angle of repose. Excavations below approximately 1m depth will require sheeting and shoring for personnel to enter safely. The stability of all excavations will deteriorate on wetting either from groundwater or surface water. Excavations could therefore be protected from rain and surface water runoff.

Any areas of particularly poor quality underlying soils (i.e. wet, soft, loose materials) should be removed from beneath all proposed foundation and hardstanding areas, and the deficit made good with suitable compacted granular fill (placed to an engineering specification).

Carbon & Sustainability

Attempt to retain surplus soils on site, provided there is legitimate reason for reuse.

5.4 Foundation Assessment

General

Made Ground was present across both locations, but it's granular nature means that foundation can found within it.

The soils at and below probable founding depths are granular and so (subject the LABC) foundations could found as shallow as 0.5m depth.

Taking account of the strata revealed by this investigation we recommend that shallow strip and pad foundations are adopted for the proposed developments.

The following foundation guidance should be reviewed if the ground conditions vary significantly from those highlighted in Section 4.

All foundation formations should be inspected and approved by a suitably qualified geotechnical engineer. Any 'soft' spots where exposed should be excavated and replaced with suitably compacted engineering fill.

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Carbon & Sustainability

For sustainability, one should consider the following:

- Propose the use of cement-types with less impact than the classical Portland Cement. (use CEMII or CEMIII to replace CEMI).
- Earth Friendly Concrete (EFC): Replacement of Cement by the use of GGBS (Ground Granulated Blast Furnace Slag)(and fly ash geopolymer).
- Propose alternative materials. E.g. alkali activated materials (AAM's) and micro-macro synthetic fibre to replace steel reinforcement.
- Design cement-free ground improvement solutions and specify low Ordinary Portland Cement (OPC) mixes. For example, by cement replacement with Ground Granular Blast Furnace Slag (GGBS) / Pulverised Fly Ash (PFA) (e.g. CEMIII B) where locally available.
- Consider other, non/less- cement based techniques of ground improvement (e.g. stone columns or well-designed soil-mixing), or driven **timber piles** #.

#: One of the main drawbacks to using timber is that it is biodegradable. Decay occurs fastest when the timber is exposed to the air, which allows fungal decay and rot to occur. As such, a typical life span for timber placed in an **unsaturated environment is c. 25 years**. Timber placed **below groundwater level**, in a saturated, anoxic environment, will decay at a much slower rate and can have a design life of **up to 100 years** depending on the timber species used.

Shallow Strips and Pad Foundations

For the new extension, we recommend that shallow **strip foundations** be seated into the natural sand that lies at ~0.5mBGL.

For the canopy, we recommend that shallow **pad foundations** be seated into the granular made ground that occurs down to 1m depth.

Carbon & Sustainability

Foundation depth and widths should be assessed to find the minimum volume of soil arisings that could occur, and so minimise the amount of concrete used in foundations (if surplus soils need to go off site, such will also minimise the carbon footprint of exporting).

At the minimum foundation depth of 0.5mBGL# the allowable bearing capacity for strip foundations is (adopting a factor of safety of 3 on the ultimate calculated value):

Extension: 0.45m wide strips: $Q_{a(0.5mBGL)} = 265kN/m^2$

Canopy: 1m wide pads: $Q_{a(0.5mBGL)} = >235kN/m^2$

Canopy: 2m wide pads: $Q_{a(0.5mBGL)} = >175kN/m^2$

#: provided that the shallow sands are medium dense, the same as the sands below 1.35m depth.

The **canopy** foundations will probably need to be deepened and enlarged to provide enough weight to overcome wind uplift forces.

The above values are based on a fresh cut formation for foundation level. If the formation is left exposed to the weather for a period of time, then further excavation may be required until the strengths/densities discussed above for the bearing stratum are obtained.

To avoid differential settlements then individual foundations should found upon the same strata type (for example, entirely onto sands, etc).

5.5 Floor Slabs

The site is underlain by granular made ground and granular natural soils. Accordingly, ground bearing (or suspended) floor slabs may be used. Suspended slabs should be considered...see gas Section 6.7.

Any requirements for membranes to be placed within ground floor slabs to protect against ground/landfill gas, chemical vapours, or Radon, are discussed in later sections of this report.

5.6 Chemical Attack on Buried Materials

Concrete

Carbon & Sustainability

See Section 5.3, General.

Samples were tested for sulphate suites as outlined in *BRE Special Digest 1, Concrete in Aggressive Ground: 2005* (SD1).

The site can be classed as Brownfield¹ and with groundwater lying at >5m depth, water conditions are taken to be static above that depth and mobile below.

The water-soluble sulphate results for natural soils were all <20mg/l. The 'Characteristic Value' is therefore 20mg/l and this falls into Design Sulphate Class DS-1 in Table C2 of BRE Special Digest 1 (SD1).

The strata on the site are unlikely to be pyritic. Natural soils were however checked for such. Assuming that the concrete (e.g. foundations, drainage pipes, etc) may be exposed to disturbed ground in which pyrite may oxidize to sulphate, the oxidisable sulphide content of the soils must be calculated, using the total sulphur and acid soluble sulphate results.

The results show that none of the oxidisable sulphide contents exceed the 0.3% level given in the Digest and therefore pyrite is probably not present.

Soil pH values varying from 8.3 to 9.0 were recorded and from these results a 'Characteristic Value' of 8.3 is derived.

From consideration of the sulphate, pH and groundwater conditions it is concluded that the Aggressive Chemical Environment for Concrete (ACEC) classes are:

- AC-1s if there is no risk of concrete being in contact with groundwater,
- and AC-1 where concrete could be contact with groundwater (e.g. below 5m depth).

The designer should utilise these classifications in order to produce the concrete specification.

Other Materials

The parties responsible for selecting all other materials that will be placed in the ground as part of this development, shall ensure that they are resistant to the chemical concentrations identified in the appendix of this report (e.g. pipe joint seals).

¹ The definition of "Brownfield" adopted by SD1 is one that has been *subject to industrial development, storage of chemicals, or deposition of waste, and which may contain aggressive chemicals in residual surface materials or in ground penetrated by leachates.*

6 Assessment of Contamination & Environmental Risks

6.1 Tier 1 Generic Quantitative Risk Assessment - Soil Risks to Humans

6.1.1 General

The proposed redevelopment of the **Site is essentially hardcover**, therefore, to identify chemicals of potential concern, the analytical data has initially been **conservatively** compared against the relevant available guidelines for **residential with** and **without plant uptake** end-use (i.e. with and without food crops, including fruit trees).

Residential with plant uptake limits are given for consideration of risks to ground workers.

The maximum results, have been used for subsequent comparison with the following 4no. sets of GAC:

1. Firstly against **Category 4 (Cat 4) Screening Levels**, SP1010, 24th September 2014, by CL:AIRE.
2. Then:
 - a. CL:AIRE/EIC/AGS **Soil Generic Assessment Criteria** (GAC) for Human Health Risk assessment, January 2010.
 - b. The LQM/CIEH **S4ULs** for Human Health Risk Assessment. Ref: S4UL3269, released January 2015 (with update in August 2015), Land Quality Press, Nottingham.
 - c. **EA Science Reports** SC050021, SR2 & SR3.

6.1.2 Metals

The CLEA model has separate Soil Guideline Values (SGVs) for different forms of mercury. However, the SGV report states that for general surface contamination, and to simplify the assessment, the chemical analysis results for total mercury content can just normally be compared with the SGVs for inorganic mercury (e.g. 40mg/kg for private gardens)(this is because the equilibrium concentrations of elemental and methyl mercury compounds are likely to be very low).

The following table summarises the results (**Bold** and/or **highlight** shows exceedances):

Table 6.1: Values for Metals in Soils

Compound	No. of samples	Maximum values (mg/kg)	SGV or GAC (1% SOM) mg//kg (Residential with plant uptake)	SGV or GAC (1% SOM) mg/kg (Residential without plant uptake)
Arsenic	7	14.3	37	40
Cadmium	7	2.3	11	85
Chromium	7	22.8	910 #	910 (Chromium III)
Chromium VI	7	<0.8	6	6
Copper	7	183	2,400	7,100
Mercury (Inorganic)	7	0.3	40	56
Nickel	7	23.4	180	180
Lead	7	201, 310 (both in canopy area)	200	310
Selenium	7	<1	250	430
Zinc	7	181	3,700	40,000
Beryllium	6	0.8	1.7	1.7
Boron	6	<0.5	290	11,000
Vanadium	6	23	410	1200

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Generally, none of the results exceeded the GAC values for *residential with plant uptake* nor *residential without plant uptake* end-uses. **The exception was for Lead** where there were elevated concentrations in the canopy area.

6.1.3 Organics – General

Soil Organic Matter (SOM) tests were undertaken on 7no. samples. The results ranged from 0.5% to 1.7% and so a conservative figure of 1% SOM has been adopted when selecting the Generic Assessment Criteria (GAC) screening values for organics in the following sections.

6.1.4 Organics – TPH

The following table summarises the results (**Bold** and/or **highlight** shows exceedances):

Table 6.2: Values for Speciated Hydrocarbons in Soils

Compound	No. of samples	Maximum values (mg/kg)	SGV or GAC (1% SOM) mg/kg (Residential <u>with</u> plant uptake)	SGV or GAC (1% SOM) mg/kg (Residential <u>without</u> plant uptake)
Aliphatic				
EC 5-6	7	<0.01	42	42
EC> 6-8	7	<0.01	100	100
EC> 8-10	7	1.0	27	27
EC> 10-12	7	<1.0	130	130
EC> 12-16	7	<1.0	1,100	1,100
EC> 16-35	7	68.8	65,000	65,000
EC> 35-44	7	8.8	65,000	65,000
Aromatic				
EC 5-7(benzene)	7	<0.01	70	370
EC> 7-8 (toluene)	7	<0.01	130	860
EC>8-10	7	<1.0	34	47
EC>10-12	7	<1.0	74	250
EC>12-16	7	<1.0	140	1,800
EC>16-21	7	2.4	260	1,900
EC>21-35	7	97.5	1,100	1,900
EC>35-44	7	23.1	1,100	1,900

None of the results exceeded the GAC values for *residential with plant uptake* nor *residential without plant uptake* end-uses.

All BTEX (Benzene, Toluene, Ethylbenzene, Xylene) results were below the limits of detection.

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6.1.5 Organics – Polyaromatic Hydrocarbons (PAHs)

The following table summarises the results (**Bold** and/or **highlight** shows exceedances):

Table 6.3: Values for Speciated PAH in Soils

Compound	No. of samples	Maximum values (mg/kg)	SGV or GAC (1% SOM) mg/kg (Residential <u>with</u> plant uptake)	SGV or GAC (1% SOM) mg/kg (Residential <u>without</u> plant uptake)
Naphthalene	7	0.02	2.3	2.3
Acenaphthylene	7	< 0.01	170	2,900
Acenaphthene	7	< 0.01	210	3,000
Fluorene	7	< 0.01	170	2,800
Phenanthrene	7	0.06	95	1,300
Anthracene	7	0.02	2,400	31,000
Fluoranthene	7	0.12	280	1,500
Pyrene	7	0.12	620	3,700
Benzo(a)anthracene	7	0.04	7.2	11
Chrysene	7	0.07	15	30
Benzo(b)fluorathene	7	0.04	2.6	3.9
Benzo(k)fluorathene	7	0.06	77	110
Benzo(a)pyrene	7	0.05	2.2	3.2
Indeno(123-ed)pyrene	7	0.02	27	45
Dibenzo(ah)anthracene	7	< 0.01	0.24	0.31
Benzo(ghi)perylene	7	0.03	320	360

None of the results exceeded the GAC values for *residential with plant uptake* nor *residential without plant uptake* end-uses.

6.1.6 Other

Asbestos was screened for in 4no. made ground samples and none was found.

VOCs were checked for in 5no. samples at depths of 0.4 to 1.4m and no traces of VOCs were found.

6.2 Tier 2 Detailed Quantitative Risk Assessment - Soil Risks to Humans

Not required as the degree of risks are less than conservative generic criteria.

6.3 Soil Risks to Plants (Phytotoxicity)

No new planting is occurring and so this has not been assessed.

6.4 Soil Risks to Water Supply Pipes

The future routes of water supply pipes had not been provided at the time of this report, hence the investigation and sampling strategy may not be fully compliant with UK Water Industry Research (UKWIR) recommendations.

To assess possible risks to proposed water supply pipes, the laboratory test results have been subject to initial assessment against the GAC presented in UKWIR. Full testing has not been undertaken to determine the suitability of metallic pipe materials.

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It is assumed that water pipes will be placed no deeper than 1m below existing ground level and results that relate to strata below 1m are not considered in the following table. Assessment of the results versus the GAC is summarised as follows:

Table 6.4: GAC for Water Supply Pipes

Parameter	GAC (mg/kg)		Results exceeding the GAC (mg/kg)	
	PE pipes	PVC pipes	PE pipes	PVC pipes
BTEX (<C11)	0.1	0.03	None	None
Mineral Oil C11-C20	10	Suitable	None	None
Mineral Oil C21-C40	500	Suitable	None	None
VOCs	0.5	0.125	None	None

Other parameters within UKWIR have not been assessed since they are not potential contaminants of concern for this site.

Visual or olfactory indications of chemicals, or petroleum hydrocarbons (e.g. oil, petrol, diesel) were not noted on site.

Given the above, then we consider that the local water supply company should accept the use of PVC and PE water supply pipe materials on site.

It is recommended that this assessment be given to the relevant water supply company at an early stage (ideally prior to an application for planning permission being made) to confirm its requirements, which may not necessarily be the same as those recommended by UKWIR.

6.5 Tier 1 Generic Quantitative Risk Assessment – Risks to Water Resources

No significant contamination has been found that could migrate or leach to groundwater. Given this, then it is unlikely that any significant risk will be posed to groundwater under the site.

6.6 Ground/Landfill Gas Risks to Humans

The site could be at risk from the adjacent landfill. In order to assess the significance of potential ground gases at the site measured concentrations (by volume in air) and flow rates have been used to generate Gas Screening Values (GSVs). These have then been compared to CIRIA Report 665. BS8485 has also been referenced.

It is recommended that the gas risk should be assessed by the consideration of pathways to human receptors as follows:

- Gas entering the dwelling through the substructure and building up to hazardous levels.

The following ground gas parameters have been recorded over 4no. gas monitoring rounds (results are contained in Appendix D):

○ A maximum 'initial' methane concentration of	At limit of detection (0.1%)
○ A maximum 'initial' flow rate of	0.5 l/hr
○ A maximum 'steady state' carbon dioxide concentration of	2.0%
○ A maximum 'steady state' flow rate of	0.5 l/hr
○ Atmospheric pressures were	1005mb (constant), 1010/1012mb (falling), 1001mb (rising), 1017mb (falling)

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Negative flow rates are taken as being zero since they do not indicate gas generation, but usually indicate dropping water levels within monitoring wells, or well/atmospheric pressures equalising.

The worst-case Gas Screening Values (GSV) for both methane and carbon dioxide have been calculated, in order to see if any gas protective measures are required in the new development.

The GSV for methane is calculated to be 0.00l/hr and for carbon dioxide it is 0.01l/hr.

No VOCs were detected during monitoring.

In accordance with CIRIA C665 and NHBC guidance, the type of buildings proposed are residential (not “low-rise”) or warehouses/schools/office/commercial/industrial and fall under the CIRIA C665 guidance

The site falls into ‘Characteristic Situation’ **1 (CS1)(very low hazard)** in Table 8.5 of CIRIA 665.

This indicates that no special protection measures are required in the new buildings, given the proximity of the adjacent landfill and its unknown contents **then partial CS2 gas protection is suggested** (i.e. suspended floor sabs with ventilated underfloor void, gas tight cavity trays and a DPM having taped joints and around service entries).

Note that gas protection should be designed in accordance with BS8485 and by someone familiar with the standard.

6.7 Radon Risk to Humans

The chance of a property having a radon level that is at least as high as the **Action Level**, is called the **Radon Potential**.

For this area the environmental data sheets show the Radon Potential to be **0-1% (low risk)**(i.e. up to 1% of properties in this area could exceed the action level), for which **no radon protection** is required for new buildings or extensions on site.

Even though the Radon potential shows “no” Radon protection to be required, many developers are nonetheless adopting “Basic” protection and we would recommend such be considered here. The reason is that protection is obligatory only where >3% of properties exceed the Radon Action Level, but that still leaves 3% potentially at risk from Radon.

6.8 Chemical Vapour Risks to Humans

No olfactory indications that could suggest a vapour risk, have been found.

6.9 Final Conceptual Model and Risk Assessment

The preliminary conceptual model and risk assessment has been updated in light of the findings of the Phase 2 work as shown in the following tables.

The method used for risk evaluation is qualitative based on interpretation of the available geoenvironmental and geotechnical data in order to provide an overall impression of the potential risks present at the site. This is described in terms of two variables as follows:

- **“Probability”** – being the likelihood that a hazard is present on site or in the surroundings.
- **“Consequence”** – being the potential outcome of the hazard.

The combination of these is used to define the risk. Clearly if a hazard is not present there can be no consequence. Similarly hazards that are potentially present will have different degrees of potential consequence. The combination of the presence of a hazard, and the potential severity of outcome of such a hazard within any event, can be used to manage the approach to management of the risk.

The **probability** (likelihood) of an event can be classified on a four point system using the following terms and definitions based on CIRIA C552:

- **Highly likely:** The event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;
- **Likely:** It is probable that an event will occur, or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- **Low likelihood:** Circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term;
- **Unlikely:** Circumstances are such that it is improbable the event would occur even in the long term.

An extra class is added to those of C552, that of **“negligible likelihood”**, which is an amount or effect that is negligible, i.e. is so small that it is not worth considering or worrying about.

The **consequence** (severity) can be classified using a similar system also based on CIRIA C552. The terms and definitions relating to consequence are:

- **Severe:** Short term (acute) risk to human health likely to result in ‘significant harm’¹. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short term risk to an ecosystem or organism forming part of that ecosystem¹;
- **Medium:** Chronic damage to human health (‘significant harm’¹), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem¹;
- **Mild:** Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services (‘significant harm’¹). Damage to sensitive buildings, structures or the environment; and
- **Minor:** Harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.

⁽¹⁾ Defined in Defra Circular on “Contaminated Land”, EPA 1990 Part 2a”, 01/2006, September 2006.)

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Once the probability of an event occurring and its consequence have been classified, a risk category can be assigned as in the following table.

Table 6.5: Risk Classification System (CIRA 552)

Probability	Consequence				
		Severe	Medium	Mild	Minor
	Highly likely	Very high	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low likelihood	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

Risk Level	Action
Low to Very Low	None
Moderate to Moderate/Low	Undertake appropriate mitigation measures to reduce the risk level by appropriate on-site practice at little additional cost.
High to Very High	Designers should take such risks into account and avoid or reduce risk level to acceptable levels. Additional resources required.

The following duplicates the **preliminary potential risks** from Table 2.2 and discusses whether they have now been proven to be risks.

Table 6.6: Proven Risks

Feature	Now proven to be a risk?
On-Site	
Made ground.	Yes, primarily to groundworkers since all pathways will be cut to end-users.
Unexploded Ordnance.	A risk could always exist
Off-Site	
Proximity to the historic landfill	No gas or chemical vapour risks have been found, but (for reasons discussed earlier we'd suggest some very basic protection (e.g. CS2)

The tables that follow provide a summary of the data reference points, together with an indication of the hazards, probabilities, consequences and degrees of risk.

This assessment indicates the site and environs are considered as **Very Low** to **Moderate/Low** risk with respect to contamination. **Indicators above low risk** comprise:

- **Lead concentrations** in the made ground and their risk to ground workers.
- Potential for **UXO risk**.

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Table 6.7: On-Site to On-Site Source – Pathway Receptor Model - Both Locations

Source		Pathway	Receptor	Probability	Consequence	Potential Risk?
General	Hazard					
Total soils concentrations (e.g. heavy metals and hydrocarbons): General impact (made ground) from former site usage	Contamination of groundwater	Migration of leachate through unsaturated zone; Then Migration through saturated zone/groundwater.	Groundwater	Unlikely	Mild	Very Low
	Human health	Ingestion of and dermal contact with soil & household dust; Inhalation of dust (indoor household & outdoor fugitive).	Construction workers	Likely	Medium	Moderate
		Growing then eating food crops.	Site end-users	Negligible likelihood	Medium	Very Low
	Vegetation poisoning.	Plant root uptake	Plants	None	Mild	None
UXO	Explosion	Hit during excavations, piling or borehole drilling	Construction workers & drillers	Unlikely	Severe	Low/moderate

There are not considered to be any significant **on-site to off-site** pathways or risks.

Table 6.8: Off-Site to On-Site Source – Pathway – Receptor Model – New Extension

Source		Pathway	Receptor	Probability	Consequence	Potential Risk?
General	Hazard					
Ground/landfill Gases & chemical vapours from: - landfill	Explosion (accumulation of methane and volatiles)	Preferential flow paths into buildings through unsaturated zone Inhalation of indoor vapours/gases and possible explosion.	Human beings	Unlikely	Medium (Inhalation of indoor vapours/gases)	Low
	Asphyxiation (resulting from elevated levels of carbon dioxide, methane etc).				Severe (possible explosion)	Low/moderate

6.10 Strategy for Risk Reduction & Remediation

6.10.1 Introduction

There are two ways to reduce contamination/environmental type risks:

- “**remediation**” of soil and/or groundwater.
- Other **risk reduction measures** (that can only be completed post-commencement, such as clean cover in final garden areas, gas protection, or special water supply pipe materials).

No unacceptable risks have been found that require **pre-commencement** soil or groundwater remediation.

No long-term monitoring and maintenance of remediation is required.

Timescales for the construction and implementation of risk-reduction measures, are unknown.

6.10.2 Post-Commencement Risk Reduction Measures Requiring Validation

Risks from Imported Materials and Recycled Aggregates

For **sustainability**, recycled aggregates should be considered. Any recycled aggregates that are planned to be imported to site, and **any derived from on-site**, shall be assessed for asbestos content (and any other contaminants that might be present at the source site), prior to import.

No imported topsoil or subsoil is expected but if it were it would require checking/validation. Topsoil and subsoil can contain naturally occurring contamination such as arsenic and lead. The results shall be assessed for any exceedances of guidelines.

Unforeseen Contamination

A site investigation samples a very small portion of the overall site soils. Given the existence of made ground on the site, vigilance should be maintained during site clearance and construction, in case any areas of suspected **unforeseen contamination** are encountered. If areas are found then a suitably qualified person (e.g. AGGC) should undertake appropriate sampling, testing and further risk assessment.

6.10.3 Post-Commencement Risk Reduction Measures Not Requiring Validation

Gas and Vapour Risks to End Users

We consider the site to be CS1 gas risk classification, which requires no protection. However, given the adjacent landfill and it's unknown contents then we suggest employing partial CS2 gas protection. Measures to deal with such risks can be found in CIRIA 665 and BR414 and would include:

- DPMs that are upgraded to deal with such gases and vapours (e.g. 1200g, with well taped joints and services entries),
- plus gas-tight cavity trays,
- suspended floor slabs,
- and ventilated unfloor void.

Note that gas protection should be designed in accordance with BS8485 and by someone familiar with the standard.

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Measures to deal with risks from ground gases/landfill gases and from any chemical vapours can be dealt with via a single combined system (e.g. just one membrane, etc) and such can also double as the DPM.

Other

If any school site maintenance staff form [excavations east of the school buildings](#) and encounter a granular layer underlain by a **geo-fabric/membrane**, then the soils beneath that are the landfill waste and that is where most of the risk lies. That said, that granular layer showed elevated Lead concentrations.

Site, landscape and maintenance workers should wear gloves, boots and overalls and wash their hands before eating, drinking and smoking. Excessive dust generation should be avoided.

Excavations or below ground voids should be checked for the presence of harmful gases and vapours prior to personnel entry.

A watch should be kept for potential UXO.

6.10.4 Validation Report

If planning conditions require such, then in order to achieve sign-off by the Regulators, a final Validation Report will be established for their review and agreement, following substantial completion of the development (but prior to first occupation). Validation might still be prudent in order to satisfy lenders or site purchasers. The report's aim is to validate the measures in Section 6.10.2 as having been completed, and completed correctly.

Validation shall be undertaken by a suitably qualified and experienced geo-environmental engineer. Any Validation Report shall include the following information as a minimum:

- Validation of the aforementioned measures (where required).
- Copies of all chemical testing results of soils and for all materials tested.
- Figures and drawings (or discussion) detailing the locations of all samples retrieved for chemical testing.
- Copies of any correspondence with the Regulators.

The client shall separately maintain copies of all Duty of Care Consignment Notes for off-site treatment, re-use and/or disposal of materials. Information regarding such materials and their volumes will be required to validate any DoWCoP *Materials Management Plan* (MMP). This information is usually provided within a final Verification report and such can be one in-the-same as the Validation report for contamination risks.

A copy of the final Validation Report (following sign-off by the Regulators if applicable) shall be incorporated within the Site File in accordance with the CDM Regulations (2015).

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New Canopy & New Extension at, Abraham Moss Community School, Crumpsall

7 Site H&S File

The remediation and risk-reduction measures discussed earlier are designed to protect **end-users** of the site. Others at risk comprise **post-construction groundworkers** and **utilities workers**, etc, for which it is not usually economically viable to remove all risks.

Accordingly, and as with most sites, some sources of risk will remain as follows. **Such should be added to, and discussed in, the “Site H&S File” (or similar document):**

- Made ground remaining in place that contains elevated contaminants.
- Potential for ground gas and chemical vapour risks in excavations (esp confined spaces).
- Potential for UXO.

Appendices

- A. Proposed Development Plan
- B. Exploratory Hole Locations
- C. Exploratory Hole Logs, Foundation Pit Sections & Photos, SPT Hammer Calibration
- D. Monitoring Results
- E. Geotechnical Laboratory Results
- F. Chemical Laboratory Results
- G. Environmental Datasheets
- H. Historic Mapping
- I. Previous Ground Investigations On and Around the School

Appendix A

Centre
Library

Abraham Moss Community School

Lease boundary

Proposed Site
new extension

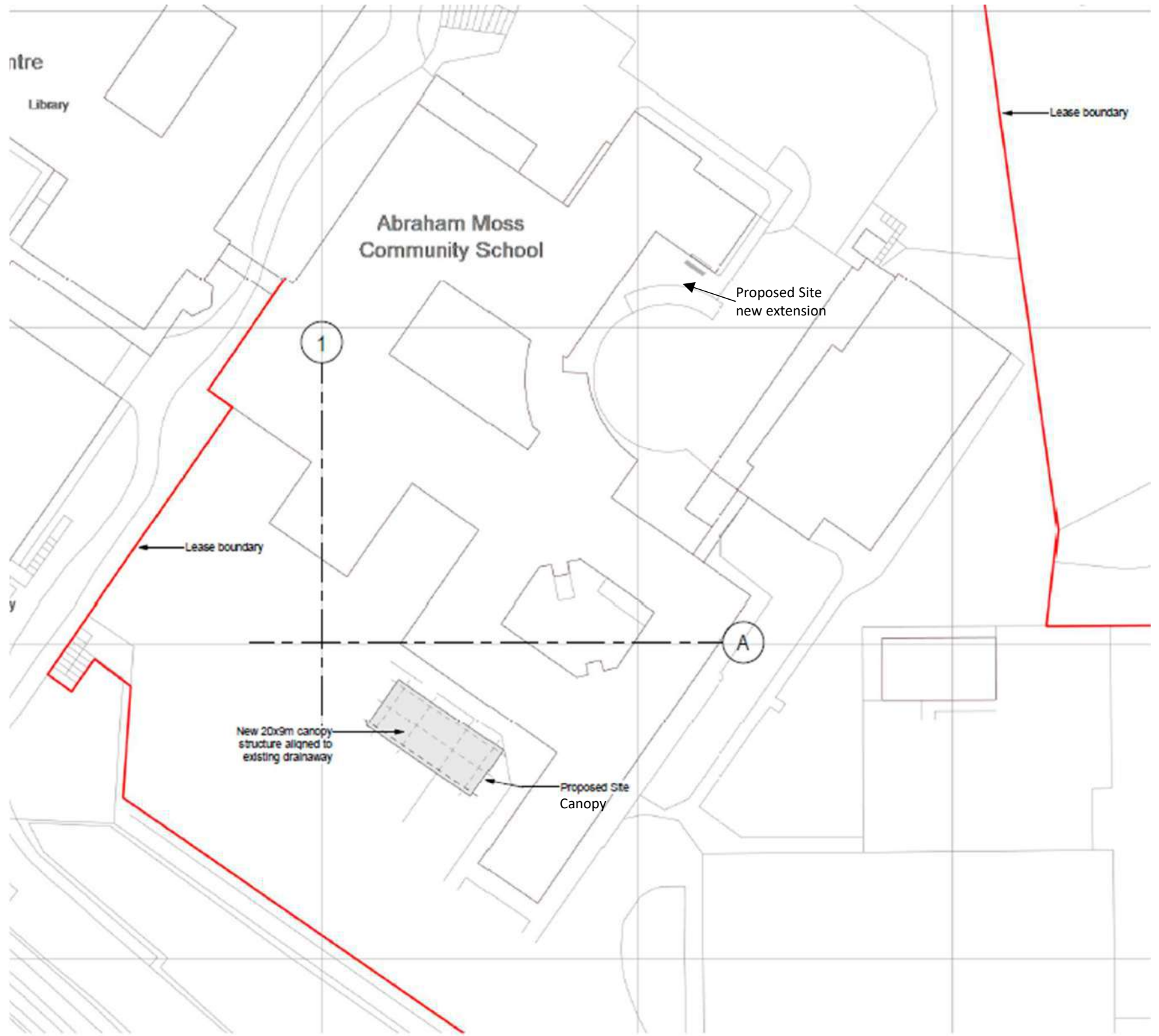
1

Lease boundary

A

New 20x9m canopy
structure aligned to
existing drainaway

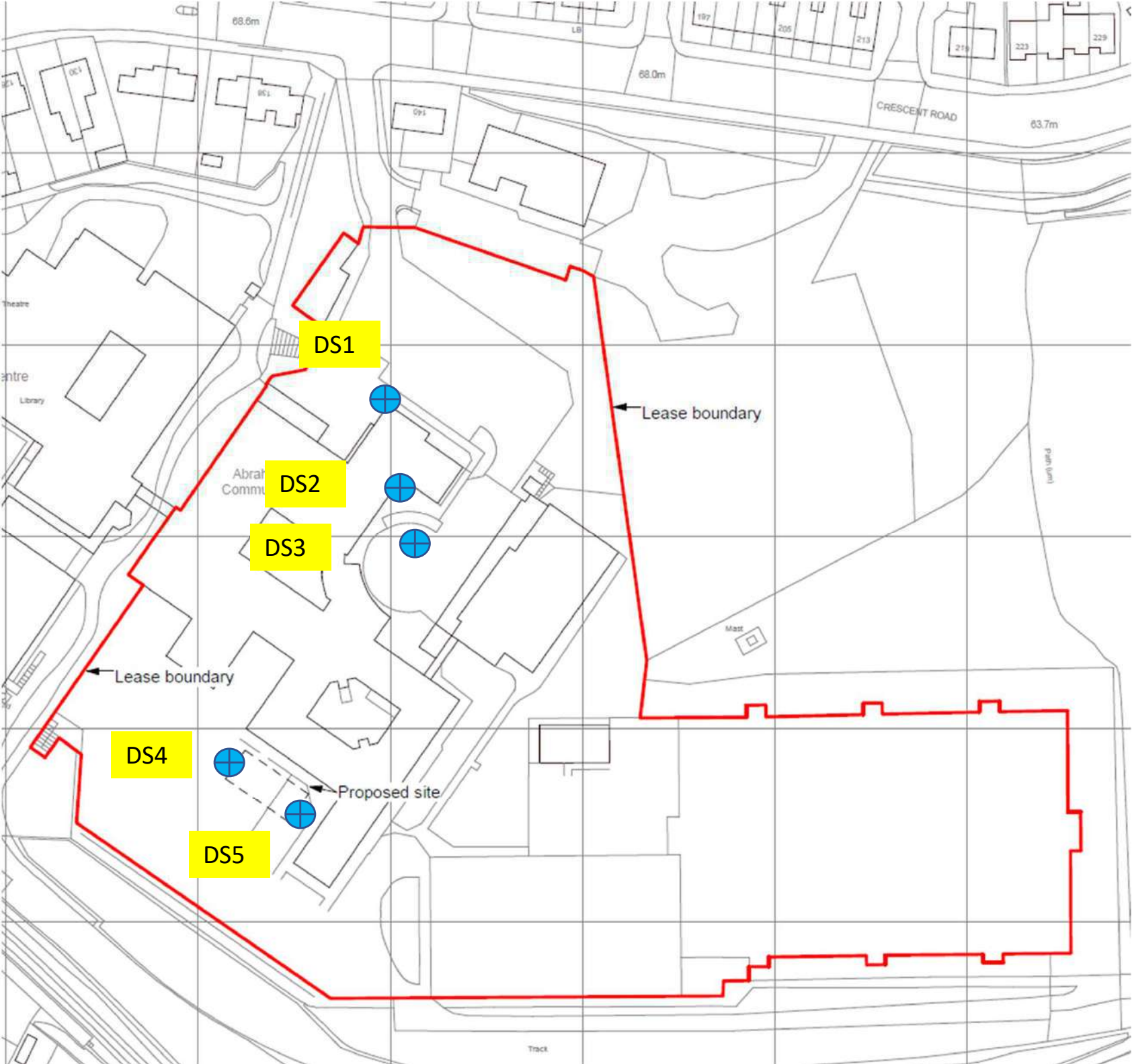
Proposed Site
Canopy



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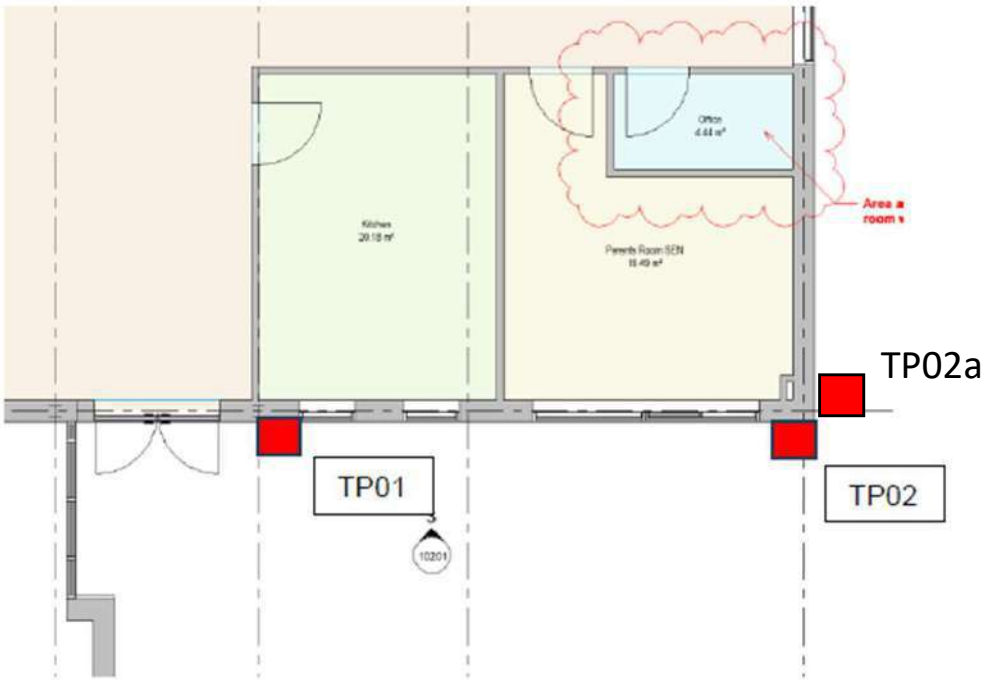
Appendix B

Exploratory Hole
Location Plan



Version	Date
0	11/11/23
1	16/11/23

Exploratory Hole
Location Plan



Version	Date
0	20/12/23

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Appendix C

Key to Exploratory Hole Symbols and Abbreviations

SAMPLE TYPES

B	Bulk disturbed sample	ES	Environmental soil sample	U	Undisturbed sample
C	Core sample	EW	Environmental water sample	UT	Undisturbed thin wall sample
CBR-D	Disturbed sample from CBR test area	G	Gas sample	W	Water sample
CBR-U	Undisturbed sample from CBR test area	L	Liner sample		
D	Small disturbed sample	SPT	SPT split spoon sample		

IN-SITU TESTING

SPTs	Standard Penetration Test (using a split spoon sampler)
SPTc	Standard Penetration Test (using a solid 60 degree cone)
N	Recorded SPT 'N' Value *
-/-	Blows/Penetration (mm) after seating blows totalling 150 mm
MX	Mexi Probe Test (records CBR as %)
HV	Hand Shear Vane Test (undrained shear strength quoted in kPa)
HP	Hand Penetrometer Test (kg/m ³)
()	Denotes residual test value
PID	Photo Ionisation Detector (ppm) *
Kf/Kr	Permeability Test (f = falling head, r = rising head quoted in ms ⁻¹)
HPD	High Pressure Dilatometer Test (pressure meter)
PKR	Packer / Lugeon Permeability Test
CBR	California Bearing Ratio Test

ROTARY CORE DETAILS

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation (% of intact core >100 mm)
FI	Fracture Spacing (average fracture spacing; in mm, over indicated length of core) **
NI	Non-Intact Core
AZCL	Assumed Zone of Core Loss

GROUNDWATER



Groundwater strike



Standing water level after 20 minutes; 1st, 2nd etc (number denotes level order)

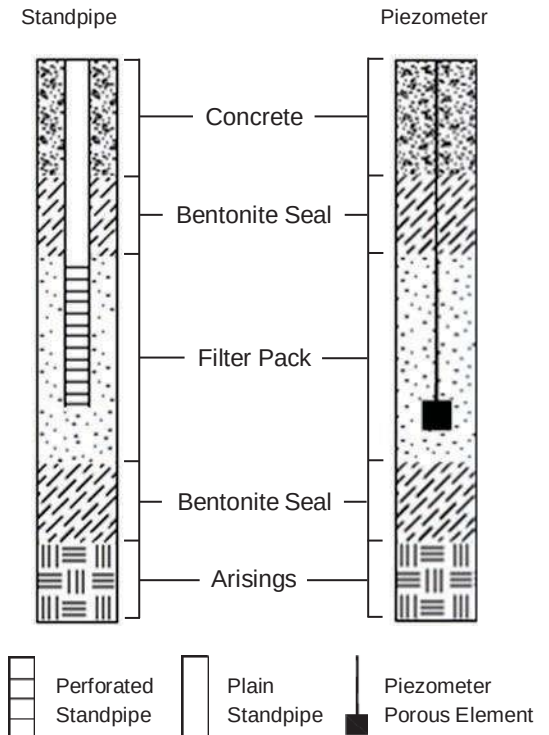
STRATA LEGENDS - Note: Composite strata types are shown by combining symbols

	Made Ground		Silt		Peat		Limestone
	Concrete		Sand		Void		Chalk
	Bituminous Bound Materials		Gravel		Mudstone		Coal
	Topsoil		Cobbles		Siltstone		Metamorphic Rock
	Clay		Boulders		Sandstone		Fine Grained Igneous Rock

* Where a single value is quoted this is the uncorrected 'N' value for a full 300 mm test drive following a seating drive of 150mm. Where the full test drive penetration is not achieved the number of blows is quoted for the penetration below the test total of 300mm, e.g.: 50/75.

** The minimum, average and maximum are shown e.g. 5/45/125.

INSTALLATION & BACKFILL DETAILS



STRATUM BOUNDARIES

Unit boundary

Project Name: **ABRAHAM MOSS**Project Number: **23-075**Start Date: **22/11/2023**Finish Date: **22/11/2023**

Termination Depth (mBGL): 5.00

Eastings: N/A

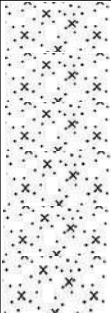
Northings: N/A

Elevation (mAD): N/A

Drilling Contractor: **MT Geoservices Ltd**Drilled By: **M Elegbede**

Equipment type: Dando Terrier Rig

Logged By: **Michael Elegbede**Checked By: **Andre Gilleard**

LEGEND	Depth From/To (mBGL)	Description	Sampling			Testing		Field Records	Backfill/ Installations
			From/To (mBGL)	Type	No.	From/To (mBGL)	Type/ Result		
	0.00 - 0.60	Light grey very gravelly fine to coarse SAND. (MG)							
	0.60 - 4.00	Brown fine to coarse SAND.		ES	1	0.70			
						1.20 - 1.65	S N=12	2,2,3,3,3,3	
						2.00 - 2.45	S N=9	2,3,2,3,2,2	
						3.00 - 3.45	S N=8	1,2,3,2,1,2	
	4.00 - 5.00	Brown silty fine SAND.				4.00 - 4.45	S N=7	1,1,1,2,2,2	
		End of Borehole at 5.00m bgl				5.00 - 5.45	S N=5	1,1,1,2,1,1	

Inspection pit dug to 1.20m and 102mm diameter casing inserted. Drilling started at 1.20m and completed at 5.00m, backfilled with arisings and bentonite pellets.

Window Sample Log

DS02

Page 1 of 1

Project Name: **ABRAHAM MOSS**

Project Number: **23-075**

Start Date: **22/11/2023**

Finish Date: **22/11/2023**

Termination Depth (mBGL): 5.00

Eastings: N/A

Northings: N/A

Elevation (mAD): N/A

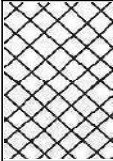
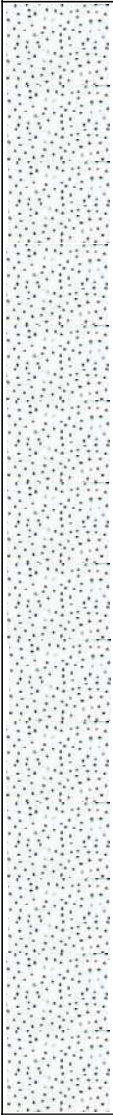
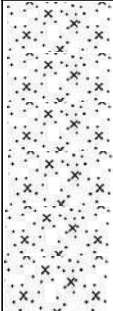
Drilling Contractor: **MT Geoservices Ltd**

Drilled By: **M Elegbede**

Equipment type: Dando Terrier Rig

Logged By: **Michael Elegbede**

Checked By: **Andre Gilleard**

LEGEND	Depth From/To (mBGL)	Description	Sampling			Testing		Field Records	Backfill/ Installations
			From/To (mBGL)	Type	No.	From/To (mBGL)	Type/ Result		
	0.00 - 0.50	Light grey very gravelly fine to coarse SAND. (MG)							
	0.50 - 4.00	Brown fine to coarse SAND.		ES	1	0.70			
						1.20 - 1.65	S N=10	5,2,2,3,2,3	
						2.00 - 2.45	S N=8	2,2,2,2,2,2	
						3.00 - 3.45	S N=8	1,2,2,2,2,2	
	4.00 - 5.00	Brown silty fine SAND.				4.00 - 4.45	S N=5	1,1,1,2,1,1	
		End of Borehole at 5.00m bgl				5.00 - 5.45	S N=6	1,2,1,2,2,1	

Inspection pit dug to 1.20m and 102mm diameter casing inserted. Drilling started at 1.20m and completed at 5.00m. Installed with 50mm monitoring pipework and backfilled with gravel and bentonite pellets and capped with gas tap and traffic rated flush cover.

Window Sample Log DS03

Page 1 of 1

Project Name: **ABRAHAM MOSS**

Project Number: **23-075**

Start Date: **22/11/2023**

Finish Date: **22/11/2023**

Termination Depth (mBGL): 5.00

Eastings: N/A

Northings: N/A

Elevation (mAD): N/A

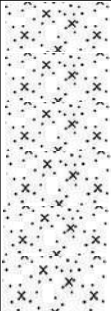
Drilling Contractor: **MT Geoservices Ltd**

Drilled By: **M Elegbede**

Equipment type: Dando Terrier Rig

Logged By: **Michael Elegbede**

Checked By: **Andre Gilleard**

LEGEND	Depth From/To (mBGL)	Description	Sampling			Testing		Field Records	Backfill/ Installations
			From/To (mBGL)	Type	No.	From/To (mBGL)	Type/ Result		
	0.00 - 0.50	Light grey very gravelly fine to coarse SAND. (MG)							
	0.50 - 4.00	Brown fine to coarse SAND.							
	4.00 - 5.00	Brown silty fine SAND.							
		End of Borehole at 5.00m bgl							

Inspection pit dug to 1.20m and 102mm diameter casing inserted. Drilling started at 1.20m and completed at 5.00m, backfilled with arisings and bentonite pellets.

Project Name: **ABRAHAM MOSS**Project Number: **23-075**Start Date: **23/11/2023**Finish Date: **23/11/2023**

Termination Depth (mBGL): 5.00

Eastings: N/A

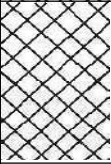
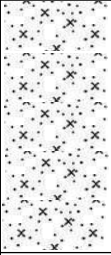
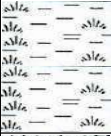
Northings: N/A

Elevation (mAD): N/A

Drilling Contractor: **MT Geoservices Ltd**Drilled By: **M Elegbede**

Equipment type: Dando Terrier Rig

Logged By: **Michael Elegbede**Checked By: **Andre Gilleard**

LEGEND	Depth From/To (mBGL)	Description	Sampling			Testing		Field Records	Backfill/ Installations
			From/To (mBGL)	Type	No.	From/To (mBGL)	Type/ Result		
	0.00 - 0.20	Tarmacadam (MG)							
	0.20 - 0.50	MADE GROUND: Light grey and brown very sandy GRAVEL. (Sub-base)	0.20	ES	1	0.40			
	0.50 - 1.00	MADE GROUND: Brown gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of red bricks and limestone.	0.50	ES	2	0.70			
	1.00 - 1.80	Brown silty fine SAND.	1.00						
	1.80 - 3.80	Brown very silty fine to medium SAND with black laminations of organic matter.	1.80						
	3.80 - 4.25	Stiff brown silty CLAY.	3.80						
	4.25 - 5.00	Brown fine to medium SAND.	4.25						
		End of Borehole at 5.00m bgl	5.00						

Inspection pit dug to 1.20m and 102mm diameter casing inserted. Drilling started at 1.20m and completed at 5.00m, installed with 50mm monitoring pipework and backfilled with gravel and bentonite pellets and capped with gas tap and traffic rated flush cover.

Project Name: **ABRAHAM MOSS**Project Number: **23-075**Start Date: **23/11/2023**Finish Date: **23/11/2023**

Termination Depth (mBGL): 5.00

Eastings: N/A

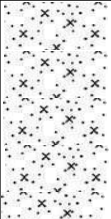
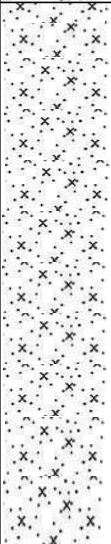
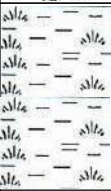
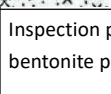
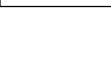
Northings: N/A

Elevation (mAD): N/A

Drilling Contractor: **MT Geoservices Ltd**Drilled By: **M Elegbede**

Equipment type: Dando Terrier Rig

Logged By: **Michael Elegbede**Checked By: **Andre Gilleard**

LEGEND	Depth From/To (mBGL)	Description	Sampling			Testing		Field Records	Backfill/ Installations
			From/To (mBGL)	Type	No.	From/To (mBGL)	Type/ Result		
	0.00 - 0.20	Tarmacadam (MG)							
	0.20 - 0.50	MADE GROUND: Light grey and brown very sandy GRAVEL. (Sub-base)	0.20						
	0.50 - 1.00	MADE GROUND: Brown gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of red bricks and limestone.	0.50	ES	1	0.40			
	1.00 - 1.70	Brown silty fine SAND.	1.00	ES	2	0.90			
	1.70 - 3.40	Brown slightly silty fine to medium SAND.	1.70	D	3	1.30			
	3.40 - 4.00	Stiff brown silty CLAY.	2.00						
	4.00 - 5.00	Brown fine to medium SAND with black laminations of organic matter.	3.00	D	4	2.50			
		End of Borehole at 5.00m bgl	3.40	D	5	3.60			
			4.00						
			4.50	D	6	4.50			
			5.00						

Inspection pit dug to 1.20m and 102mm diameter casing inserted. Drilling started at 1.20m and completed at 5.00m, backfilled with arisings and bentonite pellets.

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref: DT0782
Test Date: 10/05/2023
Report Date: 10/05/2023
File Name: DT0782.spt
Test Operator: MT

Instrumented Rod Data

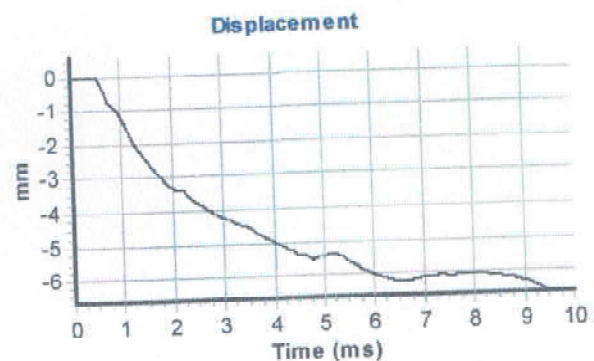
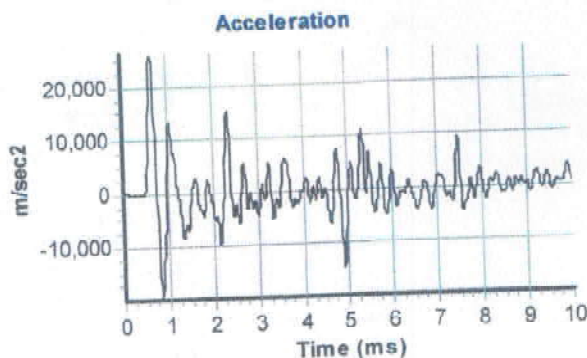
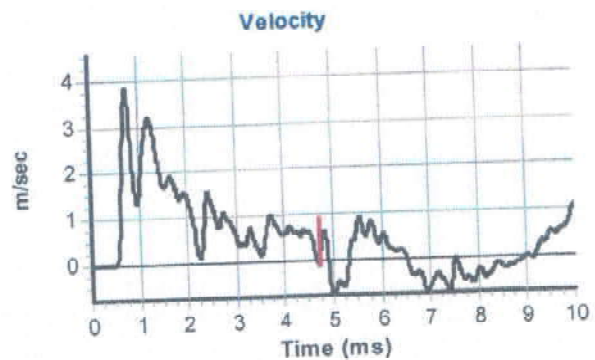
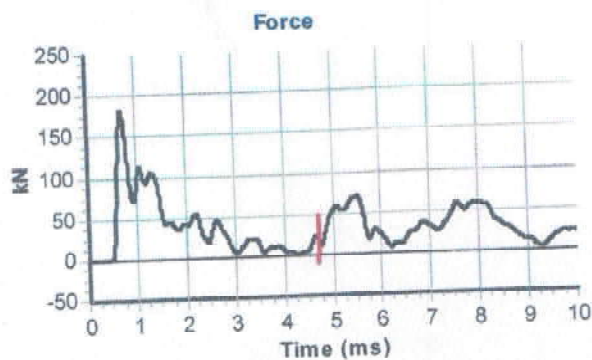
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.5
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 72572
Accelerometer No.2: 72757

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 10.0

Comments / Location

MT GEOSERVICES LTD - 84826



Calculations

Area of Rod A (mm²): 970
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 348

Energy Ratio E_r (%):

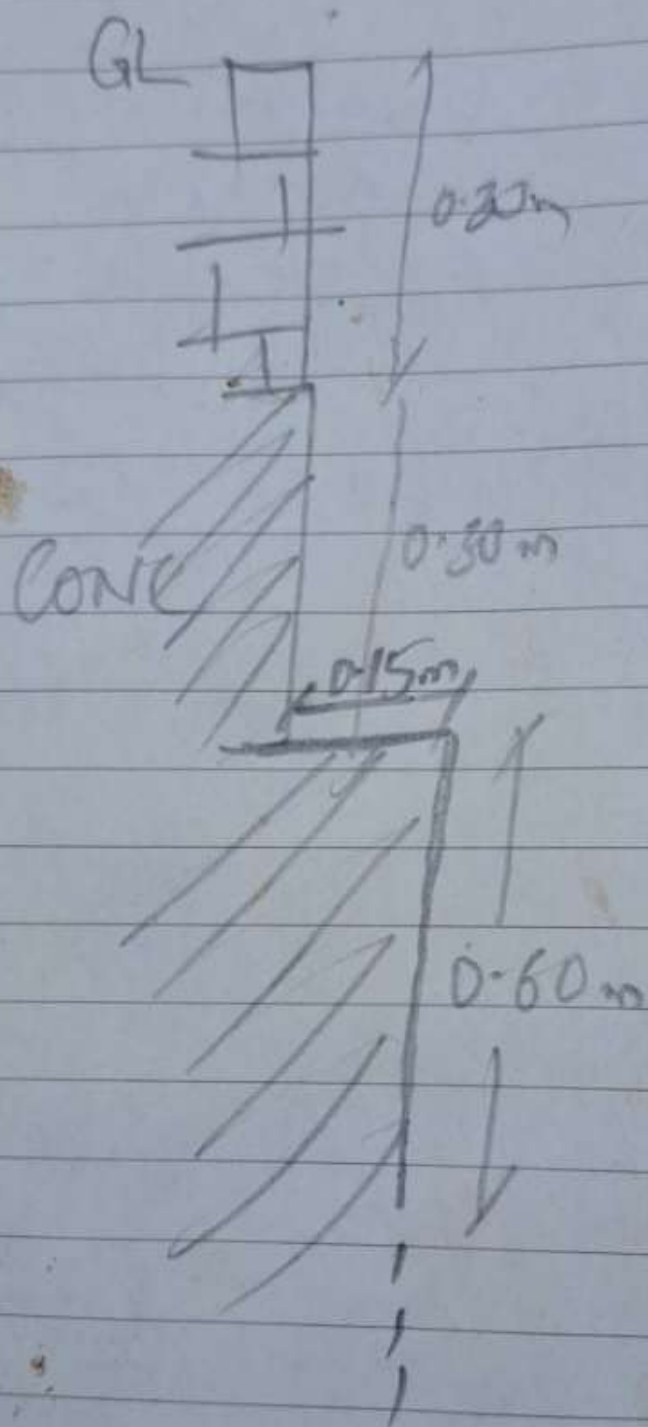
74

Signed: M.TONER

Title: FITTER

The recommended calibration interval is 12 months

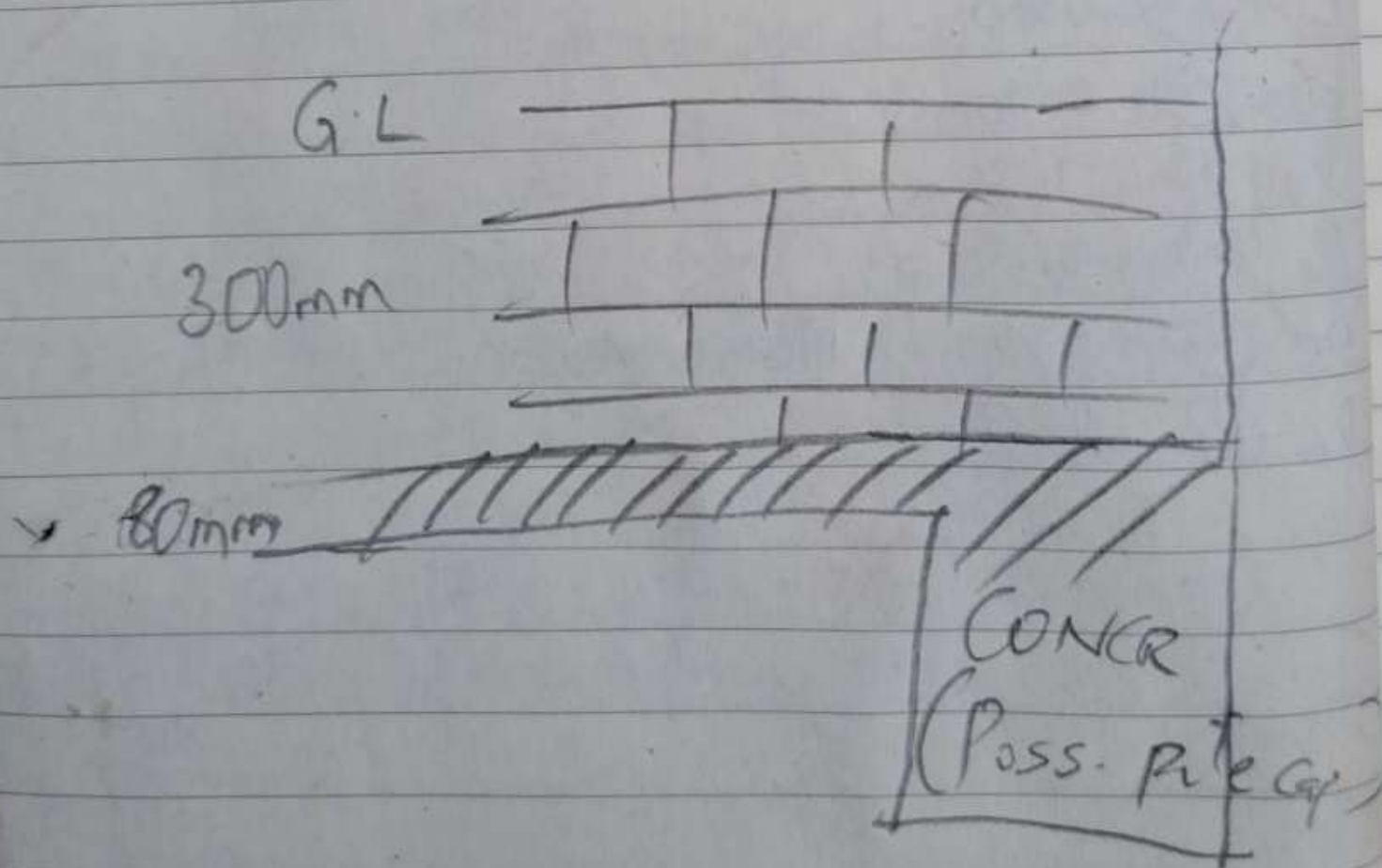
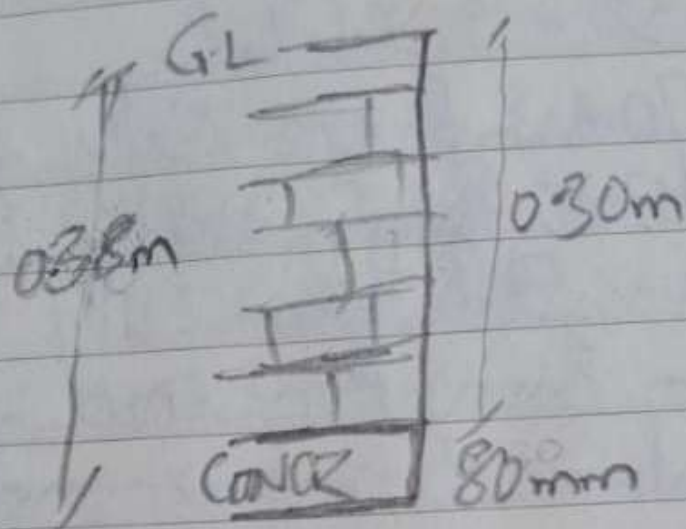
TR 01





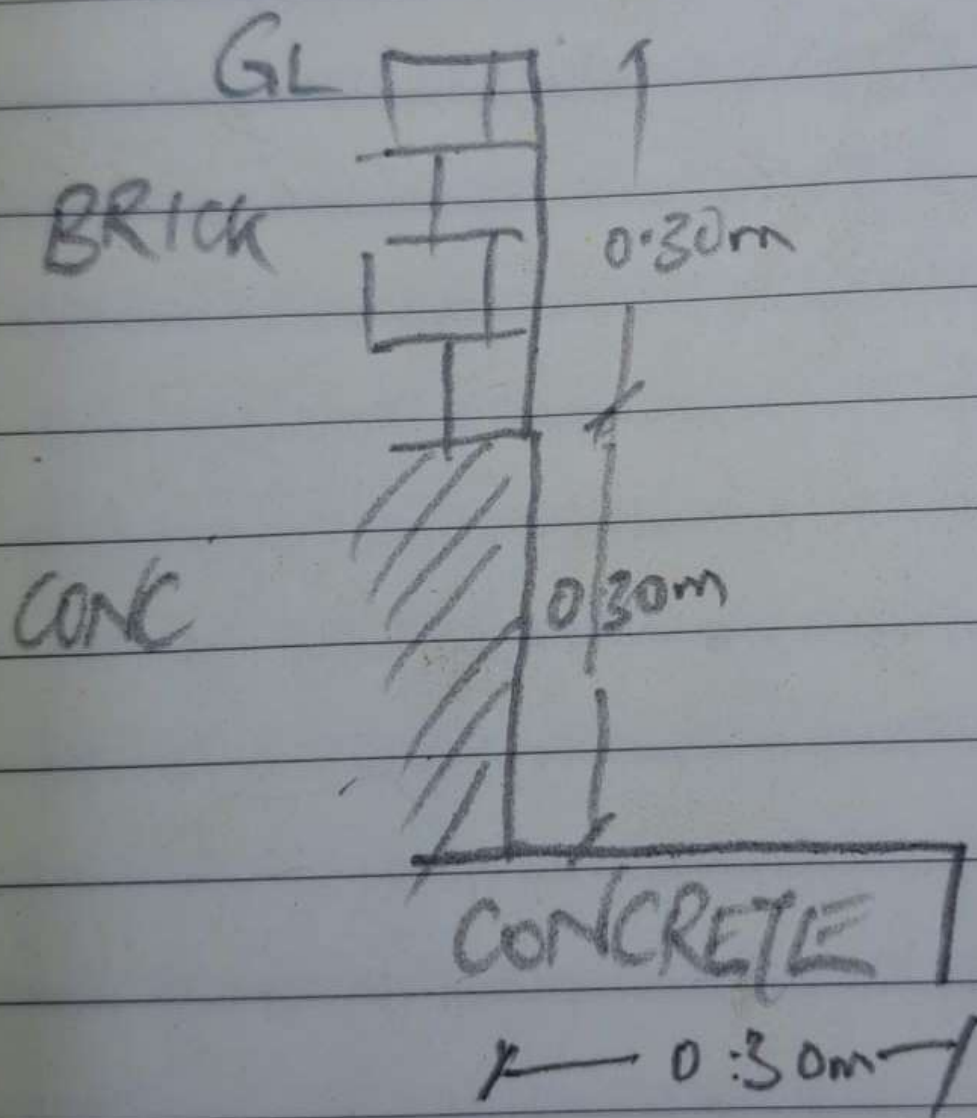


TP02

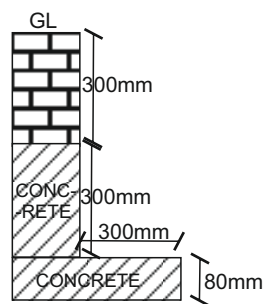
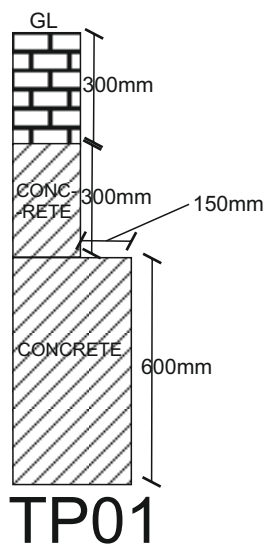




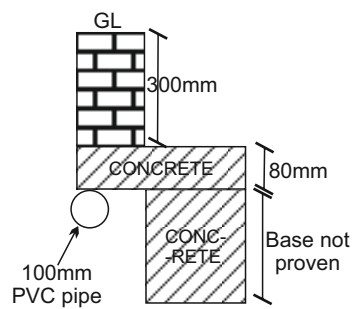
TP02A







TP02A



TP02

AG Geo-Consultants Ltd

Appendix D

GAS MONITORING RESULTS

Date: 29/11/2023

Contract No:
Contract Name Abraham Moss Community School

Contract Engineer:
Client name/contact Andre Gilleard 07395 100 727

Weather Conditions: Sunny Atmospheric Wind Conditions: Light ALM Pressure: 1005								Equipment used: Gas analyser GA504040, Dip tape CPW100-008, PID				Data Collected By: C Wilson, S Mullen			Input Checked by (sign):	
Location	Time		Atmospheric Pressure (mb)	BH Pressure or differential (mb)	Flow (l/hr)	Depth to water (m bgl) (if noted to vary during monitoring then record such)	Well depth (mbgl)	% by volume in air			LEL (%)	(ppm)			Top of Response zone (m bgl)	Notes (eg, samples taken, dual installation, odours, sheens, broken headworks).
	hours mins	secs						Methane	Carbon Dioxide	Oxygen		H2S	CO	PID		
DS2	11:16	0	Constant	0.92	0	Dry	2.58									No samples needed - borehole is dry.
		-- Seconds			0											
		0						ND	1.9	20.9	ND	ND	ND	0		
		15						ND	2.0	20.1	ND	ND	ND	0		
		30														
		60														
		90														
		-- ##														
		-- ##														
		-- ##														
DS5	12:05	0	Constant	-0.97	0	Dry	3.52									No samples needed - dry.
		-- Seconds			0											
		0						ND	0.8	21.0	ND	ND	1	0		
		15						ND	0.8	19.9	ND	ND	ND	0		
		30														
		60														
		90														
		-- ##														
		-- ##														
		-- ##														

GAS MONITORING RESULTS

Date: 06/12/2023

Contract No:
Contract Name Abraham Moss Community School

Contract Engineer:
Client name/contact Andre Gilleard 07395 100 727

Weather Conditions: Sunny Atmospheric Wind Conditions: Light ALM Pressure: 1018							Equipment used: Gas analyser GA504040, Dip tape CPW100-008				Data Collected By: S Mullen				Input Checked by (sign):	
Location	Time		Atmospheric Pressure (mb)	BH Pressure or differential (mb)	Flow (l/hr)	Depth to water (m bgl) (if noted to vary during monitoring then record such)	Well depth (mbgl)	% by volume in air			LEL (%)	(ppm)			Top of Response zone (m bgl)	Notes (eg, samples taken, dual installation, odours, sheens, broken headworks).
	hours mins	secs						Methane	Carbon Dioxide	Oxygen		H2S	CO	PID		
DS2	08:30	0	1010	-0.95	0.5	Dry	2.58									No samples needed - borehole is dry.
		-- Seconds														
		0			0.3			ND	0.1	20.8	ND	ND	ND	NA		
		15			0.4			ND	1.8	20.1	ND	ND	ND	NA		
		30			0.5			ND	1.8	19.9	ND	ND	ND	NA		
		60			0.5			ND	1.8	19.9	ND	ND	ND	NA		
		90			0.5			ND	1.8	19.9	ND	ND	ND	NA		
		-- ##														
		-- ##														
		-- ##														
DS5	08:40	0	1012	-1.07	0.2	Dry	3.52									No samples needed - dry.
		-- Seconds														
		0			0.1			0.1	0.2	20.9	2	ND	ND	NA		
		15			0.2			0.1	0.2	21.1	2	ND	ND	NA		
		30			0.2			0.1	0.1	21.2	2	ND	ND	NA		
		60			0.2			0.1	0.1	21.2	2	ND	ND	NA		
		90			0.2			0.1	0.1	21.2	2	ND	ND	NA		
		-- ##														
		-- ##														
		-- ##														

GAS MONITORING RESULTS

Date: 11/12/2023 Contract No: Contract Name Abraham Moss Community School

Contract Engineer: Client name/contact Andre Gilleard 07395 100 727

Weather Conditions: Showers Atmospheric Wind Conditions: Light ALM Pressure: 1003								Equipment used: Gas analyser GA507573, Dip tape CPW100-003				Data Collected By: C Wilson				Input Checked by (sign):	
Location	Time		Atmospheric Pressure (mb)	BH Pressure or differential (mb)	Flow (l/hr)	Depth to water (m bgl) (if noted to vary during monitoring then record such)	Well depth (mbgl)	% by volume in air				(ppm)			Top of Response zone (m bgl)	Notes (eg, samples taken, dual installation, odours, sheens, broken headworks).	
	hours mins	secs						Methane	Carbon Dioxide	Oxygen	LEL (%)	H2S	CO	PID			
DS2	08:38	0	1001	0.07	0.3	Dry	2.59									No samples needed - borehole is dry.	
		-- Seconds															
		0						ND	0.2	20.9	ND	ND	ND	NA			
		15						ND	1.7	19.6	ND	ND	1	NA			
		30						ND	1.7	19.6	ND	ND	ND	NA			
		60						ND	1.7	19.6	ND	ND	1	NA			
		90						ND	1.7	19.6	ND	ND	ND	NA			
		-- ##															
		-- ##															
		-- ##															
								Water level at end = Dry									
								Water level 3mins after end = Dry									
DS5	08:48	0	1001	-0.12	0.4	Dry	3.55									No samples needed - dry.	
		-- Seconds															
		0						ND	0.2	20.9	ND	ND	1	NA			
		15						ND	0.1	21.0	ND	ND	1	NA			
		30						ND	0.1	21.0	ND	ND	1	NA			
		60						ND	0.1	21.0	ND	ND	ND	NA			
		90						ND	0.1	21.1	ND	ND	ND	NA			
		-- ##															
		-- ##															
		-- ##															
								Water level at end = Dry									
								Water level 3mins after end = Dry									

GAS MONITORING RESULTS

Date: 20/12/2023

Contract No:
Contract Name Abraham Moss Community School

Contract Engineer:
Client name/contact Andre Gilleard 07395 100 727

Weather Conditions: Overcast Atmospheric Wind Conditions: Moderate ALM Pressure: 1017								Equipment used: Gas analyser GA507573, Dip tape CPW100-003				Data Collected By: C Wilson				Input Checked by (sign):									
Ground Conditions: Waterlogged						Depth to water (m bgl) (if noted to vary during monitoring then record such)	Well depth (mbgl)	% by volume in air				(ppm)			Top of Response zone (m bgl)	Notes (eg, samples taken, dual installation, odours, sheens, broken headworks).									
Location	Time		Atmospheric Pressure (mb)	BH Pressure or differential (mb)	Flow (l/hr)			Methane	Carbon Dioxide	Oxygen	LEL (%)	H2S	CO	PID											
	hours mins	secs																							
DS2	08:25	0	1017	-0.12	0.2	Dry	2.59									No samples needed - borehole is dry.									
		__ Seconds			0																				
		0						ND	0.1	20.9	ND	ND	ND	0											
		15						ND	1.6	19.9	ND	ND	ND	0											
		30						ND	1.6	19.6	ND	ND	1	0											
		60						ND	1.6	19.5	ND	ND	ND	0											
		90						ND	1.6	19.5	ND	ND	ND	0											
		_ ##																							
		-- ##																							
		_ ##							Water level at end = Dry																
									Water level 3mins after end = Dry																
	DS5	08:37			0			1017	-0.37	0.3	Dry	3.56											No samples needed - dry.		
					__ Seconds					0															
					0								ND	0.1			20.9	ND	ND	ND	0				
		15		ND	0.1	21.1	ND			ND			ND	0											
		30		ND	0.1	21.1	ND			ND			ND	0											
		60		ND	0.1	21.1	ND			ND			ND	0											
		90		ND	0.1	21.1	ND			ND			ND	0											
		_ ##																							
		-- ##																							
		_ ##			Water level at end = Dry																				
					Water level 3mins after end = Dry																				

AG Geo-Consultants Ltd

Appendix E

TEST REPORT

Client AG Geo-Consultants Ltd

Address 58 Church Road
Bishopston
Bristol
BS7 8SE

Contract Abraham Moss School

Job Number MRN 4093/6

Date of Issue 06 December 2023

Pages 1 of 2

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.
- 5 The results included within the report are representative of the samples submitted for analysis.
- 6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.



Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 475 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

Murray Rix is the trading name of Murray Rix (Northern) Limited. Registered in England 2878361

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

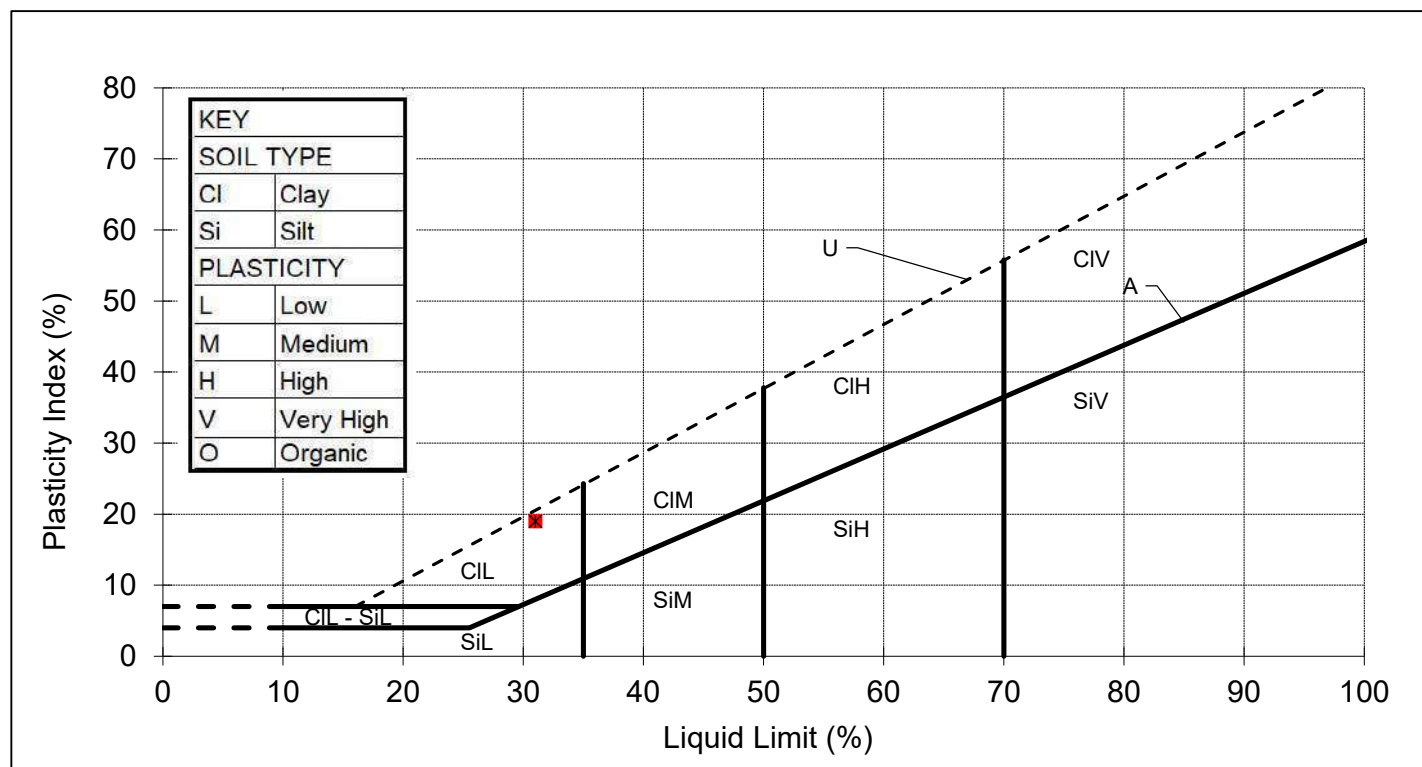
CLIENT	AG Geo-Consultants Ltd		
SITE	Abraham Moss School		
JOB NUMBER	MRN 4093/6		

SAMPLE LABEL	DS4 3.6	DATE SAMPLED	23-Nov-23
SAMPLE No.	134463	DATE RECEIVED	29-Nov-23
DATE TESTED	01-Dec-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	22.7	32.2	0.965	
Determination 2 (avg)	22.6	32.1		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
16.6	31	12	19	99



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

06-Dec-23

AG Geo-Consultants Ltd

Appendix F



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 23-51261

Issue: 1

Date of Issue: 04/12/2023

Contact: Andre Gilleard

Customer Details: AG Geo-Consultants Ltd
58 Church Road
Horfield
Bristol
BS7 8SE

Quotation No: Q23-03916

Order No: Not Supplied

Customer Reference: 23-075

Date Received: 27/11/2023

Date Approved: 04/12/2023

Details: Abraham Moss School

Approved by:

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

This report may only be reproduced in full



Sample Summary

Report No.: 23-51261, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
346313	DS1 0.70	22/11/2023	27/11/2023	Sand	
346314	DS2 0.30	22/11/2023	27/11/2023	Loamy sand	
346315	DS2 0.70	22/11/2023	27/11/2023	Sand	
346316	DS4 0.40	23/11/2023	27/11/2023	Loamy sand	c
346317	DS4 0.90	23/11/2023	27/11/2023	Sand	c
346318	DS5 0.40	23/11/2023	27/11/2023	Sandy loam	
346319	DS5 0.70	23/11/2023	27/11/2023	Loamy sand	
346320	DS2 2.80	23/11/2023	27/11/2023	Sand	
346321	DS4 1.30	23/11/2023	27/11/2023	Sand	
346322	DS4 2.50	23/11/2023	27/11/2023	Sand	
346323	DS4 4.50	23/11/2023	27/11/2023	Sand	
346324	DS5 1.40	23/11/2023	27/11/2023	Sand	c
346325	DS5 2.90	23/11/2023	27/11/2023	Sandy Silty clayey loam	



Results Summary

Report No.: 23-51261, issue number 1

ELAB Reference	346313	346314	346315	346316	346317	346318	346319	346320	346321	346322
Customer Reference										
Sample ID										
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	DS1	DS2	DS2	DS4	DS4	DS5	DS5	DS2	DS4	DS4
Sample Depth (m)	0.70	0.30	0.70	0.40	0.90	0.40	0.70	2.80	1.30	2.50
Sampling Date	22/11/2023	22/11/2023	22/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023

Determinand	Codes	Units	LOD										
Soil sample preparation parameters													
Moisture Content	N	%	0.1	8.4	7.2	9.6	4.0	12.2	9.3	7.5	19.2	15.4	13.7
Material removed	N	%	0.1	< 0.1	5.9	3.3	< 0.1	< 0.1	1.9	7.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed	N		0	None	None	Stones	None	None	Stones	Stones	None	None	None
Metals													
Arsenic	M	mg/kg	0.5	4.9	4.6	5.3	5.8	5.5	14.3	8.6	n/t	n/t	n/t
Beryllium	M	mg/kg	0.5	n/t	n/t	n/t	< 0.5	< 0.5	0.8	< 0.5	n/t	n/t	< 0.5
Cadmium	M	mg/kg	0.2	< 0.2	0.4	< 0.2	2.3	< 0.2	0.6	0.4	n/t	n/t	n/t
Chromium	M	mg/kg	1	9.6	14.9	5.0	13.7	10.8	17.1	22.8	n/t	n/t	n/t
Copper	M	mg/kg	4	14.5	26.3	12.2	15.1	19.1	183	67.2	n/t	n/t	n/t
Lead	M	mg/kg	1	11.3	16.3	7.1	201	17.2	310	85.6	n/t	n/t	n/t
Mercury	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3	0.1	n/t	n/t	n/t
Nickel	M	mg/kg	1	14.9	17.6	6.9	13.8	17.0	23.4	15.3	n/t	n/t	n/t
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	n/t	n/t	n/t
Vanadium	M	mg/kg	0.5	n/t	n/t	n/t	14.1	12.1	23.0	15.3	n/t	n/t	8.2
Zinc	M	mg/kg	4.5	52.7	62.5	36.1	122	54.3	181	109	n/t	n/t	n/t
Anions													
Water Soluble Sulphate	M	mg/l	20	n/t	n/t	n/t	n/t	n/t	n/t	n/t	< 20	< 20	< 20
Water Soluble Sulphate	M	mg/kg	40	< 40	< 40	< 40	< 40	< 40	40	< 40	n/t	n/t	n/t
Inorganics													
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	n/t	n/t	n/t
Total Sulphur	N	%	0.01	n/t	n/t	n/t	n/t	n/t	n/t	n/t	0.03	0.02	0.01
Acid Soluble Sulphate (SO4)	U	%	0.02	n/t	n/t	n/t	n/t	n/t	n/t	n/t	< 0.02	< 0.02	< 0.02
Water Soluble Boron	N	mg/kg	0.5	n/t	n/t	n/t	< 0.5	< 0.5	< 0.5	< 0.5	n/t	n/t	< 0.5



Results Summary

Report No.: 23-51261, issue number 1

ELAB Reference	346313	346314	346315	346316	346317	346318	346319	346320	346321	346322
Customer Reference										
Sample ID										
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	DS1	DS2	DS2	DS4	DS4	DS5	DS5	DS2	DS4	DS4
Sample Depth (m)	0.70	0.30	0.70	0.40	0.90	0.40	0.70	2.80	1.30	2.50
Sampling Date	22/11/2023	22/11/2023	22/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023

Determinand	Codes	Units	LOD										
Miscellaneous													
pH	M	pH units	0.1	8.7	8.8	8.5	9.0	8.9	9.0	8.7	8.3	8.6	8.9
Soil Organic Matter	U	%	0.1	0.5	0.4	0.9	0.4	1.7	1.4	1.0	n/t	n/t	n/t
Polyaromatic hydrocarbons													
Naphthalene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	0.01	0.02	n/t	n/t	n/t
Acenaphthylene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	< 0.01	n/t	n/t	n/t
Acenaphthene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	< 0.01	n/t	n/t	n/t
Fluorene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	< 0.01	n/t	n/t	n/t
Phenanthrene GCMS	N	mg/kg	0.01	0.04	< 0.01	< 0.01	c 0.01	c < 0.01	0.02	0.06	n/t	n/t	n/t
Anthracene GCMS	N	mg/kg	0.01	0.02	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	0.02	n/t	n/t	n/t
Fluoranthene GCMS	N	mg/kg	0.01	0.08	< 0.01	< 0.01	c 0.07	c < 0.01	0.03	0.12	n/t	n/t	n/t
Pyrene GCMS	N	mg/kg	0.01	0.07	< 0.01	< 0.01	c 0.07	c < 0.01	0.04	0.12	n/t	n/t	n/t
Benzo(a)anthracene GCMS	N	mg/kg	0.01	0.02	< 0.01	< 0.01	c 0.02	c < 0.01	0.01	0.04	n/t	n/t	n/t
Chrysene GCMS	N	mg/kg	0.01	0.03	< 0.01	< 0.01	c 0.03	c < 0.01	0.04	0.07	n/t	n/t	n/t
Benzo(b)fluoranthene GCMS	N	mg/kg	0.01	0.03	< 0.01	< 0.01	c 0.01	c < 0.01	0.02	0.04	n/t	n/t	n/t
Benzo(k)fluoranthene GCMS	N	mg/kg	0.01	0.02	< 0.01	< 0.01	c 0.02	c < 0.01	0.02	0.06	n/t	n/t	n/t
Benzo(a)pyrene GCMS	N	mg/kg	0.01	0.02	< 0.01	< 0.01	c 0.02	c < 0.01	0.02	0.05	n/t	n/t	n/t
Indeno(1,2,3-cd)pyrene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	0.02	n/t	n/t	n/t
Dibenzo(a,h)anthracene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	< 0.01	n/t	n/t	n/t
Benzo(g,h,i)perylene GCMS	N	mg/kg	0.01	0.01	< 0.01	< 0.01	c 0.01	c < 0.01	0.02	0.03	n/t	n/t	n/t
Total PAH(16) GCMS	N	mg/kg	0.04	0.38	0.05	< 0.04	c 0.31	c < 0.04	0.25	0.67	n/t	n/t	n/t



Results Summary

Report No.: 23-51261, issue number 1

ELAB Reference	346313	346314	346315	346316	346317	346318	346319	346320	346321	346322
Customer Reference										
Sample ID										
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	DS1	DS2	DS2	DS4	DS4	DS5	DS5	DS2	DS4	DS4
Sample Depth (m)	0.70	0.30	0.70	0.40	0.90	0.40	0.70	2.80	1.30	2.50
Sampling Date	22/11/2023	22/11/2023	22/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023

Determinand	Codes	Units	LOD										
BTEX													
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	c < 10.0	c < 10.0	< 10.0	< 10.0	n/t	n/t	n/t
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	c < 10.0	c < 10.0	< 10.0	< 10.0	n/t	n/t	n/t
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	c < 10.0	c < 10.0	< 10.0	< 10.0	n/t	n/t	n/t
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0	c < 10.0	c < 10.0	< 10.0	< 10.0	n/t	n/t	n/t
MTBE	U	ug/kg	10	< 10.0	< 10.0	< 10.0	c < 10.0	c < 10.0	< 10.0	< 10.0	n/t	n/t	n/t
TPH CWG													
>C5-C6 Aliphatic (HS_1D_MS_AL)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	< 0.01	n/t	n/t	n/t
>C6-C8 Aliphatic (HS_1D_MS_AL)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	< 0.01	n/t	n/t	n/t
>C8-C10 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	< 1.0	1.0	< 1.0	c < 1.0	c < 1.0	< 1.0	< 1.0	n/t	n/t	n/t
>C10-C12 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	c < 1.0	c < 1.0	< 1.0	< 1.0	n/t	n/t	n/t
>C12-C16 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	c < 1.0	c < 1.0	< 1.0	< 1.0	n/t	n/t	n/t
>C16-C21 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	2.6	< 1.0	< 1.0	c < 1.0	c < 1.0	3.2	3.3	n/t	n/t	n/t
>C21-C35 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	6.4	4.4	2.7	c 16.2	c < 1.0	65.6	15.7	n/t	n/t	n/t
>C35-C40 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	1.3	1.1	< 1.0	c 2.1	c < 1.0	8.8	3.0	n/t	n/t	n/t
Total (>C5-C40) Aliphatic (HS_1D_MS+EH_CU_1D_AL)	N	mg/kg	1	10.2	6.5	2.7	c 18.3	c < 1.0	77.6	22.1	n/t	n/t	n/t
>C5-C7 Aromatic (HS_1D_MS_AR)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	< 0.01	n/t	n/t	n/t
>C7-C8 Aromatic (HS_1D_MS_AR)	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	c < 0.01	c < 0.01	< 0.01	< 0.01	n/t	n/t	n/t
>C8-C10 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	c < 1.0	c < 1.0	< 1.0	< 1.0	n/t	n/t	n/t
>C10-C12 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	c < 1.0	c < 1.0	< 1.0	< 1.0	n/t	n/t	n/t
>C12-C16 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	c < 1.0	c < 1.0	< 1.0	< 1.0	n/t	n/t	n/t
>C16-C21 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	c < 1.0	c < 1.0	2.4	< 1.0	n/t	n/t	n/t
>C21-C35 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	2.0	1.3	< 1.0	c 11.4	c < 1.0	97.5	14.5	n/t	n/t	n/t
>C35-C40 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	c 1.3	c < 1.0	23.1	5.3	n/t	n/t	n/t
Total (>C5-C40) Aromatic (HS_1D_MS+EH_CU_1D_AR)	N	mg/kg	1	2.0	1.3	< 1.0	c 12.7	c < 1.0	123	19.8	n/t	n/t	n/t
Total (>C5-C40) Ali/Aro (HS_1D_MS+EH_CU_1D_Total)	N	mg/kg	1	12.2	7.9	2.7	c 31.0	c < 1.0	201	41.9	n/t	n/t	n/t



Results Summary

Report No.: 23-51261, issue number 1

ELAB Reference	346323	346324	346325
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	DS4	DS5	DS5
Sample Depth (m)	4.50	1.40	2.90
Sampling Date	23/11/2023	23/11/2023	23/11/2023

Determinand	Codes	Units	LOD			
Soil sample preparation parameters						
Moisture Content	N	%	0.1	6.0	15.4	13.8
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed	N		0	None	None	None
Metals						
Arsenic	M	mg/kg	0.5	n/t	n/t	n/t
Beryllium	M	mg/kg	0.5	n/t	< 0.5	n/t
Cadmium	M	mg/kg	0.2	n/t	n/t	n/t
Chromium	M	mg/kg	1	n/t	n/t	n/t
Copper	M	mg/kg	4	n/t	n/t	n/t
Lead	M	mg/kg	1	n/t	n/t	n/t
Mercury	M	mg/kg	0.1	n/t	n/t	n/t
Nickel	M	mg/kg	1	n/t	n/t	n/t
Selenium	M	mg/kg	1	n/t	n/t	n/t
Vanadium	M	mg/kg	0.5	n/t	13.8	n/t
Zinc	M	mg/kg	4.5	n/t	n/t	n/t
Anions						
Water Soluble Sulphate	M	mg/l	20	< 20	< 20	^ < 20
Water Soluble Sulphate	M	mg/kg	40	n/t	n/t	n/t
Inorganics						
Hexavalent Chromium	N	mg/kg	0.8	n/t	n/t	n/t
Total Sulphur	N	%	0.01	0.02	0.02	0.02
Acid Soluble Sulphate (SO4)	U	%	0.02	0.02	< 0.02	0.02
Water Soluble Boron	N	mg/kg	0.5	n/t	< 0.5	n/t



Results Summary

2683

Report No.: 23-51261, issue number 1

ELAB Reference	346323	346324	346325
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	DS4	DS5	DS5
Sample Depth (m)	4.50	1.40	2.90
Sampling Date	23/11/2023	23/11/2023	23/11/2023

Determinand	Codes	Units	LOD			
Miscellaneous						
pH	M	pH units	0.1	8.5	8.5	^ 8.6
Soil Organic Matter	U	%	0.1	n/t	n/t	n/t
Polyaromatic hydrocarbons						
Naphthalene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Acenaphthylene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Acenaphthene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Fluorene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Phenanthrene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Anthracene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Fluoranthene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Pyrene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Benzo(a)anthracene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Chrysene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Benzo(b)fluoranthene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Benzo(k)fluoranthene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Benzo(a)pyrene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Indeno(1,2,3-cd)pyrene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Dibenzo(a,h)anthracene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Benzo(g,h,i)perylene GCMS	N	mg/kg	0.01	n/t	n/t	n/t
Total PAH(16) GCMS	N	mg/kg	0.04	n/t	n/t	n/t



Results Summary

2683

Report No.: 23-51261, issue number 1

ELAB Reference	346323	346324	346325
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	DS4	DS5	DS5
Sample Depth (m)	4.50	1.40	2.90
Sampling Date	23/11/2023	23/11/2023	23/11/2023

Determinand	Codes	Units	LOD			
BTEX						
Benzene	M	ug/kg	10	n/t	n/t	n/t
Toluene	M	ug/kg	10	n/t	n/t	n/t
Ethylbenzene	M	ug/kg	10	n/t	n/t	n/t
Xylenes	M	ug/kg	10	n/t	n/t	n/t
MTBE	U	ug/kg	10	n/t	n/t	n/t
TPH CWG						
>C5-C6 Aliphatic (HS_1D_MS_AL)	N	mg/kg	0.01	n/t	n/t	n/t
>C6-C8 Aliphatic (HS_1D_MS_AL)	N	mg/kg	0.01	n/t	n/t	n/t
>C8-C10 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	n/t	n/t	n/t
>C10-C12 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	n/t	n/t	n/t
>C12-C16 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	n/t	n/t	n/t
>C16-C21 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	n/t	n/t	n/t
>C21-C35 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	n/t	n/t	n/t
>C35-C40 Aliphatic (EH_CU_1D_AL)	N	mg/kg	1	n/t	n/t	n/t
Total (>C5-C40) Aliphatic (HS_1D_MS+EH_CU_1D_AL)	N	mg/kg	1	n/t	n/t	n/t
>C5-C7 Aromatic (HS_1D_MS_AR)	N	mg/kg	0.01	n/t	n/t	n/t
>C7-C8 Aromatic (HS_1D_MS_AR)	N	mg/kg	0.01	n/t	n/t	n/t
>C8-C10 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	n/t	n/t	n/t
>C10-C12 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	n/t	n/t	n/t
>C12-C16 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	n/t	n/t	n/t
>C16-C21 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	n/t	n/t	n/t
>C21-C35 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	n/t	n/t	n/t
>C35-C40 Aromatic (EH_CU_1D_AR)	N	mg/kg	1	n/t	n/t	n/t
Total (>C5-C40) Aromatic (HS_1D_MS+EH_CU_1D_AR)	N	mg/kg	1	n/t	n/t	n/t
Total (>C5-C40) Ali/Aro (HS_1D_MS+EH_CU_1D_Total)	N	mg/kg	1	n/t	n/t	n/t



Results Summary

2683

Report No.: 23-51261, issue number 1

ELAB Reference				346316	346317	346318	346319	346324
Customer Reference								
Sample ID								
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				DS4	DS4	DS5	DS5	DS5
Sample Depth (m)				0.40	0.90	0.40	0.70	1.40
Sampling Date				23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023
Determinand	Codes	Units	LOD					
VOC								
Heptane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Octane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Nonane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Benzene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Toluene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Ethylbenzene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
m+p-xylene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
o-xylene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
cis-1,2-dichloroethene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,1-Dichloroethane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Chloroform	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Tetrachloromethane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,1,1-Trichloroethane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Trichloroethylene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Tetrachloroethylene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,1,1,2-Tetrachloroethane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1-1-2-2-Tetrachloroethane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Chlorobenzene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Bromobenzene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Bromodichloromethane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Methylethylbenzene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,1-Dichloro-1-propene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Trans - 1-2 -dichloroethylene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
2,2-Dichloropropane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Bromochloromethane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,2-Dichloroethane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Dibromomethane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,2-Dichloropropane	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
cis-1,3-Dichloro-1-propene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
trans-1,3-Dichloro-1-propene	M	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,1,2-Trichloroethane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Dibromochloromethane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,3-Dichloropropane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,2-dibromoethane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Styrene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Propylbenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
2-Chlorotoluene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,2,4-Trimethylbenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
4-Chlorotoluene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
t-butylbenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,3,5-Trimethylbenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1-methylpropylbenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
p-cymene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,3-Dichlorobenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Butylbenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,2-Dibromo-3-chloropropane	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Hexachlorobutadiene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1-2-3 - Trichlorobenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Naphthalene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1-2-4 - Trichlorobenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,4-Dichlorobenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
1,2-Dichlorobenzene	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
Bromoform	N	ug/kg	10	c < 10.0	c < 10.0	< 10.0	< 10.0	c < 10.0
VOC TIC								
Various	N	ug/kg	10	c None Detected	c None Detected	None Detected	None Detected	c None Detected



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Results Summary

Report No.: 23-51261, issue number 1

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
346316	0.40	DS4	Brown Soil, Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t
346317	0.90	DS4	Brown Soil, Stones	No asbestos detected	n/t	n/t	n/t	n/t
346318	0.40	DS5	Brown Soil, Stones, Clinker, Concrete	No asbestos detected	n/t	n/t	n/t	n/t
346319	0.70	DS5	Brown Soil, Stones, Clinker, Brick	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 23-51261, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
PAH (GC-MS)	N	As submitted sample	28/11/2023		GC-MS
VOC in solids	M	As submitted sample	04/12/2023		GC-MS
Hexavalent chromium	N	As submitted sample	28/11/2023	110	Colorimetry
pH	M	Air dried sample	30/11/2023	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	01/12/2023	115	Ion Chromatography
Water soluble anions	M	Air dried sample	28/11/2023	172	Ion Chromatography
Low range Aliphatic hydrocarbons soil	N	As submitted sample	04/12/2023	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	04/12/2023	181	GC-MS
VOC in solids	M	As submitted sample	04/12/2023	181	GC-MS
BTEX in solids	M	As submitted sample	04/12/2023	181A	GC-MS
Water soluble boron	N	Air dried sample	28/11/2023	202	Colorimetry
Aliphatic hydrocarbons in soil	N	As submitted sample	28/11/2023	214	GC-FID
Aliphatic/Aromatic hydrocarbons in soil	N	As submitted sample	04/12/2023	214	GC-FID
Aromatic hydrocarbons in soil	N	As submitted sample	01/12/2023	214	GC-FID
Total organic carbon/Total sulphur	N	Air dried sample	28/11/2023	216	IR
Asbestos identification	U	Air dried sample	01/12/2023	281	Microscopy
Aqua regia extractable metals	M	Air dried sample	28/11/2023	300	ICPMS
Soil organic matter	U	Air dried sample	01/12/2023	BS1377:P3	Titrimetry

Tests marked N are not UKAS accredited

Report Information

Report No.: 23-51261, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination. Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed. ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received. PCB congener results may include any coeluting PCBs Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

AG Geo-Consultants Ltd

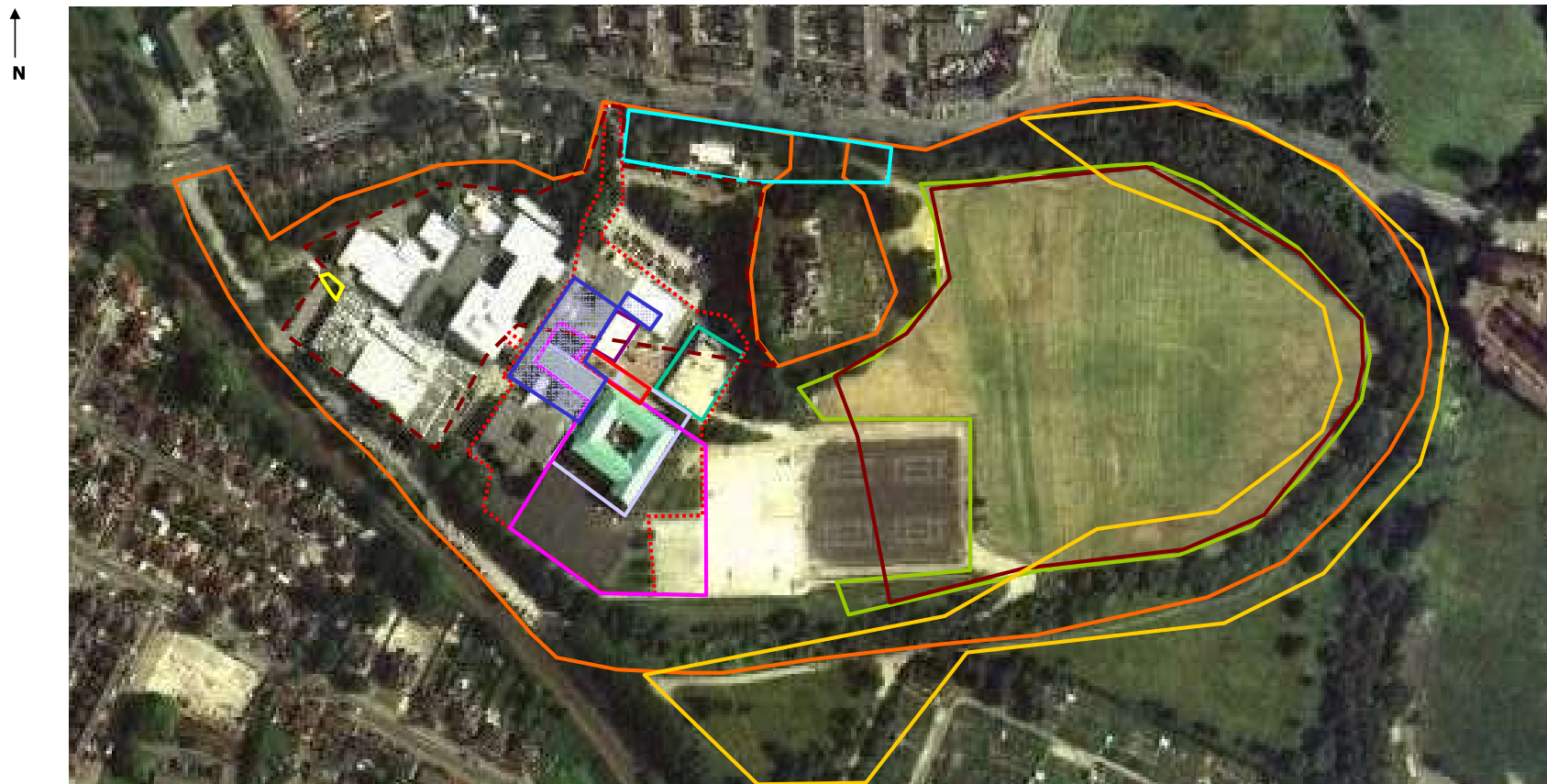
Appendix G

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Appendix H

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Appendix I



Proposed Red Line Boundary for Demolition and Redevelopment Proposed Building Locations

Previous Site Investigation Location Key:

Matthews & Mumby (Foundations) Ltd, May 1970	University of Sheffield, March 1997	AMEC, May 2000	Royle Environmental Services, Oct 2003
Matthews & Mumby (Foundations) Ltd, May 1970 (3 no. Boreholes)	Northern Foundations, Nov 1997	ARUP, Nov 2002 (1 no. Trial Pit)	CL Associates, Feb 2004
Greater Manchester Scientific Services, August 1984 (50m grid) & Exploration Associates, July 1987 (8 no. Boreholes)	REC, July 1998	WSP Environmental, Dec 2002 & May 2003	SKM, Oct 2007

Approximate Grid Ref: 384520, 401670, Approximate Site Area: 11.75 Ha

**Regatta House
Clippers Quay
Salford Quays
Manchester M50 3XP**

**Tel: 0161 872 3223
Fax: 0161 872 3192
E-mail enviro.manchester@wyg.com**

**Environmental Consultancy
Ground Technologies & Investigation**



Project : Abraham Moss School, Crumpsall, Manchester

Client: GB Building Solutions

Figure 3: Location of Previous Site Investigations

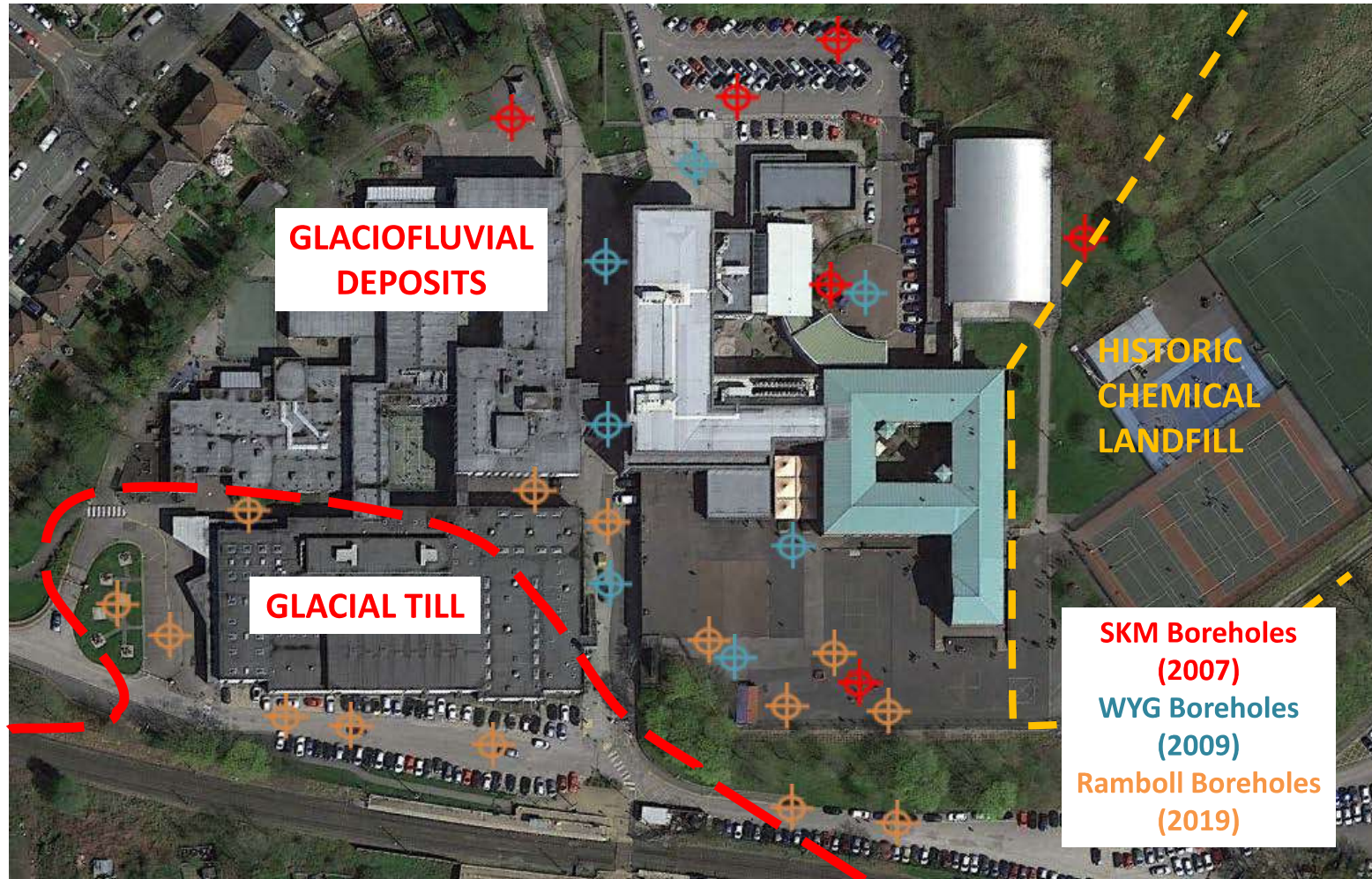
Project No.: A58242

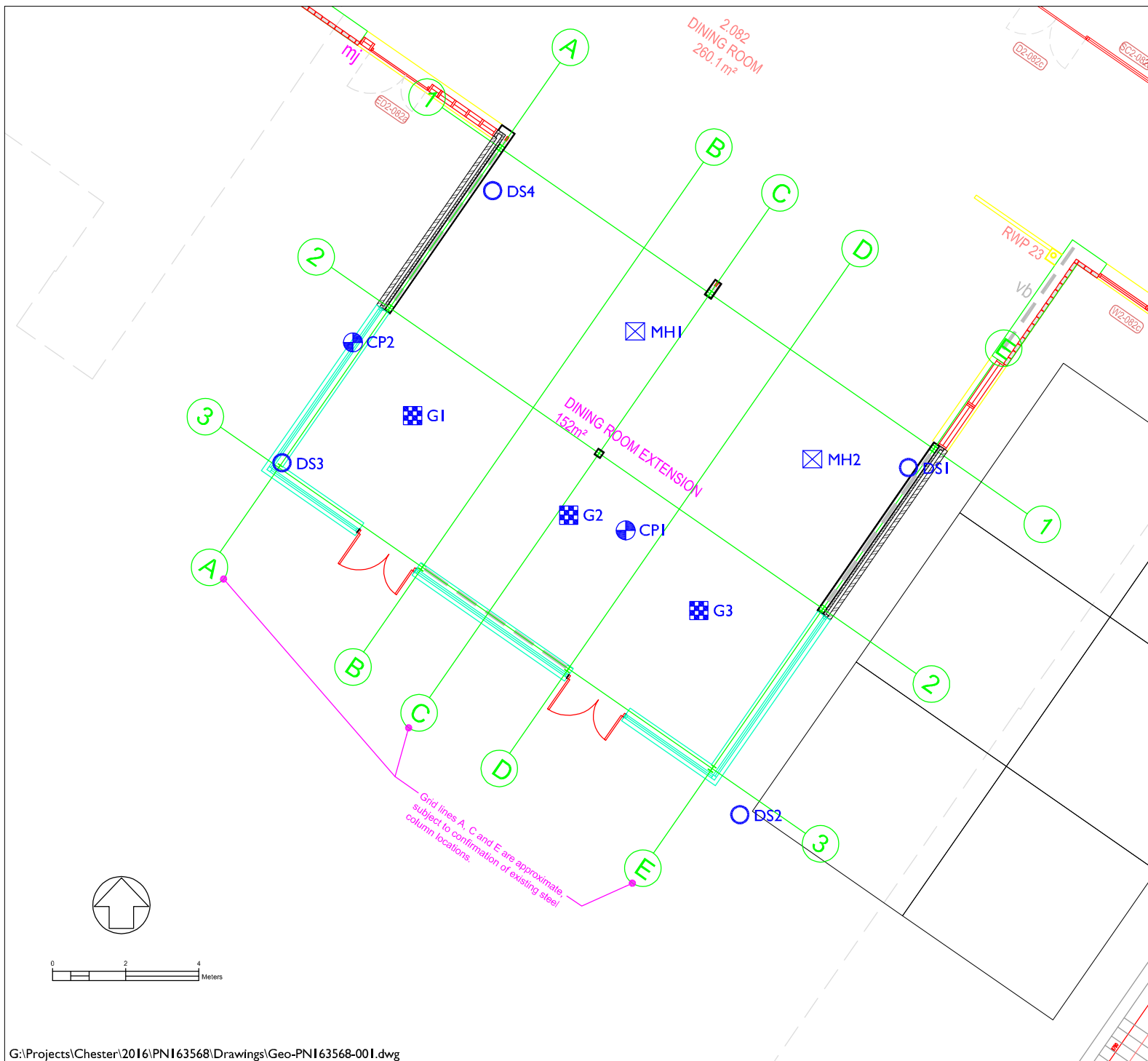
Date: Nov 2009

2019 Ground Investigation Data

ABRAHAM MOSS LIBRARY & LEISURE CENTRE

- Focussed around areas of proposed temporary and permanent facilities





Key

- ⊕ Cable Percussion Borehole
- Dynamic Sample Borehole
- ⊞ Drainage Gully
- ⊠ Manhole

Hole ID	Easting (mE)	Northing (mN)	Level (mOD)
CP1	384537.750	401631.900	68.810
CP2	384530.290	401637.040	68.800
DS1	384545.480	401633.620	68.760
DS2	384540.870	401624.130	68.870
DS3	384528.350	401633.750	68.810
DS4	384534.110	401641.190	68.760
G1	384531.920	401635.040	68.750
G2	384536.190	401632.320	68.780
G3	384539.750	401629.710	68.790
MH1	384538.010	401637.340	68.770
MH2	384542.850	401633.850	68.780

GEOTECHNICS

geotechnical and geoenvironmental specialists

The Geotechnical Centre,
Unit 1, Borders Industrial Park,
River Lane, Salfrey,
Chester
CH4 8RJ

Phone: 01244 671117
Fax: 01244 671122
Email: mail@geotechnics.co.uk
www.geotechnics.co.uk

Client:
F.Parkinson Ltd

Project:
Proposed Dining Room Extension at Abraham
Moss Community School, Crumpsall

Drawing Title:
Exploratory Hole Location Plan

Scale: 1:100@A3

Date:
December 2016

Project No:
PN163568

File Name:
Geo-PN163568-001(I)



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Notes

- DO NOT SCALE FROM THIS DRAWING.
- ALL DIMENSIONS ARE MILLIMETRES U.N.O.
- ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- THIS DRAWING HAS BEEN PRODUCED AS PART OF THE RAMBOLL GEOTECHNICAL GROUND INVESTIGATION REPORT
- THIS DRAWING USES TOPOGRAPHICAL SURVEY INFORMATION PRODUCED BY MALCOLM HUGHES DRAWINGS (REF: 52907/1 TO 52907/11)

PLAN LEGEND

- HISTORIC BOREHOLE LOCATION
- HISTORIC WINDOW SAMPLE BOREHOLE LOCATION
- CABLE PERCUSSION BOREHOLE
- WINDOW SAMPLE BOREHOLE

102	FOR INFORMATION	17/06/19	DH	BH
101	FOR INFORMATION	12/06/19	DH	BH
Rev	Description	Date	By	App

FOR INFORMATION

ABRAHAM MOSS LEISURE CENTRE

RAMBOLL

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EXPLORATORY HOLE LOCATION PLAN

Project No:	Scale (B41):	Drawn:	Date:
1620005164	1:250	DH	06/19
Drawing No:	RAM-XX-XX-DR-GE-0001		Rev:
			102

Project Id: 1620005164-001

Project Title: Abraham Moss Leisure Centre

Location: Manchester, M8 5UF

Client: LOR

Title: Site Plan

Scale: 1:1500

Engineer: Ramboll

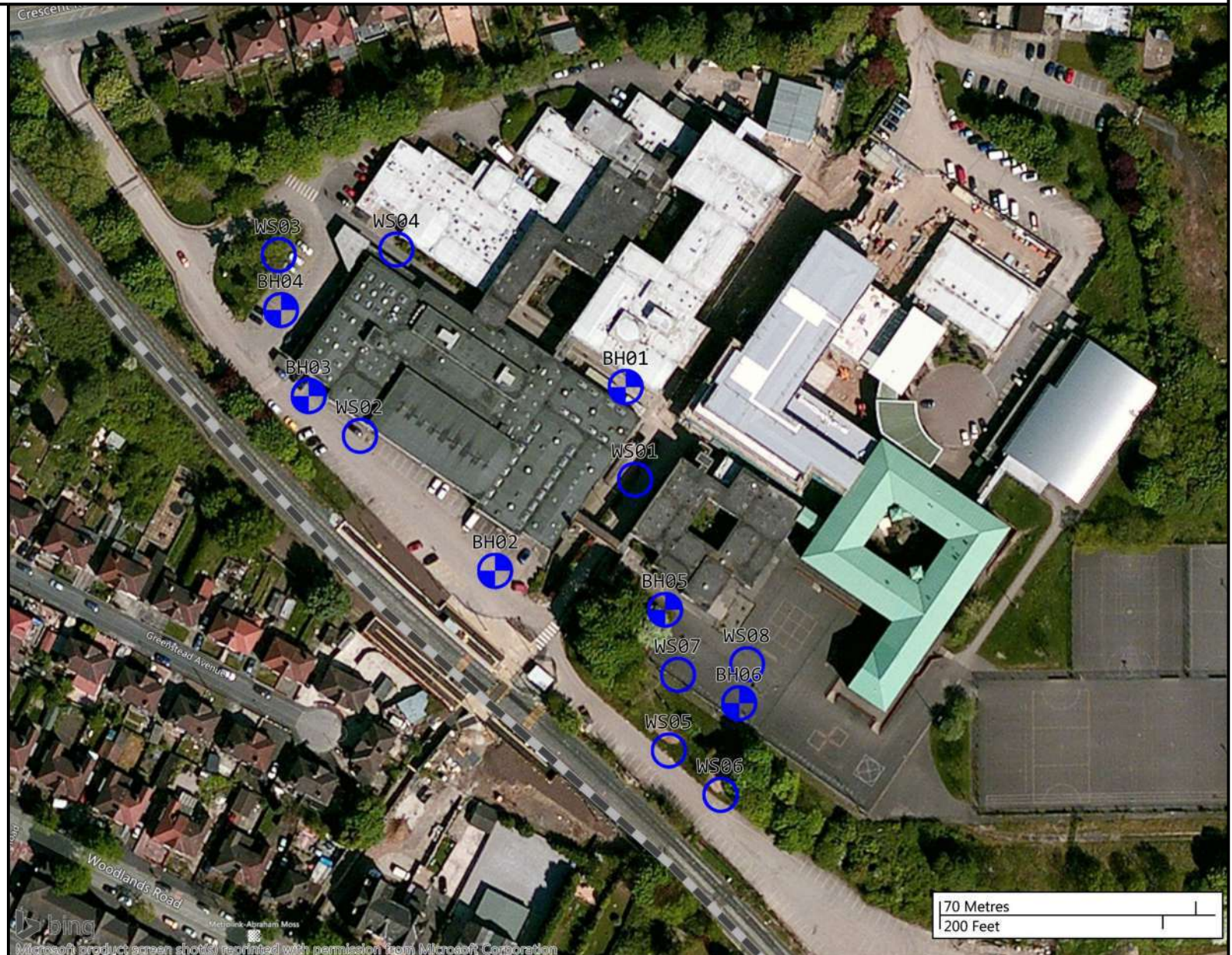
Contractor: RUK / Central Alliance

Drawing No: 1620001564E04 Abraham Moss Borehole Location Plan



Legend Key

-  Locations By Type - Cable Percussive
-  Locations By Type - Windowless Samper



Suggested area of potential contamination – notional clay bung of 600mm -3000mm in depth



Area of contamination encountered in 1998 extension